



Check valves offer optional bias springs and flow capacities up to 380 lpm (100 gpm). Pilot-operated check valves are available for flows up to 95 lpm (25 gpm).

Lock valves with thermal reliefs and sealed pistons are available for flows up to 30 lpm (8 gpm).

Load shuttle check valves offer flows up to 30 lpm (8 gpm).

Low biased (hot oil) shuttle valves are available for flows up to 132 lpm (35 gpm). Models are available with or without spring-centered spool.

Spool-type and poppet-type logic elements offer multiple function with a wide range of application potential, from controlling the rate of shift, to low pressure drop. Models are available for flows up to 280 lpm (74 gpm).

Pilot-operated spool-type directional control valves offer a wide variety of flow path configurations. A simple two-position two-way valve to a three-position four-way valve can be activated by a remote pilot signal. Models are available for flows up to 265 lpm (70 gpm). PE series valves offer proportional control when the pilot signal pressure is controlled. Operating pressure can be up to 240 bar (3500 psi)

Manual spring-return directional valves feature poppet or spool construction with optional rotational lock position. Models are available for flows up to 57 lpm (15 gpm).

Manual rotary directional valves with multiple spool options feature low manual effort under high pressure loads.

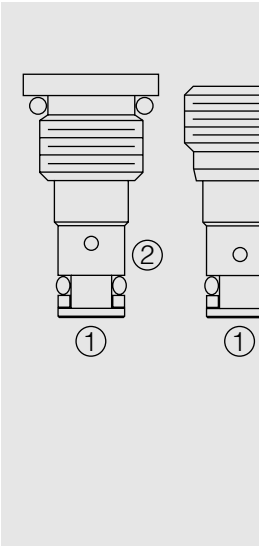
Spring-applied brake release valves are available in two versions.

Hall-effect spool position sensors are available on PD series valves.

- Check valves for blocking or load holding.
- Pilot operated valves for remote actuation.
- Logic elements for multi-function applications.
- Manual spring-return or pressure actuated models.
- Pilot-operated valves for control of spool shift rate.
- Proportional directional control valves offer excellent metering characteristics.
- Operating pressures to 240 bar (3500 psi).
- Hardened precision poppets, spools and cages for long life and low leakage.
- Industry common cavities—compact sizes.
- Can be used to create innovative circuitry options.
- Manual rotary valve handles, knob kits available in friction lock or detent.

DIRECTIONAL VALVES

CV04-20 & CV04-B20 Check Valves



DESCRIPTION

A screw-in, cartridge-style, hydraulic check valve for use as a blocking or load-holding device. Available in conventional surface mount or convenient “down-hole” versions.

OPERATION

The CV04-20 and CV04-B20 allow flow passage from ① to ②, while normally blocking oil flow in the opposite direction.

The cartridge has a fully guided check which is spring-biased closed until sufficient pressure is applied at ① to open to ②.

FEATURES

- Hardened seat for long life and low leakage.
- Optional bias springs for back-pressure application flexibility.
- Fully guided check assembly.
- Miniature size.
- Fast closing and seating.

RATINGS

Operating Pressure: 241.3 bar (3500 psi)

Flow: See Performance Chart

Internal Leakage: 0.10 cc/minute (2 drops/minute) max. at 206.8 bar (3000 psi)

Crack Pressure Defined: Gauge psi evident at ① at 16.4 cc/minute (1 cu. in./minute) attained

Standard Bias Springs at Crack: 0.34 bar (5 psi)

Temperature: -40 to 120°C

Filtration: Recommend 25μ nominal or better; See page 9.010.1

Fluids: Mineral-based or synthetics with lubricating properties at viscosities of 7.4 to 420 cSt (50 to 2000 ssu)

Installation: No restrictions

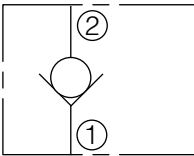
Cavity: VC04-2 or VC04-B2; See page 9.104.1

Cavity Tool: CT04-2xx or CT04-B2x

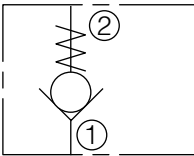
Seal Kit: For CV04-20: SK04-2X-T; For CV04-B20: SK04-B2X-T

SYMBOLS

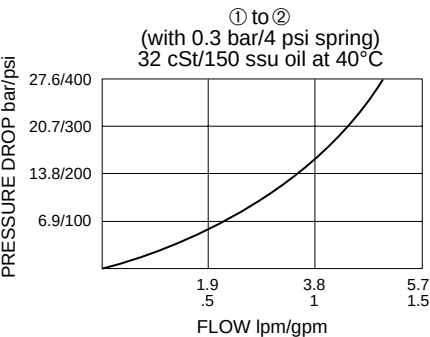
USASI:



ISO:

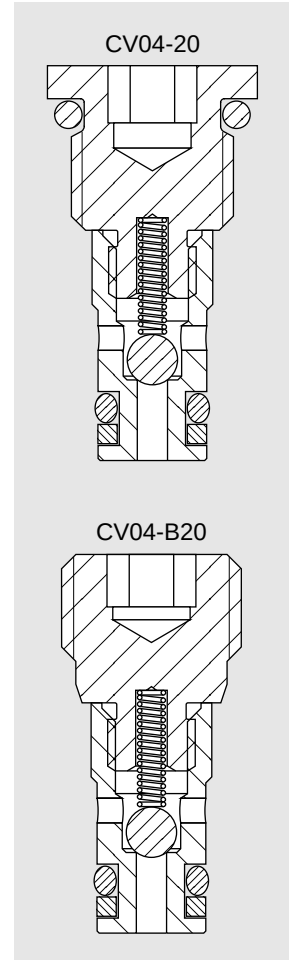
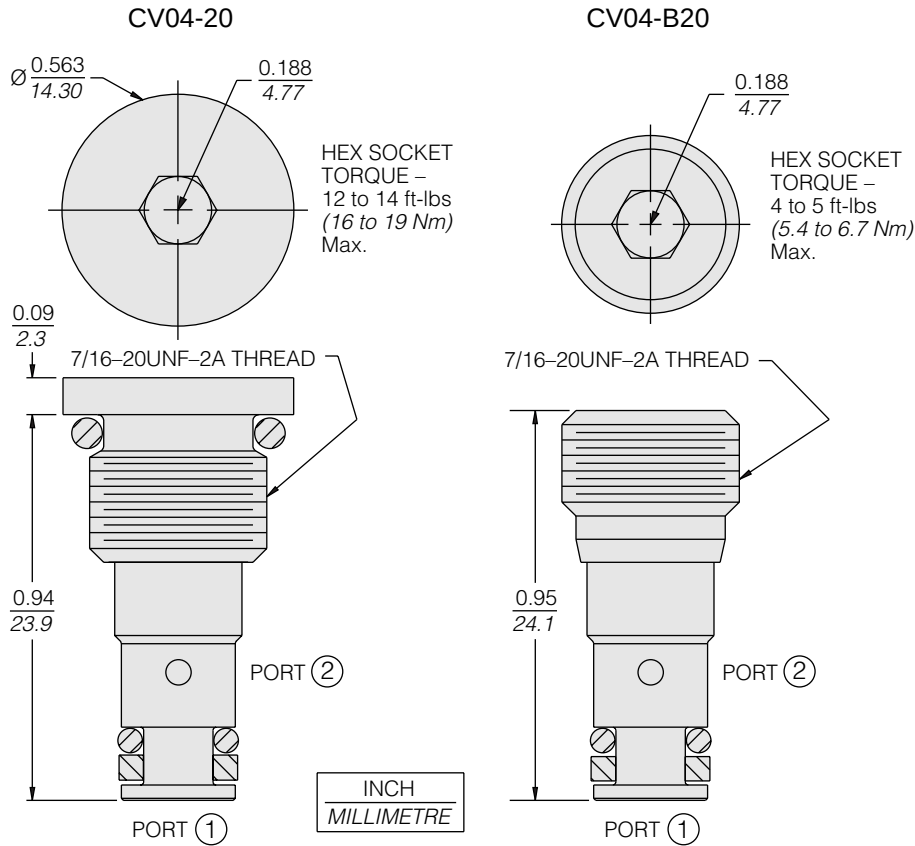


PERFORMANCE (Cartridge Only)



CV04-20 & CV04-B20

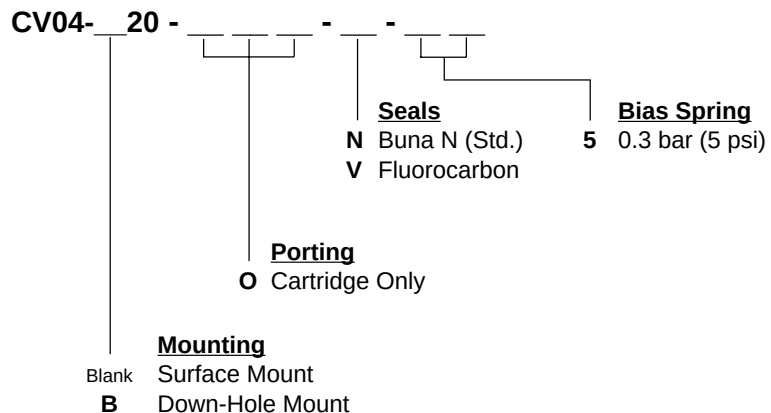
DIMENSIONS



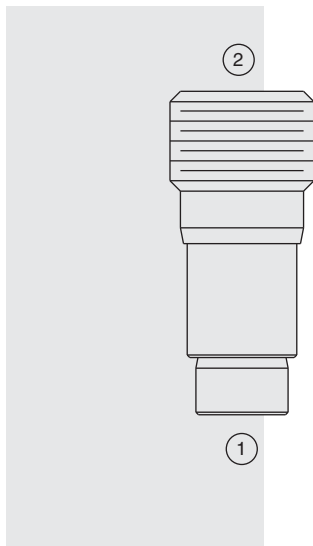
MATERIALS

Cartridge: Weight: 0.05 kg. (0.12 lbs.);
Steel with hardened work surfaces;
Zinc-plated exposed surfaces; Buna
N O-rings and back-up standard.

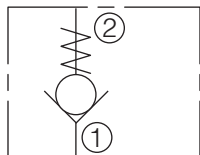
TO ORDER



CV06-B20 Check Valve



SYMBOL



DESCRIPTION

A screw-in, cartridge-style, hydraulic check valve for blocking or load-holding.

OPERATION

The **CV06-B20** allows flow from ① to ②, while normally blocking flow in the opposite direction. The cartridge is spring-biased closed until sufficient pressure is applied at ① to open to ②.

FEATURES

- Hardened seat for long life and low leakage.
- Fully guided check assembly.
- Small size.
- Fast closing and seating.

RATINGS

Operating Pressure: 345 bar (5000 psi)

Proof Pressure: 690 bar (10,000 psi)

Burst Pressure: greater than 828 bar (12,000 psi)

Flow: up to 7.6 lpm (2 gpm)

Internal Leakage: 0.10 cc/minute (2 drops/minute) max. at 34.5 bar (500 psi) and 345 bar (5000 psi) from port 1, port 2, inlet

Operating Temperature: -54°C to 107°C (-65°F to 225°F)

Filtration: Recommend 25μ nominal or better; See page 9.010.1

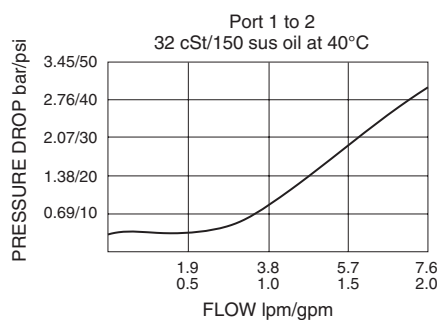
Fluids: Mineral-based or synthetics with lubricating properties at viscosities of 7.4 to 420 cSt (50 to 2000 sus); See Temperature and Oil Viscosity, page 9.060.1

Installation: No restrictions

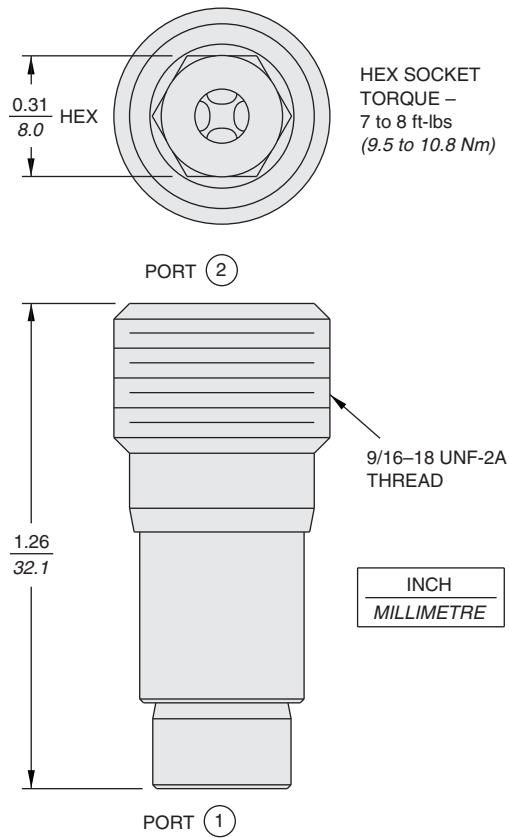
Cavity: VC06-B2; See page 9.106.1

Cavity Tool: CT06-B2xx; See page 8.600.1

PERFORMANCE (Cartridge Only)



DIMENSIONS



MATERIALS

Cartridge: Weight: 0.023 kg. (0.05 lbs.)
Steel with hardened work surfaces.
Zinc-plated exposed surfaces.

TO ORDER

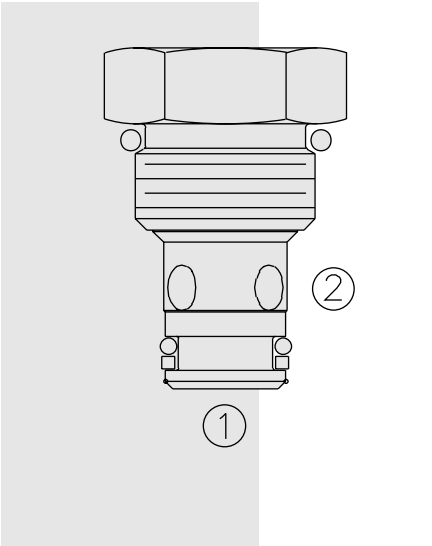
CV06-B20 - -

Bias Spring
5 0.34 bar (5 psi)

Porting
0 Cartridge Only

DIRECTIONAL VALVES

CV08-20 Check Valve



DESCRIPTION

A screw-in, cartridge-style, hydraulic check valve for use as a blocking or load-holding device.

OPERATION

The CV08-20 allows flow passage from ① to ②, while normally blocking oil flow in the opposite direction.

The cartridge has a fully guided check which is spring-biased closed until sufficient pressure is applied at ① to open to ②.

FEATURES

- Hardened seat for long life and low leakage.
- Optional bias springs for back-pressure application flexibility.
- Fully guided check assembly.
- Compact size.
- Fast closing and seating.

RATINGS

Operating Pressure: 240 bar (3500 psi)

Proof Pressure: 350 bar (5075 psi)

Flow: See Performance Chart

Internal Leakage: 0.10 cc/minute (2 drops/minute) max. at 240 bar (3500 psi)

Crack Pressure Defined: Gauge psi evident at ① at 16.4 cc/minute (1 cu. in./minute) attained

Standard Bias Springs at Crack: 0.3 bar (4 psi); 0.7 bar (10 psi); 1.7 bar (25 psi); 4.1 bar (60 psi)

Temperature: -40 to 120°C

Filtration: See page 9.010.1

Fluids: Mineral-based or synthetics with lubricating properties at viscosities of 7.4 to 420 cSt (50 to 2000 ssu)

Installation: No restrictions; See page 9.020.1

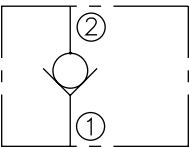
Cavity: VC08-2; See page 9.108.1

Cavity Tool: CT08-2XX; See page 8.600.1

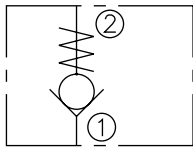
Seal Kit: SK08-2X-T; See page 8.650.1

SYMBOLS

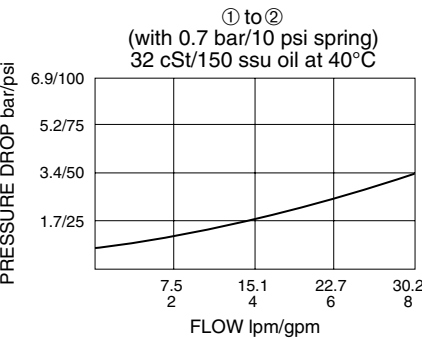
USASI:



ISO:

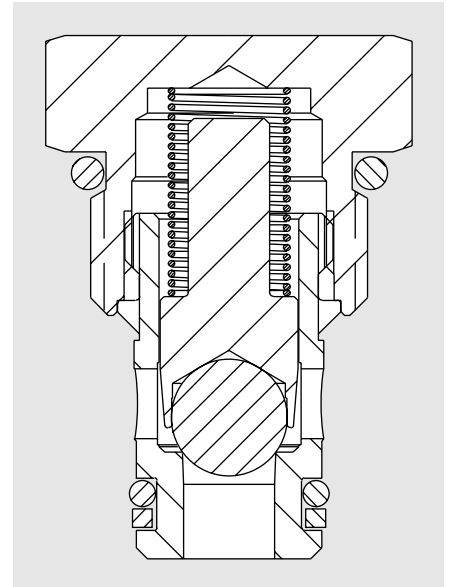
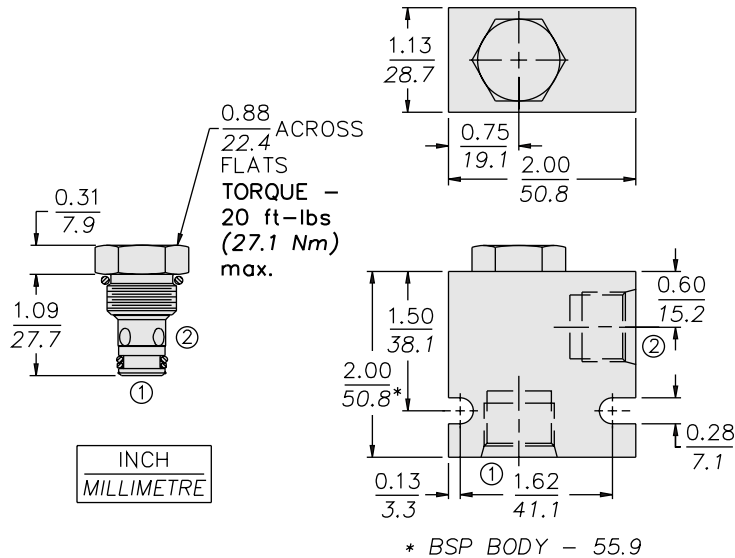


PERFORMANCE (Cartridge Only)



CV08-20

DIMENSIONS



MATERIALS

Cartridge: Weight: 0.05 kg. (0.12 lbs.); Steel with hardened work surfaces; Zinc-plated exposed surfaces; Buna N O-rings and back-up standard.

Standard Ported Body: Weight: 0.16 kg. (0.35 lbs.); Anodized high-strength 6061 T6 aluminum alloy, rated to 240 bar (3500 psi); See page 8.008.1. Ductile iron and steel bodies available; dimensions may differ; consult factory.

TO ORDER

CV08-20 -

Porting
Cartridge Only **0**
SAE 4 **4T**
SAE 6 **6T**
SAE 8 **8T**
1/4 in. BSP* **2B**
3/8 in. BSP* **3B**
1/2 in. BSP* **4B**

*BSP Body;
U.K. Mfr. Only

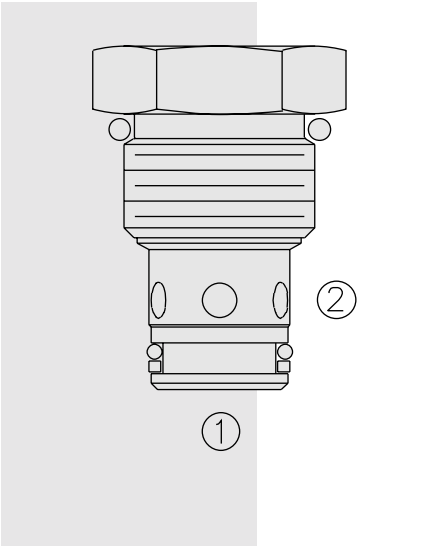
Bias Spring
4 0.3 bar (4 psi)
10 0.7 bar (10 psi)
25 1.7 bar (25 psi)
60 4.1 bar (60 psi)
100 6.9 bar (100 psi)
150 10.3 bar (150 psi)
200 13.8 bar (200 psi)
270 18.3 bar (270 psi)

Seals

N Buna N (Std.)
V Fluorocarbon

DIRECTIONAL VALVES

CV10-20 Check Valve



DESCRIPTION

A screw-in, cartridge-style, hydraulic check valve for use as a blocking or load-holding device.

OPERATION

The CV10-20 allows flow passage from ① to ②, while normally blocking oil flow in the opposite direction.

The cartridge has a fully guided check which is spring-biased closed until sufficient pressure is applied at ① to open to ②.

FEATURES

- Hardened seat for long life and low leakage.
- Optional bias springs for back-pressure application flexibility.
- Fully guided check assembly.
- Industry common cavity.

RATINGS

Operating Pressure: 240 bar (3500 psi)

Proof Pressure: 350 bar (5075 psi)

Flow: See Performance Chart

Internal Leakage: 0.10 cc/minute (2 drops/minute) max. at 240 bar (3500 psi)

Crack Pressure Defined: Gauge psi evident at ① at 16.4 cc/minute (1 cu. in./minute) attained

Standard Bias Springs at Crack: 0.34 bar (5 psi); 1 bar (15 psi); 2.1 bar (30 psi); 4.8 bar (70 psi); 6.9 bar (100 psi)

Temperature: -40 to 120°C

Filtration: See page 9.010.1

Fluids: Mineral-based or synthetics with lubricating properties at viscosities of 7.4 to 420 cSt (50 to 2000 ssu)

Installation: No restrictions; See page 9.020.1

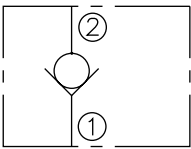
Cavity: VC10-2; See page 9.110.1

Cavity Tool: CT10-2XX; See page 8.600.1

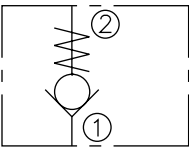
Seal Kit: SK10-2X-T; See page 8.650.1

SYMBOLS

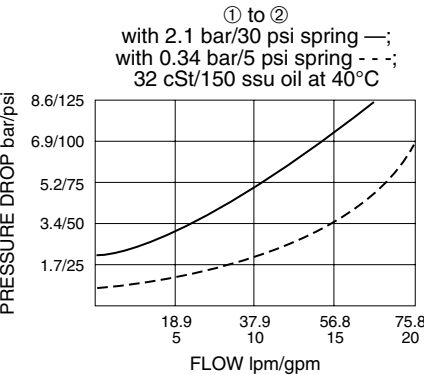
USASI:



ISO:

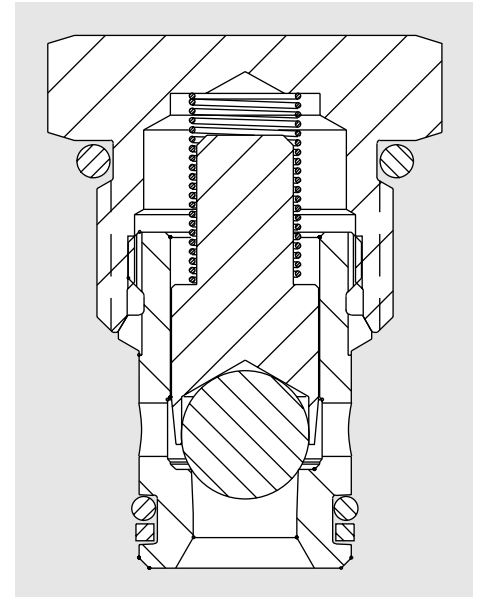
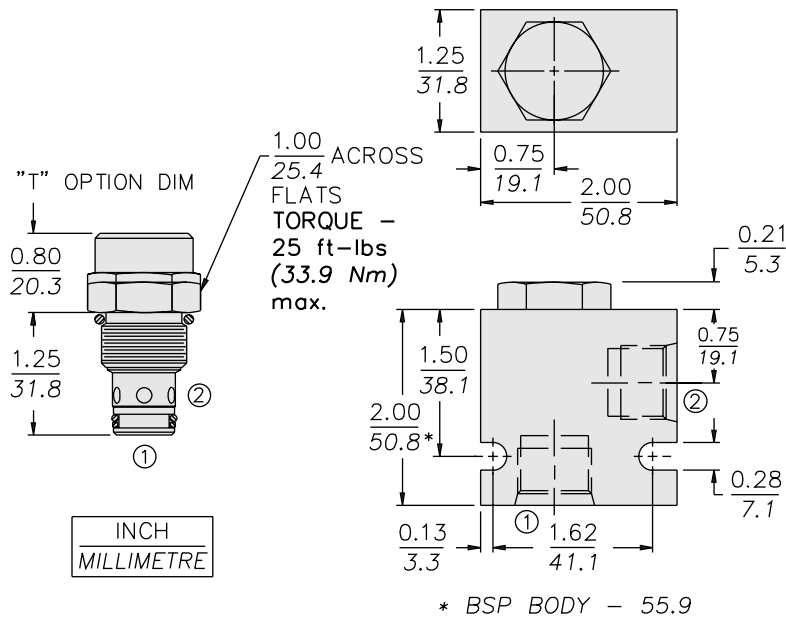


PERFORMANCE (Cartridge Only)



CV10-20

DIMENSIONS



MATERIALS

Cartridge: Weight: 0.08 kg. (0.17 lbs.); Steel with hardened work surfaces; Zinc-plated exposed surfaces; Buna N O-rings and polyester elastomer back-ups standard.

Standard Ported Body: Weight: 0.16 kg. (0.35 lbs.); Anodized high-strength 6061 T6 aluminum alloy, rated to 240 bar (3500 psi); See page 8.010.1. Ductile iron and steel bodies available; dimensions may differ; consult factory.

TO ORDER

CV10-20 - - - -

"T" Option* T

*Required for 300 psi Spring

Porting

Cartridge Only 0
SAE 6 6T
SAE 8 8T
1/4 in. BSP* 2B
3/8 in. BSP* 3B
1/2 in. BSP* 4B

*BSP Body;
U.K. Mfr. Only

Bias Spring

5 0.34 bar (5 psi)
15 1 bar (15 psi)
30 2.1 bar (30 psi)
40 2.8 bar (40 psi)
70 4.8 bar (70 psi)
100 6.9 bar (100 psi)
200 13.6 bar (200 psi)
300 20.4 bar (300 psi)*

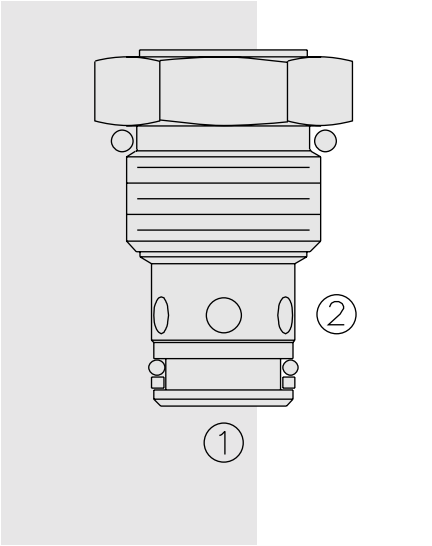
*Requires "T" Option

Seals

N Buna N (Std.)
V Fluorocarbon

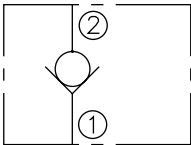
DIRECTIONAL VALVES

CV50-20 Check Valve, High Pressure

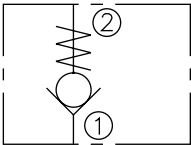


SYMBOLS

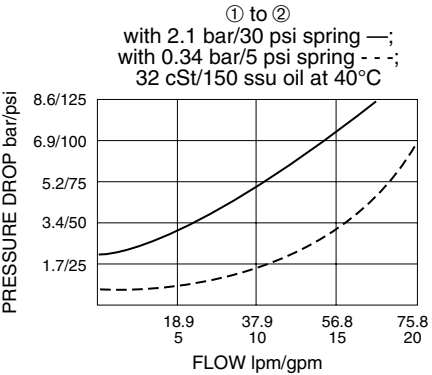
USASI:



ISO:



PERFORMANCE (Cartridge Only)



DESCRIPTION

A screw-in, cartridge-style, hydraulic check valve for use as a blocking or load-holding device for high pressure applications.

OPERATION

The CV50-20 allows flow passage from ① to ②, while normally blocking oil flow in the opposite direction.

The cartridge has a fully guided check which is spring-biased closed until sufficient pressure is applied at ① to open to ②.

FEATURES

- Hardened seat for long life and low leakage.
- Optional bias springs for back-pressure application flexibility.
- Fully guided check assembly.
- Industry common cavity.

RATINGS

Operating Pressure: 345 bar (5000 psi)

Flow: See Performance Chart

Internal Leakage: 0.10 cc/minute (2 drops/minute) max. at 345 bar (5000 psi)

Crack Pressure Defined: Gauge psi evident at ① at 16.4 cc/minute (1 cu. in./minute) attained

Standard Bias Springs at Crack: 0.34 bar (5 psi); 1 bar (15 psi); 2.1 bar (30 psi); 4.8 bar (70 psi)

Temperature: -40 to 120°C

Filtration: See page 9.010.1

Fluids: Mineral-based or synthetics with lubricating properties at viscosities of 7.4 to 420 cSt (50 to 2000 ssu)

Installation: No restrictions; See page 9.020.1

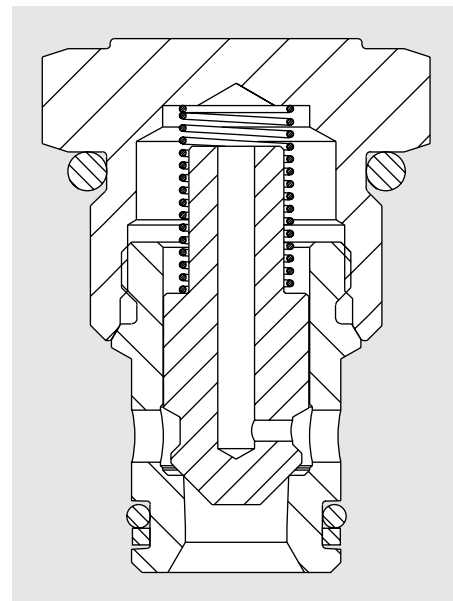
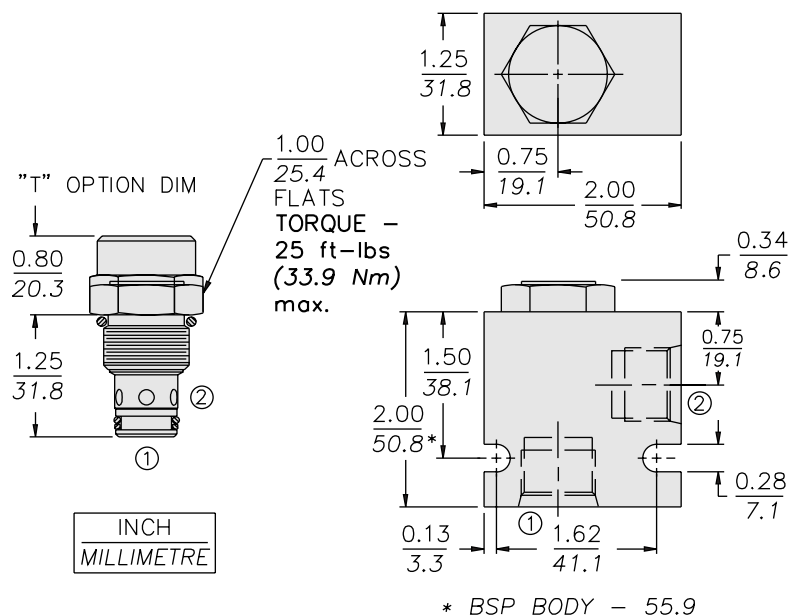
Cavity: VC10-2; See page 9.110.1

Cavity Tool: CT10-2XX; See page 8.600.1

Seal Kit: SK10-2P-T; See page 8.650.1

CV50-20

DIMENSIONS



MATERIALS

Cartridge: Weight: 0.08 kg. (0.17 lbs.); Steel with hardened work surfaces; Zinc-plated exposed surfaces; Polyurethane O-rings and Fluorocarbon back-ups standard.

Ported Body: Weight: 0.43 kg. (0.95 lbs.); Steel, zinc-plated (code "S"); or **Ductile Iron (code "D") standard**, consult factory for weight, dimensions may differ; rated to 345 bar (5000 psi); See page 8.010.1.

TO ORDER

CV50-20 -

"T" Option*

*Required for 300 psi Spring

T

Porting

Cartridge Only **0**
SAE 6 **6TD**
SAE 6 **6TS**
SAE 8 **8TD**
SAE 8 **8TS**
1/4 in. BSP* **2BD**
1/4 in. BSP* **2BS**
3/8 in. BSP* **3BD**
3/8 in. BSP* **3BS**

*BSP Body;
U.K. Mfr. Only

Bias Spring

5 0.34 bar (5 psi)
15 1 bar (15 psi)
30 2.1 bar (30 psi)
70 4.8 bar (70 psi)
100 6.9 bar (100 psi)
300 20.4 bar (300 psi)*

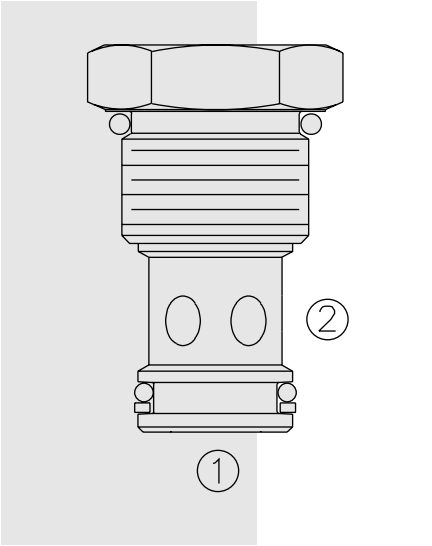
*Requires "T" Option

Seals

P Polyurethane
(Std.)

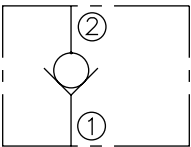
DIRECTIONAL VALVES

CV12-20 Check Valve

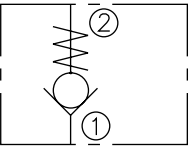


SYMBOLS

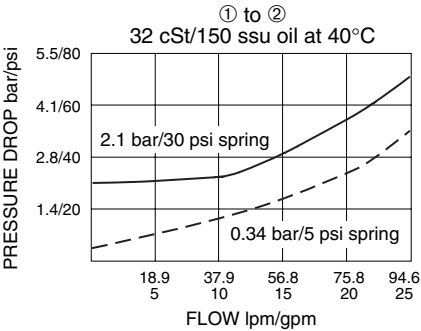
USASI:



ISO:



PERFORMANCE (Cartridge Only)



DESCRIPTION

A screw-in, cartridge-style, hydraulic check valve for use as a blocking or load-holding device.

OPERATION

The CV12-20 allows flow passage from ① to ②, while normally blocking oil flow in the opposite direction.

The cartridge has a fully guided check which is spring-biased closed until sufficient pressure is applied at ① to open to ②.

FEATURES

- Hardened seat for long life and low leakage.
- Optional bias springs for back-pressure application flexibility.
- Fully guided check assembly.
- Cost effective cavity.

RATINGS

Operating Pressure: 240 bar (3500 psi)

Proof Pressure: 420 bar (6090 psi)

Flow: See Performance Chart

Internal Leakage: 0.25 cc/minute (5 drops/minute) max. at 240 bar (3500 psi)

Crack Pressure Defined: Gauge bar (psi) evident at ① at 16.4 cc/minute (1 cu. in./minute) attained

Standard Bias Springs at Crack: 0.34 bar (5 psi); 1.7 bar (25 psi); 4.1 bar (60 psi)

Temperature: -40 to 120°C

Filtration: See page 9.010.1

Fluids: Mineral-based or synthetics with lubricating properties at viscosities of 7.4 to 420 cSt (50 to 2000 ssu)

Installation: No restrictions; See page 9.020.1

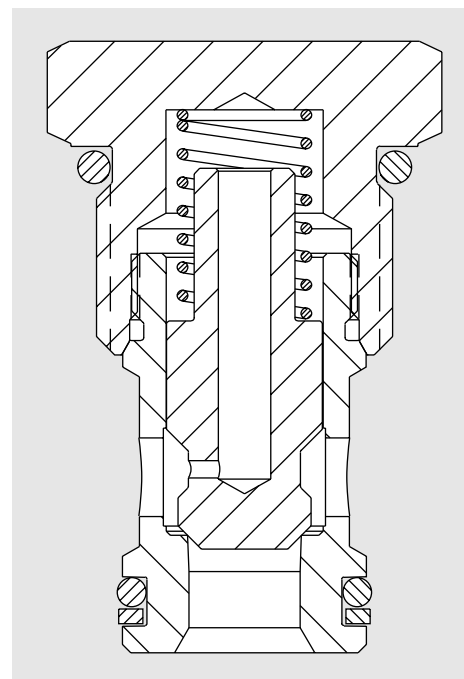
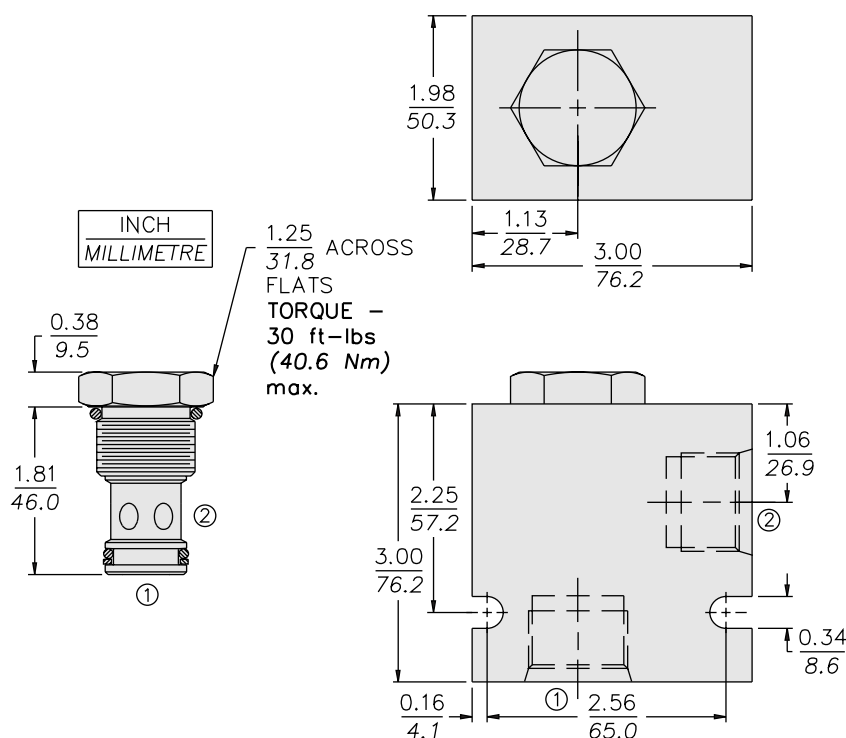
Cavity: VC12-2; See page 9.112.1

Cavity Tool: CT12-2XX; See page 8.600.1

Seal Kit: SK12-2X-T; See page 8.650.1

CV12-20

DIMENSIONS



MATERIALS

Cartridge: Weight: 0.18 kg. (0.40 lbs.);
Steel with hardened work surfaces.
Zinc-plated exposed surfaces. Buna
N O-rings and polyester elastomer
back-ups standard.

Standard Ported Body: Weight:
0.57 kg. (1.25 lbs.); Anodized high-
strength 6061 T6 aluminum alloy,
rated to 240 bar (3500 psi); See
page 8.012.1. Ductile iron and steel
bodies available; dimensions may
differ; consult factory.

TO ORDER

CV12-20 -		
Porting		Bias Spring*
Cartridge Only	0	5 0.34 bar (5 psi)
SAE 10	10T	25 1.7 bar (25 psi)
SAE 12	12T	30 2.1 bar (30 psi)
SAE 16	16T	60 4.1 bar (60 psi)

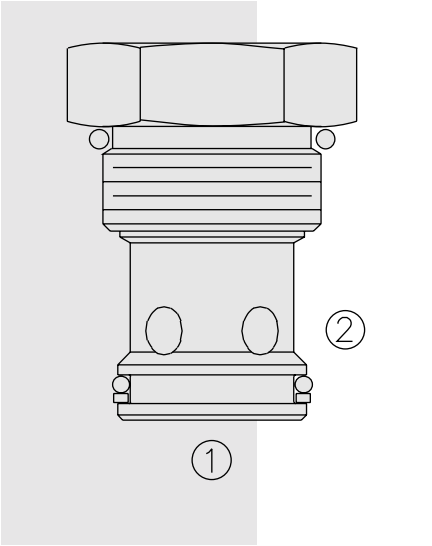
*Additional springs in development;
Consult factory.

Seals

N Buna N (Std.)
V Fluorocarbon

DIRECTIONAL VALVES

CV16-20 Check Valve



DESCRIPTION

A screw-in, cartridge-style, hydraulic check valve for use as a blocking or load-holding device.

OPERATION

The CV16-20 allows flow from ① to ②, while blocking oil flow in the opposite direction. The cartridge has a fully guided poppet which is spring-biased to closed until sufficient pressure is applied at ① to open to ②.

FEATURES

- Hardened seat for long life and low leakage.
- Optional bias springs for back-pressure application flexibility.
- Industry common cavity.

RATINGS

Operating Pressure: 240 bar (3500 psi)

Proof Pressure: 350 bar (5075 psi)

Flow: See Performance Chart

Internal Leakage: 0.25 cc/minute (5 drops/minute) max. at 240 bar (3500 psi)

Crack Pressure Defined: Gauge pressure evident at ① at 0.95 lpm (0.25 gpm) attained

Standard Bias Springs at Crack: 0.35 bar (5 psi); 1.7 bar (25 psi); 4.1 bar (60 psi)

Temperature: -40 to 120°C

Filtration: See page 9.010.1

Fluids: Mineral-based or synthetics with lubricating properties at viscosities of 7.4 to 420 cSt (50 to 2000 ssu)

Installation: No restrictions; See page 9.020.1

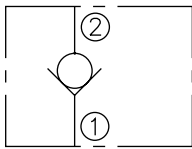
Cavity: VC16-2; See page 9.116.1

Cavity Tool: CT16-2XX; See page 8.600.1

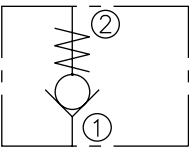
Seal Kit: SK16-2X-T; See page 8.650.1

SYMBOLS

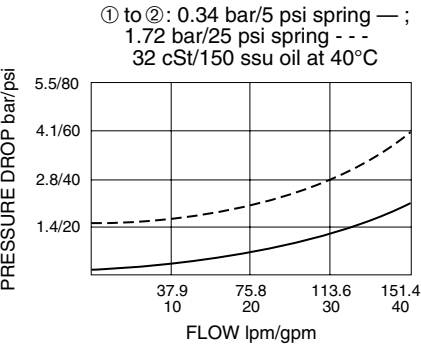
USASI:



ISO:

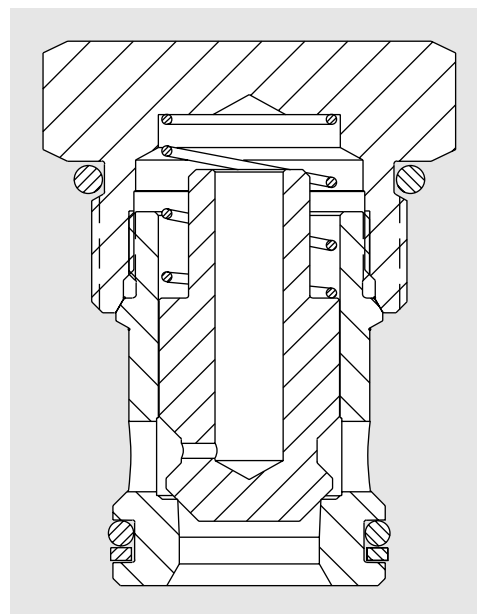
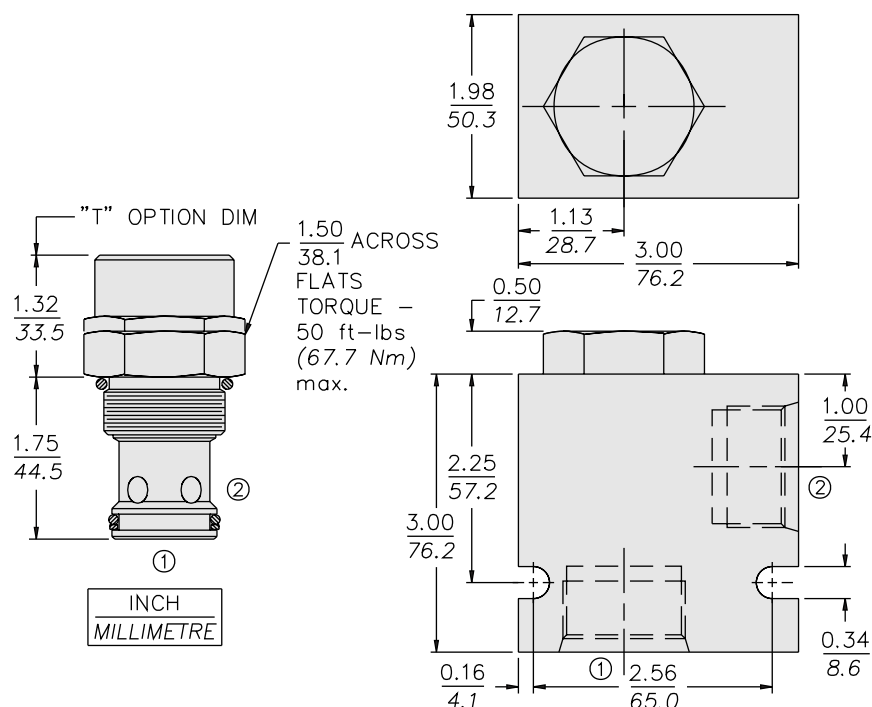


PERFORMANCE (Cartridge Only)



CV16-20

DIMENSIONS



MATERIALS

Cartridge: Weight: 0.29 kg. (0.63 lbs.); Steel with hardened work surfaces; Zinc-plated exposed surfaces; Buna N O-rings and polyester elastomer back-ups standard.

Standard Ported Body: Weight: 0.57 kg. (1.25 lbs.); Anodized high-strength 6061 T6 aluminum alloy, rated to 240 bar (3500 psi). See page 8.016.1. Ductile iron and steel bodies available; dimensions may differ; consult factory.

TO ORDER

CV16-20 -

"T" Option*

*Required for 100 psi Spring

T

Porting

Cartridge Only **0**
SAE 12 **12T**
SAE 16 **16T**
3/4 in. BSP* **6B**
1 in. BSP* **8B**

*BSP Body;
U.K. Mfr. Only

Bias Spring (Crack)

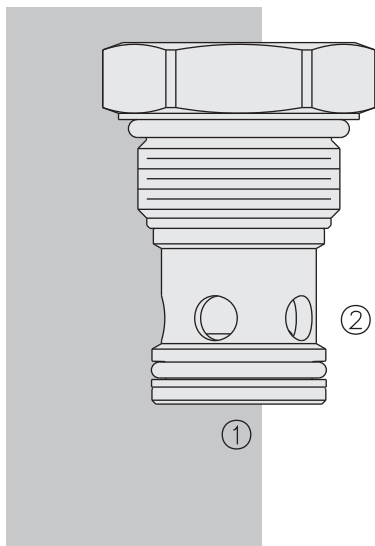
5 0.35 bar (5 psi)
25 1.7 bar (25 psi)
60 4.1 bar (60 psi)
100 6.9 bar (100 psi)*

*Requires "T" Option

Seals

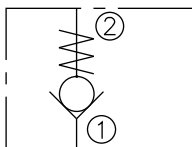
N Buna N (Std.)
V Fluorocarbon

HCV16-20 HyPerformance™ Check Valve

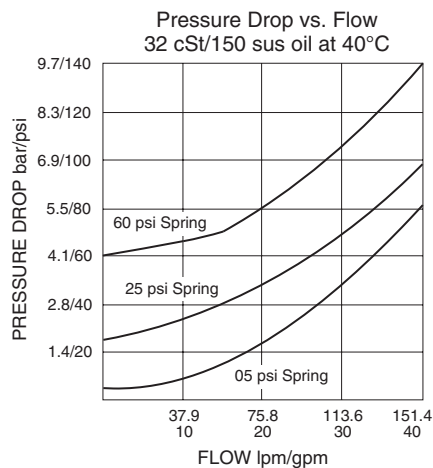


SYMBOLS

USAS/ISO:



PERFORMANCE (Cartridge Only)



DESCRIPTION

A screw-in, cartridge-style, hydraulic check valve for use as a blocking or load-holding device in high pressure applications.

OPERATION

The **HCV16-20** allows flow from 1 to 2, while normally blocking flow in the opposite direction.

The cartridge has a fully guided poppet which is spring-biased to closed until sufficient pressure is applied at 1 to open to 2.

FEATURES

- Hardened seat for long life and low leakage.
- Optional bias springs for back-pressure application flexibility.
- All HyPerformance products are tested to the rigorous standards of the NFPA specification T2.6.1.
- All HyPerformance valves are tested at a verification level of 90% and an assurance of 99%.

RATINGS

Operating Pressure: 350 bar (5075 psi); 10% cycle life: 420 bar (6090 psi)

Note: All HyPerformance products are tested for 900K cycles at 350 bar and 100K at 420 bar.

Fatigue Rating: 2 million cycles at 420 bar

Burst Pressure: 1380 bar (20000 psi)

Flow: Up to 151 lpm (40 gpm)

Max. Internal Leakage: 0.25 cc/minute (5 drops/minute) at 350 bar (5075 psi)

Operating Temperature: -54 to 107°C (-65 to 225°F) with Urethane seals

Filtration: See page 9.010.1

Fluids: Mineral-based or synthetics with lubricating properties at viscosities of 7.4 to 420 cSt (50 to 2000 sus); See Temperature and Oil Viscosity, page 9.060.1

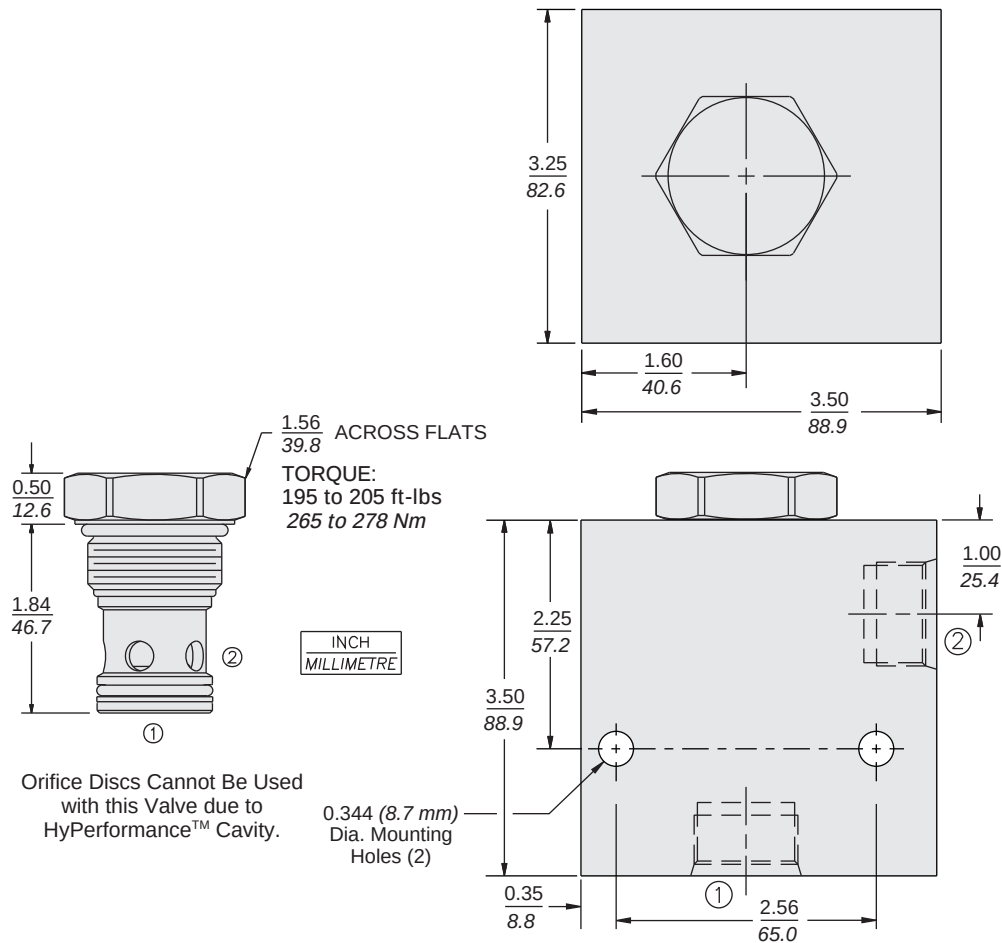
Installation: No restrictions; See page 9.020.1

Cavity: HVC16-2; See page 9.116.1

Cavity Tool: HCT16-2XX; See page 8.600.1

Seal Kit: SK16-2X-X; See page 8.650.1

DIMENSIONS



MATERIALS

Cartridge: Weight: 0.32 kg. (0.70 lbs.)
Steel with hardened work surfaces.
Zinc-nickel plated exposed surfaces.
PPDI Urethane seals and no back-up rings standard.

Ported Body: Weight: 3.97 kg.
(8.75 lbs.); HyPerformance™
Ductile iron (code 'D') standard.
Rated to 345 bar (5000 psi).

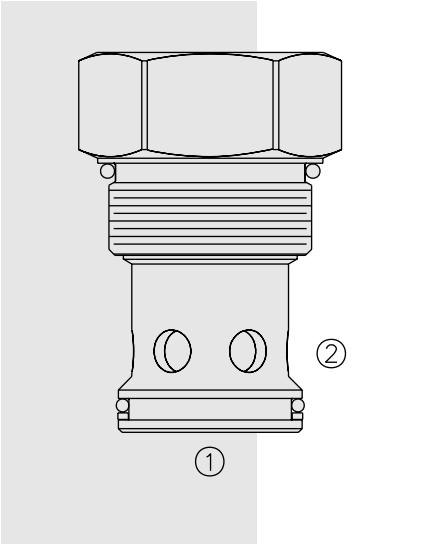
TO ORDER

HCV16-20 - - -		
Porting	0	05
Cartridge Only	SAE 16	08
	16TD	15
	1 in. BSP*	25
	8BD	60
*BSP Body; U.K. Mfr. Only		
		Bias Spring Value
		05 0.35 bar (5 psi)
		08 0.6 bar (8 psi)
		15 1.0 bar (15 psi)
		25 1.7 bar (25 psi)
		60 4.1 bar (60 psi)
		Seals
		U PPDI Urethane

Note: PPDI Urethane seals are recommended for pressures over 241 bar (3500 psi).

DIRECTIONAL VALVES

CV42-M20 Check Valve



DESCRIPTION

A screw-in, cartridge-style, hydraulic check valve for use as a blocking or load-holding device.

OPERATION

The CV42-M20 allows flow from ① to ②, while blocking oil flow in the opposite direction.

The cartridge has a fully guided poppet which is spring-biased to closed until sufficient pressure is applied at ① to open to ②.

FEATURES

- Hardened seat for long life and low leakage.
- Optional bias springs for back-pressure application flexibility.
- Conforms to ISO 7789 cavity.

RATINGS

Operating Pressure: 240 bar (3500 psi)

Proof Pressure: 350 bar (5075 psi)

Flow: See Performance Chart

Internal Leakage: 0.25 cc/minute (5 drops/minute) max. at 240 bar (3500 psi)

Crack Pressure Defined: Gauge pressure evident at ① at 0.95 lpm (0.25 gpm) attained at ②

Standard Bias Springs at Crack: 0.35 bar (5 psi); 1.7 bar (25 psi); 4.1 bar (60 psi)

Temperature: -40 to 120°C

Filtration: See page 9.010.1

Fluids: Mineral-based or synthetics with lubricating properties at viscosities of 7.4 to 420 cSt (50 to 2000 ssu)

Installation: No restrictions; See page 9.020.1

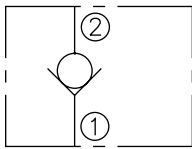
Cavity: VC42-M2 (ISO M42-2.0); See page 9.142.1

Cavity Tool: CT42-M2XX; See page 8.600.1

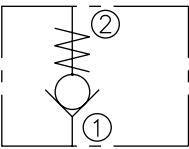
Seal Kit: SK42-M2X-T; See page 8.650.1

SYMBOLS

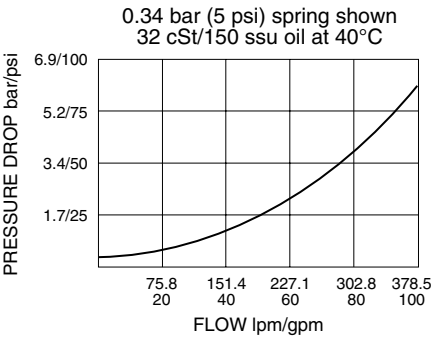
USASI:



ISO:

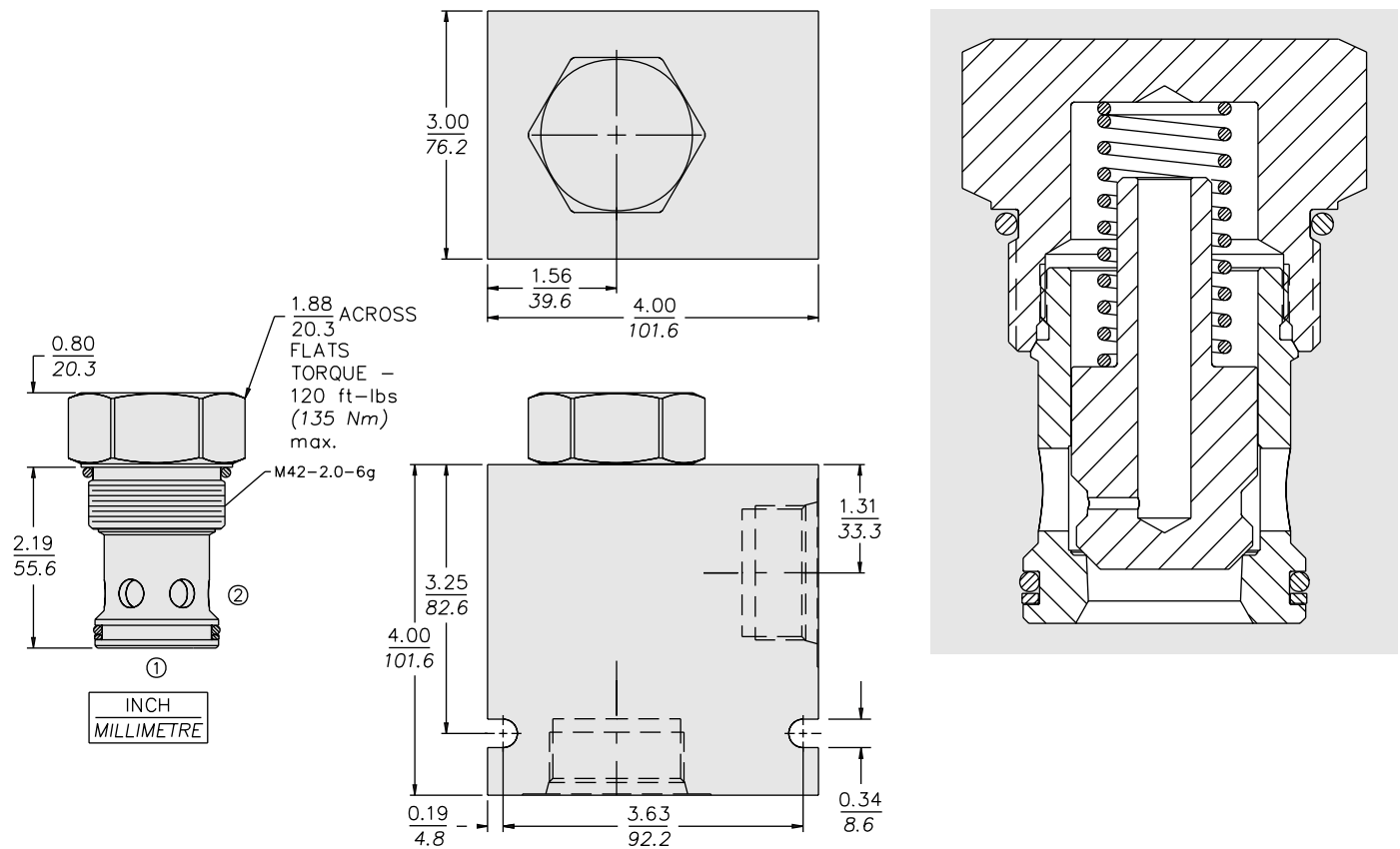


PERFORMANCE (Cartridge Only)



CV42-M20

DIMENSIONS



MATERIALS

Cartridge: Weight: 0.43 kg. (0.95 lbs.); Steel with hardened work surfaces; Zinc-plated exposed surfaces; Buna N O-rings and polyester elastomer back-ups standard.

Standard Ported Body: Weight: 1.63 kg. (3.60 lbs.); Anodized high-strength 6061 T6 aluminum alloy, rated to 240 bar (3500 psi). See page 8.016.1. Ductile iron and steel bodies available; dimensions may differ; consult factory.

TO ORDER

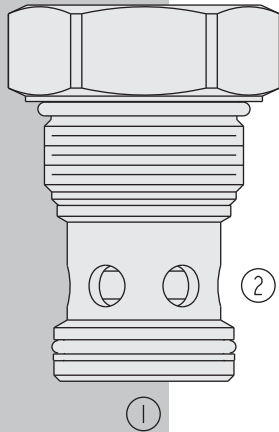
CV42-M20 -

Porting
Cartridge Only 0
SAE 20 20T

Bias Spring (Crack)
5 0.35 bar (5 psi)
15 1.0 bar (15 psi)
30 2.1 bar (30 psi)
60 4.1 bar (60 psi)

Seals
N Buna N (Std.)
V Fluorocarbon

HCV42-M20 HyPerformance™ Check Valve



DESCRIPTION

A screw-in, cartridge-style, hydraulic check valve for use as a blocking or load-holding device in high pressure applications.

OPERATION

The **HCV42-M20** allows flow from ① to ②, while blocking flow in the opposite direction.

The cartridge has a fully guided poppet which is spring-biased to closed until sufficient pressure is applied at ① to open to ②.

FEATURES

- Hardened seat for long life and low leakage.
- Optional bias springs for back-pressure application flexibility.
- All HyPerformance products are tested to the rigorous standards of the NFPA specification T2.6.1.
- All HyPerformance valves are tested at a verification level of 90% and an assurance of 99%.

RATINGS

Operating Pressure: 350 bar (5075 psi); 10% cycle life: 420 bar (6090 psi)

Note: All HyPerformance products are tested for 900K cycles at 350 bar and 100K at 420 bar.

Fatigue Rating: 2 million cycles at 420 bar

Burst Pressure: 1380 bar (20000 psi)

Flow: 303 lpm (80 gpm)

Max. Internal Leakage: 0.25 cc/minute (5 drops/minute) at 350 bar (5075 psi)

Operating Temperature: -54 to 107°C (-65 to 225°F) with Urethane seals

Ambient Temperature: -40 to 90°C

Filtration: See page 9.010.1

Fluids: Mineral-based or synthetics with lubricating properties at viscosities of 7.4 to 420 cSt (50 to 2000 sus); See Temperature and Oil Viscosity, page 9.060.1

Installation: No restrictions; See page 9.020.1

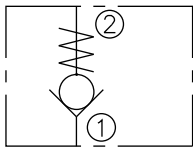
Cavity: HVC42-M2; See page 9.142.1

Cavity Tool: HCT42-M2XX; See page 8.600.1

Seal Kit: SK42-M2X-X; See page 8.650.1

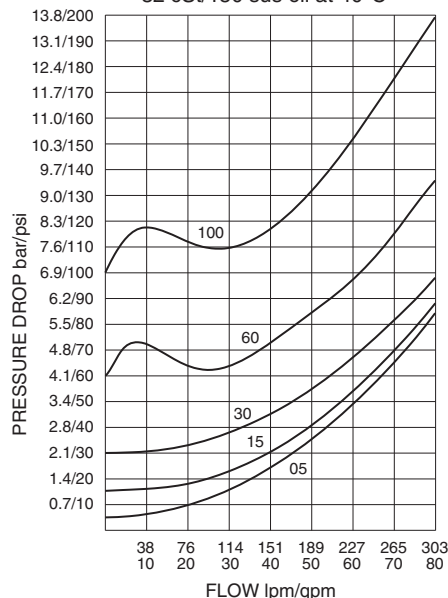
SYMBOLS

USAS/ISO:



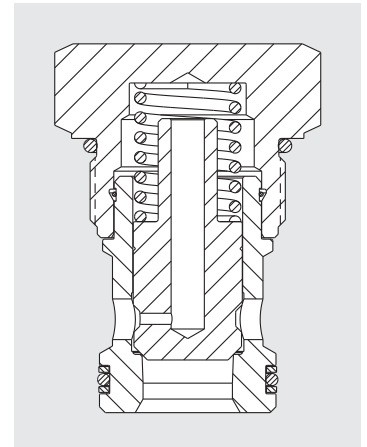
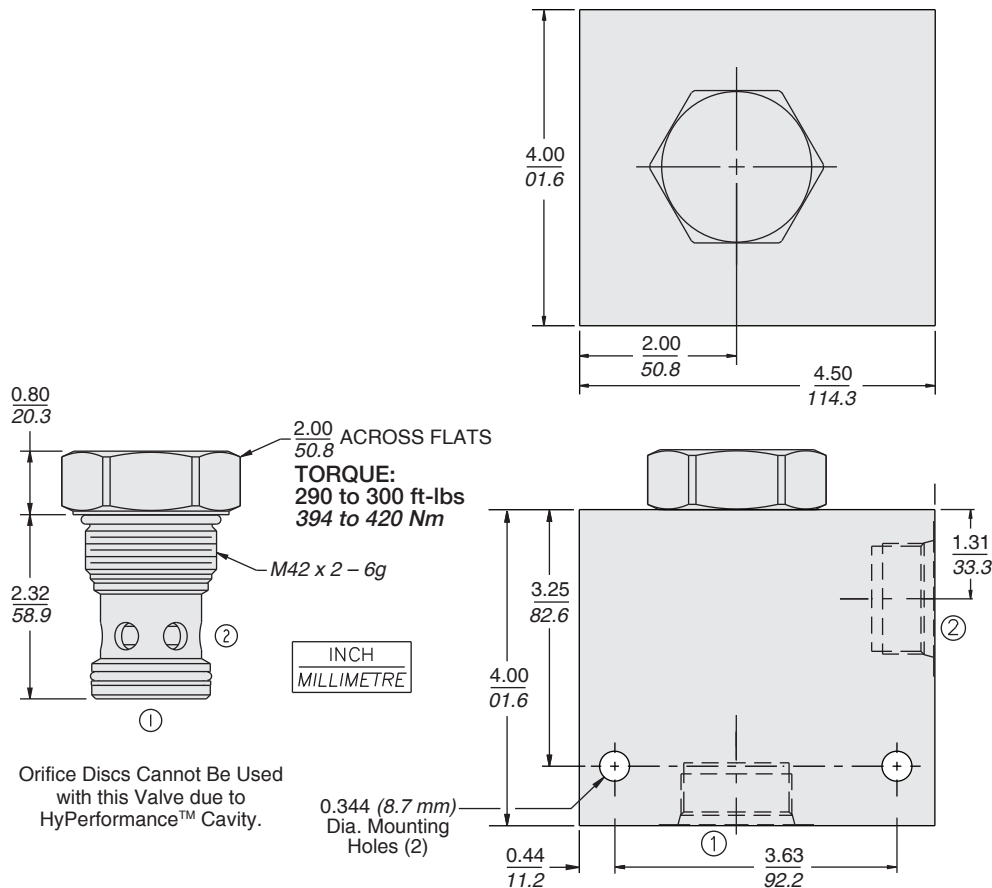
PERFORMANCE (Cartridge Only)

Pressure Drop vs. Flow
for each Spring Code Option
32 cSt/150 sus oil at 40°C



HCV42-M20

DIMENSIONS



MATERIALS

Cartridge: Weight: 0.68 kg. (1.50 lbs.)
Steel with hardened work surfaces.
Zinc-nickel plated exposed surfaces.
PPDI Urethane seals with no backup rings standard.

Ported Body: Weight: 7.21 kg. (15.89 lbs.); HyPerformance™
Ductile iron (code 'D') standard.
Rated to 345 bar (5000 psi).

TO ORDER

HCV42-M20 -

Porting
Cartridge Only 0
SAE 20 20TD
1-1/4 in. BSP* 10BD
*BSP Body; U.K. Mfr. Only

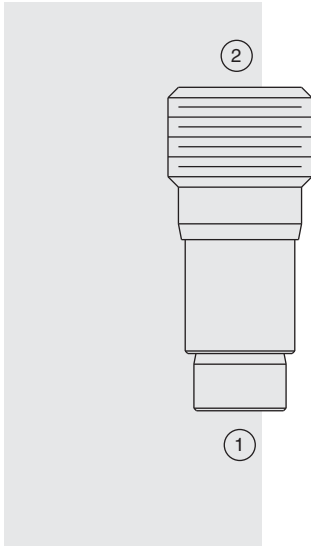
Bias Spring Value

5 0.35 bar (5 psi)
15 1.0 bar (15 psi)
30 2.1 bar (30 psi)
60 4.1 bar (60 psi)
100 6.9 bar (100 psi)

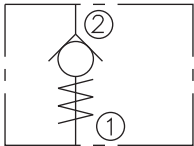
Seals

U PPDI Urethane — Recommended for pressures above 241 bar (3500 psi)

CV06-B21 Check Valve



SYMBOL



DESCRIPTION

A screw-in, cartridge-style, hydraulic check valve for blocking or load-holding.

OPERATION

The **CV06-B21** allows flow from ② to ①, while normally blocking flow in the opposite direction. The cartridge is spring-biased closed until sufficient pressure is applied at ② to open to ①.

FEATURES

- Hardened seat for long life and low leakage.
- Fully guided check assembly.
- Small size.
- Fast closing and seating.

RATINGS

Operating Pressure: 345 bar (5000 psi)

Proof Pressure: 690 bar (10,000 psi)

Burst Pressure: greater than 828 bar (12,000 psi)

Flow: up to 7.6 lpm (2 gpm)

Internal Leakage: 0.10 cc/minute (2 drops/minute) max. at 34.5 bar (500 psi) and 345 bar (5000 psi) from port 1, port 2, inlet

Operating Temperature: -54°C to 107°C (-65°F to 225°F)

Filtration: Recommend 25μ nominal or better; See page 9.010.1

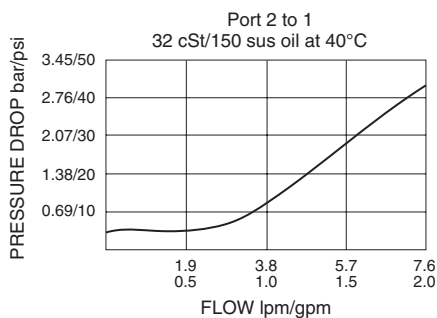
Fluids: Mineral-based or synthetics with lubricating properties at viscosities of 7.4 to 420 cSt (50 to 2000 sus); See Temperature and Oil Viscosity, page 9.060.1

Installation: No restrictions

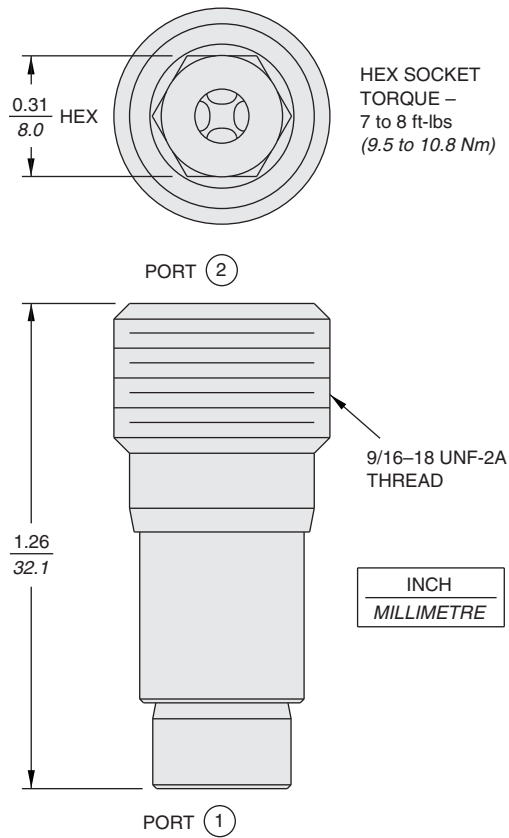
Cavity: VC06-B2; See page 9.106.1

Cavity Tool: CT06-B2xx; See page 8.600.1

PERFORMANCE (Cartridge Only)



DIMENSIONS



MATERIALS

Cartridge: Weight: 0.023 kg. (0.05 lbs.)
Steel with hardened work surfaces.
Zinc-plated exposed surfaces.

TO ORDER

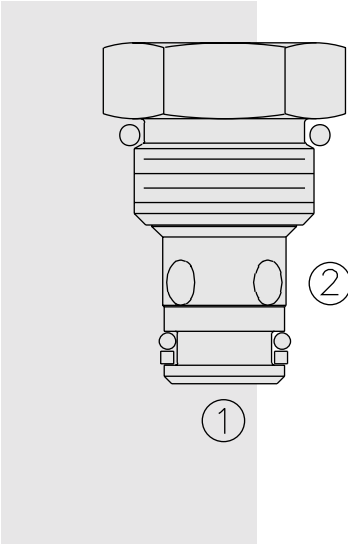
CV06-B21 - -

Bias Spring
5 0.34 bar (5 psi)

Porting
0 Cartridge Only

DIRECTIONAL VALVES

CV08-21 Check Valve



DESCRIPTION

A screw-in, cartridge-style, hydraulic check valve for use as a blocking or load-holding device.

OPERATION

The CV08-21 allows flow passage from ② to ①, while normally blocking oil flow in the opposite direction.

The cartridge has a fully guided poppet which is spring-biased closed until sufficient pressure is applied at ② to open to ①.

FEATURES

- Hardened seat for long life and low leakage.
- Fully guided poppet.
- Compact size.

RATINGS

Operating Pressure: 240 bar (3500 psi)

Flow: See Performance Chart

Internal Leakage: 0.25 cc/minute (5 drops/minute) max. at 240 bar (3500 psi)

Crack Pressure Defined: Gauge bar (psi) evident at ② at 16.4 cc/minute (1 cu. in./minute) attained

Standard Bias Spring at Crack: 2.1 bar (30 psi) nominal. Actual cracking pressure may vary from 1.9 to 2.8 bar (27 to 40 psi); valves which are not actuated for a period of time may initially crack at higher than subsequent cracking pressures.

Temperature: -40 to 120°C

Filtration: See page 9.010.1

Fluids: Mineral-based or synthetics with lubricating properties at viscosities of 7.4 to 420 cSt (50 to 2000 ssu)

Installation: No restrictions; See page 9.020.1

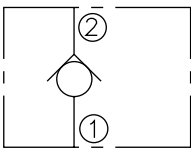
Cavity: VC08-2; See page 9.108.1

Cavity Tool: CT08-2XX; See page 8.600.1

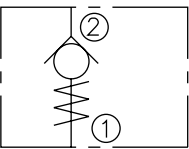
Seal Kit: SK08-2X-B; See page 8.650.1

SYMBOLS

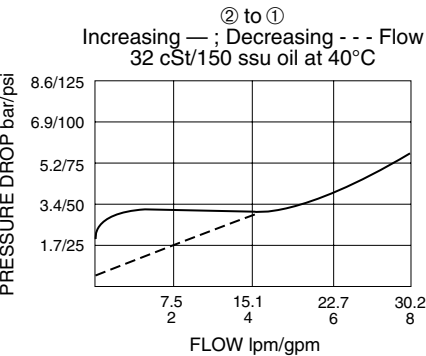
USASI:



ISO:

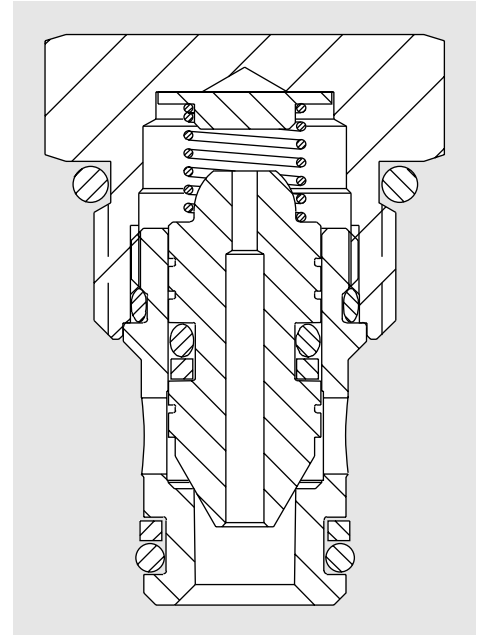
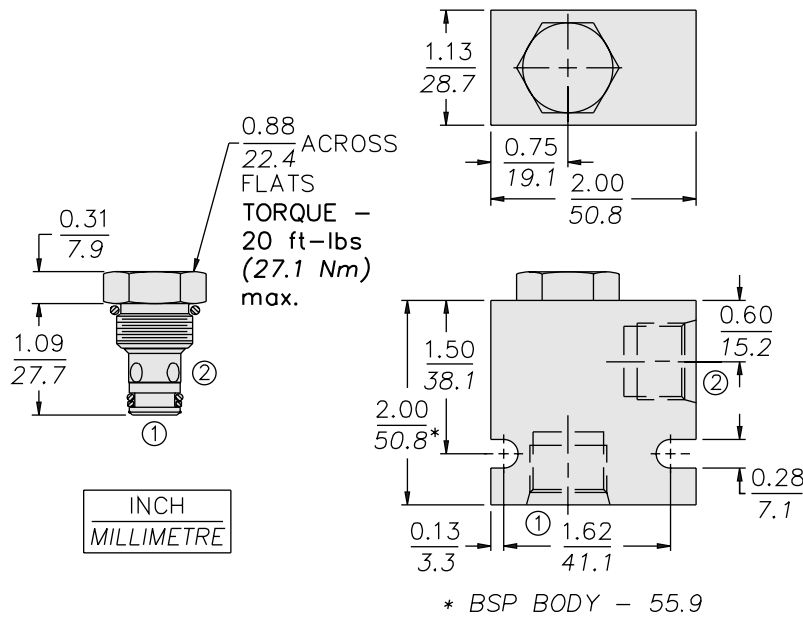


PERFORMANCE (Cartridge Only)



CV08-21

DIMENSIONS



MATERIALS

Cartridge: Weight: 0.05 kg. (0.12 lbs.);
Steel with hardened work surfaces.
Zinc-plated exposed surfaces. Buna
N O-rings and back-up standard.

Standard Ported Body: Weight:
0.16 kg. (0.35 lbs.); Anodized high-
strength 6061 T6 aluminum alloy,
rated to 240 bar (3500 psi); See
page 8.008.1. Ductile iron and steel
bodies available; dimensions may
differ; consult factory.

TO ORDER

CV08-21 - - - 30

Porting
Cartridge Only **0**
SAE 4 **4T**
SAE 6 **6T**
SAE 8 **8T**
1/4 in. BSP* **2B**
3/8 in. BSP* **3B**
1/2 in. BSP* **4B**

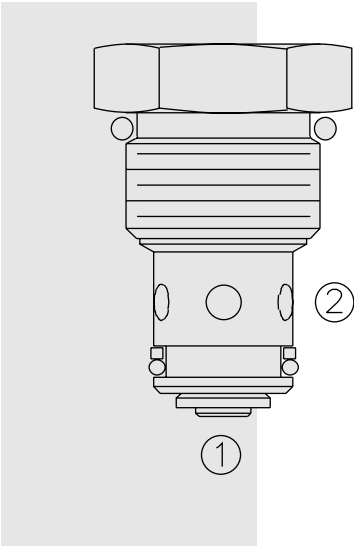
*BSP Body;
U.K. Mfr. Only

Standard Bias Spring
30 2.07 bar (30 psi)

Seals
N Buna N (Std.)
V Fluorocarbon

DIRECTIONAL VALVES

CV10-21 Check Valve



DESCRIPTION

A screw-in, cartridge-style, hydraulic check valve for use as a blocking or load-holding device.

OPERATION

The CV10-21 allows flow passage from ② to ①, while blocking flow from ① to ②.

The cartridge has a fully guided check which is spring-biased closed until sufficient pressure is applied at ② to open to ①.

Note: High shock/rapid actuation applications may require a high load option. Consult factory.

FEATURES

- Low check mass for anti-cavitation applications.
- Hardened seat for long life and low leakage.
- Optional bias springs for back-pressure application flexibility.
- Industry common cavity.

RATINGS

Operating Pressure: 210 bar (3000 psi)

Proof Pressure: 420 bar (6090 psi)

Flow: See Performance Chart

Internal Leakage: 0.25 cc/minute (5 drops/minute) max. at 210 bar (3000 psi)

Crack Pressure Defined: Gauge psi evident at ② at 16.4 cc/minute (1 cu. in./minute) attained at ①

Standard Bias Springs at Crack: 0.3 bar (4 psi); 1.7 bar (25 psi); 3.8 bar(55 psi)

Temperature: -40 to 120°C

Filtration: See page 9.010.1

Fluids: Mineral-based or synthetics with lubricating properties at viscosities of 7.4 to 420 cSt (50 to 2000 ssu)

Installation: See note in dimension drawing regarding minimum pilot drill diameter. Use of 10-size 2P standard ported body is prohibited.

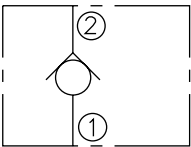
Cavity: VC10-2; See page 9.110.1 (Cavity Variation "A")

Cavity Tool: CT10-2XX; See page 8.600.1

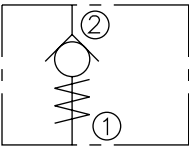
Seal Kit: SK10-2X-B; See page 8.650.1

SYMBOLS

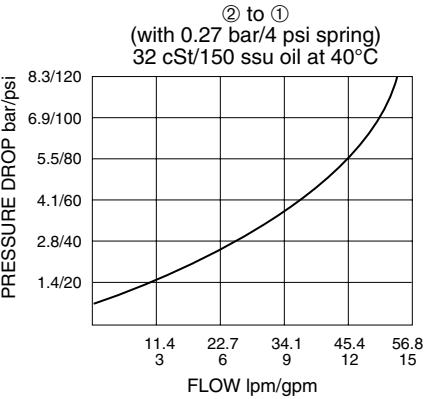
USASI:



ISO:

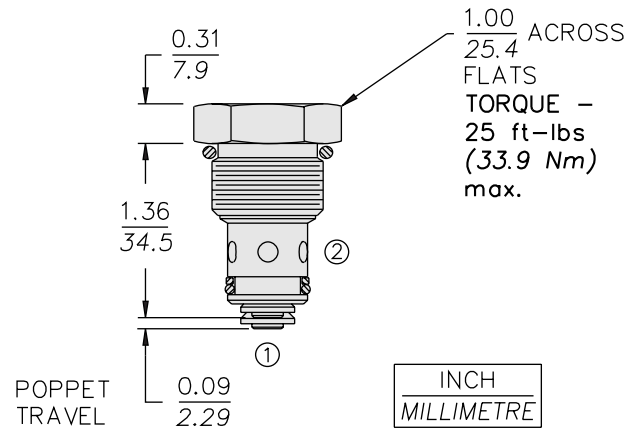


PERFORMANCE (Cartridge Only)



CV10-21

DIMENSIONS



MATERIALS

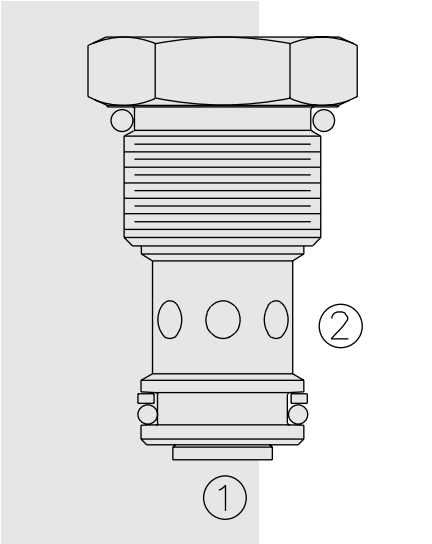
Cartridge: Weight: 0.08 kg. (0.17 lbs.);
Steel with hardened work surfaces;
Zinc-plated exposed surfaces;
Buna N O-rings and polyester
elastomer back-ups standard.

TO ORDER

CV10-21 -			
Porting		Bias Spring	
Cartridge Only		5	0.4 bar (5 psi)
		25	1.7 bar (25 psi)
		55	3.8 bar (55 psi)
Seals			
		N	Buna N (Std.)
		V	Fluorocarbon

DIRECTIONAL VALVES

CV12-21 Check Valve



DESCRIPTION

A screw-in, cartridge-style, hydraulic check valve for use as a blocking or load-holding device.

OPERATION

The CV12-21 allows flow passage from ② to ①, while blocking flow from ① to ②. The cartridge has a fully guided check which is spring-biased closed until sufficient pressure is applied at ② to open to ①.

FEATURES

- Low check mass for anti-cavitation applications.
- Hardened seat for long life and low leakage.
- Optional bias springs for back-pressure application flexibility.
- Cost-effective cavity.

RATINGS

Operating Pressure: 240 bar (3500 psi)

Flow: See Performance Chart

Internal Leakage: 0.25 cc/minute (5 drops/minute) max. at 240 bar (3500 psi)

Crack Pressure Defined: Gauge bar (psi) evident at ② at 16.4 cc/minute (1 cu. in./minute) attained at ①

Standard Bias Springs at Crack: 0.4 bar (6 psi); 1.8 bar (26 psi); 3.8 bar (56 psi)

Temperature: -40 to 120°C

Filtration: See page 9.010.1

Fluids: Mineral-based or synthetics with lubricating properties at viscosities of 7.4 to 420 cSt (50 to 2000 ssu)

Installation: See note in dimension drawing regarding minimum pilot drill diameter

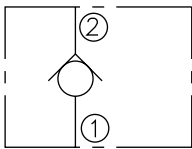
Cavity: VC12-2 (Cavity Variation "A"); See page 9.112.1

Cavity Tool: CT12-2XX; See page 8.600.1

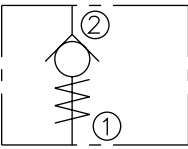
Seal Kit: SK12-2X-B; See page 8.650.1

SYMBOLS

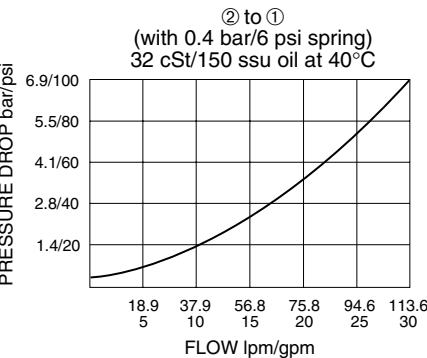
USASI:



ISO:

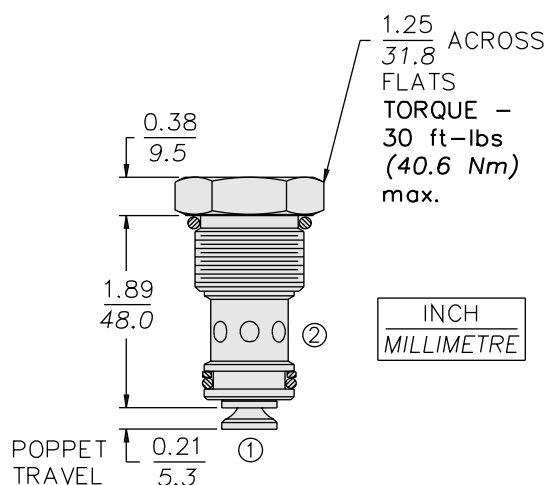


PERFORMANCE (Cartridge Only)

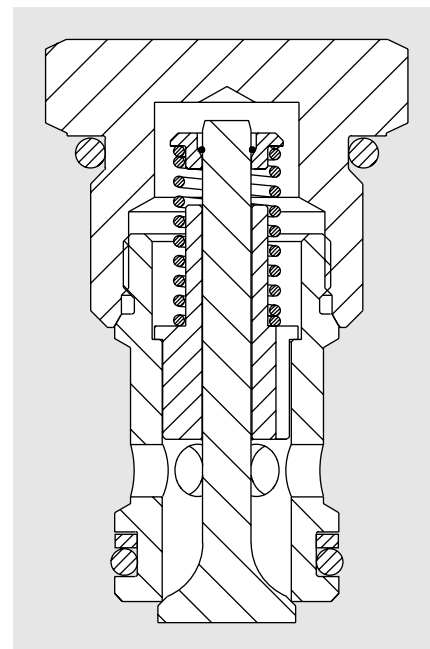


CV12-21

DIMENSIONS



ORIFICE DISCS MAY NOT BE
USED WITH THIS PRODUCT.



MATERIALS

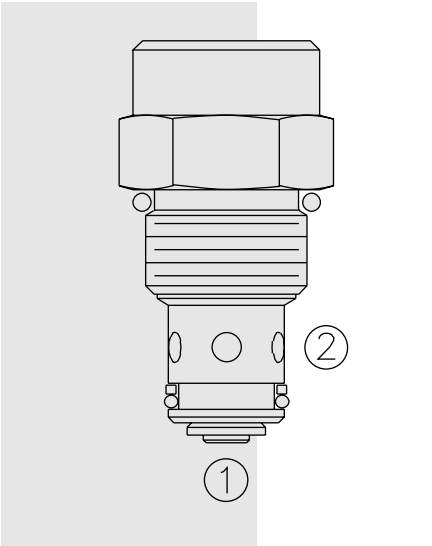
Cartridge: Weight: 0.18 kg. (0.40 lbs.);
Steel with hardened work surfaces;
Zinc-plated exposed surfaces; Buna
N O-rings and polyester elastomer
back-up standard.

TO ORDER

CV12-21 -		
Porting		
Cartridge Only	0	
		Bias Spring
		6 0.4 bar (6 psi)
		26 1.8 bar (26 psi)
		56 3.8 bar (56 psi)
		Seals
		N Buna N (Std.)
		V Fluorocarbon

DIRECTIONAL VALVES

CV10-23 Check Valve



DESCRIPTION

A screw-in, cartridge-style, hydraulic check valve for use as a blocking or load-holding device.

OPERATION

The CV10-23 allows flow passage from ② to ①, while blocking flow from ① to ②. The cartridge has a fully guided check which is spring-biased closed until sufficient pressure is applied at ② to open to ①.

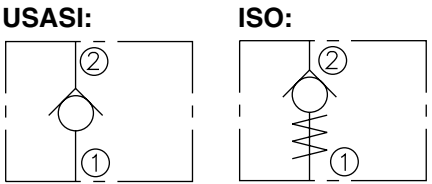
FEATURES

- Low check mass for anti-cavitation applications.
- Hardened seat for long life and low leakage.
- Optional bias springs for back-pressure application flexibility.
- Industry common cavity.

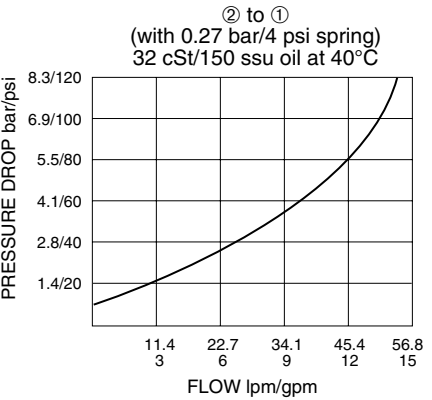
RATINGS

- Operating Pressure:** 240 bar (3500 psi)
Proof Pressure: 420 bar (6090 psi)
Flow: See Performance Chart
Internal Leakage: 0.25 cc/minute (5 drops/minute) max. at 240 bar (3500 psi)
Crack Pressure Defined: Gauge psi evident at ② at 16.4 cc/minute (1 cu. in./minute) attained at ①
Standard Bias Springs at Crack: 0.3 bar (4 psi); 1.7 bar (25 psi); 3.8 bar (55 psi)
Temperature: -40 to 120°C
Filtration: See page 9.010.1
Fluids: Mineral-based or synthetics with lubricating properties at viscosities of 7.4 to 420 cSt (50 to 2000 ssu)
Installation: See note in dimension drawing regarding minimum pilot drill diameter. Use of 10-size 2P standard ported body is prohibited.
Cavity: VC10-2; See page 9.110.1 (Cavity Variation "A")
Cavity Tool: CT10-2XX; See page 8.600.1
Seal Kit: SK10-2X-B; See page 8.650.1

SYMBOLS

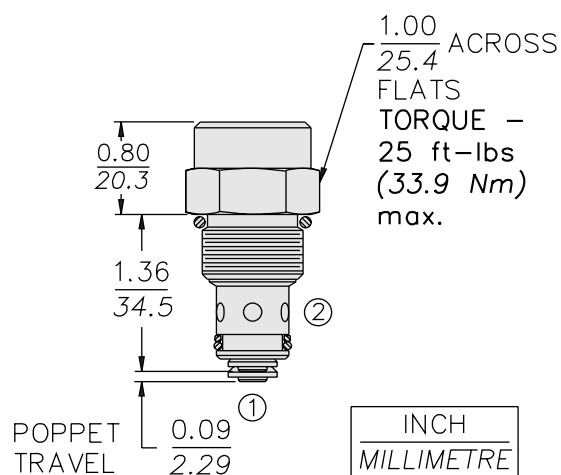


PERFORMANCE (Cartridge Only)

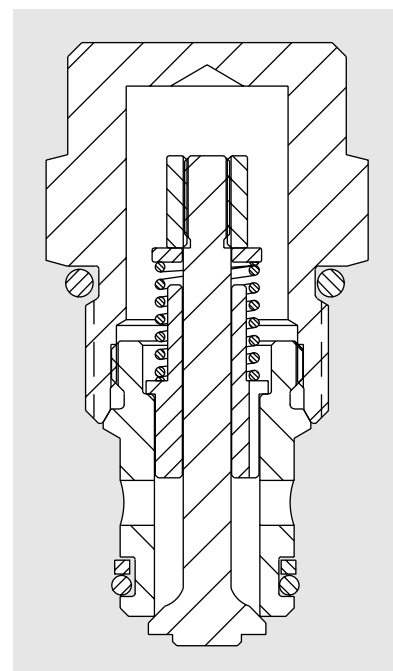


CV10-23

DIMENSIONS



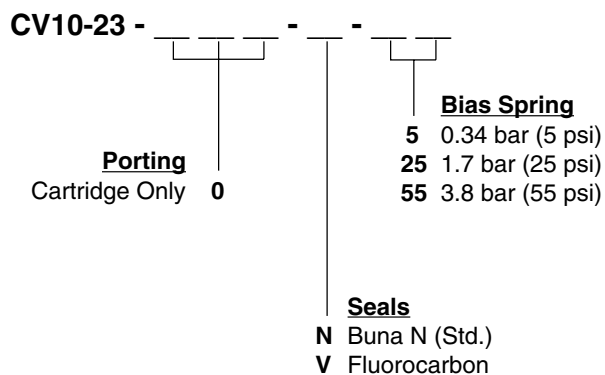
ORIFICE DISC MAY NOT BE
USED WITH THIS PRODUCT.



MATERIALS

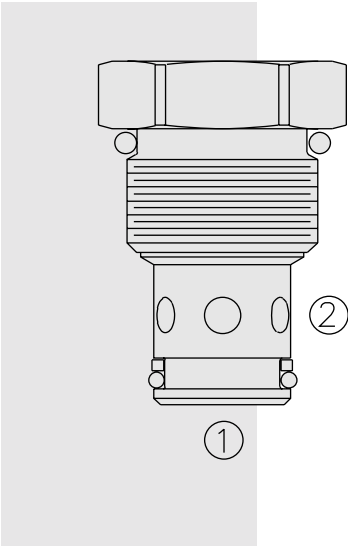
Cartridge: Weight: 0.08 kg. (0.17 lbs.);
Steel with hardened work surfaces;
Zinc-plated exposed surfaces;
Buna N O-rings and polyester
elastomer back-ups standard.

TO ORDER



DIRECTIONAL VALVES

CV10-24 Check Valve



DESCRIPTION

A screw-in, cartridge-style, hydraulic check valve for use as a blocking or load-holding device.

OPERATION

The CV10-24 allows flow passage from ② to ①, while blocking flow from ① to ②.

The cartridge has a fully guided check which is spring-biased closed until sufficient pressure is applied at ② to open to ①.

Note: High shock/rapid actuation applications may require a high load option. Consult factory.

FEATURES

- Low check mass for anti-cavitation applications.
- Hardened seat for long life and low leakage.
- Optional bias springs for back-pressure application flexibility.
- Industry common cavity.

RATINGS

Operating Pressure: 240 bar (3500 psi)

Flow: See Performance Chart

Internal Leakage: 0.25 cc/minute (5 drops/minute) max. at 207 bar (3000 psi)

Crack Pressure Defined: Gauge psi evident at ② at 16.4 cc/minute (1 cu. in./minute) attained at ①

Standard Bias Springs at Crack: 0.35 bar (5 psi); 1.7 bar (25 psi); 3.8 bar(55 psi)

Temperature: -40 to 120°C

Filtration: See page 9.010.1

Fluids: Mineral-based or synthetics with lubricating properties at viscosities of 7.4 to 420 cSt (50 to 2000 ssu)

Installation: No restrictions; See page 9.020.1

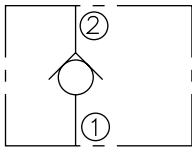
Cavity: VC10-2; See page 9.110.1

Cavity Tool: CT10-2XX; See page 8.600.1

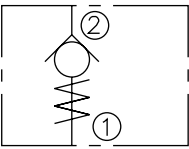
Seal Kit: SK10-2X-B; See page 8.650.1

SYMBOLS

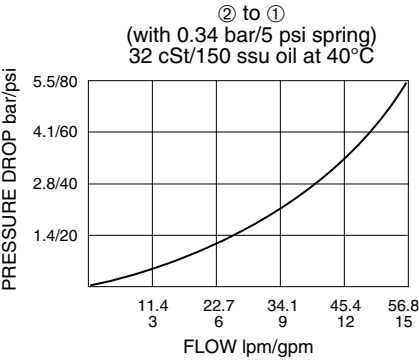
USASI:



ISO:

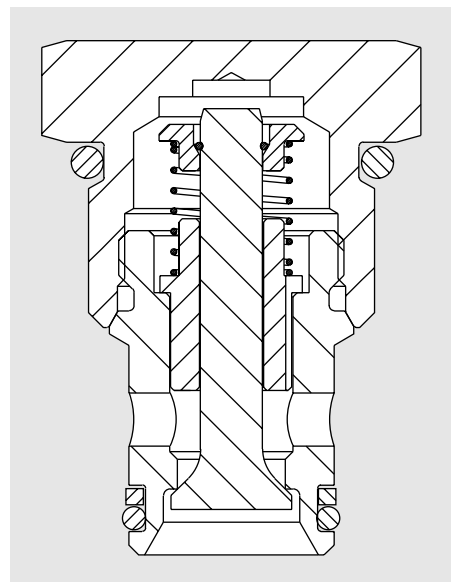
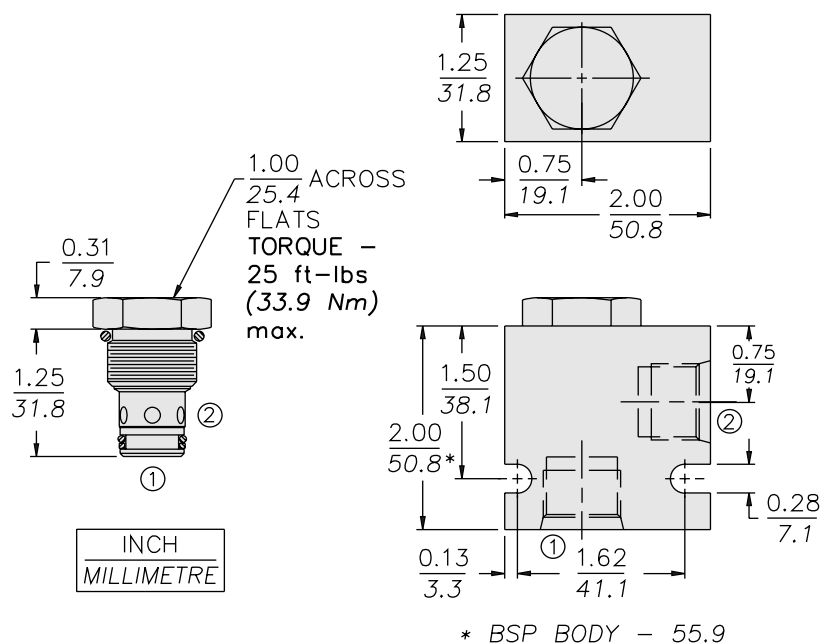


PERFORMANCE (Cartridge Only)



CV10-24

DIMENSIONS



MATERIALS

Cartridge: Weight: 0.08 kg. (0.17 lbs.);
Steel with hardened work surfaces;
Zinc-plated exposed surfaces;
Buna N O-rings and polyester elastomer back-ups standard.

Standard Ported Body: Weight: 0.16 kg. (0.35 lbs.); Anodized high-strength 6061 T6 aluminum alloy, rated to 240 bar (3500 psi); See page 8.010.1. Ductile iron and steel bodies available; dimensions may differ; consult factory.

TO ORDER

CV10-24 -

Porting
Cartridge Only **0**
SAE 6 **6T**
SAE 8 **8T**
1/4 in. BSP* **2B**
3/8 in. BSP* **3B**
1/2 in. BSP* **4B**

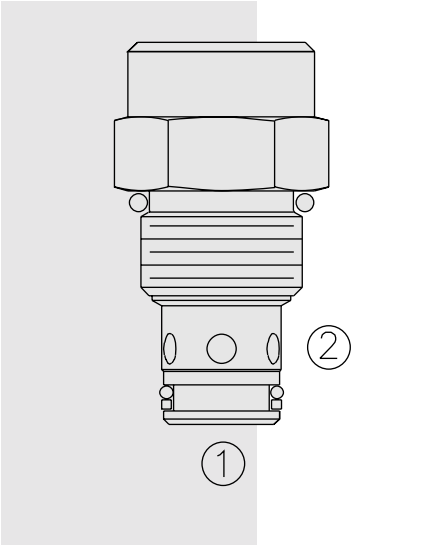
*BSP Body;
U.K. Mfr. Only

Bias Spring
05 0.34 bar (5 psi)

Seals
N Buna N (Std.)
V Fluorocarbon

DIRECTIONAL VALVES

CV10-28 Check Valve with Thermal Relief



DESCRIPTION

A screw-in, cartridge-style, hydraulic check valve for use as a blocking or load-holding device. The cartridge incorporates a low flow thermal relief valve intended to prevent cylinder damage resulting from temperature-induced pressure intensification.

OPERATION

The CV10-28 allows flow from ① to ②, while blocking oil flow in the opposite direction. If the pressure at ② exceeds the thermal relief valve setting, a small amount of oil will be allowed to pass from ② to ①, preventing cylinder damage from pressure intensification.

NOTE: The relief valve feature is not intended for use in dynamic pressure limiting applications. Consult factory.

FEATURES

- Hardened seats for long life and low leakage.
- Industry common cavity.

RATINGS

Thermal Relief Factory Setting: 324 ± 28 bar (4700 ± 400 psi)

Formula for Thermal Expansion: $\Delta P = 57.7 \times \Delta T$ (where ΔP is in psi; ΔT is in °F)

Proof Pressure: 390 bar (5700 psi)

Thermal Relief Setting: 348 ± 38 bar (5050 ± 550 psi)

Thermal Relief Reseat: 276 bar (4000 psi)

Flow: See Performance Chart

Internal Leakage: 0.25 cc/minute (5 drops/minute) max. at 240 bar (3500 psi)

Standard Check Bias Spring at Crack: 4.5 bar (65 psi)

Check ① to ② Crack Pressure Defined: Gauge bar (psi) evident at ① at 16.4 cc/minute (1 cu. in./minute) attained at ②

Temperature: -40 to 120°C

Filtration: See page 9.010.1

Fluids: Mineral-based or synthetics with lubricating properties at viscosities of 7.4 to 420 cSt (50 to 2000 ssu)

Installation: No restrictions; See page 9.020.1

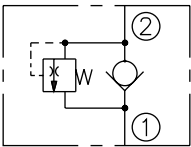
Cavity: VC10-2; See page 9.110.1

Cavity Tool: CT10-2XX; See page 8.600.1

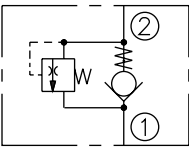
Seal Kit: SK10-2X-T; See page 8.650.1

SYMBOLS

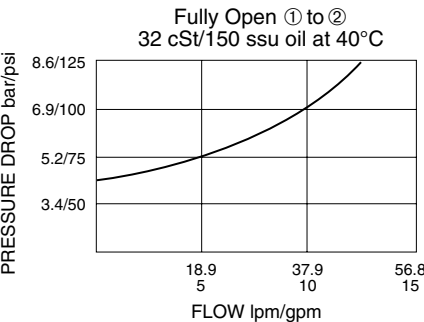
USASI:



ISO:

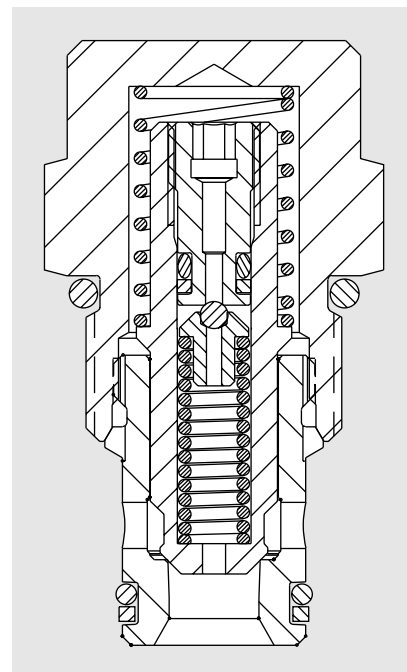
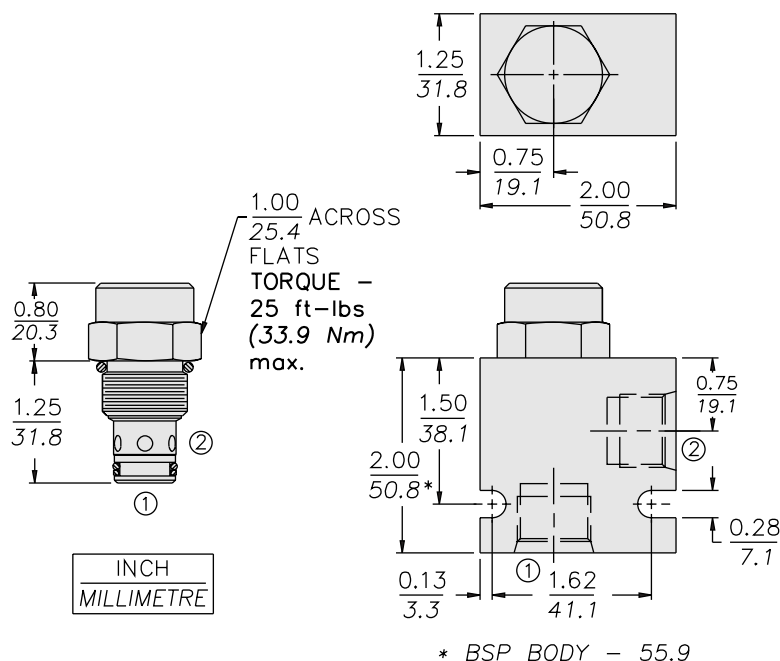


PERFORMANCE (Cartridge Only)



CV10-28

DIMENSIONS



MATERIALS

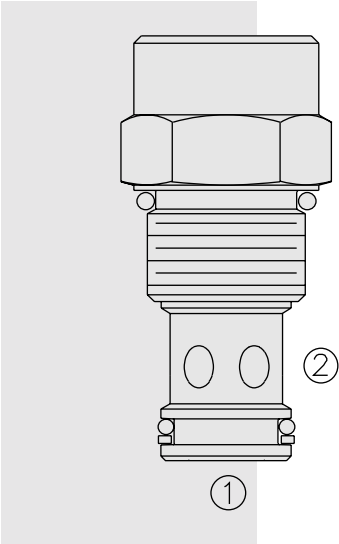
Cartridge: Weight: 0.08 kg. (0.18 lbs.); Steel with hardened work surfaces; Zinc-plated exposed surfaces; Buna N O-rings and polyester elastomer back-ups standard.

Standard Ported Body: Weight: 0.16 kg. (0.35 lbs.); Anodized high-strength 6061 T6 aluminum alloy, rated to 240 bar (3500 psi); See page 8.010.1. Ductile iron and steel bodies available; dimensions may differ; consult factory.

TO ORDER

CV10-28 -		/	
Porting		Thermal Relief Setting	
Cartridge Only	0	45	348 ±38 bar (5050 ±550 psi) Std.†
SAE 6	6T		
SAE 8	8T		
1/4 in. BSP*	2B		
3/8 in. BSP*	3B		
1/2 in. BSP*	4B		
*BSP Body U.K. Mfr. Only		Check Bias Spring Setting	
		65	4.5 bar (65 psi) (Std.)†
		†Non-standard check bias spring settings and thermal relief settings available for OEM applications. Consult factory.	
		Seals	
		N Buna N (Std.)	
		V Fluorocarbon	

CV12-28 Check Valve with Thermal Relief



DESCRIPTION

A screw-in, cartridge-style, hydraulic check valve for use as a blocking or load-holding device. The cartridge incorporates a low flow thermal relief valve intended to prevent cylinder damage resulting from temperature-induced pressure intensification.

OPERATION

The CV12-28 allows flow from ① to ②, while blocking oil flow in the opposite direction. If the pressure at ② exceeds the thermal relief valve setting, a small amount of oil will be allowed to pass from ② to ①, preventing cylinder damage from pressure intensification.

NOTE: The relief valve feature is not intended for use in dynamic pressure limiting applications. Consult factory.

FEATURES

- Hardened seats for long life and low leakage.
- Cost effective cavity.

RATINGS

Thermal Relief Factory Setting: 324 ± 28 bar (4700 ± 400 psi)

Proof Pressure: 390 bar (5700 psi)

Thermal Relief Reseat: 207 bar (3000 psi)

Flow: See Performance Chart

Internal Leakage: 0.25 cc/minute (5 drops/minute) max. at 240 bar (3500 psi)

Standard Check Bias Spring at Crack: 4.5 bar (65 psi)

Check ① to ② Crack Pressure Defined: Gauge bar (psi) evident at ① at 16.4 cc/minute (1 cu. in./minute) attained at ②

Temperature: -40 to 120°C

Filtration: See page 9.010.1

Fluids: Mineral-based or synthetics with lubricating properties at viscosities of 7.4 to 420 cSt (50 to 2000 ssu)

Installation: No restrictions; See page 9.020.1

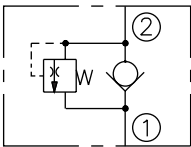
Cavity: VC12-2; See page 9.112.1

Cavity Tool: CT12-2XX; See page 8.600.1

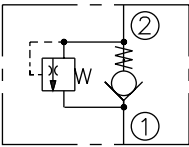
Seal Kit: SK12-2X-T; See page 8.650.1

SYMBOLS

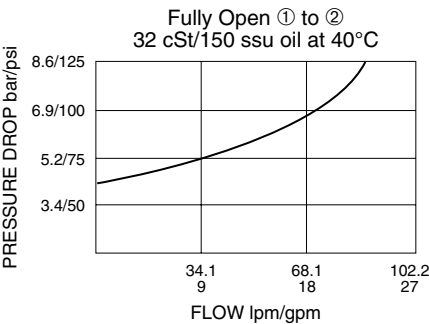
USASI:



ISO:

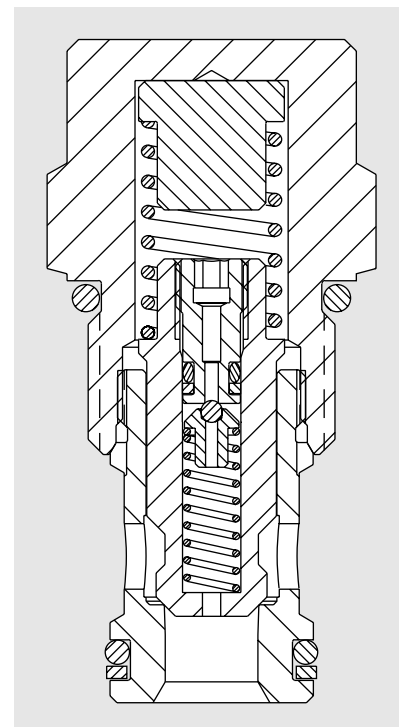
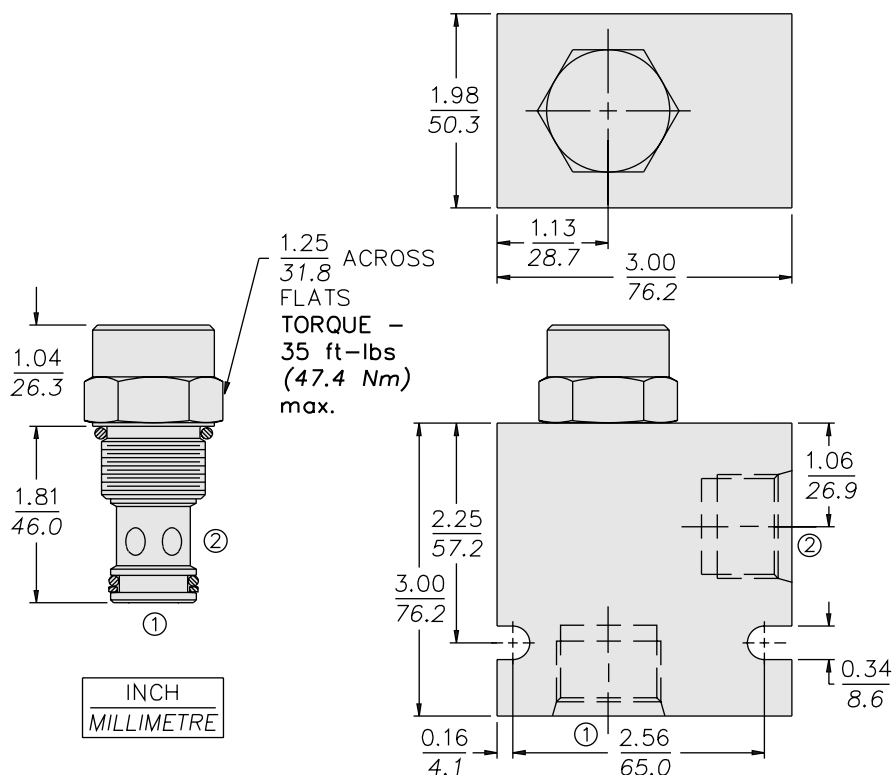


PERFORMANCE (Cartridge Only)



CV12-28

DIMENSIONS



MATERIALS

Cartridge: Weight: 0.18 kg. (0.40 lbs.); Steel with hardened work surfaces; Zinc-plated exposed surfaces; Buna N O-rings and polyester elastomer back-ups standard.

Standard Ported Body: Weight: 0.57 kg. (1.25 lbs.); Anodized high-strength 6061 T6 aluminum alloy, rated to 240 bar (3500 psi); See page 8.012.1. Ductile iron and steel bodies available; dimensions may differ; consult factory.

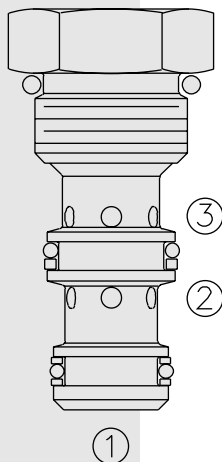
TO ORDER

CV12-28 -			
Porting		Thermal Relief Setting	
Cartridge Only	0	45	310 bar (4500 psi) (Std.) [†]
SAE 10	10T		
SAE 12	12T		
SAE 16	16T		
		Check Bias Spring Setting	
		65	4.5 bar (65 psi) (Std.) [†]
		Seals	
		N	Buna N (Std.)
		V	Fluorocarbon

[†]Non-standard check bias spring settings and thermal relief settings available for OEM applications. Consult factory.

DIRECTIONAL VALVES

PC08-30 Check, Pilot-to-Open



DESCRIPTION

A screw-in, cartridge-style, pilot-operated, hydraulic check valve for use in blocking or load-holding circuits.

OPERATION

The **PC08-30** allows flow from ② to ③, while normally blocking flow from ③ to ②. Flow will be allowed from ③ to ② when sufficient pressure is applied at ①.

The cartridge has a 3:1 pilot ratio, meaning that at least one-third of the load pressure held at ③ is required at ① to open the valve.

The check is spring-biased to assure holding in static or no-load conditions. A sealed pilot piston option is available.

FEATURES

- Hardened seat for long life and low leakage.
- Optional sealed piston.
- Optional spring ranges.
- Compact size.

RATINGS

Operating Pressure: 240 bar (3500 psi)

Flow: See Performance Chart

Internal Leakage:

- ③ to ②: 0.25 cc/minute (2 drops/minute) max. at 240 bar (3500 psi)
- ② to ① (without sealed piston): 115 cc/minute (7 cu. in./minute) max. at 240 bar (3500 psi)

Pilot Ratio: 3:1

Check Spring Bias: 1.72 bar (25 psi) standard;

With sealed piston option: 6.2 bar (90 psi) minimum

Temperature: -40 to 120°C with standard Buna seals

Filtration: See page 9.010.1

Fluids: Mineral-based or synthetics with lubricating properties at viscosities of 7.4 to 420 cSt (50 to 2000 ssu)

Installation: No restrictions; See page 9.020.1

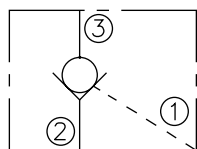
Cavity: VC08-3; See page 9.108.1

Cavity Tool: CT08-3XX; See page 8.600.1

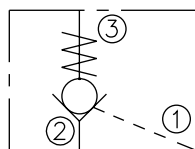
Seal Kit: SK08-3X-TM; See page 8.650.1

SYMBOLS

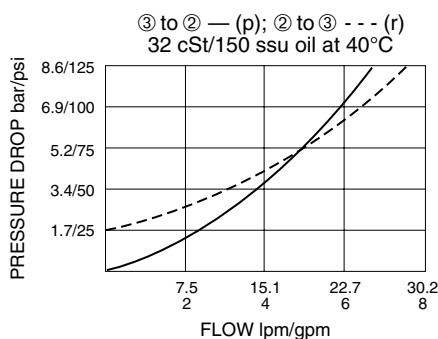
USASI:



ISO:

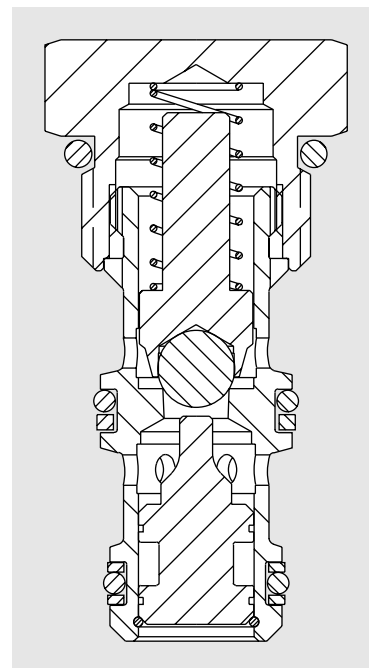
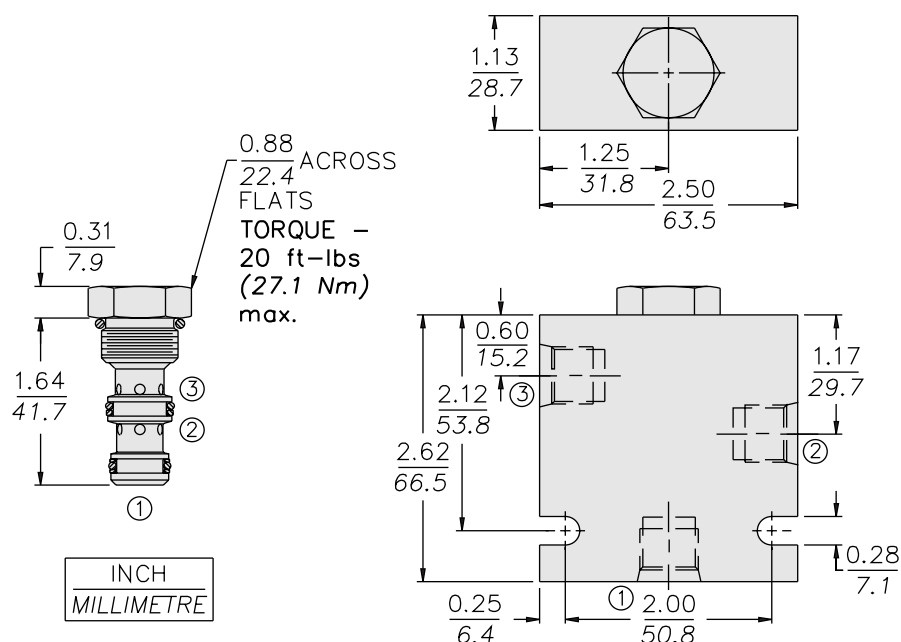


PERFORMANCE (Cartridge Only)



PC08-30

DIMENSIONS



MATERIALS

Cartridge: Weight: 0.08 kg. (0.18 lbs.); Steel with hardened work surfaces; Zinc-plated exposed surfaces; Buna N O-rings and back-ups standard.

Standard Ported Body: Weight: 0.27 kg. (0.60 lbs.); Anodized high-strength 6061 T6 aluminum alloy, rated to 240 bar (3500 psi); See page 8.008.1. Ductile iron and steel bodies available; dimensions may differ; consult factory.

TO ORDER

PC08-30

Options

None (Blank)

Porting

Cartridge Only

SAE 6

3/8 in. BSP*

*BSP Body;
U.K. Mfr. Only

0

6T

3B

Bias Spring

(Blank) 1.72 bar/25 psi (Std.)*

70 4.8 bar/70 psi

90 6.2 bar/90 psi

120 8.2 bar/120 psi

270 18.3 bar/270 psi

Note: Other bias spring pressures available for OEM applications. Consult factory.

* PC08-30 valves built with standard 25 psi spring are not stamped with spring rating. Other spring ratings are stamped on valve.

Seals

N Buna N (Std.)

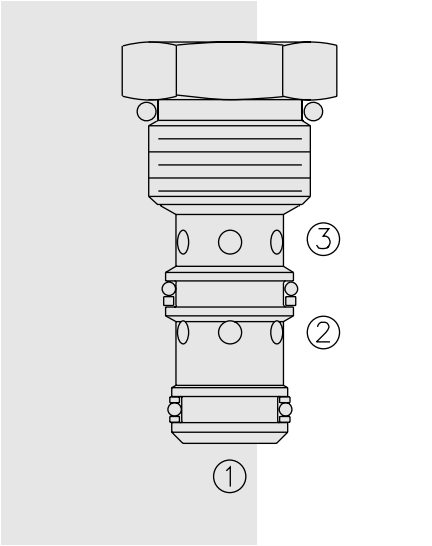
NS Buna N with Sealed Piston:
6.2 bar (90 psi) minimum spring

V Fluorocarbon

VS Fluorocarbon with Sealed Piston:
6.2 bar (90 psi) minimum spring

DIRECTIONAL VALVES

PC10-30 Check, Pilot-to-Open



DESCRIPTION

A screw-in, cartridge-style, pilot-operated, hydraulic check valve for use in blocking or load-holding circuits.

OPERATION

The PC10-30 allows flow passage from ② to ③, while normally blocking flow from ③ to ②. Flow will be allowed from ③ to ② when pressure is applied at ①.

The cartridge has a 4:1 pilot ratio, meaning that at least one-fourth of the load pressure held at ③ is required at ① to open the valve.

The check is spring-biased to assure holding in static or no-load conditions. A sealed pilot piston option is available.

Note: Special higher bias spring values available. Consult factory.

FEATURES

- Hardened seat for long life and low leakage.
- Optional sealed piston.
- Optional spring ranges.
- Industry common cavity.

RATINGS

Operating Pressure: 240 bar (3500 psi)

Flow: See Performance Chart

Internal Leakage:

- ③ to ②: 0.25 cc/minute (2 drops/minute) max. at 240 bar (3500 psi);
- ② to ① (without sealed piston): 115 cc/minute (7 cu. in./minute) max. at 240 bar (3500 psi)

Pilot Ratio: 4:1

Check Bias Spring: 2.07 bar (30 psi);
With sealed piston option: 6.2 bar (90 psi) minimum

Temperature: -40 to 120°C with standard Buna seals

Filtration: See page 9.010.1

Fluids: Mineral-based or synthetics with lubricating properties at viscosities of 7.4 to 420 cSt (50 to 2000 ssu)

Installation: No restrictions; See page 9.020.1

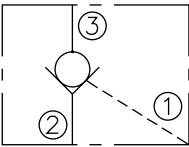
Cavity: VC10-3; See page 9.110.1

Cavity Tool: CT10-3XX; See page 8.600.1

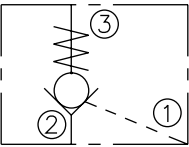
Seal Kit: SK10-3X-TM; See page 8.650.1

SYMBOLS

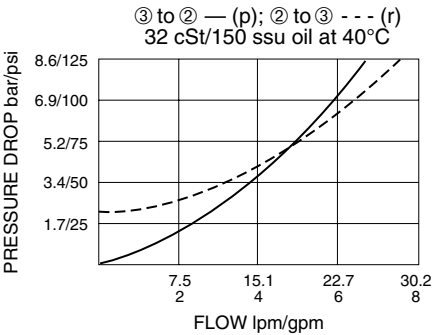
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ISO:

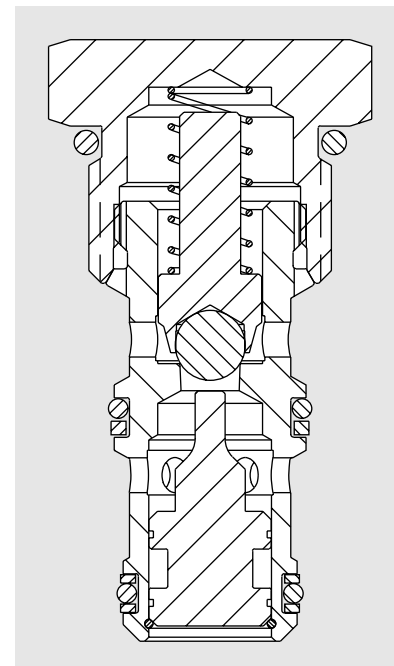
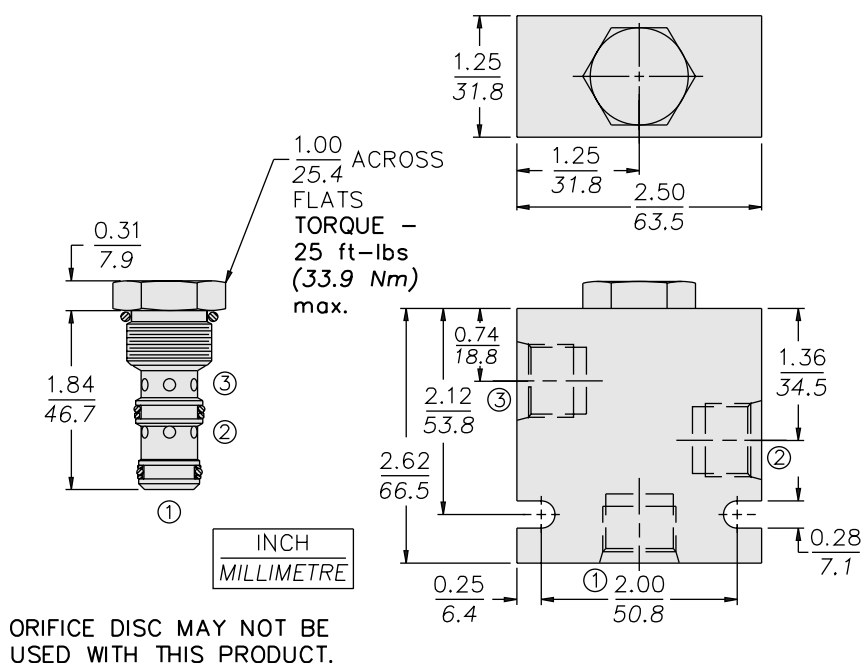


PERFORMANCE (Cartridge Only)



PC10-30

DIMENSIONS



MATERIALS

Cartridge: Weight: 0.09 kg. (0.20 lbs.); Steel with hardened work surfaces. Zinc-plated exposed surfaces. Buna N O-rings and polyester elastomer back-ups standard.

Standard Ported Body: Weight: 0.36 kg. (0.80 lbs.); Anodized high-strength 6061 T6 aluminum alloy, rated to 240 bar (3500 psi); See page 8.010.1. Ductile iron and steel bodies available; dimensions may differ; consult factory.

TO ORDER

PC10-30 -

Porting

Cartridge Only	0
SAE 6	6T
SAE 8	8T
1/4 in. BSP*	2B
3/8 in. BSP*	3B

*BSP Body;
U.K. Mfr. Only

Bias Spring

(Blank)	2.07 bar/30 psi (Std.)*
70	4.8 bar/70 psi
90	6.2 bar/90 psi
120	8.2 bar/120 psi
270	18.3 bar/270 psi

Note: Other bias spring pressures available for OEM applications. Consult factory.

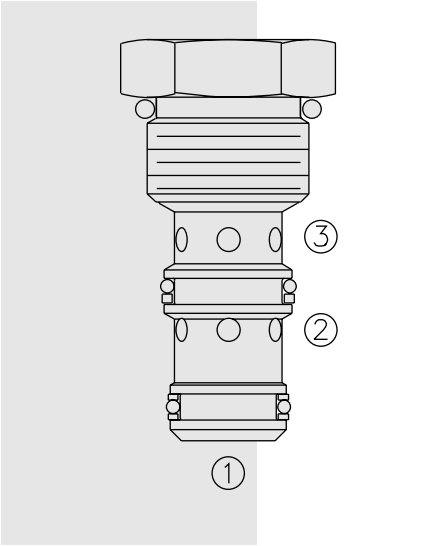
* PC10-30 valves built with standard 30 psi spring are not stamped with spring rating. Other spring ratings are stamped on valve.

Seals

N	Buna N (Std.)
NS	Buna N with Sealed Piston 6.2 bar (90 psi) minimum spring
V	Fluorocarbon
VS	Fluorocarbon with Sealed Piston 6.2 bar (90 psi) minimum spring

DIRECTIONAL VALVES

PC10-32 Check, Pilot-to-Open, 2:1 Pilot Ratio



DESCRIPTION

A screw-in, cartridge-style, pilot-operated, hydraulic check valve for use in blocking or load-holding circuits.

OPERATION

The PC10-32 allows flow passage from 2 to 3, while normally blocking flow from 3 to 2. Flow will be allowed from 3 to 2 when pressure is applied at 1.

The cartridge has a 2:1 pilot ratio, meaning that at least one-half of the load pressure held at 3 is required at 1 to open the valve.

The check is spring-biased to assure holding in static or no-load conditions. A sealed pilot piston option is available.

FEATURES

- Hardened seat for long life and low leakage.
- Optional sealed piston.
- Industry common cavity.

RATINGS

Operating Pressure: 240 bar (3500 psi)

Flow: See Performance Chart

Internal Leakage:

- 3 to 2: 0.25 cc/minute (5 drops/minute) max. at 240 bar (3500 psi);
- 2 to 1 (without sealed piston): 115 cc/minute (7 cu. in./minute) max. at 240 bar (3500 psi)

Pilot Ratio: 2:1

Check Bias Spring: 2.07 bar (30 psi);
With sealed piston option: 6.2 bar (90 psi) minimum

Temperature: -40 to 120°C with standard Buna seals

Filtration: See page 9.010.1

Fluids: Mineral-based or synthetics with lubricating properties at viscosities of 7.4 to 420 cSt (50 to 2000 ssu)

Installation: No restrictions; See page 9.020.1

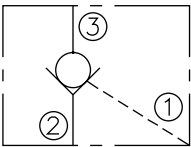
Cavity: VC10-3; See page 9.110.1

Cavity Tool: CT10-3XX; See page 8.600.1

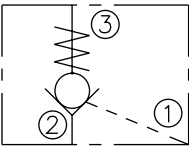
Seal Kit: SK10-3X-TM; See page 8.650.1

SYMBOLS

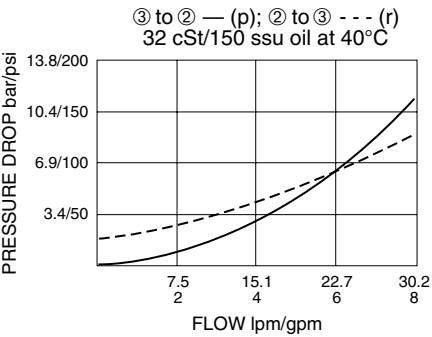
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ISO:

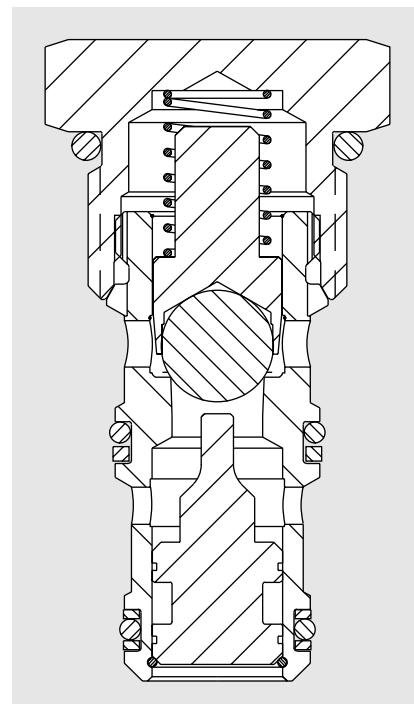
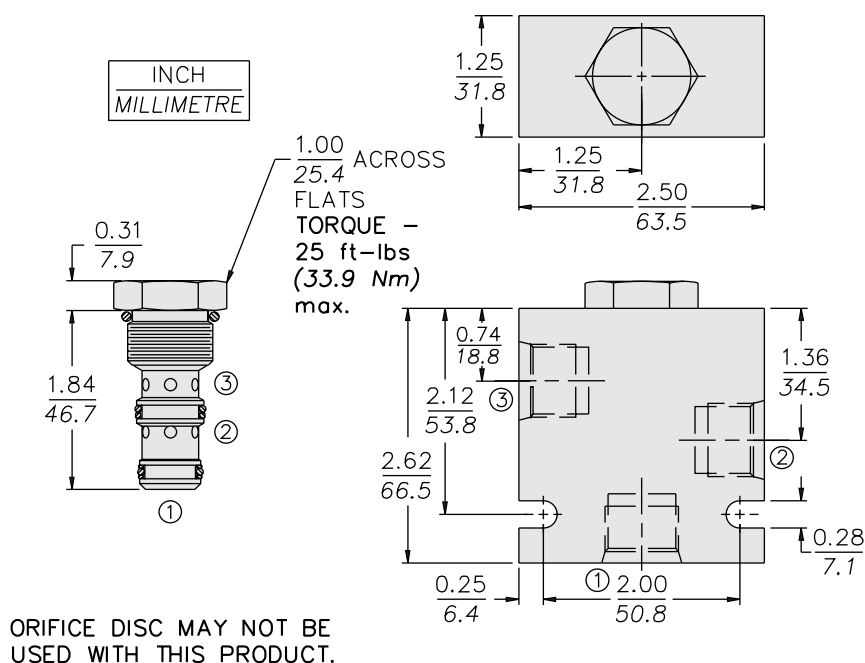


PERFORMANCE (Cartridge Only)



PC10-32

DIMENSIONS



MATERIALS

Cartridge: Weight: 0.09 kg. (0.20 lbs.); Steel with hardened work surfaces. Zinc-plated exposed surfaces. Buna N O-rings and polyester elastomer back-ups standard.

Standard Ported Body: Weight: 0.36 kg. (0.80 lbs.); Anodized high-strength 6061 T6 aluminum alloy, rated to 240 bar (3500 psi); See page 8.010.1. Ductile iron and steel bodies available; dimensions may differ; consult factory.

TO ORDER

PC10-32 -

Porting
Cartridge Only **0**
SAE 6 **6T**
SAE 8 **8T**
1/4 in. BSP* **2B**
3/8 in. BSP* **3B**

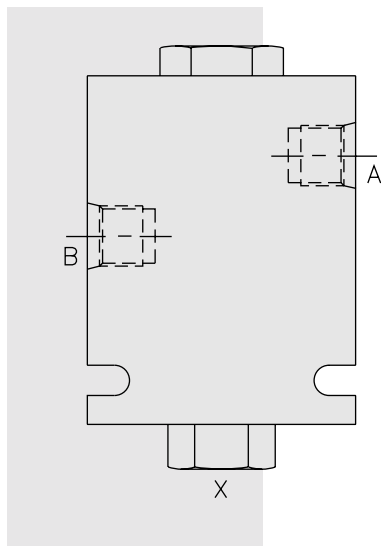
*BSP Body;
U.K. Mfr. Only

Seals
N Buna N (Std.)
2.07 bar (30 psi) spring
NS Buna N with Sealed Piston
6.2 bar (90 psi) spring minimum
V Fluorocarbon
2.07 bar (30 psi) spring
VS Fluorocarbon with Sealed Piston
6.2 bar (90 psi) spring minimum

Note: Non-standard bias spring pressures available for OEM applications. Consult factory.

DIRECTIONAL VALVES

PCV10 Check, Pilot-to-Open



DESCRIPTION

An in-line-housed, pilot-operated, hydraulic check valve for use in blocking or load-holding circuits.

OPERATION

The **PCV10** allows flow from B to A, while normally blocking flow from A to B. Flow will be allowed from A to B when pressure is applied at X.

The check valve has a 4:1 pilot ratio, meaning that at least one-fourth of the load pressure held at A is required at X to open the valve.

The check is spring-biased at 2 bar (30 psi) to assure holding in static or no-load conditions. A sealed pilot piston option with check spring bias of 6.9 bar (100 psi) is available.

FEATURES

- Hardened seat for long life and low leakage.
- Optional sealed pilot piston.
- Optional spring ranges.
- Check section is serviceable as a cartridge.

RATINGS

Operating Pressure: 240 bar (3500 psi)

Flow: See Performance Chart

Internal Leakage:

A to B: 0.25 cc/minute (5 drops/minute) max. at 240 bar (3500 psi);

B to X (without sealed piston): 245 cc/minute (15 cu. in./minute) max. at 240 bar (3500 psi)

Pilot Ratio: 4:1

Temperature: -40 to 120°C with standard Buna seals

Filtration: See page 9.010.1

Fluids: Mineral-based or synthetics with lubricating properties at viscosities of 7.4 to 420 cSt (50 to 2000 ssu)

Installation: No restrictions; See page 9.020.1

Check Spring Bias: 2 bar (30 psi); with sealed piston option, 6.9 bar (100 psi)

Seal Kit (for CV10-20): SK10-2X-T; See page 8.650.1;

Piston Seal: See Dimension Drawing

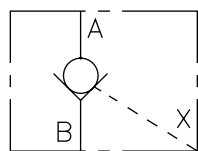
Pilot Piston Service Part Numbers:

O-Ring (1): Buna 6001014; Fluorocarbon 6003014

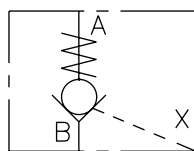
Back-ups (2): Buna 6011014; Fluorocarbon 6011014

SYMBOLS

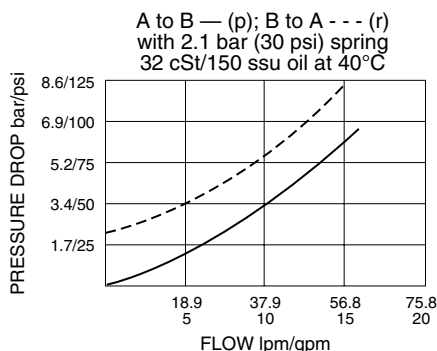
USASI:



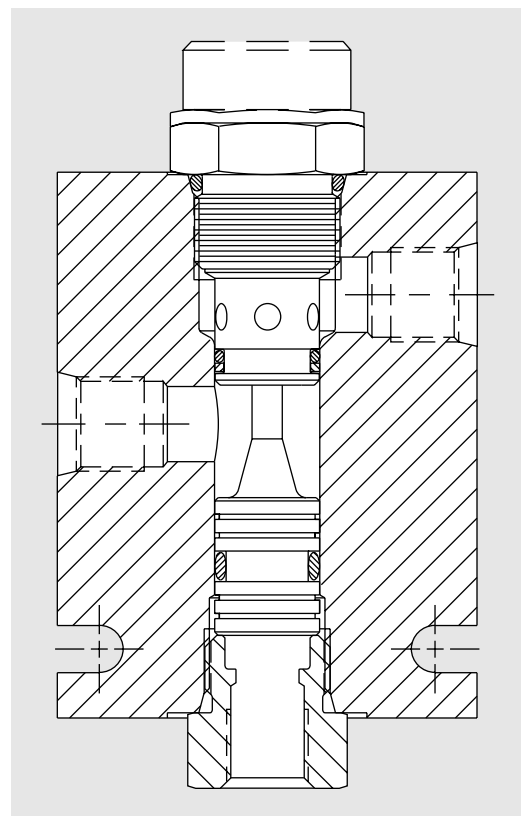
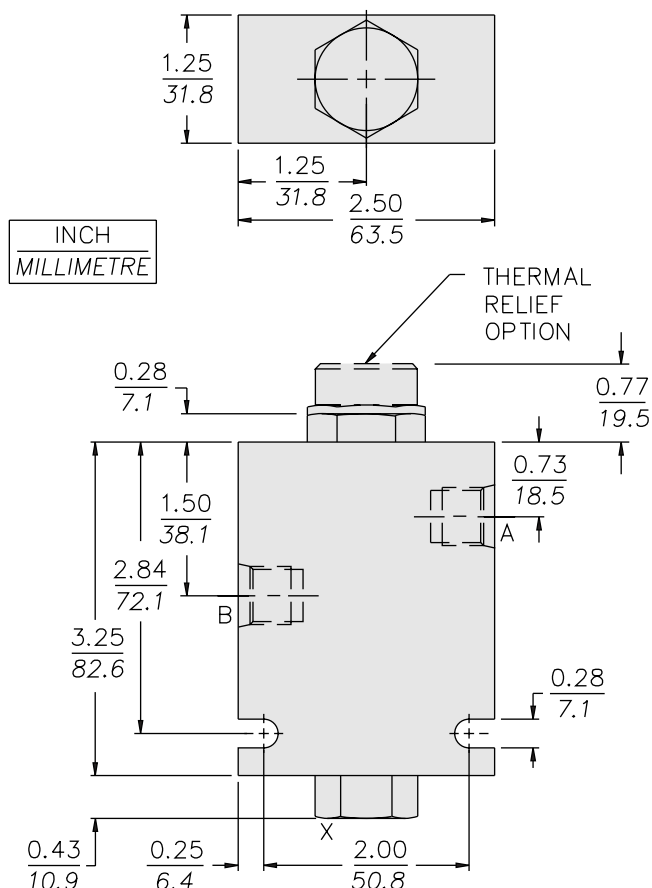
ISO:



PERFORMANCE (Cartridge Only)



DIMENSIONS



MATERIALS

Cartridge (CV10-20): Weight: 0.08 kg. (0.17 lbs.); Steel with hardened work surfaces. Zinc-plated exposed surfaces. Buna N O-rings and polyester elastomer back-ups standard.

Pilot Piston: Hardened steel.

Standard Ported Body: Anodized high-strength 6061 T6 aluminum alloy, rated to 240 bar (3500 psi). Ductile iron and steel bodies available; dimensions may differ; consult factory.

Product Weight: 0.5 kg. (1.10 lbs.).

TO ORDER

PCV10 -

Porting

SAE 6; SAE 6 Pilot **6T**
SAE 8; SAE 6 Pilot **8T**

Bias Spring

(Blank) 2.1 bar (30 psi) (Std.)*
40 2.8 bar (40 psi)
100 6.9 bar (100 psi)
200 13.8 bar (200 psi)
300 20.7 bar (300 psi)

* PCV10 valves built with standard 30 psi spring are not stamped with spring rating. Other spring ratings are stamped on valve.

Seals

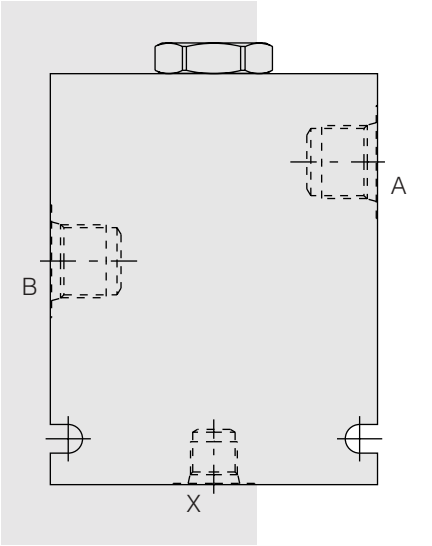
N Buna N (Std.)
NS Buna N w/Sealed Pilot Piston (100 psi spring minimum required)
V Fluorocarbon
VS Fluorocarbon with Sealed Pilot Piston (100 psi spring minimum required)

Options

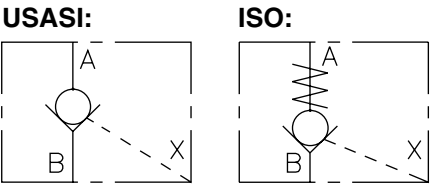
(Blank) None
1 Thermal Relief on C1

DIRECTIONAL VALVES

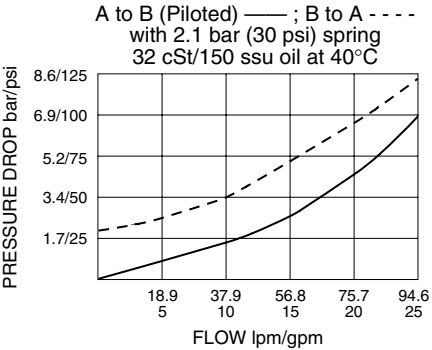
PCV12 Check, Pilot-to-Open



SYMBOLS



PERFORMANCE (Cartridge Only)



DESCRIPTION

An in-line-housed, pilot-operated, hydraulic check valve for use in blocking or load-holding circuits.

OPERATION

The **PCV12** allows flow from B to A, while normally blocking flow from A to B. Flow will be allowed from A to B when pressure is applied at X.

The check valve has a 4:1 pilot ratio, meaning that at least one-fourth of the load pressure held at A is required at X to open the valve.

The check is spring-biased at 2 bar (30 psi) to assure holding in static or no-load conditions.

FEATURES

- Hardened seat for long life and low leakage.
- Optional sealed pilot piston.
- Check section is serviceable as a cartridge.

RATINGS

Maximum Operating Pressure: 240 bar (3500 psi)

Flow: See Performance Chart

Internal Leakage:

- A to B: 0.25 cc/minute (5 drops/minute) max. at 240 bar (3500 psi);
- B to X (without sealed piston): 245 cc/minute (15 cu. in./minute) max. at 240 bar (3500 psi)

Check Bias Spring: 2 bar (30 psi); With Sealed Piston: 4.1 bar (60 psi)

Temperature: -40 to 120°C with standard Buna seals

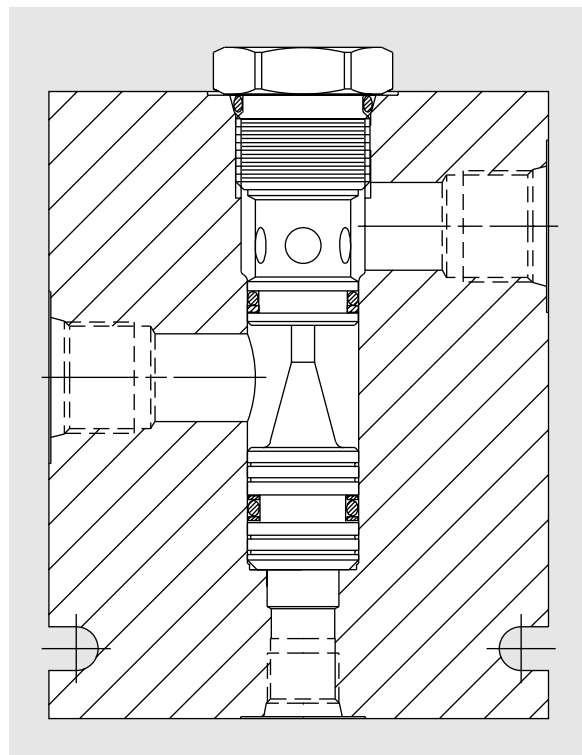
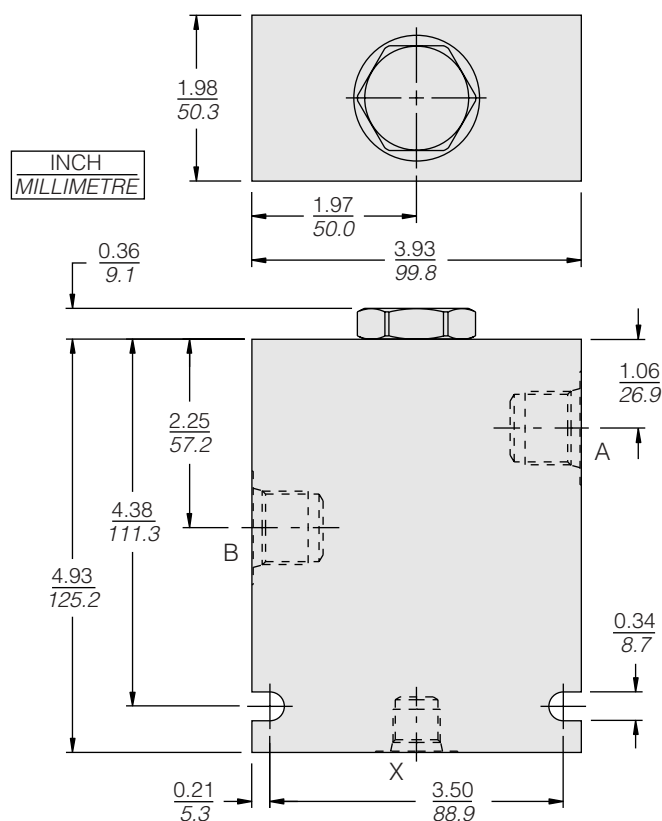
Filtration: See page 9.010.1

Fluids: Mineral-based or synthetics with lubricating properties at viscosities of 7.4 to 420 cSt (50 to 2000 ssu)

Installation: No restrictions; See page 9.020.1

Seal Kit: SK12-2X-T; See page 8.650.1

DIMENSIONS



MATERIALS

Cartridge (CV12-20): Weight: 0.18 kg. (0.40 lbs.); Steel with hardened work surfaces. Zinc-plated exposed surfaces. Buna N O-rings and TFE back-ups standard.

Standard Ported Body: Anodized high-strength 6061 T6 aluminum alloy, rated to 240 bar (3500 psi). Ductile iron and steel bodies available; dimensions may differ; consult factory.

TO ORDER

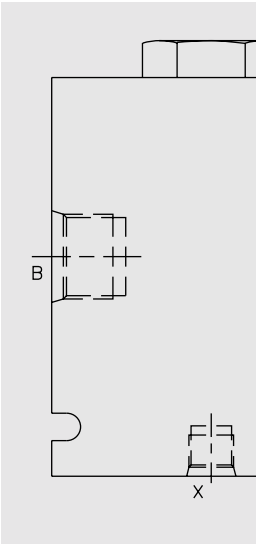
PCV12 -		
Porting		Bias Spring
SAE 10	10T	25 1.7 bar (25 psi)
		30 2.1 bar (30 psi)
		60 4.1 bar (60 psi)

Seals

- N** Buna N (Std.)
- NS** Buna N with Sealed Pilot Piston (60 psi spring minimum required)
- V** Fluorocarbon
- VS** Fluorocarbon with Sealed Pilot Piston (60 psi spring minimum required)

DIRECTIONAL VALVES

PCV16 Check, Pilot-to-Open



DESCRIPTION

An in-line-housed, pilot-operated, hydraulic check valve for use in blocking or load-holding circuits.

OPERATION

The PCV16 allows flow from B to A, while normally blocking flow from A to B. Flow will be allowed from A to B when pressure is applied at X.

The check valve has a 3.8:1 pilot ratio, meaning that at least one-fourth of the load pressure held at A is required at X to open the valve.

The check is spring-biased at 1.7 bar (25 psi) to assure holding in static or no-load conditions. A sealed pilot piston option is available.

FEATURES

- Hardened seat for long life and low leakage.
- Optional sealed pilot piston.
- Optional spring ranges.
- Check section is serviceable as a cartridge.

RATINGS

Operating Pressure: 240 bar (3500 psi)

Flow: See Performance Chart

Internal Leakage:

- A to B: 0.25 cc/minute (5 drops/minute) max. at 240 bar (3500 psi);
- B to X (without sealed piston): 245 cc/minute (15 cu. in./minute) max. at 240 bar (3500 psi)

Pilot Ratio: 3.8:1

Temperature: -40 to 120°C with standard Buna seals

Filtration: See page 9.010.1

Fluids: Mineral-based or synthetics with lubricating properties at viscosities of 7.4 to 420 cSt (50 to 2000 ssu)

Installation: No restrictions; See page 9.020.1

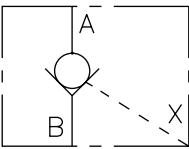
Seal Kit (for CV16-20): SK16-2X-T; See page 8.650.1;

Piston Seals:

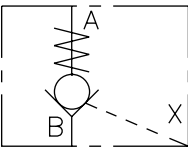
	O-Ring (1)	Back-Ups (2)
Buna	6002119	6010119
Fluorocarbon	6003119	6010119

SYMBOLS

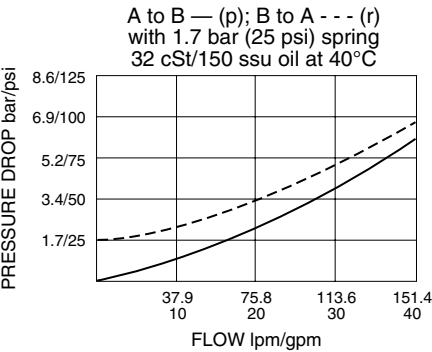
USASI:



ISO:

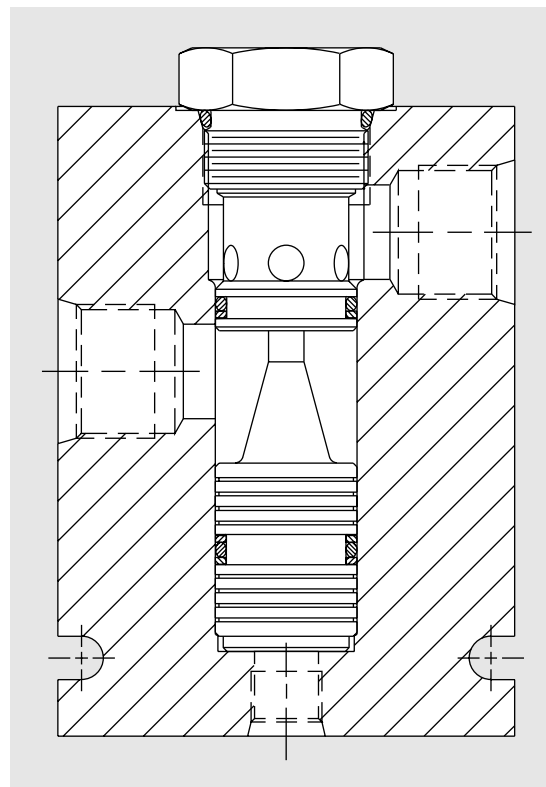
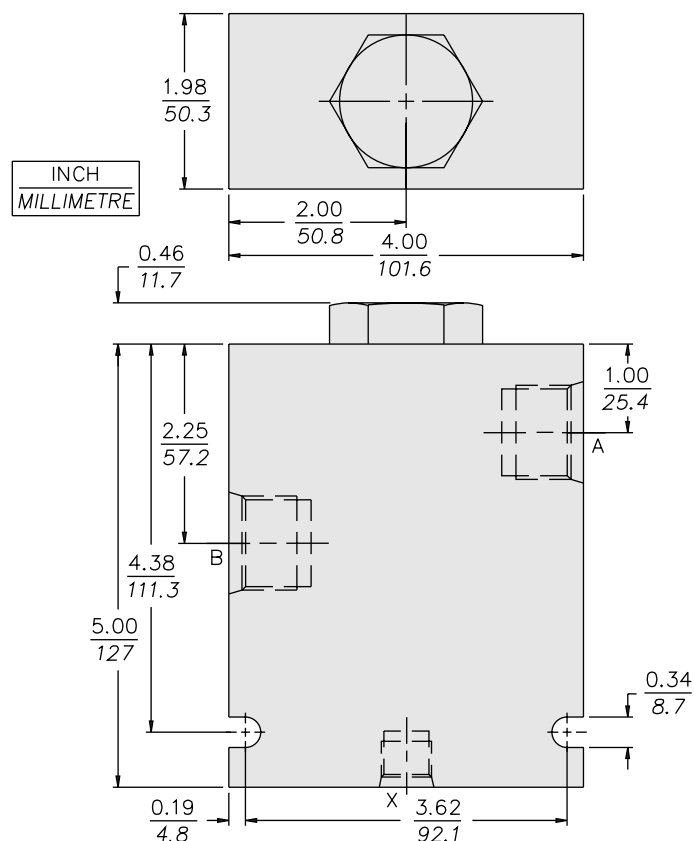


PERFORMANCE (Cartridge Only)



PCV16

DIMENSIONS



MATERIALS

Cartridge (CV16-20): Weight: 0.29 kg. (0.63 lbs.); Steel with hardened work surfaces. Zinc-plated exposed surfaces. Buna N O-rings and polyester elastomer back-ups standard.

Pilot Piston: Hardened steel.

Standard Ported Body: Anodized high-strength 6061 T6 aluminum alloy, rated to 240 bar (3500 psi). Ductile iron and steel bodies available; dimensions may differ; consult factory.

TO ORDER

PCV16 -

Porting
SAE 12
w/ SAE 6 Pilot 12T

Bias Spring

(Blank) 1.7 bar (25 psi) (Std.)*
60 4.1 bar (60 psi)
100 6.9 bar (100 psi)

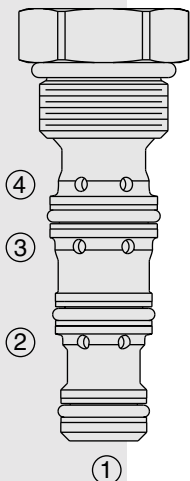
* PCV16 valves built with standard 25 psi spring are not stamped with spring rating. Other spring ratings are stamped on valve.

Seals

N Buna N (Std.)
NS Buna N with Sealed Pilot Piston (60 psi spring minimum required)
V Fluorocarbon
VS Fluorocarbon with Sealed Pilot Piston (60 psi spring minimum required)

DIRECTIONAL VALVES

DC08-40 Pilot Operated Check Valve



DESCRIPTION

A dual pilot operated check valve for use in blocking or load-holding circuits.

OPERATION

The **DC08-40** will block flow from ① to ②, and from ④ to ③. Flow is allowed in the opposite direction when pressure is applied to port ② and/or port ③.

The valve has a 3:1 pilot ratio, so at least 1/3 of the load pressure at port ① or ④ is required at the pilot lines (ports ② or ③) to open the flow passage to allow flow from ports ① or ④.

The check is spring-biased at 25 psi to assure holding in a static or no load condition. An optional spring biased at 135 psi is available.

FEATURES

- Hardened seat for long life and low leakage.
- Low pressure drop.

RATINGS

Operating Pressure: Inlet: 240 bar (3500 psi)

Flow: Rated Inlet Flow: 19 lpm (5 gpm); see performance chart

Pilot Ratio: 3:1

Check Spring Bias: 1.7 bar (25 psi); Optional 9.3 bar (135 psi)

Leakage: 5 drops per minute (0.25 ml per minute) at 3000 psi

Temperature: -40 to 120°C with Buna N seals

Filtration: See page 9.010.1

Fluids: Mineral-based or synthetics with lubricating properties at viscosities of 7.4 to 420 cSt (50 to 2000 ssu)

Installation: No restrictions; See page 9.020.1

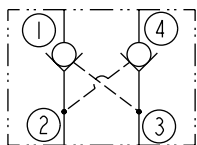
Cavity: VC08-4; See page 9.108.1

Cavity Tool: CT08-4XX-X-X; See page 8.600.1

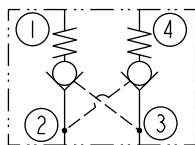
Seal Kit: SK08-4X-MMM; See page 8.650.1

SYMBOLS

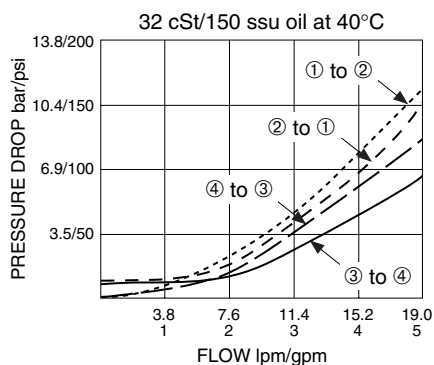
USASI:



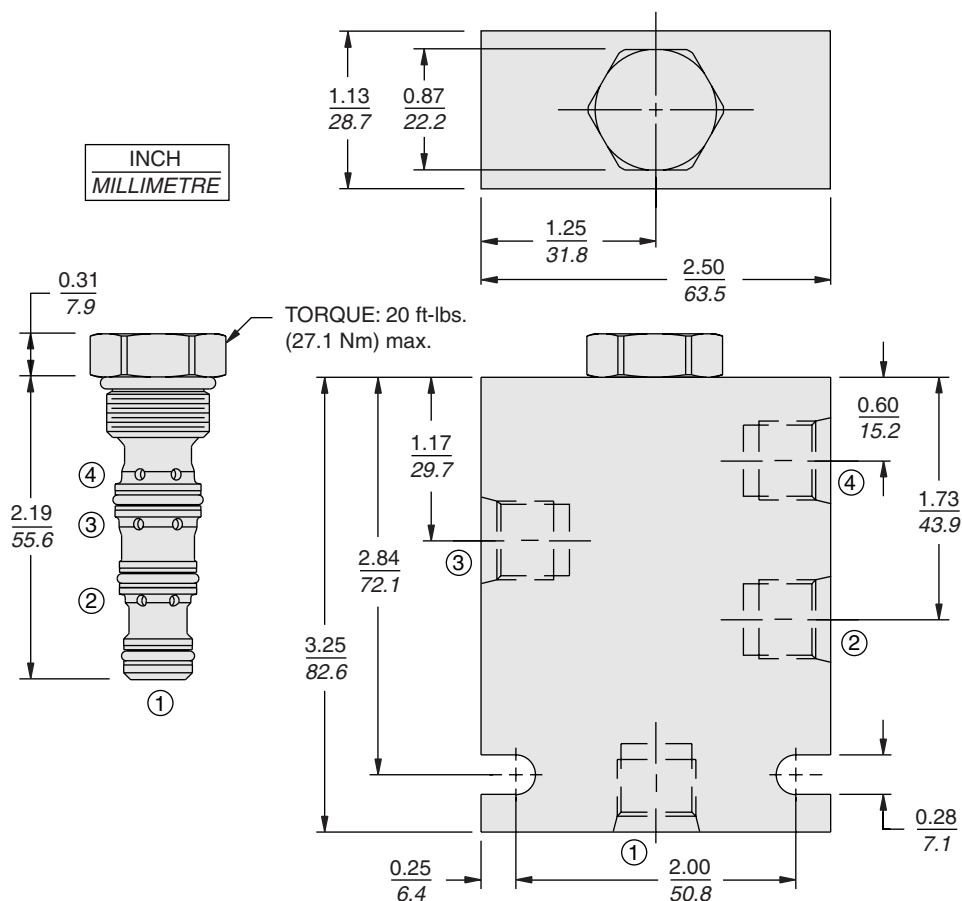
ISO:



PERFORMANCE (Cartridge Only)



DIMENSIONS



MATERIALS

Cartridge: Weight: 0.13 kg. (0.28 lbs.); Steel with hardened work surfaces. Zinc-plated exposed surfaces. Buna N O-rings and polyester elastomer back-ups standard.

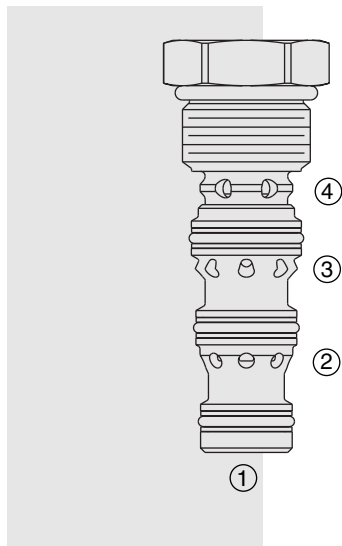
Standard Ported Body: Weight: 0.18 kg. (0.40 lbs.); Anodized high-strength 6061 T6 aluminum alloy, rated to 240 bar (3500 psi). See page 8.008.1. Ductile iron and steel bodies available; dimensions may differ; consult factory.

TO ORDER

DC08-40 - - - -			
Porting			Bias Spring
Cartridge Only	0		25 1.7 bar (25 psi) Standard
SAE 6	6T		135 9.3 bar (135 psi) Optional
1/4 in. BSP*	2B		
3/8 in. BSP*	3B		
*BSP Body; U.K. Mfr. Only		Seals	
		N	Buna N (Std.)
		V	Fluorocarbon

DIRECTIONAL VALVES

DC10-40 Pilot Operated Check Valve



DESCRIPTION

A dual pilot operated check valve for use in blocking or load-holding circuits. This valve has an optional thermal relief from port ④ to port ③.

OPERATION

The **DC10-40** will block flow from ① to ②, and from ④ to ③. Flow is allowed in the opposite direction when pressure is applied to port ② and/or port ④.

The valve has a 3:1 pilot ratio, so at least 1/3 of the load pressure at port ① or ④ is required at the pilot lines (ports ② or ③) to open the flow passage to allow flow from ports ① or ④.

The check is spring-biased at 25 psi to assure holding in a static or no load condition.

FEATURES

- Hardened seat for long life and low leakage.
- Low pressure drop.
- Optional thermal relief.

RATINGS

Operating Pressure: Inlet: 240 bar (3500 psi)

Flow: Rated Inlet Flow: 30.3 lpm (8 gpm); See performance chart.

Pilot Ratio: 3:1

Check Spring Bias: 1.7 bar (25 psi)

Thermal Relief Crack Pressure Range: 310 to 386 bar (4500 to 5600 psi)

Thermal Relief Valve Leakage: 5 drops per minute (0.25 ml per minute) at up to 85% of crack pressure.

Maximum Check Valve Leakage: 5 drops per minute (0.25 ml per minute) at 240 bar (3500 psi).

Temperature: -40 to 120°C with Buna N seals

Filtration: See page 9.010.1

Fluids: Mineral-based or synthetics with lubricating properties at viscosities of 7.4 to 420 cSt (50 to 2000 sus)

Installation: No restrictions; See page 9.020.1

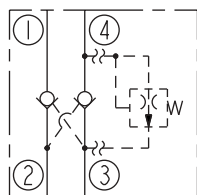
Cavity: VC10-4; See page 9.110.1

Cavity Tool: CT10-4XX-X-X; See page 8.600.1

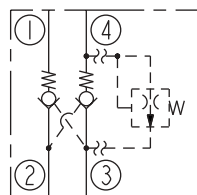
Seal Kit: SK10-4X-MMM; See page 8.650.1

SYMBOLS

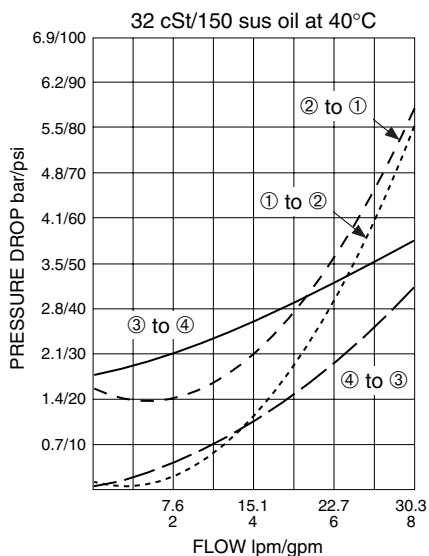
USASI:



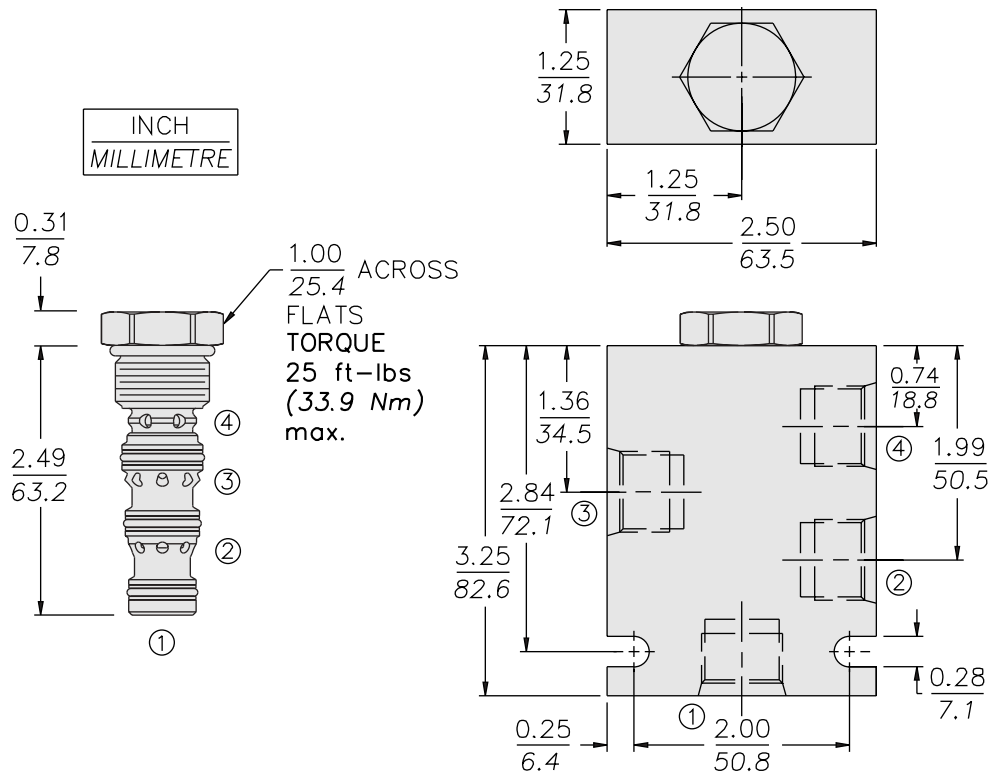
ISO:



PERFORMANCE (Cartridge Only)



DIMENSIONS



MATERIALS

Cartridge: Weight: 0.13 kg. (0.28 lbs.); Steel with hardened work surfaces. Zinc-plated exposed surfaces. Buna N O-rings and polyester elastomer back-ups standard.

Standard Ported Body: Weight: 0.34 kg. (0.75 lbs.); Anodized high-strength 6061 T6 aluminum alloy, rated to 240 bar (3500 psi). See page 8.010.1. Ductile iron and steel bodies available; dimensions may differ; consult factory.

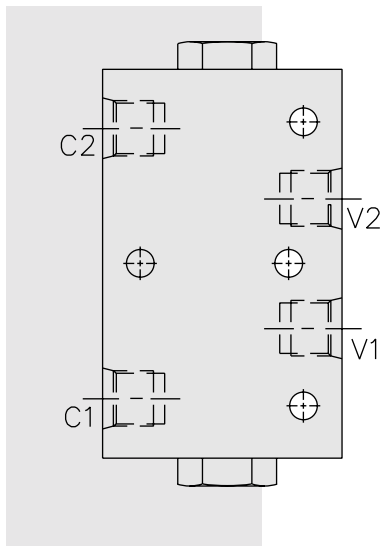
TO ORDER

DC10-40			
Option			
None (Blank)			
Thermal Relief	T		
Porting			
Cartridge Only	0		
SAE 6	6T		
SAE 8	8T		
1/4 in. BSP*	2B		
3/8 in. BSP*	3B		
Bias Spring			
25			1.7 bar (25 psi) Standard
Seals			
N			Buna N (Std.)
V			Fluorocarbon

*BSP Body;
U.K. Mfr. Only

DIRECTIONAL VALVES

DCV08 Lock Valve



DESCRIPTION

An in-line-housed, double-pilot-operated, hydraulic check valve for use in blocking or load holding circuits.

OPERATION

The **DCV08** allows flow from V ports to C ports, while normally blocking flow in the opposite direction. Flow will be allowed from C to V when pressure is applied to the opposite side V port.

The valve has a 4:1 pilot ratio, so approximately one-fourth of the load pressure held at either C port is required at the opposite V port to open the flow passage.

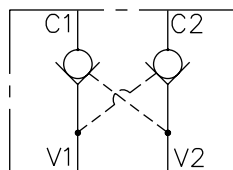
The check is spring-biased at 1.7 bar (25 psi) to assure holding in static or no-load conditions. An optional sealed piston with check spring bias of 6.9 bar (100 psi) is available.

FEATURES

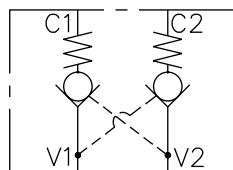
- Hardened seat for long life and low leakage.
- Check section serviceable as a cartridge.
- Optional sealed piston.
- Optional spring ranges.
- Low pressure drop.

SYMBOLS

USASI:



ISO:



RATINGS

Flow: See Performance Chart

Internal Leakage Cx to Vx: 0.25 cc/minute (5 drops/minute) max. at 207 bar (3000 psi)

V1 to V2 (without sealed piston): 328 cc/minute (20 cu. in./minute) max. at 240 bar (3500 psi)

Pilot Ratio: 4:1

Temperature: -40 to 120°C with standard Buna seals

Filtration: See page 9.010.1

Fluids: Mineral-based or synthetics with lubricating properties at viscosities of 7.4 to 420 cSt (50 to 2000 ssu)

Installation: No restrictions; See page 9.020.1

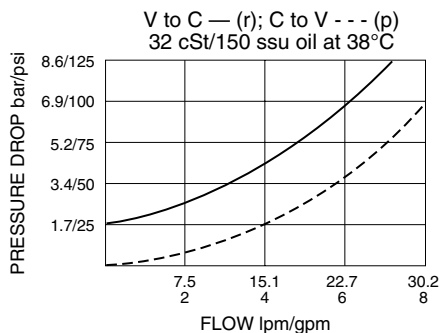
Seal Kit: See CV08-2X, page 4.010.1

Pilot Piston Service Part Numbers:

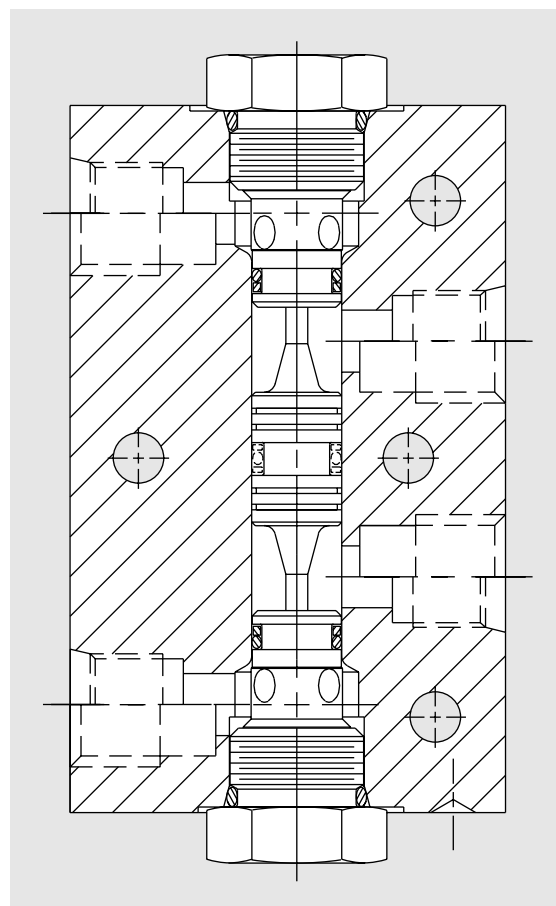
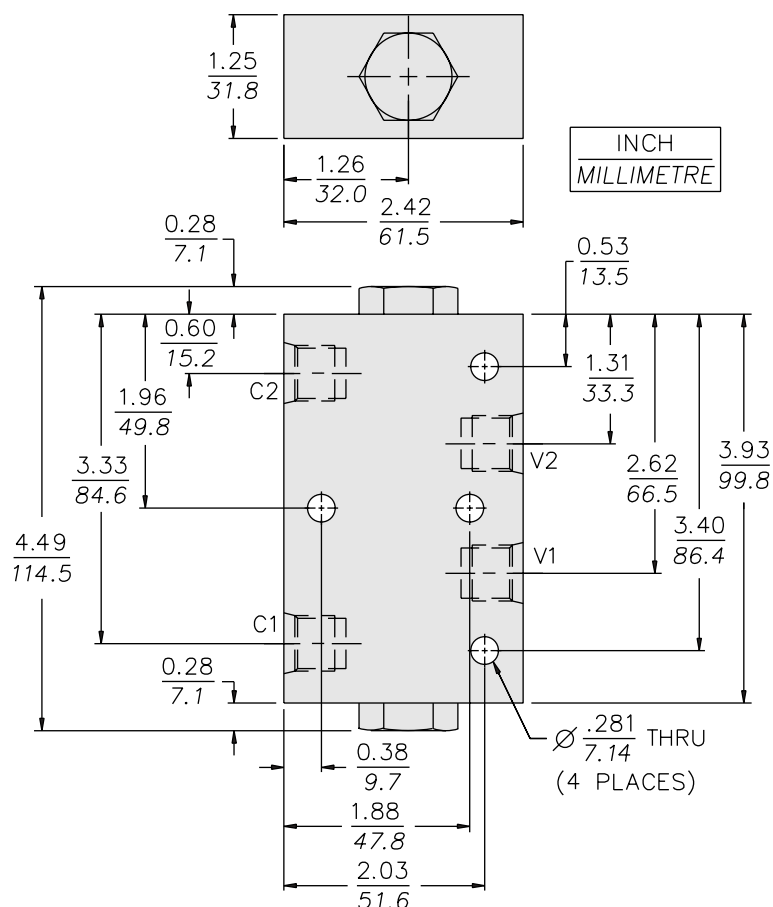
O-Ring (1) – Buna 6001012, Fluorocarbon 6003012

Back-up (2) – Buna 6011012, Fluorocarbon 6011012

PERFORMANCE (Cartridge Only)



DIMENSIONS



MATERIALS

Cartridge: (CV08-20): Steel with hardened work surfaces; Zinc-plated exposed surfaces; Buna N O-rings and back-up standard.

Pilot Piston: Hardened steel.

Standard Ported Body: Anodized high-strength 6061 T6 aluminum alloy, rated to 240 bar (3500 psi). See page 8.008.1. Ductile iron and steel bodies available; dimensions may differ; consult factory.

Product Weight: 0.58 kg. (1.28 lbs.)

TO ORDER

DCV08-

Porting

SAE 6 **6T**
SAE 8 **8T**
1/4 in. BSP* **2B**
3/8 in. BSP* **3B**

*BSP Body;
U.K. Mfr. Only

Seals

Buna N (Std.) **N**
Fluorocarbon **V**
Buna N w/Sealed Piston **NS**
(100 psi spring minimum required)
Fluorocarbon w/Sealed Piston **VS**
(100 psi spring minimum required)

Bias Spring

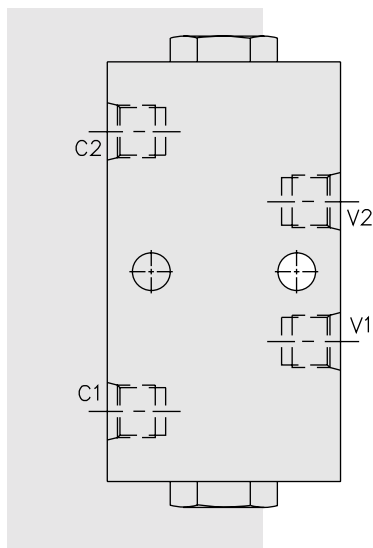
(Blank) 1.7 bar (25 psi) (Std.)*
60 4.1 bar (60 psi)
100 6.9 bar (100 psi)
150 10.3 bar (150 psi)
200 13.8 bar (200 psi)
270 18.3 bar (270 psi)

Note: Both check valves must have same spring value.

* DCV08 valves built with standard 25 psi spring are not stamped with spring rating. Other spring ratings are stamped on valve.

DIRECTIONAL VALVES

DCV10 Lock Valve



DESCRIPTION

An in-line-housed, double-pilot-operated, hydraulic check valve with optional thermal reliefs for use in blocking or load holding circuits.

OPERATION

The **DCV10** allows flow from V ports to C ports, while normally blocking flow in the opposite direction. Flow will be allowed from C to V when pressure is applied to the opposite side V port.

The valve has a 4:1 pilot ratio, so at least one-fourth of the load pressure held at either C port is required at the opposite V port to open the flow passage.

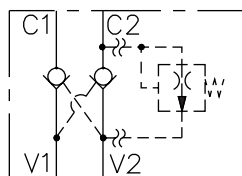
The check is spring-biased at 2 bar (30 psi) to assure holding in static or no-load conditions. An optional sealed piston with check spring bias of 6.9 bar (100 psi) is available. Optional thermal reliefs are preset to 214.5 bar (4700 psi) as standard.

FEATURES

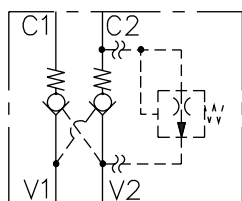
- Hardened seat for long life and low leakage.
- Check section serviceable as a cartridge.
- Optional cartridge thermal relief(s).
- Optional sealed piston.
- Optional spring ranges.
- Low pressure drop.

SYMBOLS

USASI:



ISO:



RATINGS

Flow: See Performance Chart

Optional Thermal Relief Factory Setting: 348 ±38 bar (5050 ±550 psi)

Thermal Relief Reseat: 276 bar (4000 psi)

Internal Leakage Cx to Vx: 0.25 cc/minute (5 drops/minute) max. at 207 bar (3000 psi);

V1 to V2 (without sealed piston): 328 cc/minute (20 cu. in./minute) max. at 240 bar (3500 psi)

Pilot Ratio: 4:1

Check Spring Bias: 2 bar (30 psi); with sealed piston option, 6.9 bar (100 psi)

Temperature: -40 to 120°C with standard Buna seals

Filtration: See page 9.010.1

Fluids: Mineral-based or synthetics with lubricating properties at viscosities of 7.4 to 420 cSt (50 to 2000 ssu)

Installation: No restrictions; See page 9.020.1

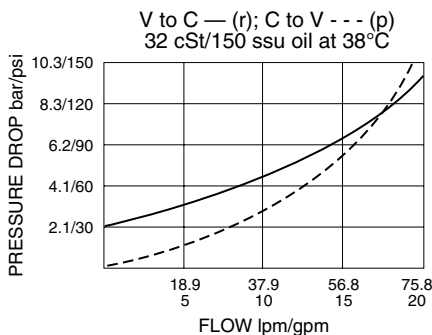
Seal Kit: See CV10-2X, page 4.011.1

Pilot Piston Service Part Numbers:

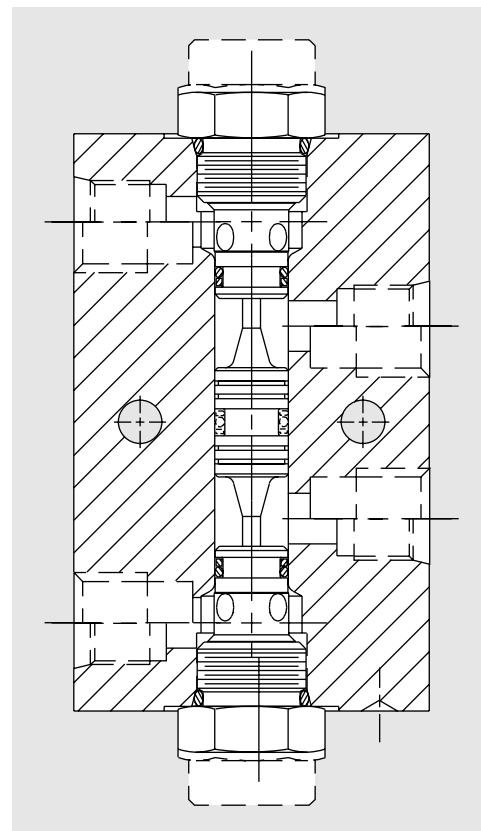
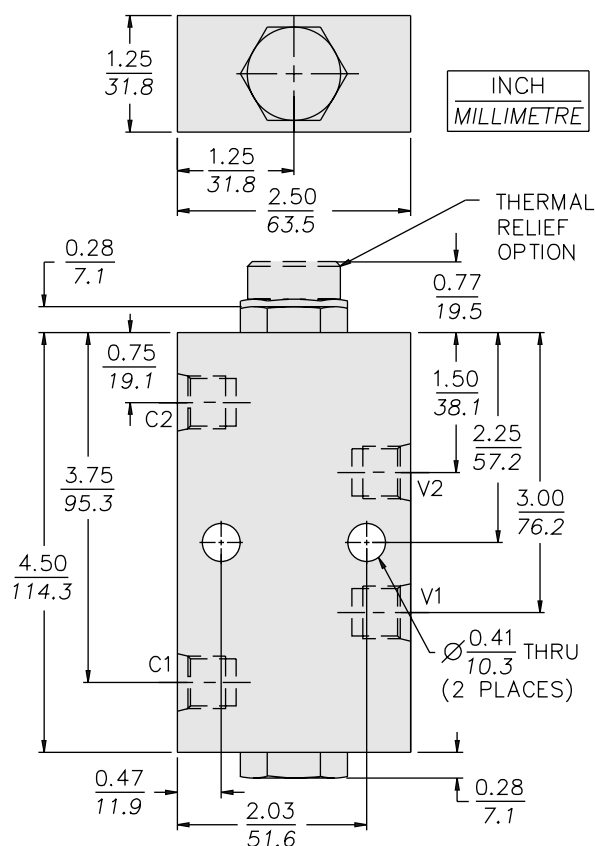
O-Ring (1) – Buna 6001014, Fluorocarbon 6003014

Back-up (2) – Buna 6011014, Fluorocarbon 6011014

PERFORMANCE (Cartridge Only)



DIMENSIONS



MATERIALS

Cartridge: (CV10-20): Steel with hardened work surfaces; Zinc-plated exposed surfaces; Buna N O-rings and polyester elastomer back-ups standard.

Pilot Piston: Hardened steel.

Standard Ported Body: Anodized high-strength 6061 T6 aluminum alloy, rated to 240 bar (3500 psi). See page 8.010.1. Ductile iron and steel bodies available; dimensions may differ; consult factory.

Product Weight: 0.58 kg. (1.28 lbs.)

TO ORDER

DCV10-

Porting

SAE 6 6T
SAE 8 8T

Seals

Buna N (Std.) N
Fluorocarbon V
Buna N w/Sealed Piston NS
(100 psi spring minimum required)
Fluorocarbon w/Sealed Piston VS
(100 psi spring minimum required)

Bias Spring

(Blank) 2.1 bar (30 psi) (Std.)*
40 2.8 bar (40 psi)
70 4.8 bar (70 psi)
100 6.9 bar (100 psi)
200 13.6 bar (200 psi)
300 20.4 bar (300 psi)

Note: Both check valves must have same spring value.

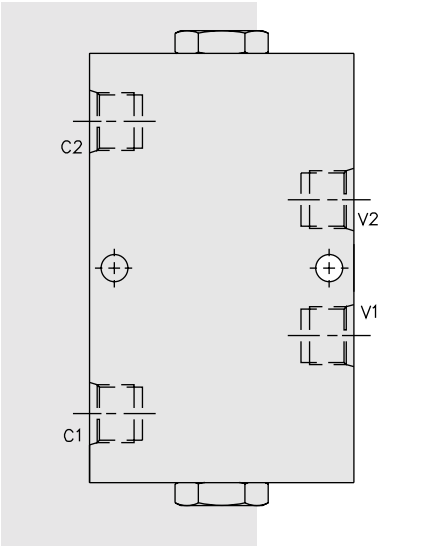
* DCV10 valves built with standard 30 psi spring are not stamped with spring rating. Other spring ratings are stamped on valve.

Options

None (Blank)
Thermal Relief on C1 1
Thermal Relief on C2 2
Thermal Relief on C1 and C2 3

DIRECTIONAL VALVES

DCV12 Lock Valve



DESCRIPTION

An in-line-housed, double-pilot-operated, hydraulic check valve with optional thermal reliefs for use in blocking or load holding circuits.

OPERATION

The DCV12 allows flow from V ports to C ports, while normally blocking flow in the opposite direction. Flow will be allowed from C to V when pressure is applied to the opposite side V port.

The valve has a 4:1 pilot ratio, so at least one-fourth of the load pressure held at either C port is required at the opposite V port to open the flow passage.

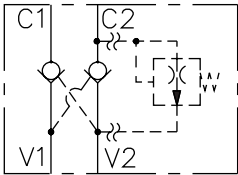
The check is spring-biased at 1.7 bar (25 psi) to assure holding in static or no-load conditions. An optional sealed piston with check spring bias of 4.1 bar (60 psi) is available. Optional thermal reliefs are preset to 214.5 bar (4700 psi) as standard.

FEATURES

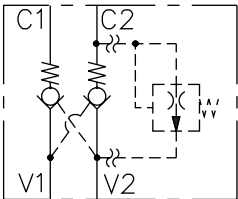
- Hardened seat for long life and low leakage.
- Check section serviceable as a cartridge.
- Optional cartridge thermal relief(s).
- Optional sealed piston.
- Optional spring ranges.
- Low pressure drop.

SYMBOLS

USASI:



ISO:



RATINGS

Flow: See Performance Chart

Optional Thermal Relief Factory Setting: 214.5 bar (4700 psi) ± 14 bar (400 psi)

Thermal Relief Reseat: 207 bar (3000 psi) min.

Internal Leakage Cx to Vx: 0.25 cc/minute (5 drops/minute) max.

at 207 bar (3000 psi);

Vx to Vx (without sealed piston): 328 cc/minute (20 cu. in./minute) max.

at 240 bar (3500 psi)

Pilot Ratio: 4:1

Check Spring Bias: 1.7 bar (25 psi); with sealed piston option, 4.1 bar (60 psi)

Temperature: -40 to 120°C with standard Buna seals

Filtration: See page 9.010.1

Fluids: Mineral-based or synthetics with lubricating properties at viscosities of 7.4 to 420 cSt (50 to 2000 ssu)

Installation: No restrictions; See page 9.020.1

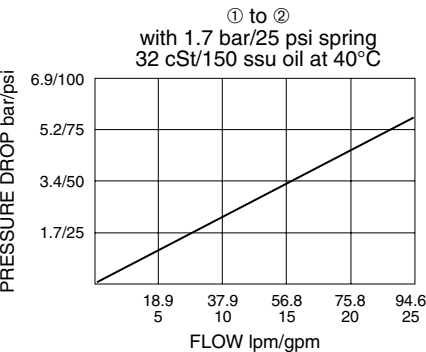
Seal Kit: See CV12-2X, page 4.013.1

Pilot Piston Service Part Numbers:

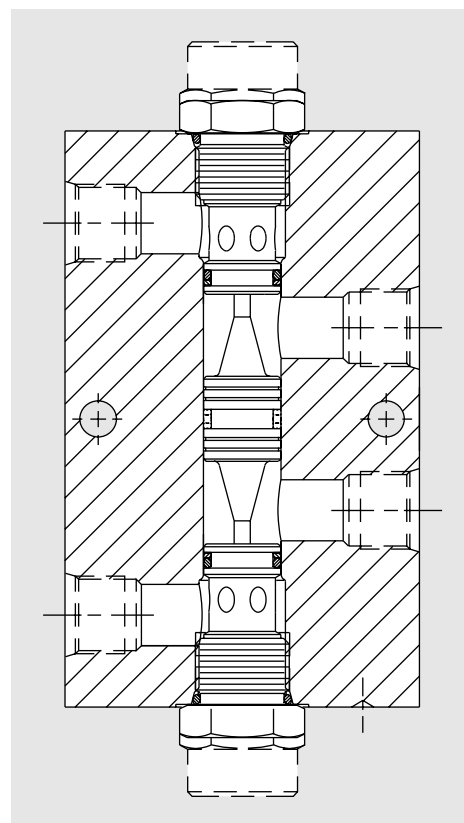
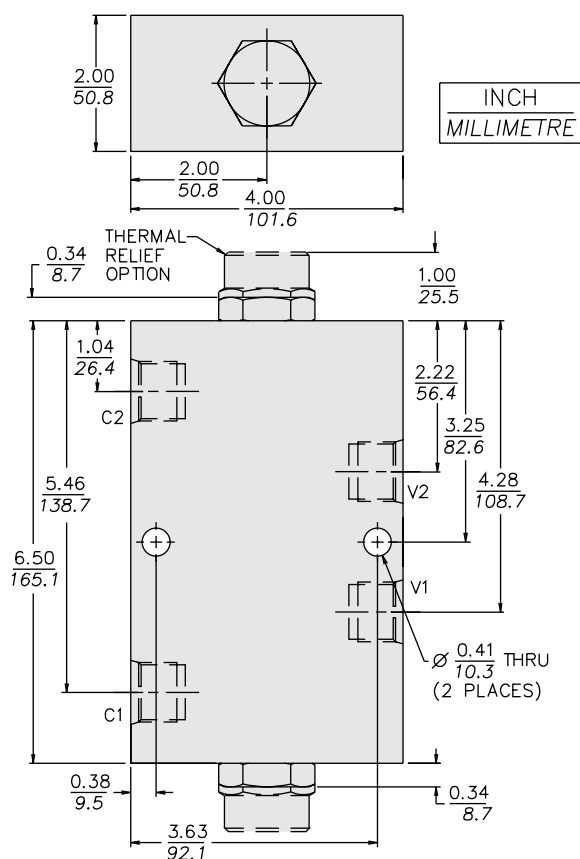
O-Ring (1) – Buna 6001115, Fluorocarbon 6003115

Back-up (2) – Fluorocarbon 6011115 (all)

PERFORMANCE (Cartridge Only)



DIMENSIONS



MATERIALS

Cartridge: (CV12-20; CV12-28): Steel with hardened work surfaces; Zinc-plated exposed surfaces; Buna N O-rings and polyester elastomer back-ups standard.

Pilot Piston: Hardened steel.

Standard Ported Body: Anodized high-strength 6061 T6 aluminum alloy, rated to 240 bar (3500 psi). See page 8.012.1. Ductile iron and steel bodies available; dimensions may differ; consult factory.

Product Weight: 2.4 kg. (5.3 lbs.)

TO ORDER

DCV12-

Porting

SAE 10 **10T**
SAE 12 **12T**
SAE 16 **16T**

Seals

Buna N (Std.) **N**
Fluorocarbon **V**
Buna N w/Sealed Piston **NS**
(100 psi spring minimum required)
Fluorocarbon w/Sealed Piston **VS**
(100 psi spring minimum required)

Options

None (Blank)
Thermal Relief on C1 **1**
Thermal Relief on C2 **2**
Thermal Relief on C1 and C2 **3**

Bias Spring

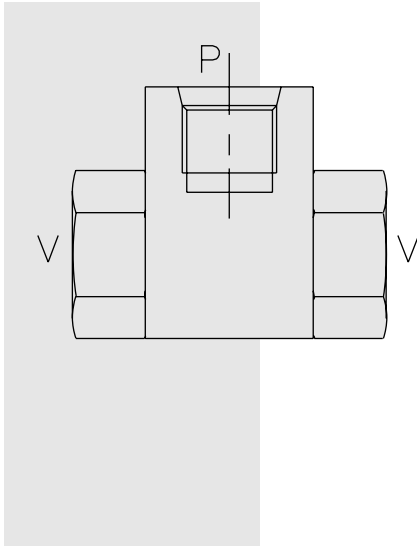
(Blank) 1.7 bar (25 psi) (Std.)*
30 2.1 bar (30 psi)
60 4.1 bar (60 psi)

Note: Both check valves must have same spring value.

* DCV12 valves built with standard 25 psi spring are not stamped with spring rating. Other spring ratings are stamped on valve.

DIRECTIONAL VALVES

LSV1 Load Shuttle, Ball-Type



DESCRIPTION

An in-line plumbed, low leak, load-shuttling hydraulic check valve for use as a directional selector.

OPERATION

The **LSV1** will allow flow from the higher pressure of ① or ③ to ②.

The valve is commonly used to direct oil from the pressure side of a bidirectional hydraulic motor to a pressure-released hydraulic brake.

FEATURES

- Hardened seat for long life and low leakage.
- Rapid response to load direction changes.
- Compact size.

RATINGS

Operating Pressure: 240 bar (3500 psi)

Flow: See Performance Chart

Internal Leakage: 0.25 cc/minute (5 drops/minute) max. at 207 bar (3000 psi)

Temperature: -40 to 120°C with standard Buna seals

Filtration: See page 9.010.1

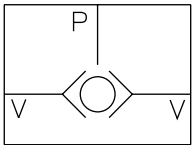
Fluids: Mineral-based or synthetics with lubricating properties at viscosities of 7.4 to 420 cSt (50 to 2000 ssu)

Installation: No restrictions

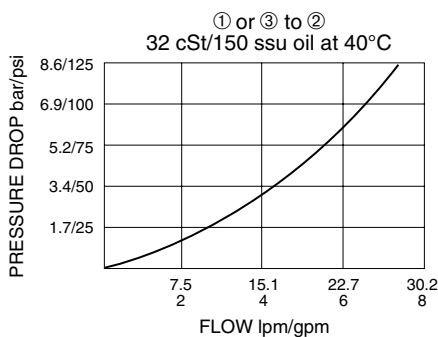
Seal Kit: Non-serviceable

SYMBOLS

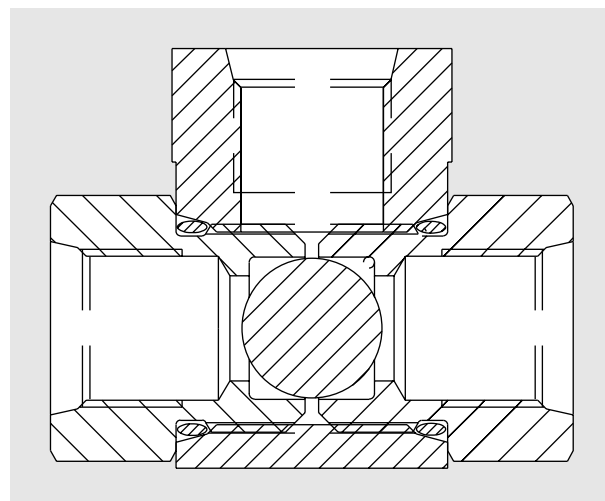
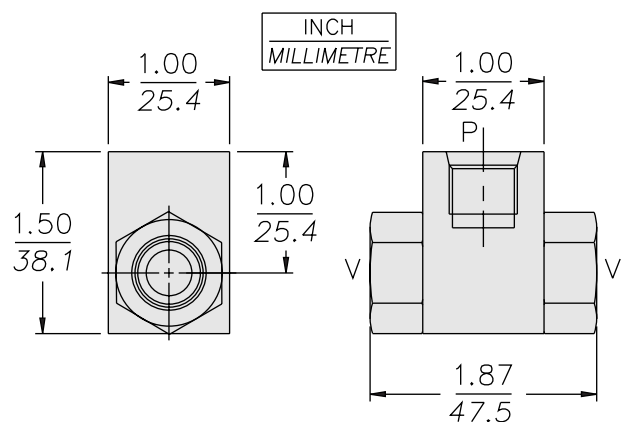
USAS/ISO:



PERFORMANCE (Cartridge Only)



DIMENSIONS



MATERIALS

Internal Parts: Steel; Zinc-plated exposed surfaces. Buna N O-rings standard.

Standard Ported Body: Anodized high-strength 6061 T6 aluminum alloy, rated to 240 bar (3500 psi).

Weight: 0.13 kg. (0.28 lbs.).

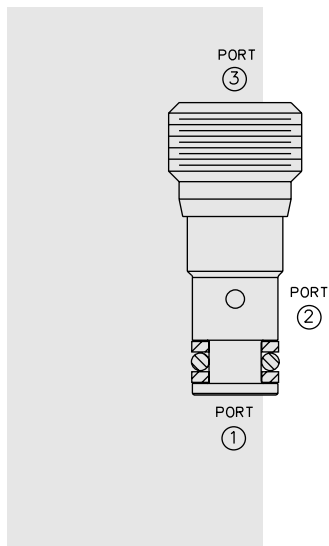
TO ORDER

LSV1 -

Porting	6T	Seals
SAE 6		N Buna N (Std.)
SAE 6 (Steel)	6TS	V Fluorocarbon

DIRECTIONAL VALVES

LS04-B30 Load Shuttle, Ball-Type, “Down-Hole” Mount



DESCRIPTION

A load-shuttling, screw-in, cartridge-style hydraulic check valve, for use in blocking circuits where a priority of flow/direction is given to a higher pressure circuit over a lower one.

OPERATION

The **LS04-B30** will allow flow from the higher pressure of ① or ③ port to the ② port.

The valve is commonly used to direct oil from the pressure side of a bidirectional hydraulic motor to a pressure-released hydraulic brake. It can also be used as a load-sense signaling valve.

FEATURES

- Rapid response to load direction changes.
- Miniature size.

RATINGS

Operating Pressure: 240 bar (3500 psi)

Flow: See Performance Chart

Internal Leakage: 0.25 cc/minute (5 drops/minute) max. at 207 bar(3000 psi)

Temperature: -40 to 120°C with standard Buna seals

Filtration: See page 9.010.1

Fluids: Mineral-based or synthetics with lubricating properties at viscosities of 7.4 to 420 cSt (50 to 2000 ssu)

Installation: No restrictions; See page 9.020.1

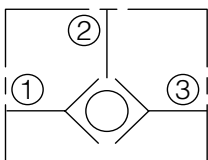
Cavity: VC04-B3; See page 9.104.1

Cavity Tool: CT04-3XX; See page 8.600.1

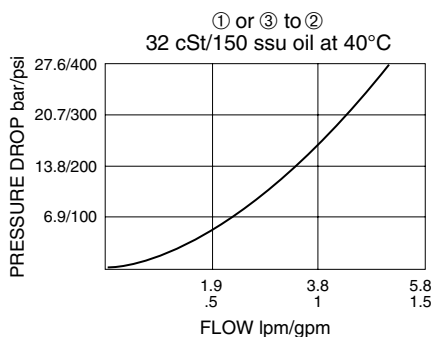
Seal Kit: SK04-B3X-M; See page 8.650.1

SYMBOLS

USAS/ISO:

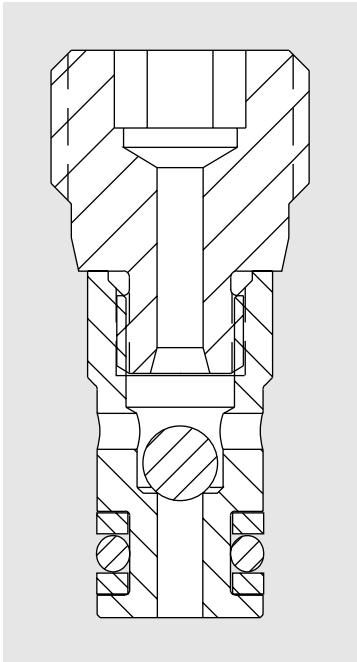
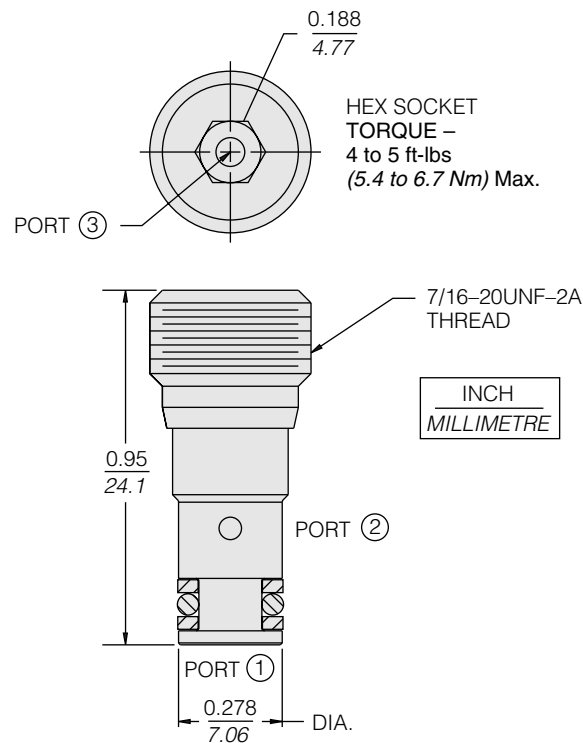


PERFORMANCE (Cartridge Only)



LS04-B30

DIMENSIONS



MATERIALS

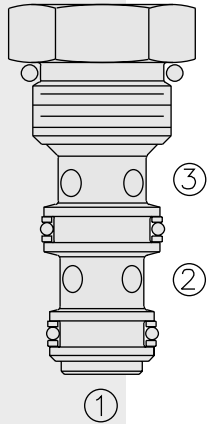
Cartridge: Weight: 0.08 kg. (0.17 lbs.);
Steel; Zinc-plated exposed surfaces;
Buna N O-rings and back-ups
standard.

TO ORDER

LS04-B30-0-	
Mounting Below the Surface	B
Porting Cartridge Only	0
Seals N Buna N (Std.) V Fluorocarbon	

DIRECTIONAL VALVES

LS08-30 Load Shuttle, Ball-Type



DESCRIPTION

A load-shuttling, screw-in, cartridge-style hydraulic check valve, for use in blocking circuits where a priority of flow/direction is given to a higher pressure circuit over a lower one.

OPERATION

The **LS08-30** will allow flow from the higher pressure of ① or ③ port to the ② port. The valve is commonly used to direct oil from the pressure side of a bidirectional hydraulic motor to a pressure-released hydraulic brake.

FEATURES

- Rapid response to load direction changes.
- Compact size.

RATINGS

Operating Pressure: 240 bar (3500 psi)

Proof Pressure: 390 bar (5700 psi)

Flow: See Performance Chart

Internal Leakage: 0.25 cc/minute (5 drops/minute) max. at 207 bar(3000 psi)

Temperature: -40 to 120°C with standard Buna seals

Filtration: See page 9.010.1

Fluids: Mineral-based or synthetics with lubricating properties at viscosities of 7.4 to 420 cSt (50 to 2000 ssu)

Installation: No restrictions; See page 9.020.1

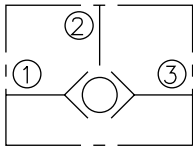
Cavity: VC08-3; See page 9.108.1

Cavity Tool: CT08-3XX; See page 8.600.1

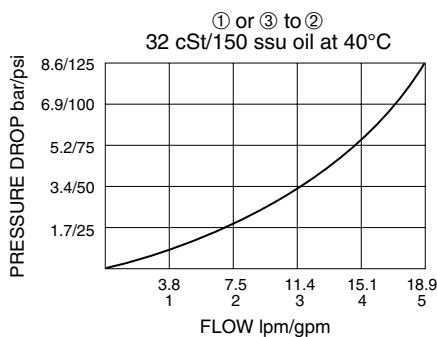
Seal Kit: SK08-3X-MM; See page 8.650.1

SYMBOLS

USAS/ISO:

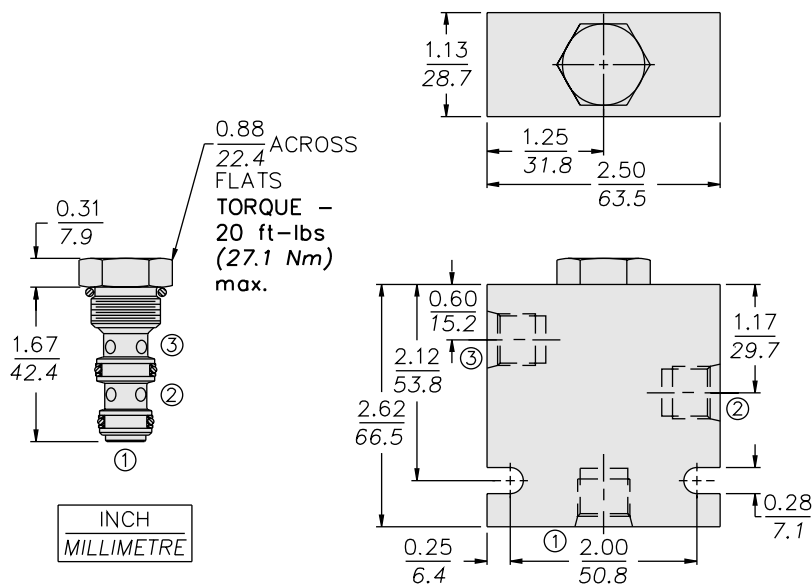


PERFORMANCE (Cartridge Only)

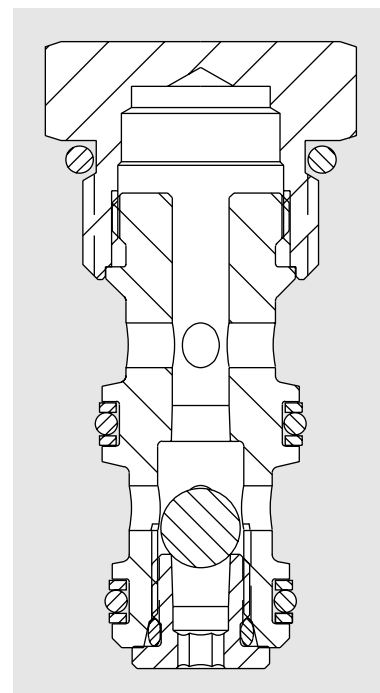


LS08-30

DIMENSIONS



ORIFICE DISC MAY NOT BE
USED WITH THIS PRODUCT.



MATERIALS

Cartridge: Weight: 0.08 kg. (0.17 lbs.);
Steel; Zinc-plated exposed surfaces;
Buna N O-rings and back-ups
standard.

Standard Ported Body: Weight:
0.27 kg. (0.60 lbs.); Anodized high-
strength 6061 T6 aluminum alloy,
rated to 240 bar (3500 psi). See
page 8.008.1. Ductile iron and steel
bodies available; dimensions may
differ; consult factory.

TO ORDER

LS08-30-

Porting

Cartridge Only	0
SAE 4	4T
SAE 6	6T
1/4 in. BSP*	2B
3/8 in. BSP*	3B

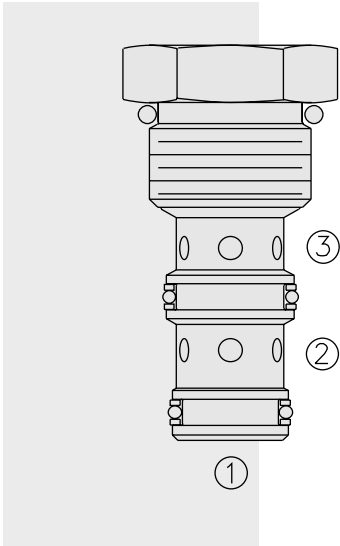
*BSP Body
U.K. Mfr. Only

Seals

N	Buna N (Std.)
V	Fluorocarbon

DIRECTIONAL VALVES

LS10-30 Load Shuttle, Ball-Type



DESCRIPTION

A load-shuttling, screw-in, cartridge-style hydraulic check valve, for use in blocking circuits where a priority of flow/direction is given to a higher pressure circuit over a lower one.

OPERATION

The **LS10-30** will allow flow from the higher pressure ① or ③ port to the ② port.

The valve is commonly used to direct oil from the pressure side of a bidirectional hydraulic motor to a pressure-released hydraulic brake.

FEATURES

- Rapid response to load direction changes.
- Industry common cavity.

RATINGS

Operating Pressure: 240 bar (3500 psi)

Proof Pressure: 390 bar (5700 psi)

Flow: See Performance Chart

Internal Leakage: 0.25 cc/minute (5 drops/minute) max. at 207 bar(3000 psi)

Temperature: -40 to 120°C with standard Buna seals

Filtration: See page 9.010.1

Fluids: Mineral-based or synthetics with lubricating properties at viscosities of 7.4 to 420 cSt (50 to 2000 ssu)

Installation: No restrictions; See page 9.020.1

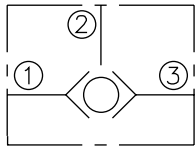
Cavity: VC10-3; See page 9.110.1

Cavity Tool: CT10-3XX; See page 8.600.1

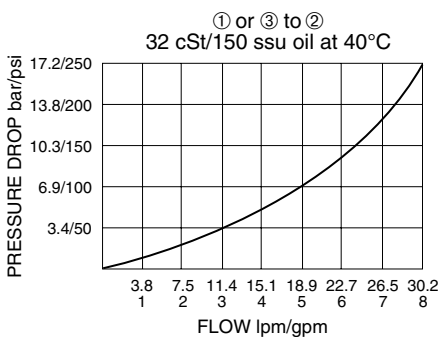
Seal Kit: SK10-3X-MM; See page 8.650.1

SYMBOLS

USASI/ISO:

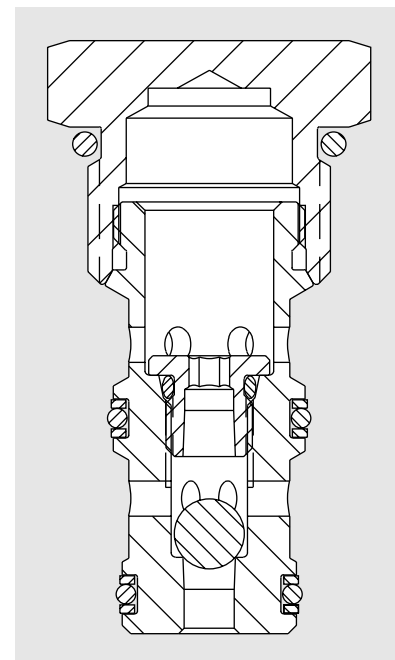
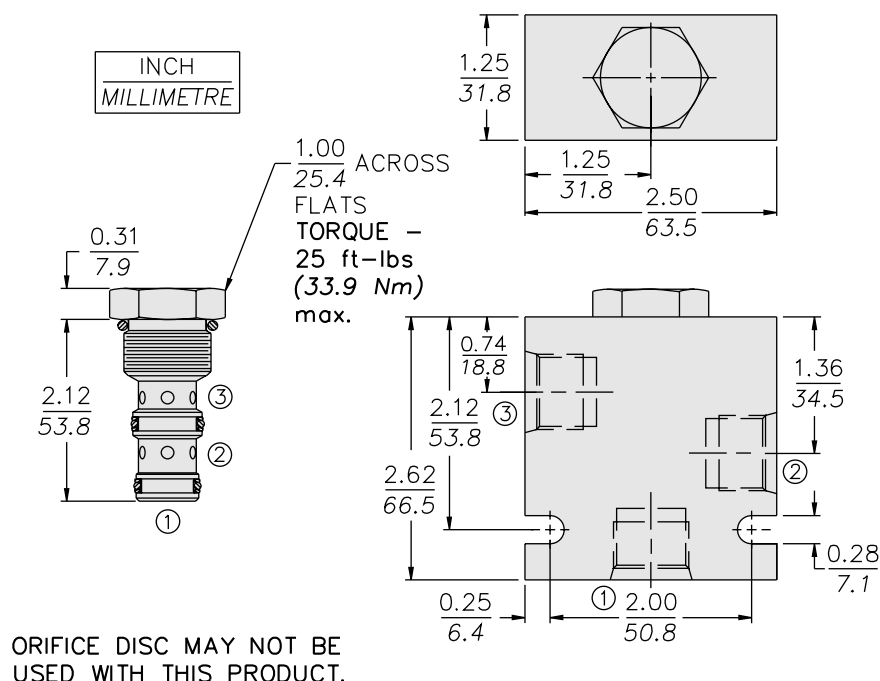


PERFORMANCE (Cartridge Only)



LS10-30

DIMENSIONS



MATERIALS

Cartridge: Weight: 0.08 kg. (0.18 lbs.).
Steel; Zinc-plated exposed surfaces;
Buna N O-rings and polyester
elastomer back-ups standard.

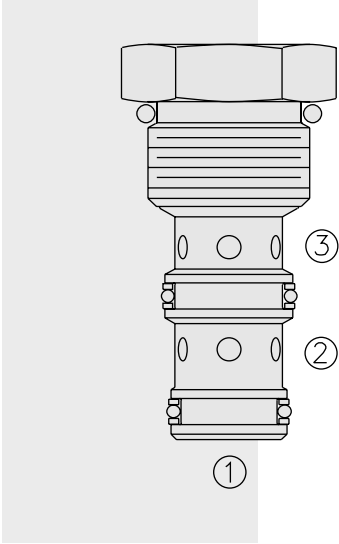
Standard Ported Body: Weight:
0.36 kg. (0.80 lbs.); Anodized high-
strength 6061 T6 aluminum alloy,
rated to 240 bar (3500 psi). See
page 8.010.1. Ductile iron and steel
bodies available; dimensions may
differ; consult factory.

TO ORDER

LS10-30-		-
Porting		Seals
Cartridge Only	0	N Buna N (Std.)
SAE 6	6T	V Fluorocarbon
SAE 8	8T	
1/4 in. BSP*	2B	
3/8 in. BSP*	3B	
*BSP Body; U.K. Mfr. Only		

DIRECTIONAL VALVES

LS50-30 Load Shuttle, Ball-Type



DESCRIPTION

A load-shuttling, screw-in, cartridge-style hydraulic check valve, for use in blocking circuits where a priority of flow/direction is given to a higher pressure circuit over a lower one.

OPERATION

The **LS50-30** will allow flow from the higher pressure ① or ③ port to the ② port.

The valve is commonly used to direct oil from the pressure side of a bidirectional hydraulic motor to a pressure-released hydraulic brake.

FEATURES

- Rapid response to load direction changes.
- Industry common cavity.

RATINGS

Operating Pressure: 345 bar (5000 psi)

Proof Pressure: 390 bar (5700 psi)

Flow: See Performance Chart

Internal Leakage: 0.25 cc/minute (5 drops/minute) max. at 345 bar(5000 psi)

Temperature: -40 to 120°C with standard Polyurethane seals

Filtration: See page 9.010.1

Fluids: Mineral-based or synthetics with lubricating properties at viscosities of 7.4 to 420 cSt (50 to 2000 ssu)

Installation: No restrictions; See page 9.020.1

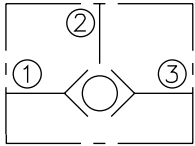
Cavity: VC10-3; See page 9.110.1

Cavity Tool: CT10-3XX; See page 8.600.1

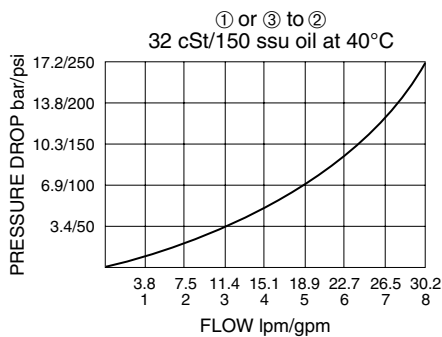
Seal Kit: SK10-3P-MM; See page 8.650.1

SYMBOLS

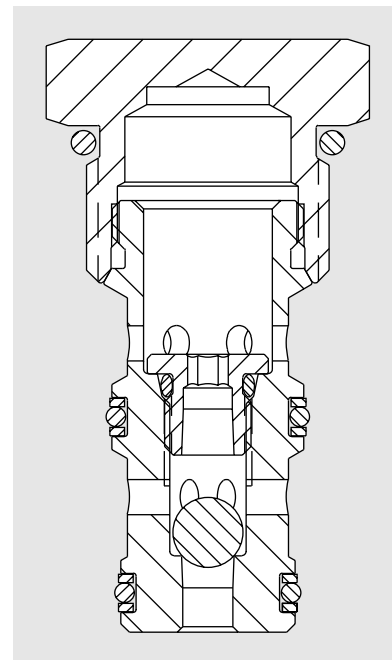
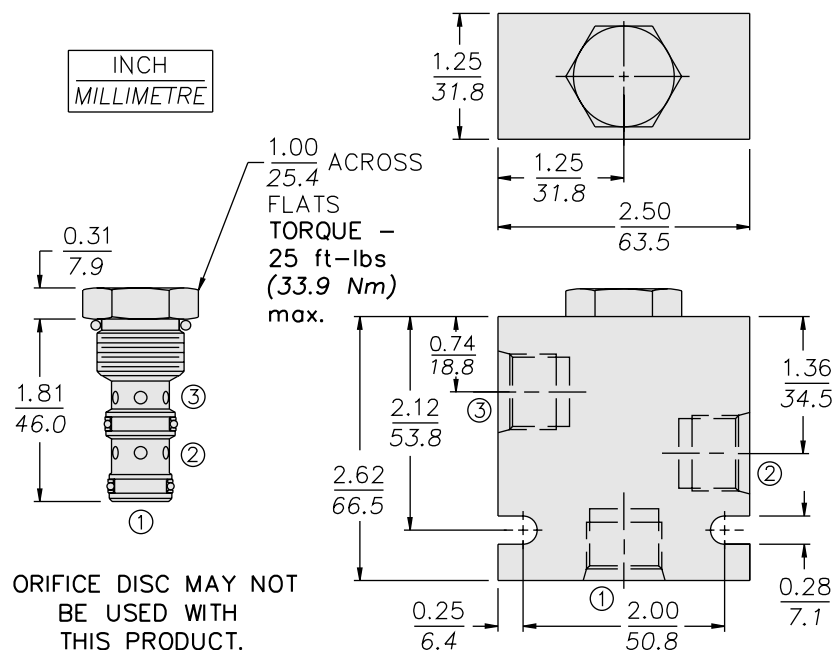
USASI/ISO:



PERFORMANCE (Cartridge Only)



DIMENSIONS



MATERIALS

Cartridge: Weight: 0.08 kg. (0.18 lbs.).
Steel; Zinc-plated exposed surfaces;
Polyurethane O-rings and
Fluorocarbon elastomer back-ups
standard.

Ported Body: Weight: 0.64 kg. (1.41
lbs.); Steel, zinc-plated (code "S"); or
Ductile Iron (code "D") standard,
consult factory for weight, dimen-
sions may differ; rated to 345 bar
(5000 psi); See page 8.010.1.

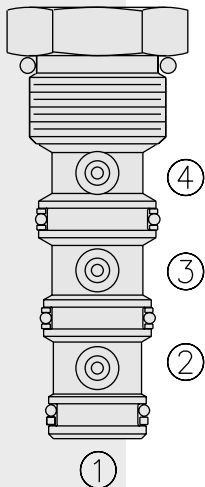
TO ORDER

LS50-30-

Porting	Seals
Cartridge Only 0	P Polyurethane
SAE 6 (Ductile) 6TD	
SAE 6 (Steel) 6TS	

DIRECTIONAL VALVES

LS10-40 Load Shuttle Network



DESCRIPTION

A cartridge-style check valve network for use in hydraulic load-sense circuits.

OPERATION

The **LS10-40** will compare pressures from three circuits to provide a pressure signal from the highest pressure circuit, while blocking the other circuits.

The valve will allow flow from the highest pressure port (④, ③ or ②) to port ①.

FEATURES

- Industry common cavity.
- Hardened seat for long life and low leakage.

RATINGS

Operating Pressure: 240 bar (3500 psi)

Flow: 1.89 lpm (0.5 gpm); See performance chart

Internal Leakage: 0.15 ml/minute (2 drops/minute) at 240 bar (3500 psi)

Temperature: -40 to 120°C with standard Buna seals

Filtration: See page 9.010.1

Fluids: Mineral-based or synthetics with lubricating properties at viscosities of 7.4 to 420 cSt (50 to 2000 sus)

Installation: No restrictions; See page 9.020.1

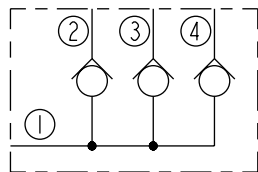
Cavity: VC10-4; See page 9.110.1

Cavity Tool: CT10-4XX-X-X; See page 8.600.1

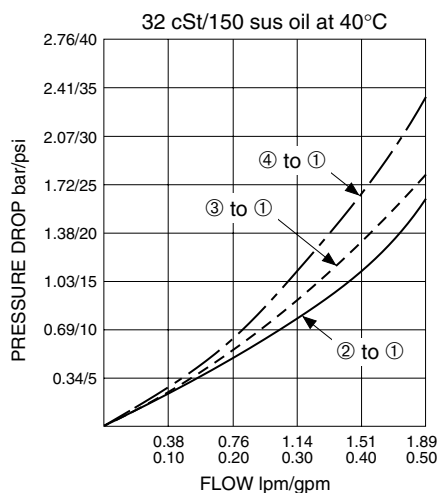
Seal Kit: SK10-4X-MMM; See page 8.650.1

SYMBOLS

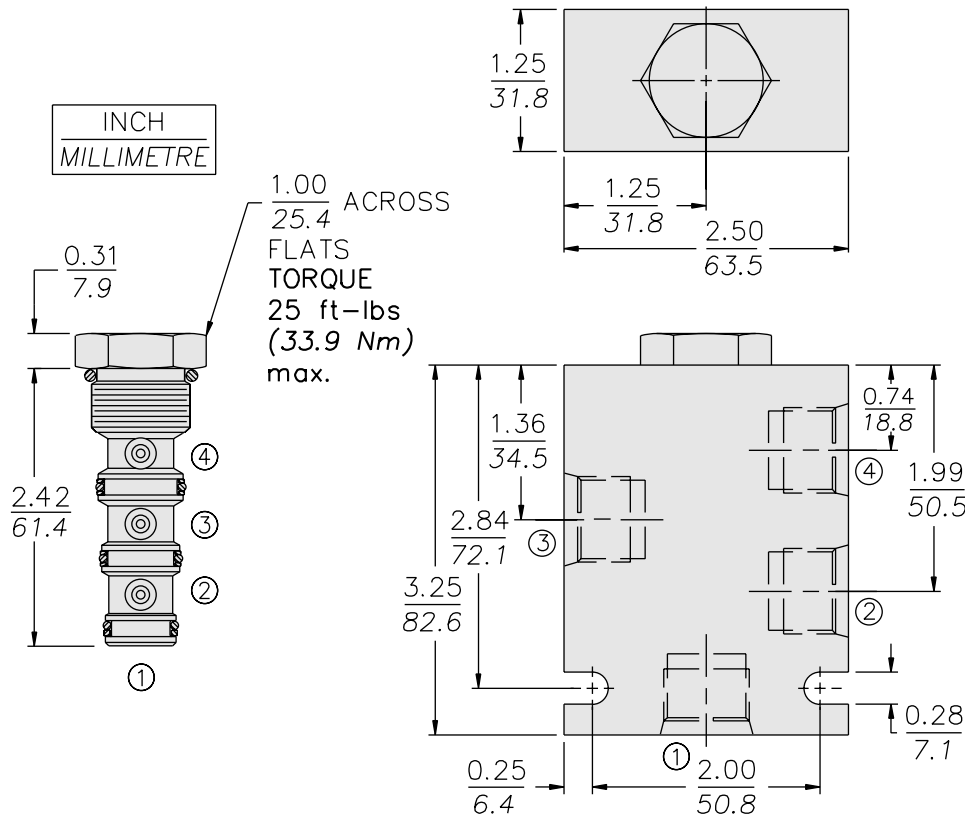
USASI/ISO:



PERFORMANCE (Cartridge Only)



DIMENSIONS



MATERIALS

Cartridge: Weight: 0.12 kg. (0.26 lbs.);
Steel with hardened work surfaces.
Zinc-plated exposed surfaces.
Buna N O-rings and polyester
elastomer back-ups standard.

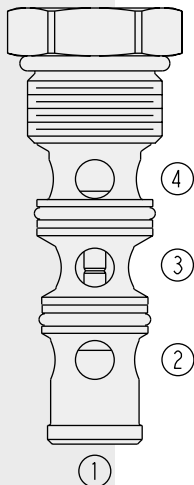
Standard Ported Body: Weight:
0.34 kg. (0.75 lbs.); Anodized high-
strength 6061 T6 aluminum alloy,
rated to 240 bar (3500 psi). See
page 8.010.1. Ductile iron and steel
bodies available; dimensions may
differ; consult factory.

TO ORDER

LS10-40 - -		
Porting		
Cartridge Only	0	
SAE 6	6T	
SAE 8	8T	
1/4 in. BSP*	2B	
3/8 in. BSP*	3B	
*BSP Body; U.K. Mfr. Only		
		Seals
	N	Buna N (Std.)
	V	Fluorocarbon

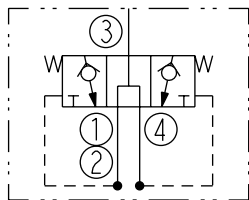
DIRECTIONAL VALVES

LS10-41 Inverted Shuttle Valve

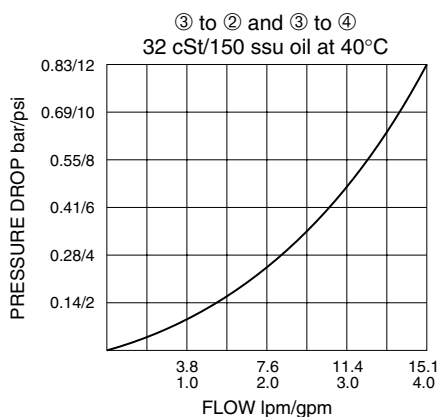


SYMBOLS

USASI/ISO:



PERFORMANCE (Cartridge Only)



DESCRIPTION

A screw-in, cartridge-style inverted shuttle valve, which can be used to help protect against brake or steering failure in the event of loss of pressure in either one of two accumulators.

OPERATION

If one accumulator fails, the **LS10-41** will shift over to protect the good one. All ports are connected in neutral. When pressure at one of the two load ports exceeds the other, the poppets shuttle to give priority flow and pressure to the port with the highest load. Typical applications include braking and steering circuits.

Note: Port ① should be blocked.

FEATURES

- Hardened work surfaces.
- Industry common cavity.

RATINGS

Operating Pressure: 240 bar (3500 psi)

Flow: 15.1 lpm (4 gpm); See Performance Chart

Internal Leakage: 0.15 ml per minute (3 drops per minute)

Temperature: -40 to 120°C with standard Buna seals

Filtration: See page 9.010.1

Fluids: Mineral-based or synthetics with lubricating properties at viscosities of 7.4 to 420 cSt (50 to 2000 sus)

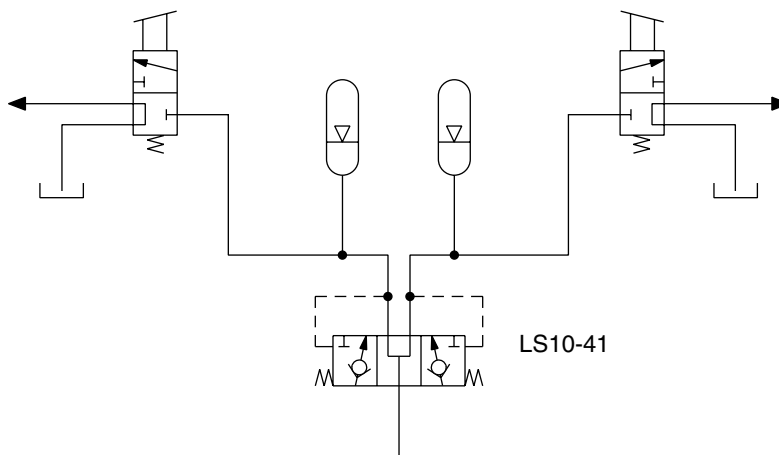
Installation: No restrictions; See page 9.020.1

Cavity: VC10-4; See page 9.110.1

Cavity Tool: CT10-4XX; See page 8.600.1

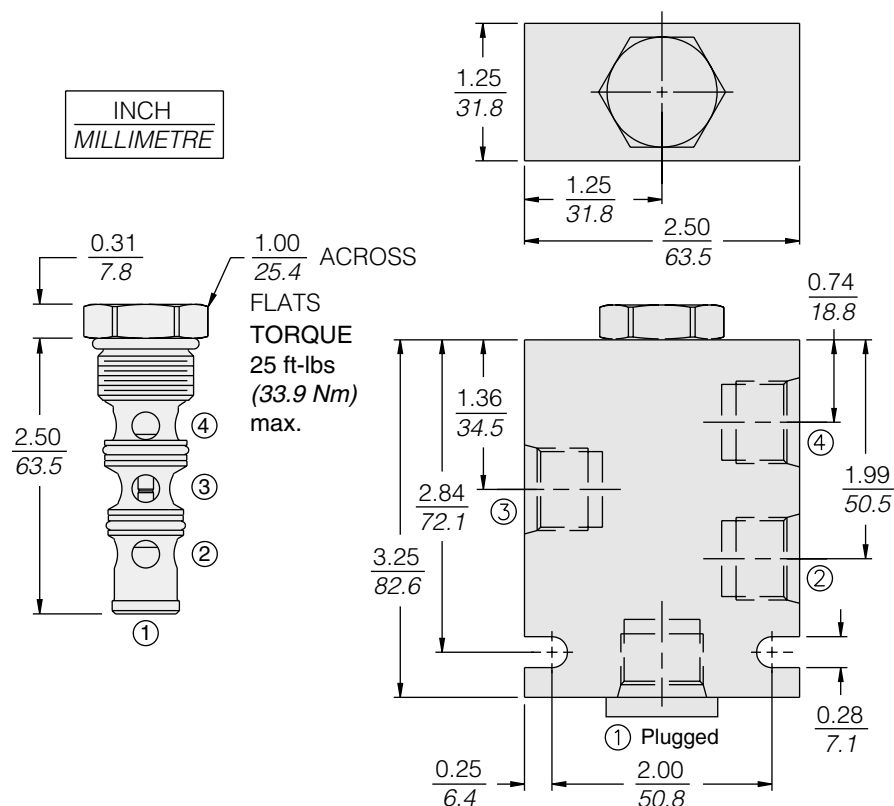
Seal Kit: SK10-4X-TBX; See page 8.650.1

TYPICAL APPLICATION



LS10-41

DIMENSIONS



MATERIALS

Cartridge: Weight: 0.1 kg. (0.22 lbs.).
Steel; Zinc-plated exposed surfaces;
Buna N O-rings and polyester
elastomer back-ups standard.

Standard Ported Body: Weight:
0.34 kg. (0.75 lbs.); Anodized high-
strength 6061 T6 aluminum alloy,
rated to 240 bar (3500 psi). See
page 8.010.1. Ductile iron and steel
bodies available; dimensions may
differ; consult factory.

TO ORDER

LS10-41-

Porting

Cartridge Only	0
SAE 6	6T
SAE 8	8T
1/4 in. BSP*	2B
3/8 in. BSP*	3B

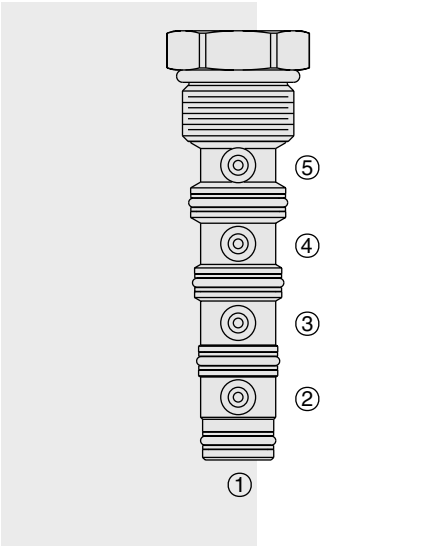
*BSP Body;
U.K. Mfr. Only

Seals

N Buna N (Std.)
V Fluorocarbon

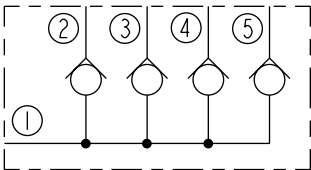
DIRECTIONAL VALVES

LS10-50 Load Shuttle Network

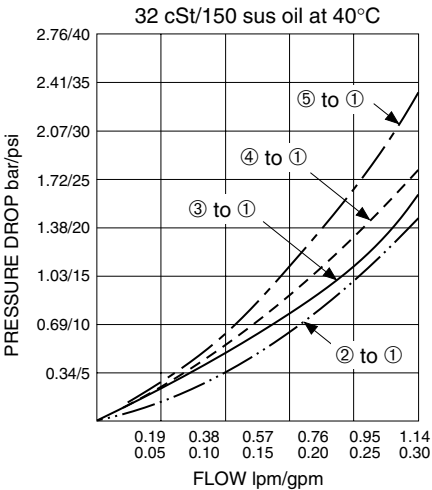


SYMBOLS

USASI/ISO:



PERFORMANCE (Cartridge Only)



DESCRIPTION

A cartridge-style check valve network for use in hydraulic load-sense circuits.

OPERATION

The **LS10-50** will compare pressures from four circuits to provide a pressure signal from the highest pressure circuit, while blocking the other circuits.

The valve will allow flow from the highest pressure port (⑤, ④, ③ or ②) to port ①.

FEATURES

- Hardened seat for long life and low leakage.

RATINGS

Operating Pressure: 240 bar (3500 psi)

Flow: 1.89 lpm (0.5 gpm); See performance chart

Internal Leakage: 0.15 ml/minute (2 drops/minute) at 240 bar (3500 psi)

Temperature: -40 to 120°C with Buna seals

Filtration: See page 9.010.1

Fluids: Mineral-based or synthetics with lubricating properties at viscosities of 7.4 to 420 cSt (50 to 2000 sus)

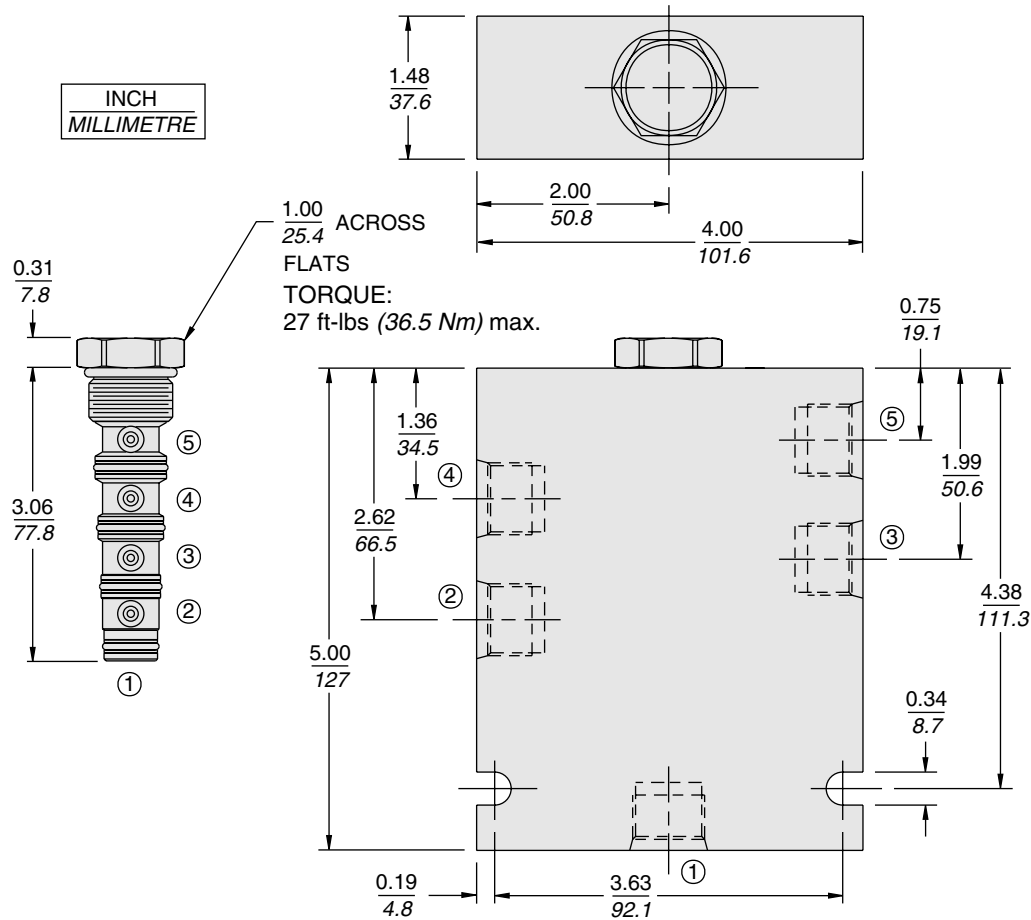
Installation: No restrictions; See page 9.020.1

Cavity: VC10-5; See page 9.110.1

Cavity Tool: CT10-5XX-X-X; See page 8.600.1

Seal Kit: SK10-5X-MMMM; See page 8.650.1

DIMENSIONS



MATERIALS

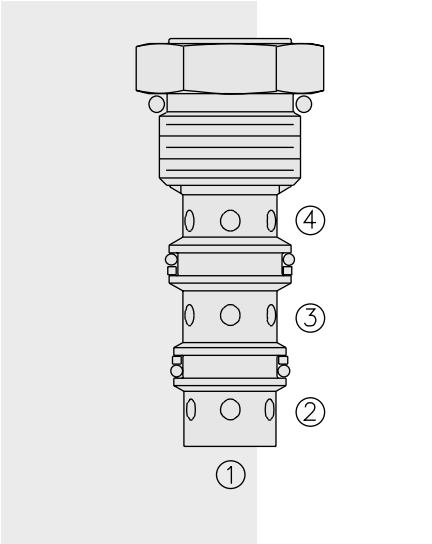
Cartridge: Weight: 0.14 kg. (0.30 lbs.);
Steel with hardened work surfaces.
Zinc-plated exposed surfaces.
Buna N O-rings and polyester
elastomer back-ups standard.

Standard Ported Body: Weight:
0.41 kg. (0.85 lbs.); Anodized high-
strength 6061 T6 aluminum alloy,
rated to 240 bar (3500 psi). See
page 8.010.1. Ductile iron and steel
bodies available; dimensions may
differ; consult factory.

TO ORDER

LS10-50 - -		
Porting Cartridge Only	0	
	6T	
	8T	
		Seals
	N	Buna N (Std.)
	V	Fluorocarbon

HS10-42 Low Side (Hot Oil) Shuttle, Springless



DESCRIPTION

A spool-type, closed in transition, 2-position, 3-way hot oil shuttle valve, which may be used on hydrostatic transmissions to direct charge pump oil to a heat exchanger or to tank.

OPERATION

With internal piloting at port ①, ② or ④, oil will flow from the port opposite of the port piloted to port ③, thus removing oil from the low-pressure side for cooling or filtration purposes. The valve is **springless**, relying solely on the internal pilot pressure signal to shift to either side. The **HS10-42** is closed in transition.

FEATURES

- Hardened parts for long life.
- Industry common cavity.

RATINGS

Operating Pressure:

HS10-42: 207 bar (3000 psi)

HS50-42: 345 bar (5000 psi)

Flow Rate: See Performance Chart

Internal Leakage: 115 cc/minute (7 cu. in./minute) max.

Temperature: -40 to 120°C

Filtration: See page 9.010.1

Fluids: Mineral-based or synthetics with lubricating properties at viscosities of 7.4 to 420 cSt (50 to 2000 ssu)

Installation: No restrictions; See page 9.020.1

Cavity: VC10-4; See page 9.110.1

Cavity Tool: CT10-4XX; See page 8.600.1

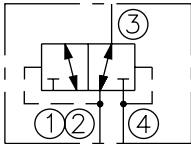
Seal Kit:

HS10-42: SK10-4N-TTT/BBB; See page 8.650.1

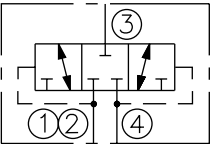
HS50-42: SK10-4P-TTT/BBB; See page 8.650.1

SYMBOLS

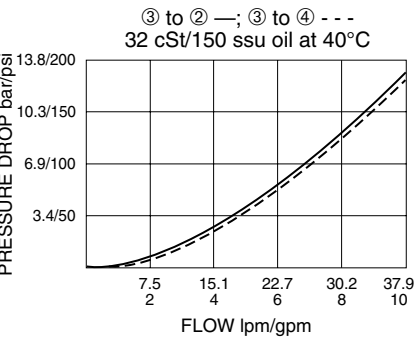
USASI/ISO:



TRANSITION:

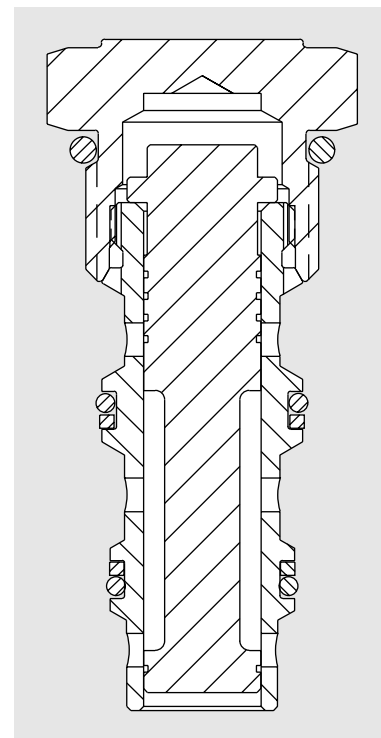
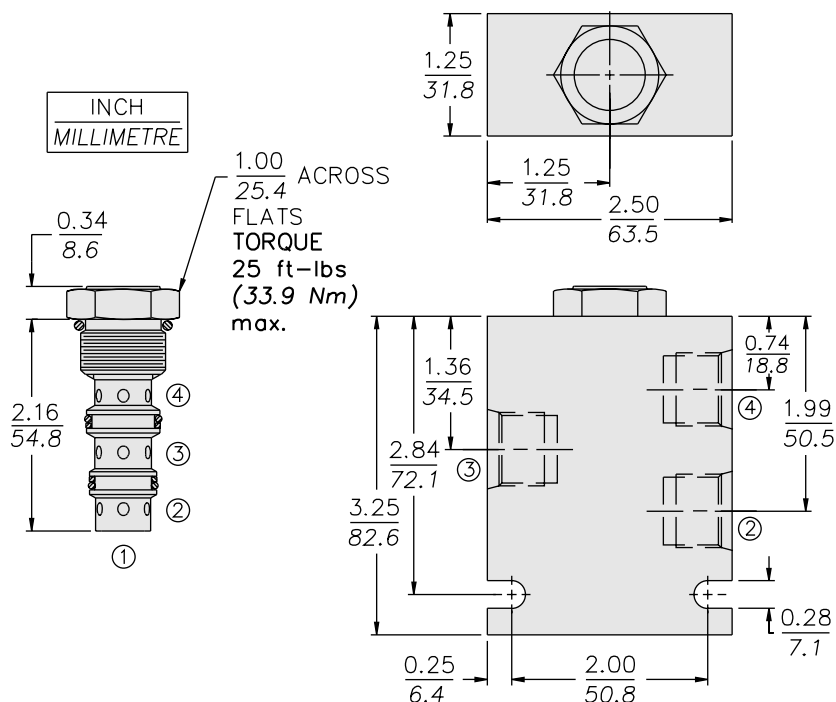


PERFORMANCE (Cartridge Only)



HS10-42

DIMENSIONS



MATERIALS

Cartridge: Weight: 0.15 kg. (0.32 lbs.); Steel with hardened work surfaces. Zinc-plated exposed surfaces. Buna N O-rings and polyester elastomer back-ups standard. Polyurethane seals optional for high pressure.

Standard Ported Body: Weight: 0.34 kg. (0.75 lbs.); Anodized high-strength 6061 T6 aluminum alloy, rated to 240 bar (3500 psi); See page 8.010.1. Steel or Ductile Iron body required for operation over 241 bar (3500 psi); dimensions may differ; consult factory.

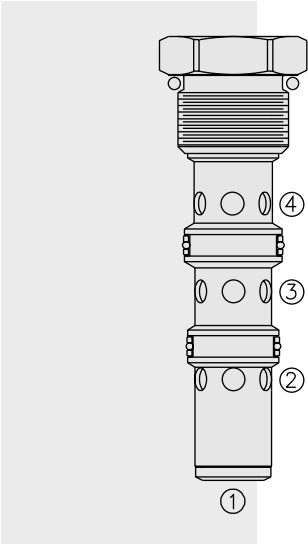
TO ORDER

Pressure		Porting		Seals	
207 bar (3000 psi)	1	Cartridge Only	0	N	Buna N (Std. for 3000 psi)
345 bar (5000 psi)	5	SAE 6	6T	P	Polyurethane (Std. for 5000 psi)
		SAE 6 (Steel)	6TS		
		SAE 6 (Ductile)	6TD		
		SAE 8	8T		
		1/4 in. BSP*	2B		
		3/8 in. BSP*	3B		

*BSP Body;
U.K. Mfr. Only

Note: Steel or Ductile body
required for operation over
241 bar (3500 psi).

HS52-42 Low Side (Hot Oil) Shuttle, Springless



DESCRIPTION

A spool-type, closed in transition, 2-position, 3-way hot oil shuttle valve, which may be used on hydrostatic transmissions to direct charge pump oil to a heat exchanger or to tank.

OPERATION

With internal piloting at port ①, ② or ④, oil will flow from the port opposite of the port piloted to port ③, thus removing oil from the low-pressure side for cooling or filtration purposes. The valve is **springless**, relying solely on the internal pilot pressure signal to shift to either side. The **HS52-42** is closed in transition.

FEATURES

- Hardened parts for long life.
- Industry common cavity.

RATINGS

Operating Pressure: 345 bar (5000 psi) when used in steel body

Flow Rate: See Performance Chart

Internal Leakage: 164 cc/minute (10 cu. in./minute) max.

Temperature: -40 to 120°C

Filtration: See page 9.010.1

Fluids: Mineral-based or synthetics with lubricating properties at viscosities of 7.4 to 420 cSt (50 to 2000 ssu)

Installation: No restrictions; See page 9.020.1

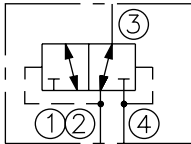
Cavity: VC12-4; See page 9.112.1 (Cavity Variation “A”)

Cavity Tool: CT12-4XX; See page 8.600.1

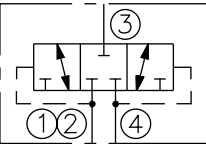
Seal Kit: SK12-2x-TB

SYMBOLS

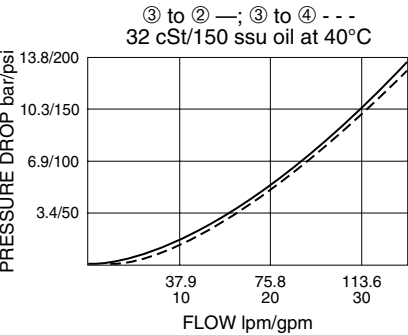
USASI/ISO:



TRANSITION:

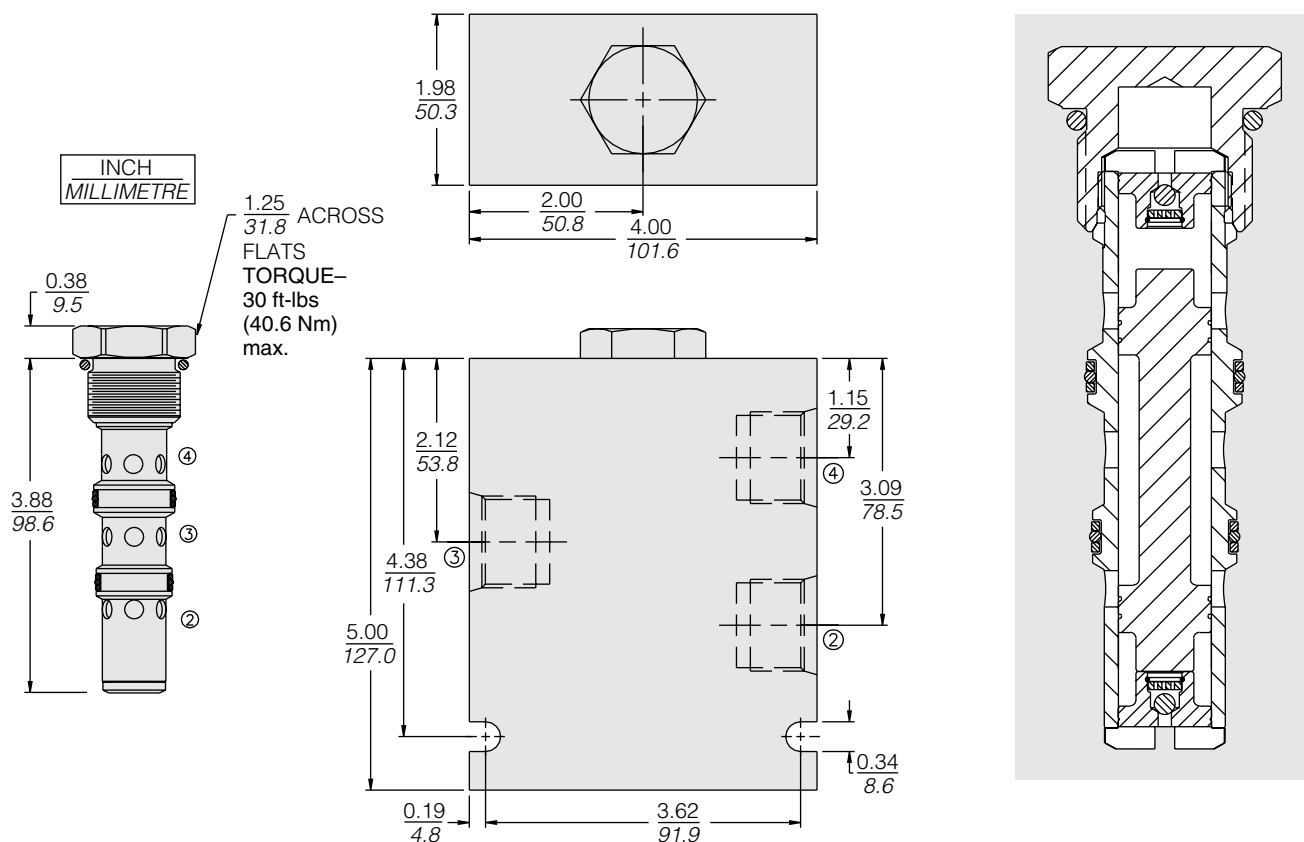


PERFORMANCE (Cartridge Only)



HS52-42

DIMENSIONS

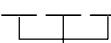


MATERIALS

Cartridge: Weight: 0.15 kg. (0.32 lbs.);
Steel with hardened work surfaces.
Zinc-plated exposed surfaces.
Polyurethane seals and polyester
elastomer back-ups standard.
Polyurethane seals optional for high
pressure.

Ported Body: Weight: 3.57 kg.
(7.87 lbs.); Steel, zinc-plated (code
"S"); or **Ductile Iron (code "D")**
standard, consult factory for weight;
dimensions may differ; rated to 345
bar (5000 psi); See page 8.012.1.

TO ORDER

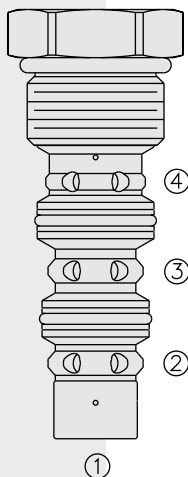
HS52 - 42 -  - P

Seals
P Polyurethane

Porting
Cartridge Only 0
SAE 12 (Ductile) 12TD
SAE 12 (Steel) 12TS

DIRECTIONAL CONTROLS

HS50-43 Low Side (Hot Oil) Shuttle,



DESCRIPTION

A spring-centered, spool-type, closed-in-neutral, 2-position, 3-way hot oil shuttle valve, which may be used on hydrostatic transmissions to direct charge pump oil to a heat exchanger or to tank.

OPERATION

With internal piloting at port ①, ② or ④, the **HS50-43** will direct oil from the port opposite of the piloted port to port ③, thus removing oil from the low-pressure side for cooling or filtration purposes. The valve has a spring-centered spool, and is closed in neutral position.

FEATURES

- Hardened spool and cage for long life.
- Industry common cavity.

RATINGS

Operating Pressure: 345 bar (5000 psi) when used in steel body

Flow Rate: See Performance Chart

Bias Spring Value: 4.1 bar (60 psi)

Internal Leakage: 541 ml/minute (33 cu. in./minute) max. at 345 bar (5000 psi)

Temperature: -40 to 120°C with standard polyurethane seals

Filtration: See page 9.010.1

Fluids: Mineral-based or synthetics with lubricating properties at viscosities of 7.4 to 420 cSt (50 to 2000 ssu)

Installation: No restrictions; See page 9.020.1

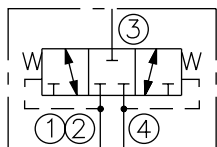
Cavity: VC10-4; See page 9.110.1

Cavity Tool: CT10-4XX; See page 8.600.1

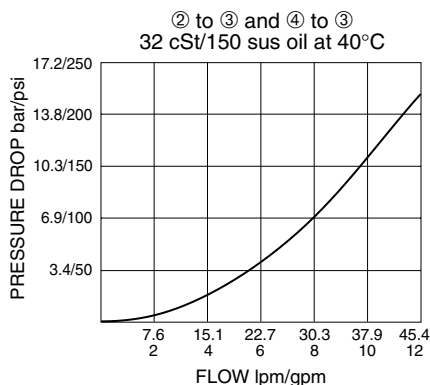
Seal Kit: SK10-4X-MMM, See page 8.650.1

SYMBOLS

USASI/ISO:



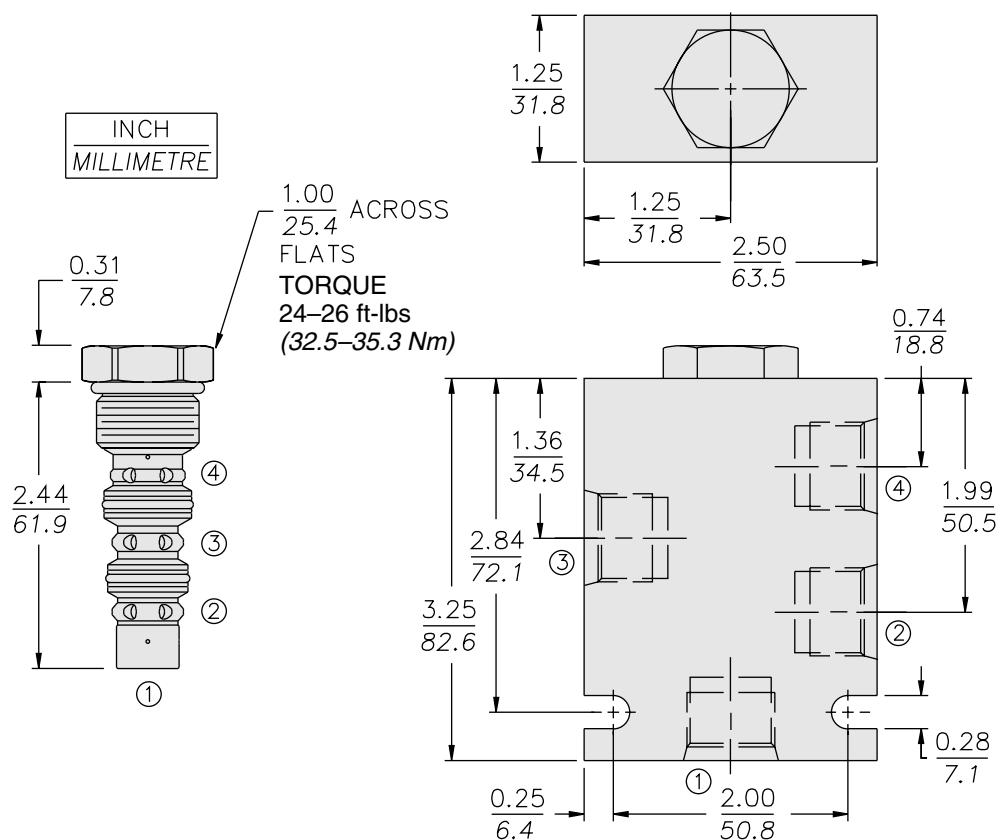
PERFORMANCE (Cartridge Only)



Spring Centered

HS50-43

DIMENSIONS



MATERIALS

Cartridge: Weight: 0.12 kg. (0.27 lbs.); Steel with hardened work surfaces. Zinc-plated exposed surfaces. Polyurethane seals and polyester elastomer back-ups standard.

Ported Body: Weight: 0.68 kg. (1.51 lbs.); Steel, zinc-plated (code "S"); or **Ductile Iron (code "D") standard**, consult factory for weight, dimensions may differ; rated to 345 bar (5000 psi); See page 8.010.1.

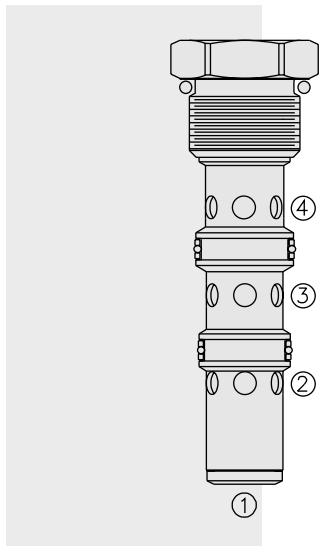
TO ORDER

HS50-43 -

	Porting		Seals
	Cartridge Only	0	P Polyurethane
	SAE 6 (Ductile)	6TD	
	SAE 6 (Steel)	6TS	

DIRECTIONAL CONTROLS

HS52-43 Low Side (Hot Oil) Shuttle,



DESCRIPTION

A spring centered, spool-type, closed in neutral, 2-position, 3-way hot oil shuttle valve, which may be used on hydrostatic transmissions to direct charge pump oil to a heat exchanger or to tank.

OPERATION

With internal piloting at port ①, ② or ④, the **HS52-43** will direct oil from the port opposite of the piloted port to port ③, thus removing oil from the low-pressure side for cooling or filtration purposes. The valve has a spring-centered spool, and is closed in neutral position.

FEATURES

- Hardened parts for long life.
- Industry common cavity.

RATINGS

Operating Pressure: 345 bar (5000 psi) when used in steel body

Flow Rate: See Performance Chart

Bias Spring Value: 4.1 bar (60 psi)

Internal Leakage: 164 cc/minute (10 cu. in./minute) max. when shifted, and 984 cc/minute (60 cu. in./minute) max. in neutral position at 207 bar (3000 psi)

Temperature: -40 to 120°C

Filtration: See page 9.010.1

Fluids: Mineral-based or synthetics with lubricating properties at viscosities of 7.4 to 420 cSt (50 to 2000 ssu)

Installation: No restrictions; See page 9.020.1

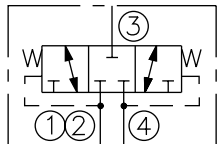
Cavity: VC12-4 (Cavity Variation "A"); See page 9.112.1

Cavity Tool: CT12-4XX; See page 8.600.1

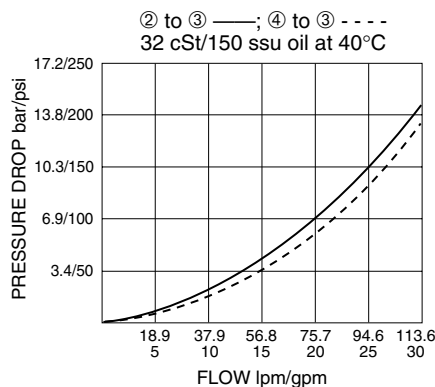
Seal Kit: SK12-2x-TB, See page 8.650.1

SYMBOLS

USASI/ISO:



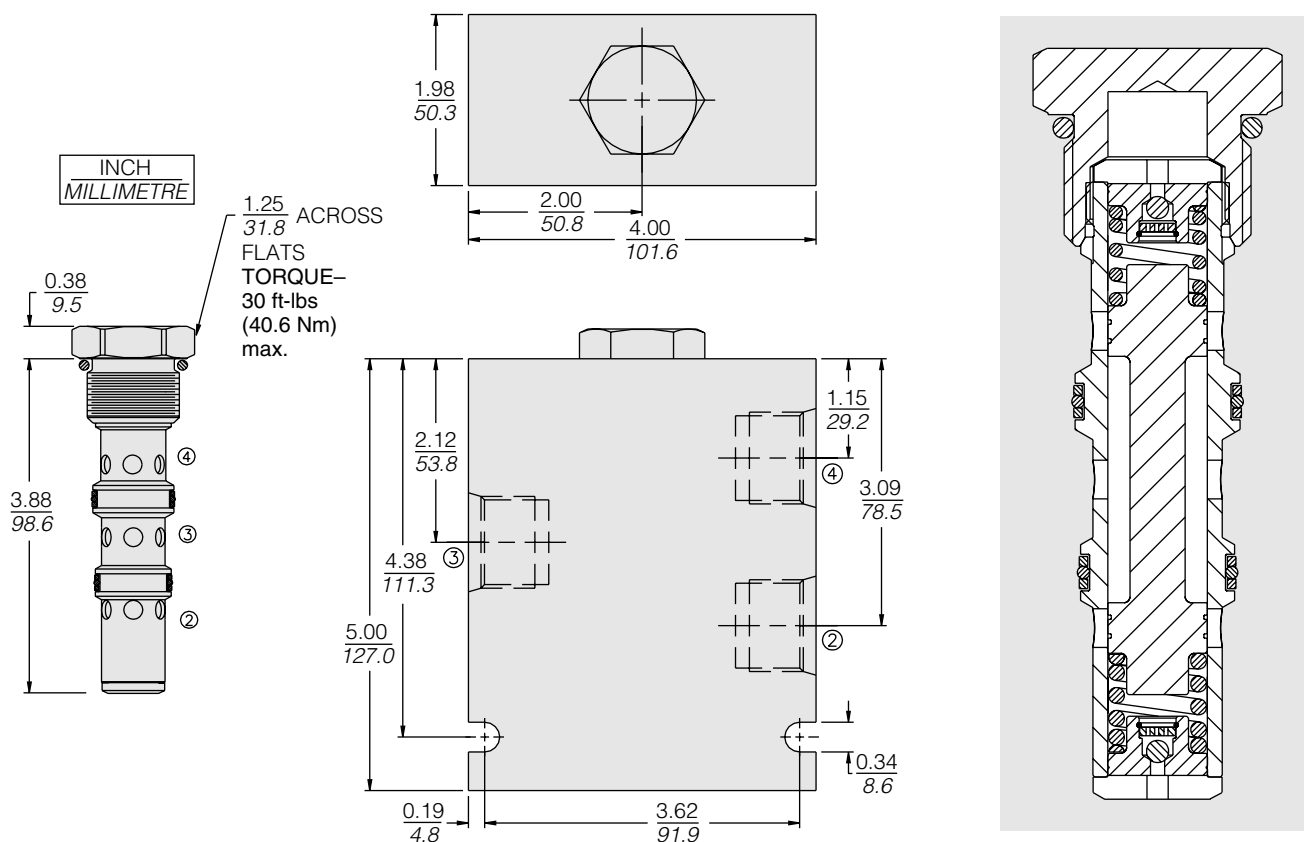
PERFORMANCE (Cartridge Only)



Spring Centered

HS52-43

DIMENSIONS

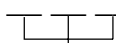


MATERIALS

Cartridge: Weight: 0.15 kg. (0.32 lbs.);
Steel with hardened work surfaces.
Zinc-plated exposed surfaces.
Polyurethane seals and polyester
elastomer back-ups standard.
Polyurethane seals optional for high
pressure.

Ported Body: Weight: 3.57 kg.
(7.87 lbs.); Steel, zinc-plated (code
"S"); or **Ductile Iron (code "D")**
standard, consult factory for weight,
dimensions may differ; rated to
345 bar (5000 psi); See page
8.012.1.

TO ORDER

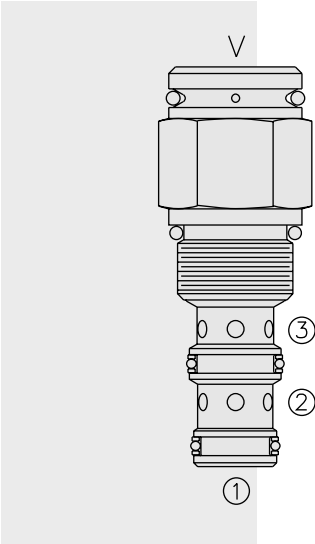
HS52 - 43 -  - P

Seals
P Polyurethane

Porting
Cartridge Only 0
SAE 12 (Ductile) 12TD
SAE 12 (Steel) 12TS

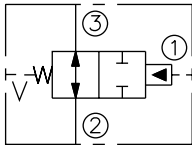
DIRECTIONAL VALVES

PD10-30 Piloted 2-Way Spool, Normally Open,

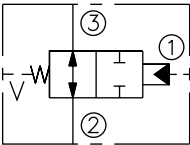


SYMBOLS

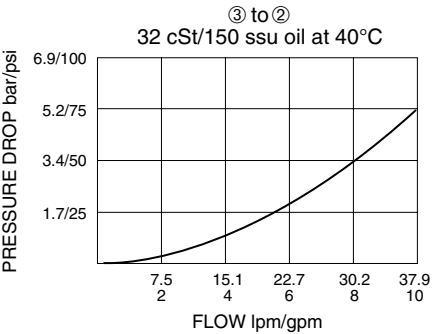
USASI:



ISO:



PERFORMANCE (Cartridge Only)



DESCRIPTION

A screw-in, cartridge-style, pilot-operated, spool-type, normally open hydraulic directional valve for two-way circuits requiring remote pilot actuation.

OPERATION

In neutral (unpiloted), the **PD10-30** allows flow from ③ to ② bidirectionally. V is a spring chamber vent-to-atmosphere, which is internally O-ring sealed from the cartridge flow paths.

On remote pilot signal at ①, the valve shifts to block ③ to ② bidirectionally.

FEATURES

- Hardened spool and cage for long life.
- Industry common cavity.

RATINGS

Operating Pressure: 240 bar (3500 psi)

Proof Pressure: 390 bar (5700 psi)

Flow: See Performance Chart

Internal Leakage: 82 cc/minute (5 cu. in./minute) max. at 207 bar (3000 psi)

Pilot Pressure Required: To Full Spool Shift:
for 4.1 bar (60 psi) spring: 4.7 bar (68.2 psi)
for 7.6 bar (110 psi) spring: 8.6 bar (125 psi)

Oil Volume Required to Full Shift: 0.65 cc (0.04 cu. in.)

Temperature: -40 to 120°C with standard Buna seals

Filtration: See page 9.010.1

Fluids: Mineral-based or synthetics with lubricating properties at viscosities of 7.4 to 420 cSt (50 to 2000 ssu)

Installation: No restrictions; See page 9.020.1

Cavity: VC10-3; See page 9.110.1

Cavity Tool: CT10-3XX; See page 8.600.1

Seal Kit: SK10-3X-MM; See page 8.650.1

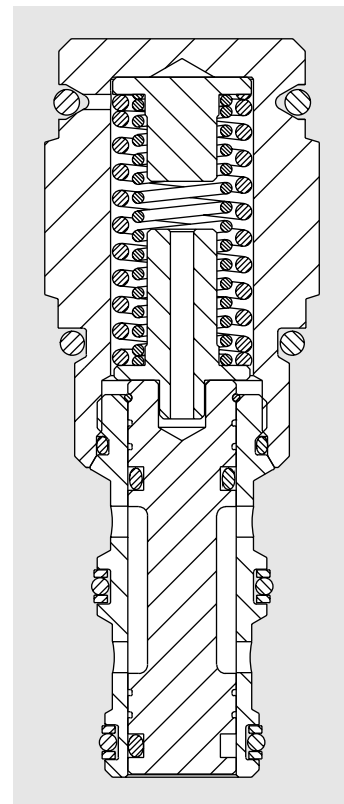
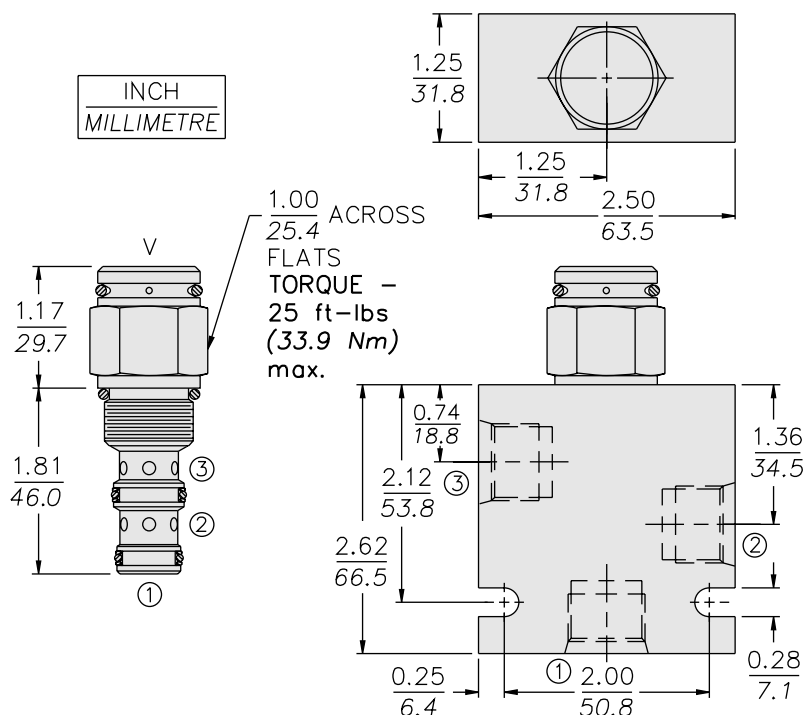
Cap Vent Seal: 6003117

Note: This valve is designed with a dynamic oil-to-atmosphere seal in the vent section. Ambient conditions will cause this vent seal to degrade which will reduce the valve's cycle life. If this could cause a problem, we suggest that a non-vented model be selected, or special seal be used. Consult factory for assistance.

External Vent

PD10-30

DIMENSIONS



MATERIALS

Cartridge: Weight: 0.15 kg. (0.34 lbs.); Steel with hardened work surfaces; Zinc-plated exposed surfaces. Buna N O-rings and polyester elastomer back-ups standard.

Standard Ported Body: Weight: 0.36 kg. (0.80 lbs.); Anodized high-strength 6061 T6 aluminum alloy, rated to 240 bar (3500 psi); See page 8.010.1. Ductile iron and steel bodies available; dimensions may differ; consult factory.

TO ORDER

PD10-30 -

Porting
Cartridge Only **0**
SAE 6 **6T**
SAE 8 **8T**
1/4 in. BSP* **2B**
3/8 in. BSP* **3B**

*BSP Body
U.K. Mfr. Only

Seals

Buna N (Std.) **N**
Buna N with
Sealed Spool **NS**
Fluorocarbon **V**
Fluorocarbon with
Sealed Spool **VS**

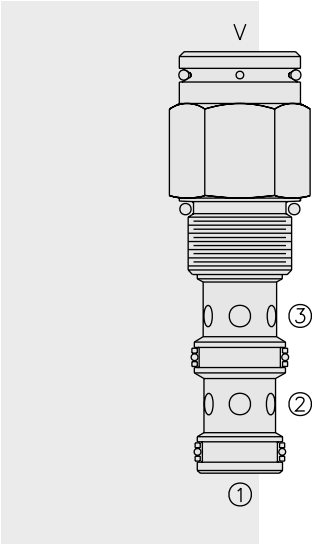
Bias Spring[†]

40 2.8 bar (40 psi)
60 4.1 bar (60 psi)
110 7.6 bar (110 psi)
170 11.7 bar (170 psi)

[†]Note: 110 psi bias spring is the minimum required for use with sealed spool.

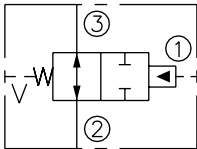
DIRECTIONAL VALVES

PD12-30 Piloted 2-Way Spool, Normally Open,

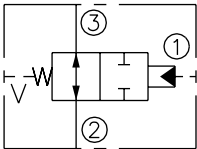


SYMBOLS

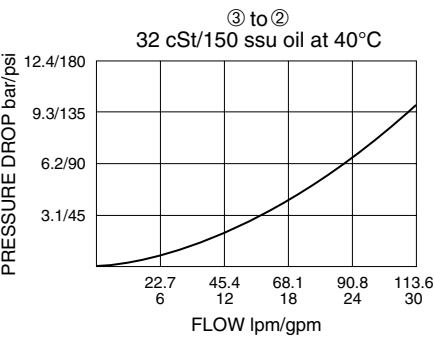
USASI:



ISO:



PERFORMANCE (Cartridge Only)



DESCRIPTION

A screw-in, cartridge-style, pilot-operated, spool-type, normally open, hydraulic directional valve for two-way circuits requiring remote pilot actuation.

OPERATION

In neutral (unpiloted), the PD12-30 allows flow from ③ to ② bidirectionally. V is a spring chamber vent-to-atmosphere, which is internally O-ring sealed from the cartridge flow paths.

On remote pilot signal at ①, the valve shifts to block ② to ③ bidirectionally.

Because of the vented spring chamber, the cartridge may be fully pressurized at any port without affecting required pilot pressure.

FEATURES

- Hardened spool and cage for long life.
- Cost-effective cavity.

RATINGS

Operating Pressure: 240 bar (3500 psi)

Flow: See Performance Chart

Internal Leakage: 82 cc/minute (5 cu. in./minute) max. at 207 bar (3000 psi)

Pilot Pressure Required for 7.6 bar (110 psi) Spring:

to Cross-Over: 7.6 bar (110 psi)

to Full Shift: 9.1 bar (132 psi)

Oil Volume Required to Full Shift: 1.32 cc (0.08 cu. in.)

Temperature: -40 to 120°C with standard Buna seals

Filtration: See page 9.010.1

Fluids: Mineral-based or synthetics with lubricating properties at viscosities of 7.4 to 420 cSt (50 to 2000 ssu)

Installation: No restrictions; See page 9.020.1

Cavity: VC12-3; See page 9.112.1

Cavity Tool: CT12-3XX; See page 8.600.1

Seal Kit: SK12-3X-MM; See page 8.650.1

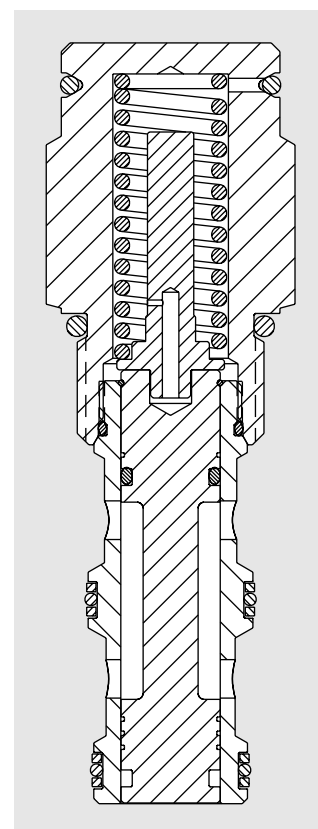
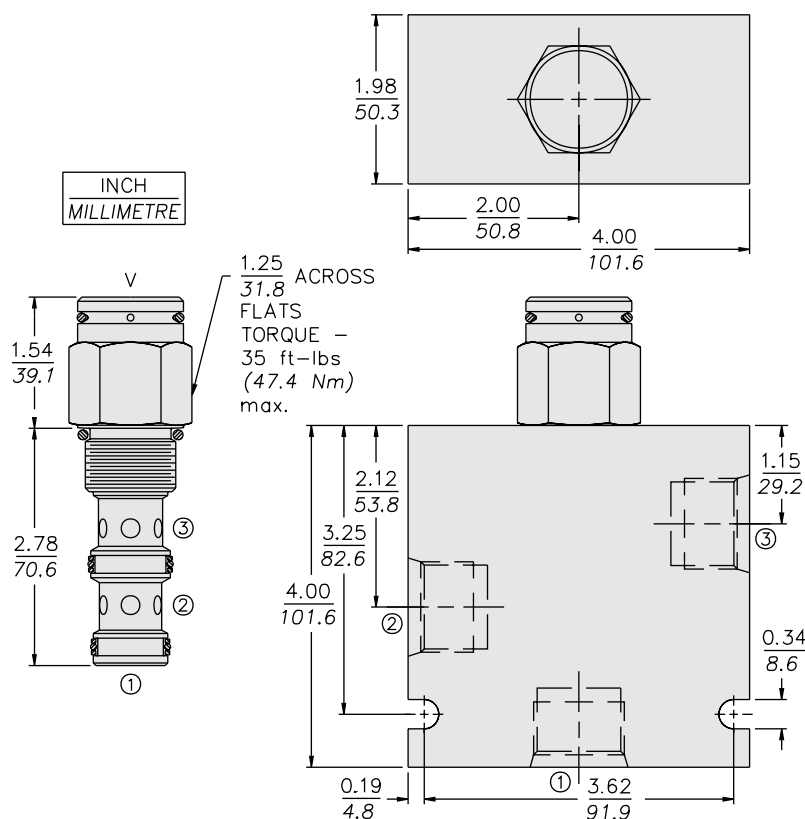
Cap Vent Seal: 6003121

Note: This valve is designed with a dynamic oil-to-atmosphere seal in the vent section. Ambient conditions will cause this vent seal to degrade which will reduce the valve's cycle life. If this could cause a problem, we suggest that a non-vented model be selected, or special seal be used. Consult factory for assistance.

External Vent

PD12-30

DIMENSIONS



MATERIALS

Cartridge: Weight: 0.23 kg. (0.50 lbs.); Steel with hardened work surfaces; Zinc-plated exposed surfaces. Buna N O-rings and polyester elastomer back-ups standard.

Standard Ported Body: Weight: 1.13 kg. (2.50 lbs.); Anodized high-strength 6061 T6 aluminum alloy, rated to 240 bar (3500 psi); See page 8.012.1 Ductile iron and steel bodies available; dimensions may differ; consult factory.

TO ORDER

PD12-30 -

Porting

Cartridge Only **0**

SAE 8 **8T**

SAE 10 **10T**

SAE 12 **12T**

1/2 in. BSP* **4B**

3/4 in. BSP* **6B**

*BSP Body
U.K. Mfr. Only

Bias Spring

110 7.6 bar (110 psi)

170 11.7 bar (170 psi)

Seals

N Buna N (Std.)

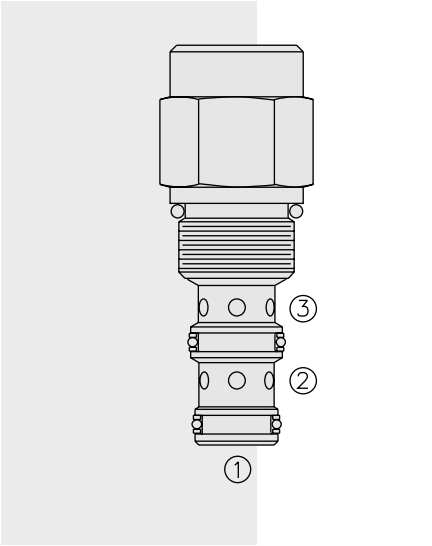
NS Buna N with Sealed Spool

V Fluorocarbon

VS Fluorocarbon with Sealed Spool

DIRECTIONAL VALVES

PD10-32 Piloted 2-Way Spool, Normally Closed,



DESCRIPTION

A screw-in, cartridge-style, pilot-operated, spool-type, normally closed, hydraulic directional valve for two-way circuits requiring remote pilot actuation.

OPERATION

In neutral (unpiloted), the PD10-32 blocks flow from ③ to ② bidirectionally. The spring bias chamber is internally vented to ③.

On remote pilot signal at ①, the valve shifts to open ② to ③ unidirectionally.

FEATURES

- Hardened spool and cage for long life.
- Industry common cavity.

RATINGS

Operating Pressure: 240 bar (3500 psi)

Proof Pressure: 390 bar (5700 psi)

Flow: See Performance Chart

Internal Leakage: 82 cc/minute (5 cu. in./minute) max. at 207 bar (3000 psi)

Pilot Pressure Required: To Full Spool Shift:

for 4.1 bar (60 psi) spring: 4.7 bar (68.2 psi)

for 7.6 bar (110 psi) spring: 8.6 bar (125 psi)

Oil Volume Required to Full Shift: 0.65 cc (0.04 cu. in.)

Temperature: -40 to 120°C with standard Buna seals

Filtration: See page 9.010.1

Fluids: Mineral-based or synthetics with lubricating properties at viscosities of 7.4 to 420 cSt (50 to 2000 ssu)

Installation: No restrictions; See page 9.020.1

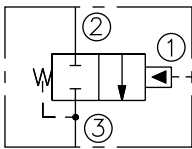
Cavity: VC10-3; See page 9.110.1

Cavity Tool: CT10-3XX; See page 8.600.1

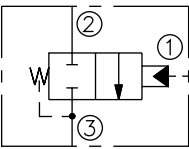
Seal Kit: SK10-3X-MM; See page 8.650.1

SYMBOLS

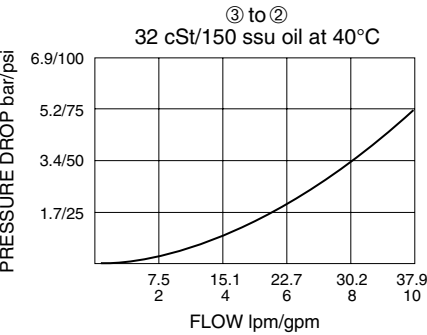
USASI:



ISO:



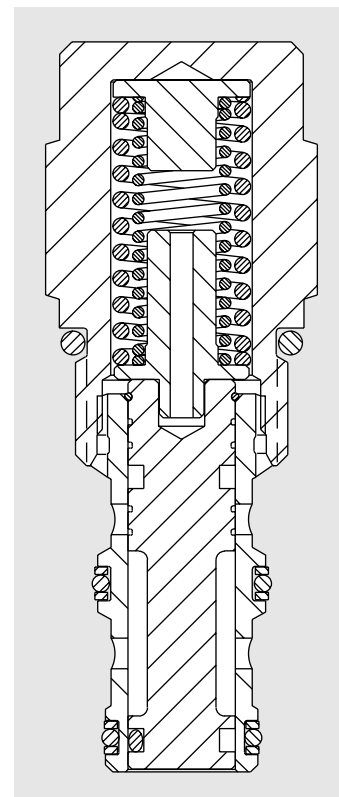
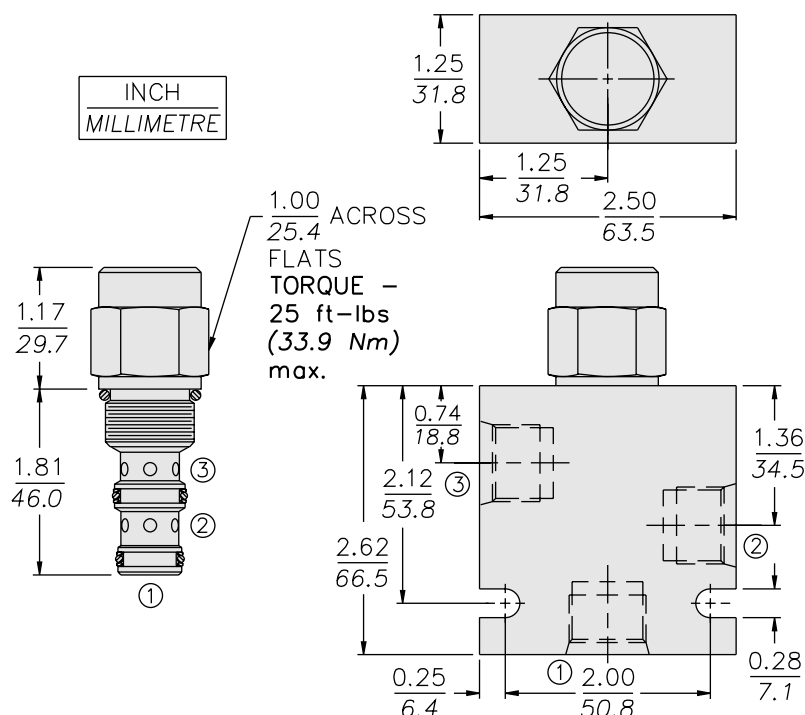
PERFORMANCE (Cartridge Only)



Internal Vent

PD10-32

DIMENSIONS



MATERIALS

Cartridge: Weight: 0.15 kg. (0.34 lbs.); Steel with hardened work surfaces; Zinc-plated exposed surfaces. Buna N O-rings and polyester elastomer back-ups standard.

Standard Ported Body: Weight: 0.36 kg. (0.80 lbs.); Anodized high-strength 6061 T6 aluminum alloy, rated to 240 bar (3500 psi); See page 8.010.1. Ductile iron and steel bodies available; dimensions may differ; consult factory.

TO ORDER

PD10-32 -

Porting
Cartridge Only **0**
SAE 6 **6T**
SAE 8 **8T**
1/4 in. BSP* **2B**
3/8 in. BSP* **3B**

*BSP Body
U.K. Mfr. Only

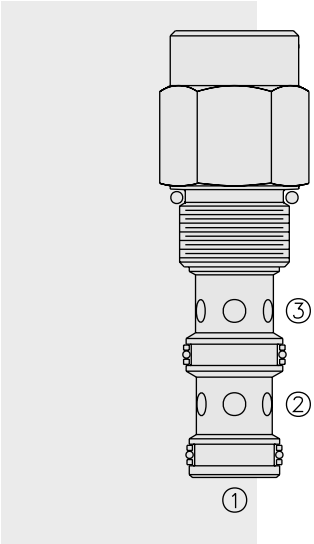
Bias Spring†
40 2.8 bar (40 psi)
60 4.1 bar (60 psi)
110 7.6 bar (110 psi)
170 11.7 bar (170 psi)

†Note: 110 psi bias spring is the minimum required for use with sealed spool.

Seals
N Buna N (Std.)
NS Buna N with Sealed Spool
V Fluorocarbon
VS Fluorocarbon with Sealed Spool

DIRECTIONAL VALVES

PD12-32 Piloted 2-Way Spool, Normally Closed,



DESCRIPTION

A screw-in, cartridge-style, pilot-operated, spool-type, normally closed, hydraulic directional valve for two-way circuits requiring remote pilot actuation.

OPERATION

In neutral (unpiloted), the PD12-32 blocks flow from ③ to ② bidirectionally. The spring bias chamber is internally vented to ③.

On remote pilot signal at ①, the valve shifts to open ② to ③ unidirectionally.

FEATURES

- Hardened spool and cage for long life.
- Industry common cavity.

RATINGS

Operating Pressure: 240 bar (3500 psi)

Flow: See Performance Chart

Internal Leakage: 82 cc/minute (5 cu. in./minute) max. at 207 bar (3000 psi)

Pilot Pressure Required: To Full Spool Shift for 7.6 bar (110 psi) spring:
8.6 bar (125 psi)

Oil Volume Required to Full Shift: 1.32 cc (0.08 cu. in.)

Temperature: -40 to 120°C with standard Buna seals

Filtration: See page 9.010.1

Fluids: Mineral-based or synthetics with lubricating properties at viscosities of
7.4 to 420 cSt (50 to 2000 ssu)

Installation: No restrictions; See page 9.020.1

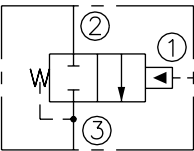
Cavity: VC12-3; See page 9.112.1

Cavity Tool: CT12-3XX; See page 8.600.1

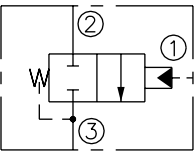
Seal Kit: SK12-3X-MM; See page 8.650.1

SYMBOLS

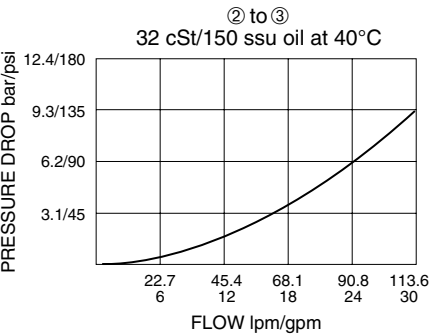
USASI:



ISO:



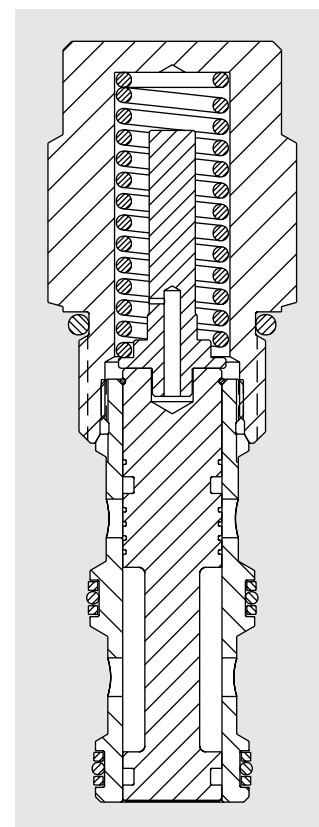
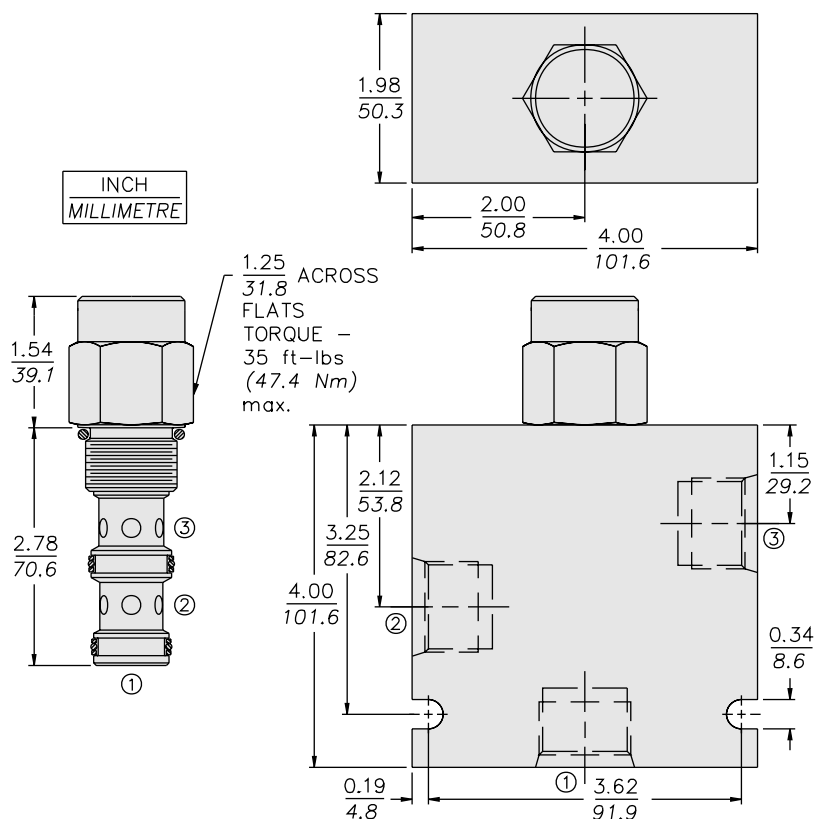
PERFORMANCE (Cartridge Only)



Internal Vent

PD12-32

DIMENSIONS



MATERIALS

Cartridge: Weight: 0.23 kg. (0.50 lbs.); Steel with hardened work surfaces; Zinc-plated exposed surfaces. Buna N O-rings and polyester elastomer back-ups standard.

Standard Ported Body: Weight: 1.13 kg. (2.50 lbs.); Anodized high-strength 6061 T6 aluminum alloy, rated to 240 bar (3500 psi); See page 8.012.1. Ductile iron and steel bodies available; dimensions may differ; consult factory.

TO ORDER

PD12-32 -

Porting

Cartridge Only **0**
SAE 8 **8T**
SAE 10 **10T**
SAE 12 **12T**
1/2 in. BSP* **4B**
3/4 in. BSP* **6B**

*BSP Body
U.K. Mfr. Only

Bias Spring

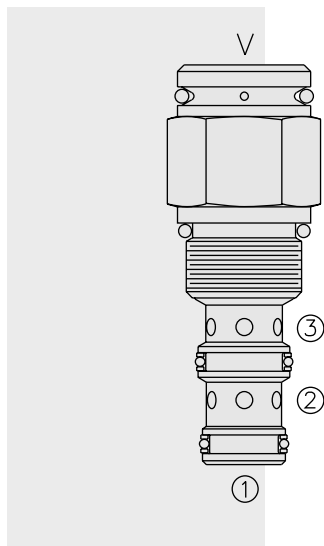
110 7.6 bar (110 psi)
170 11.7 bar (170 psi)

Seals

N Buna N (Std.)
NS Buna N with Sealed Spool
V Fluorocarbon
VS Fluorocarbon with Sealed Spool

DIRECTIONAL VALVES

PD10-34 Piloted 2-Way Spool, Normally Closed,



DESCRIPTION

A screw-in, cartridge-style, pilot-operated, spool-type, normally closed, hydraulic directional valve for two-way circuits requiring remote pilot actuation.

OPERATION

In neutral (unpiloted), the **PD10-34** blocks flow from ③ to ② bidirectionally. V is a spring chamber vent-to-atmosphere, which is internally O-ring sealed from the cartridge flow paths.

On remote pilot signal at ①, the valve shifts to open ② to ③ bidirectionally.

Because of the vented spring chamber, the cartridge may be fully pressurized at any port without affecting required pilot pressure.

FEATURES

- Hardened spool and cage for long life.
- Industry common cavity.

RATINGS

Operating Pressure: 240 bar (3500 psi)

Proof Pressure: 390 bar (5700 psi)

Flow: See Performance Chart

Internal Leakage: 82 cc/minute (5 cu. in./minute) max. at 207 bar (3000 psi)

Pilot Pressure Required: To Full Spool Shift:

for 4.1 bar (60 psi) spring: 4.7 bar (68.2 psi)

for 7.6 bar (110 psi) spring: 8.6 bar (125 psi)

Oil Volume Required to Full Shift: 0.65 cc (0.04 cu. in.)

Temperature: -40 to 120°C with standard Buna seals

Filtration: See page 9.010.1

Fluids: Mineral-based or synthetics with lubricating properties at viscosities of 7.4 to 420 cSt (50 to 2000 ssu)

Installation: No restrictions; See page 9.020.1

Cavity: VC10-3; See page 9.110.1

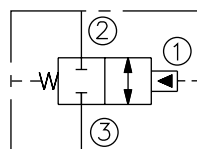
Cavity Tool: CT10-3XX; See page 8.600.1

Seal Kit: SK10-3X-MM; See page 8.650.1

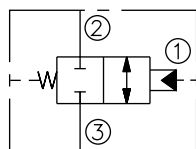
Cap Vent Seal: 6003117

SYMBOLS

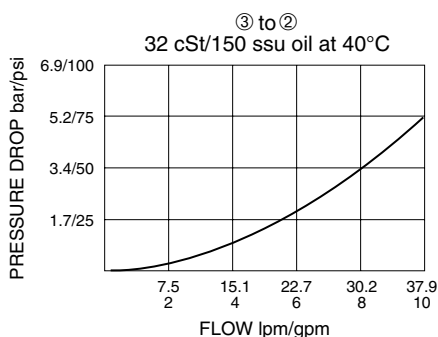
USASI:



ISO:



PERFORMANCE (Cartridge Only)

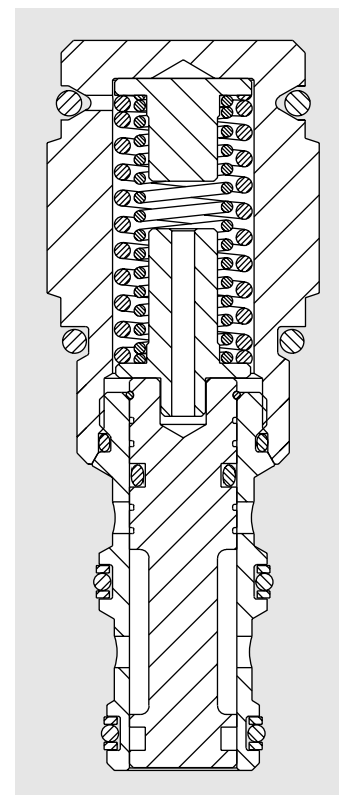
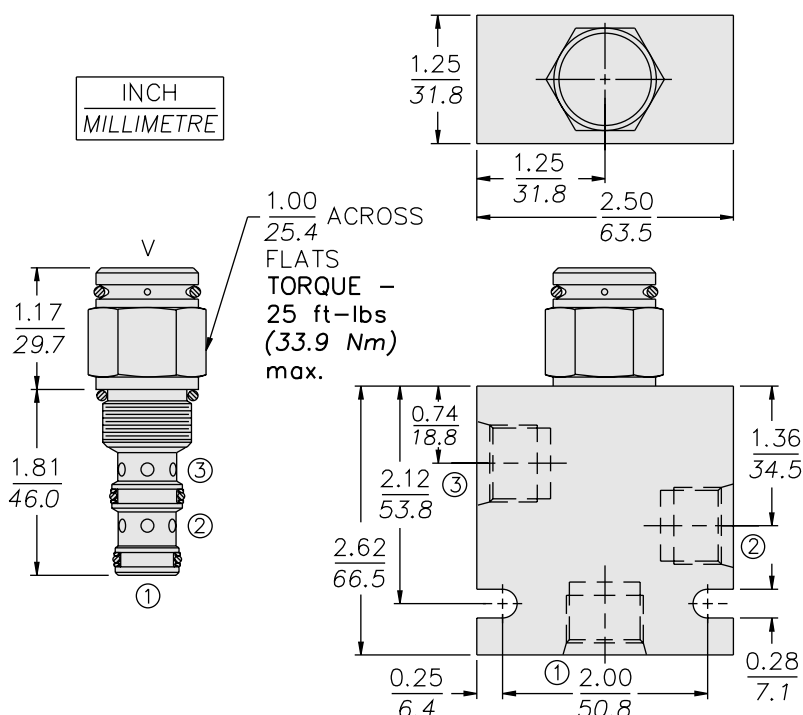


Note: This valve is designed with a dynamic oil-to-atmosphere seal in the vent section. Ambient conditions will cause this vent seal to degrade which will reduce the valve's cycle life. If this could cause a problem, we suggest that a non-vented model be selected, or special seal be used. Consult factory for assistance.

External Vent

PD10-34

DIMENSIONS



MATERIALS

Cartridge: Weight: 0.15 kg. (0.34 lbs.); Steel with hardened work surfaces; Zinc-plated exposed surfaces. Buna N O-rings and polyester elastomer back-ups standard.

Standard Ported Body: Weight: 0.36 kg. (0.80 lbs.); Anodized high-strength 6061 T6 aluminum alloy, rated to 240 bar (3500 psi); See page 8.010.1. Ductile iron and steel bodies available; dimensions may differ; consult factory.

TO ORDER

PD10-34 -

Porting
Cartridge Only **0**
SAE 6 **6T**
SAE 8 **8T**
1/4 in. BSP* **2B**
3/8 in. BSP* **3B**

*BSP Body
U.K. Mfr. Only

Bias Spring†
40 2.8 bar (40 psi)
60 4.1 bar (60 psi)
110 7.6 bar (110 psi)
170 11.7 bar (170 psi)

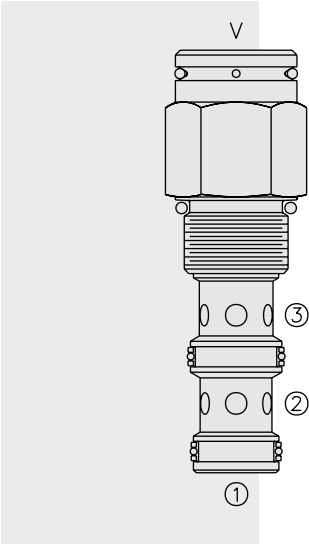
†Note: 110 psi bias spring is the minimum required for use with sealed spool.

Seals

N Buna N (Std.)
NS Buna N with Sealed Spool
V Fluorocarbon
VS Fluorocarbon with Sealed Spool

DIRECTIONAL VALVES

PD12-34 Piloted 2-Way Spool, Normally Closed,



DESCRIPTION

A screw-in, cartridge-style, pilot-operated, spool-type, normally closed, hydraulic directional valve for two-way circuits requiring remote pilot actuation.

OPERATION

In neutral (unpiloted), the PD12-34 blocks flow from ③ to ② bidirectionally. V is a spring chamber vent-to-atmosphere, which is internally O-ring sealed from the cartridge flow paths.

On remote pilot signal at ①, the valve shifts to open ② to ③ bidirectionally. Because of the vented spring chamber, the cartridge may be fully pressurized at any port without affecting required pilot pressure.

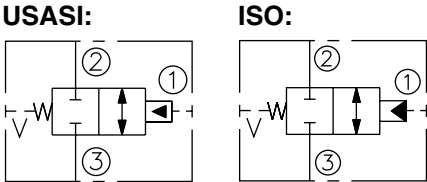
FEATURES

- Hardened spool and cage for long life.
- Cost-effective cavity.

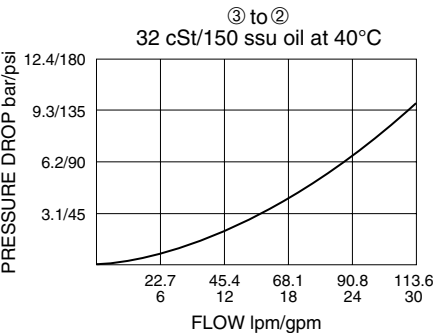
RATINGS

- Operating Pressure:** 240 bar (3500 psi)
Proof Pressure: 420 bar (6090 psi)
Flow: See Performance Chart
Internal Leakage: 82 cc/minute (5 cu. in./minute) max. at 207 bar (3000 psi)
Pilot Pressure Required for 7.6 bar (110 psi) Spring:
to Cross-Over: 7.6 bar (110 psi)
to Full Shift: 9.1 bar (132 psi)
Oil Volume Required to Full Shift: 1.32 cc (0.08 cu. in.)
Temperature: -40 to 120°C with standard Buna seals
Filtration: See page 9.010.1
Fluids: Mineral-based or synthetics with lubricating properties at viscosities of 7.4 to 420 cSt (50 to 2000 ssu)
Installation: No restrictions; See page 9.020.1
Cavity: VC12-3; See page 9.112.1
Cavity Tool: CT12-3XX; See page 8.600.1
Seal Kit: SK12-3X-MM; See page 8.650.1
Cap Vent Seal: 6003121

SYMBOLS



PERFORMANCE (Cartridge Only)

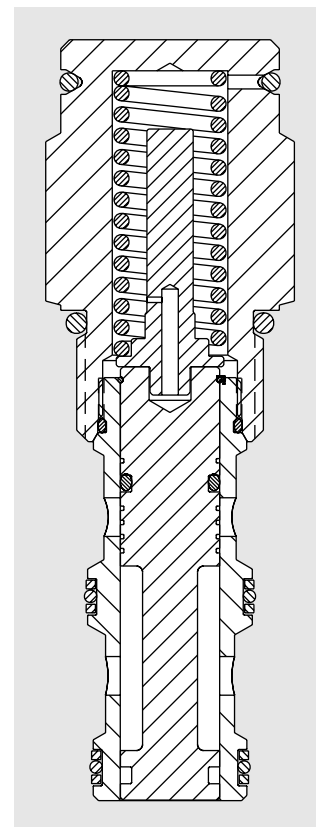
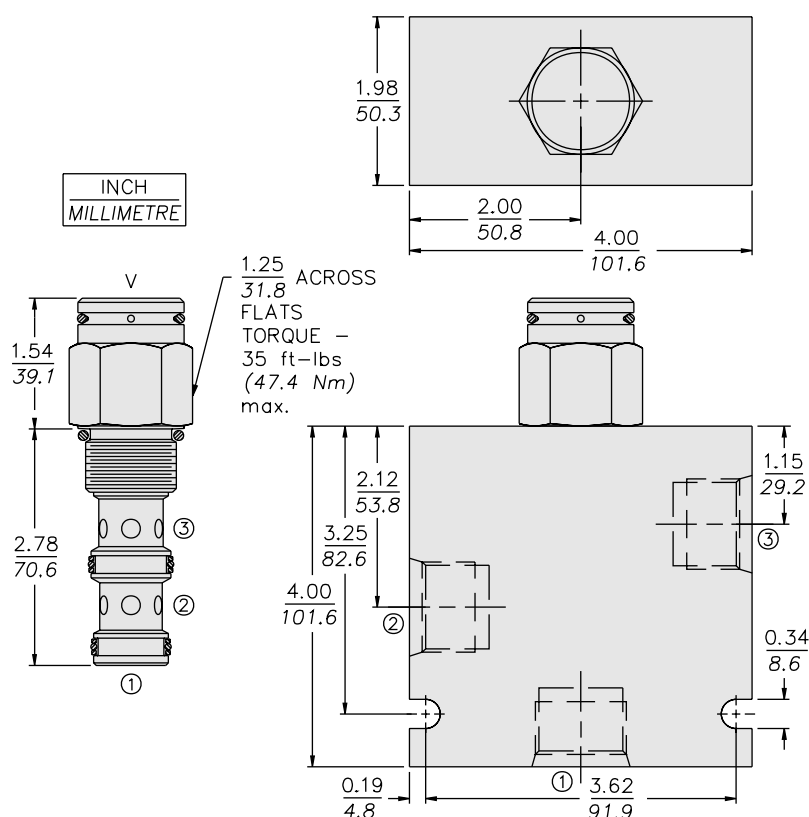


Note: This valve is designed with a dynamic oil-to-atmosphere seal in the vent section. Ambient conditions will cause this vent seal to degrade which will reduce the valve's cycle life. If this could cause a problem, we suggest that a non-vented model be selected, or special seal be used. Consult factory for assistance.

External Vent

PD12-34

DIMENSIONS



MATERIALS

Cartridge: Weight: 0.23 kg. (0.50 lbs.); Steel with hardened work surfaces; Zinc-plated exposed surfaces. Buna N O-rings and polyester elastomer back-ups standard.

Standard Ported Body: Weight: 1.13 kg. (2.50 lbs.); Anodized high-strength 6061 T6 aluminum alloy, rated to 240 bar (3500 psi); See page 8.012.1. Ductile iron and steel bodies available; dimensions may differ; consult factory.

TO ORDER

PD12-34 -

Porting

Cartridge Only **0**

SAE 8 **8T**

SAE 10 **10T**

SAE 12 **12T**

1/2 in. BSP* **4B**

3/4 in. BSP* **6B**

*BSP Body
U.K. Mfr. Only

Bias Spring

110 7.6 bar (110 psi)

170 11.7 bar (170 psi)

Seals

N Buna N (Std.)

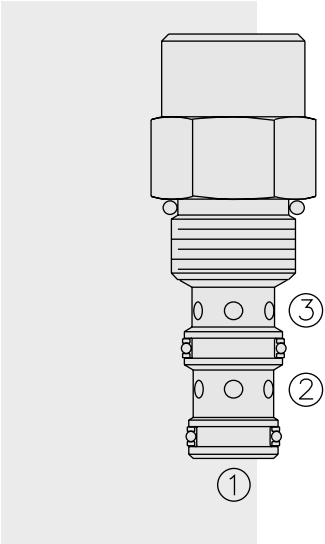
NS Buna N with Sealed Spool

V Fluorocarbon

VS Fluorocarbon with Sealed Spool

DIRECTIONAL VALVES

PD10-35 Piloted 2-Way Spool, Normally Open,



DESCRIPTION

A screw-in, cartridge-style, pilot-operated, spool-type, normally open hydraulic directional valve for two-way circuits requiring remote pilot actuation.

OPERATION

In neutral (unpiloted), the PD10-35 allows flow from ② to ③. The spring bias chamber is internally vented to ③.

On remote pilot signal at ①, the valve shifts to block ③ to ② bidirectionally.

Note: Back pressure at ③ will increase the pilot pressure required at ① to shift, at a ratio of 1:1. Consult factory.

Consult factory for applications where bi-directional flow is required when the valve is in the normal or spring-offset position.

FEATURES

- Hardened spool and cage for long life.
- Industry common cavity.

RATINGS

Operating Pressure: 240 bar (3500 psi)

Proof Pressure: 390 bar (5700 psi)

Flow: See Performance Chart

Internal Leakage: 82 cc/minute (5 cu. in./minute) max. at 207 bar (3000 psi)

Pilot Pressure Required: To Full Spool Shift

for 4.1 bar (60 psi) spring: 4.7 bar (68.2 psi)

for 7.6 bar (110 psi) spring: 8.6 bar (125 psi)

Oil Volume Required to Full Shift: 0.65 cc (0.04 cu. in.)

Temperature: -40 to 120°C with standard Buna seals

Filtration: See page 9.010.1

Fluids: Mineral-based or synthetics with lubricating properties at viscosities of 7.4 to 420 cSt (50 to 2000 ssu)

Installation: No restrictions; See page 9.020.1

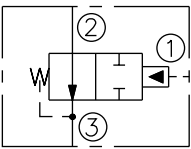
Cavity: VC10-3; See page 9.110.1

Cavity Tool: CT10-3XX; See page 8.600.1

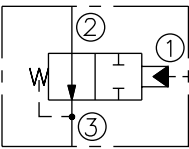
Seal Kit: SK10-3X-MM; See page 8.650.1

SYMBOLS

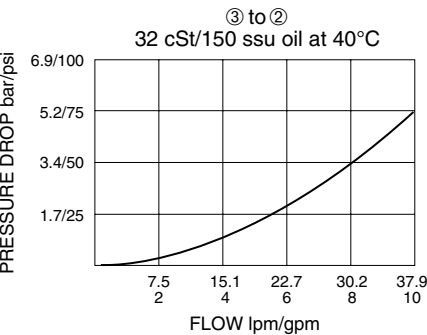
USASI:



ISO:



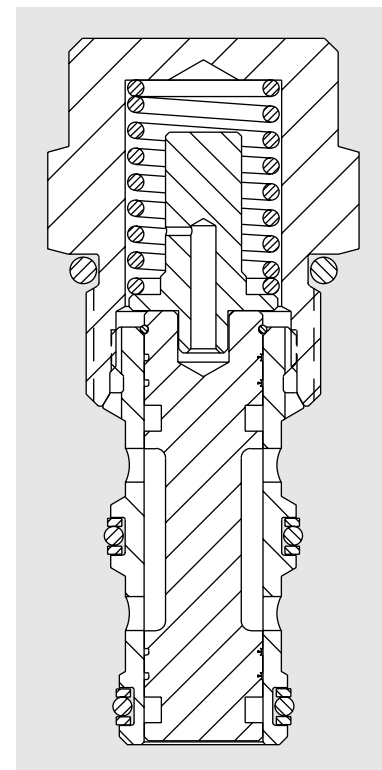
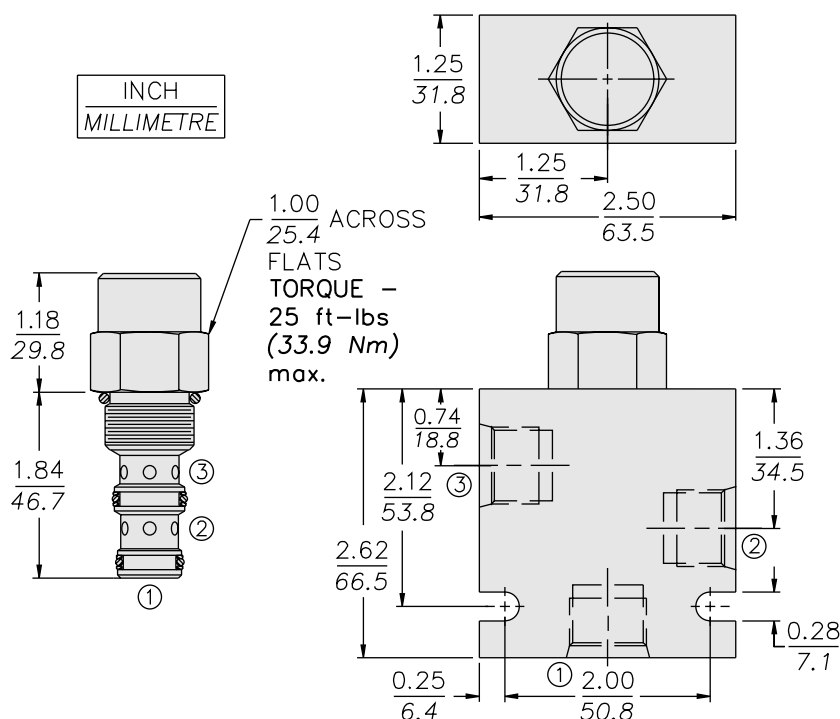
PERFORMANCE (Cartridge Only)



Internal Vent

PD10-35

DIMENSIONS



MATERIALS

Cartridge: Weight: 0.15 kg. (0.34 lbs.); Steel with hardened work surfaces; Zinc-plated exposed surfaces. Buna N O-rings and polyester elastomer back-ups standard.

Standard Ported Body: Weight: 0.36 kg. (0.80 lbs.); Anodized high-strength 6061 T6 aluminum alloy, rated to 240 bar (3500 psi); See page 8.010.1. Ductile iron and steel bodies available; dimensions may differ; consult factory.

TO ORDER

PD10-35 -

Porting
Cartridge Only **0**
SAE 6 **6T**
SAE 8 **8T**
1/4 in. BSP* **2B**
3/8 in. BSP* **3B**

*BSP Body
U.K. Mfr. Only

Bias Spring*
40 2.8 bar (40 psi)
60 4.1 bar (60 psi)
110 7.6 bar (110 psi)
170 11.7 bar (170 psi)

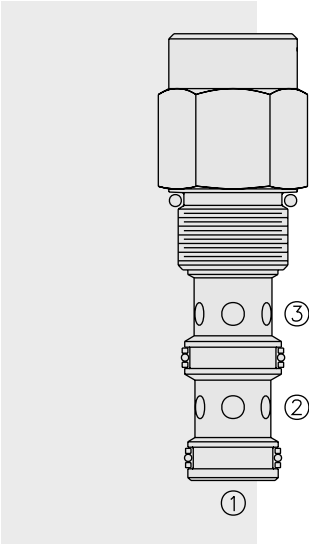
*Note: 110 psi bias spring is the minimum required for use with sealed spool.

Seals

N Buna N (Std.)
NS Buna N with Sealed Spool
V Fluorocarbon
VS Fluorocarbon with Sealed Spool

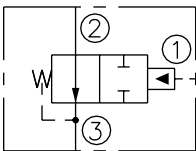
DIRECTIONAL VALVES

PD12-35 Piloted 2-Way Spool, Normally Open,

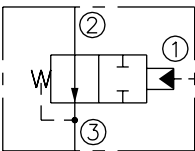


SYMBOLS

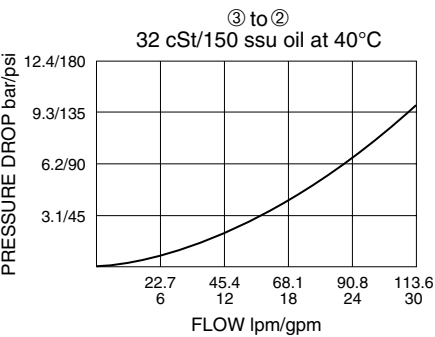
USASI:



ISO:



PERFORMANCE (Cartridge Only)



DESCRIPTION

A screw-in, cartridge-style, pilot-operated, spool-type, normally open hydraulic directional valve for two-way circuits requiring remote pilot actuation.

OPERATION

In neutral (unpiloted), the **PD12-35** allows flow from ② to ③. The spring bias chamber is internally vented to ③.

On remote pilot signal at ①, the valve shifts to block ③ to ② bidirectionally.

Note: Back pressure at ③ will increase the pilot pressure required at ① to shift, at a ratio of 1:1. Consult factory.

Consult factory for applications where bi-directional flow is required when the valve is in the normal or spring-offset position.

FEATURES

- Hardened spool and cage for long life.
- Industry common cavity.

RATINGS

Operating Pressure: 240 bar (3500 psi)

Proof Pressure: 420 bar (6090 psi)

Flow: See Performance Chart

Internal Leakage: 82 cc/minute (5 cu. in./minute) max. at 207 bar (3000 psi)

Pilot Pressure Required: To Full Spool Shift for 7.6 bar (110 psi) spring:
8.6 bar (125 psi)

Oil Volume Required to Full Shift: 1.32 cc (0.08 cu. in.)

Temperature: -40 to 120°C with standard Buna seals

Filtration: See page 9.010.1

Fluids: Mineral-based or synthetics with lubricating properties at viscosities of
7.4 to 420 cSt (50 to 2000 ssu)

Installation: No restrictions; See page 9.020.1

Cavity: VC12-3; See page 9.112.1

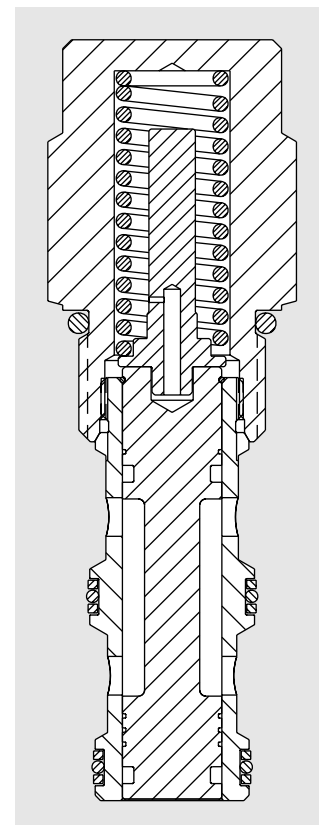
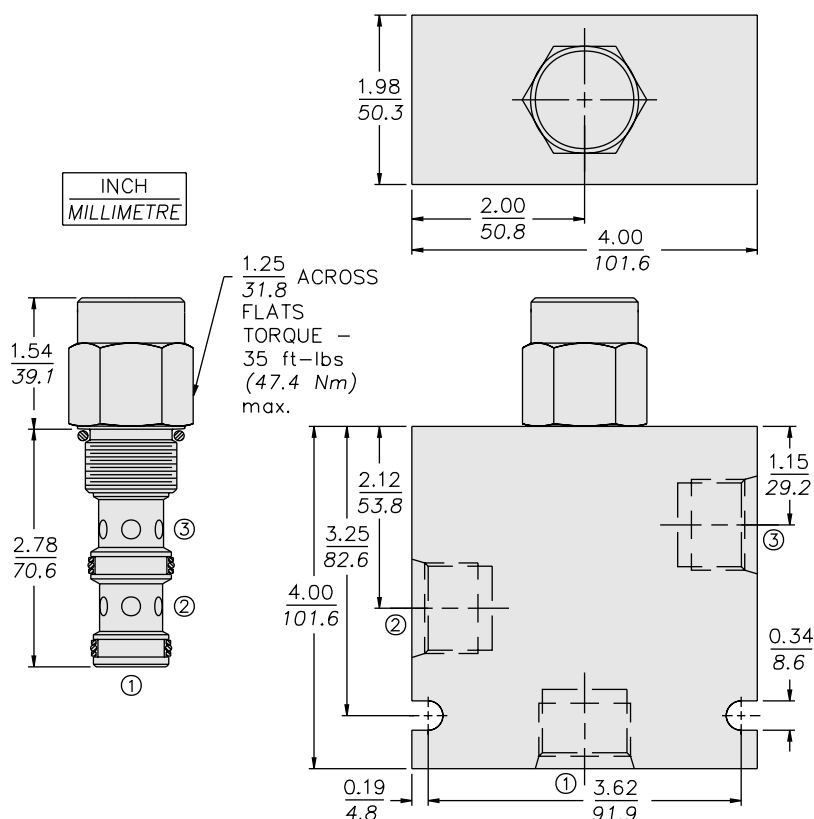
Cavity Tool: CT12-3XX; See page 8.600.1

Seal Kit: SK12-3X-MM; See page 8.650.1

Internal Vent

PD12-35

DIMENSIONS



MATERIALS

Cartridge: Weight: 0.23 kg. (0.50 lbs.); Steel with hardened work surfaces; Zinc-plated exposed surfaces. Buna N O-rings and polyester elastomer back-ups standard.

Standard Ported Body: Weight: 1.13 kg. (2.50 lbs.); Anodized high-strength 6061 T6 aluminum alloy, rated to 240 bar (3500 psi); See page 8.012.1. Ductile iron and steel bodies available; dimensions may differ; consult factory.

TO ORDER

PD12-35 -

Porting

Cartridge Only **0**
SAE 8 **8T**
SAE 10 **10T**
SAE 12 **12T**
1/2 in. BSP* **4B**
3/4 in. BSP* **6B**

*BSP Body
U.K. Mfr. Only

Bias Spring

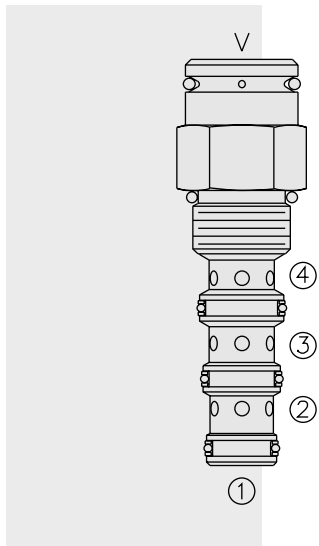
110 7.6 bar (110 psi)
170 11.7 bar (170 psi)

Seals

N Buna N (Std.)
NS Buna N with Sealed Spool
V Fluorocarbon
VS Fluorocarbon with Sealed Spool

DIRECTIONAL VALVES

PD10-40 Piloted 3-Way Spool, External Vent



DESCRIPTION

A screw-in, cartridge-style, pilot-operated, spool-type, hydraulic directional valve for three-way circuits requiring remote pilot actuation.

OPERATION

In neutral (unpiloted), the **PD10-40** allows flow from ③ to ② bidirectionally, while flow is blocked at ④. V is a spring chamber vent-to-atmosphere, which is internally O-ring sealed from the cartridge flow paths.

On remote pilot signal at ①, the valve shifts to open from ③ to ④, while blocking flow at ②.

Because of the vented spring chamber, the cartridge may be fully pressurized at any port without affecting required pilot pressure.

FEATURES

- Hardened spool and cage for long life.
- Industry common cavity.

RATINGS

Operating Pressure: 240 bar (3500 psi)

Proof Pressure: 350 bar (5075 psi)

Flow: See Performance Chart

Internal Leakage: 82 cc/minute (5 cu. in./minute) max. at 207 bar (3000 psi)

Pilot Pressure Required:

To Spool Crossover: 7.6 bar (110 psi)

To Full Spool Shift: 8.6 bar (125 psi)

Oil Volume Required to Full Shift: 0.65 cc (0.04 cu. in.)

Temperature: -40 to 120°C with standard Buna seals

Filtration: See page 9.010.1

Fluids: Mineral-based or synthetics with lubricating properties at viscosities of 7.4 to 420 cSt (50 to 2000 ssu)

Installation: No restrictions; See page 9.020.1

Cavity: VC10-4; See page 9.110.1

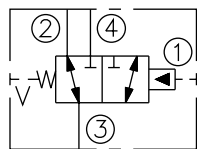
Cavity Tool: CT10-4XX; See page 8.600.1

Seal Kit: SK10-4X-MMM; See page 8.650.1

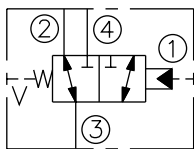
Cap Vent Seal: 6003117

SYMBOLS

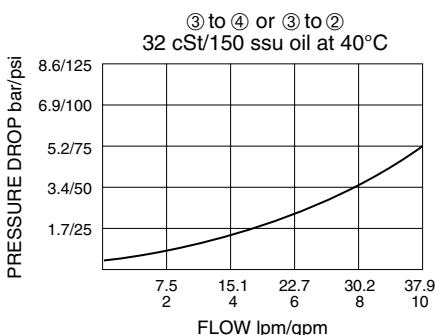
USASI:



ISO:

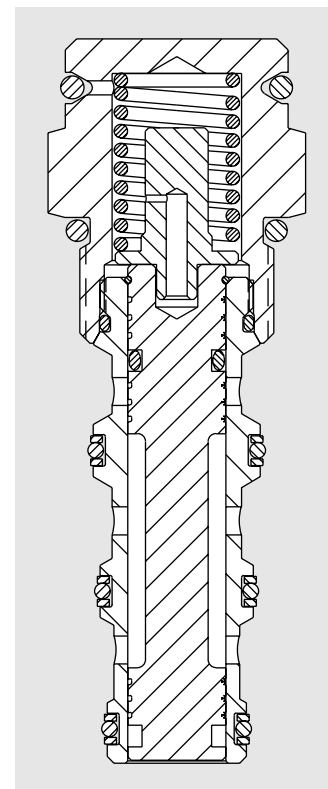
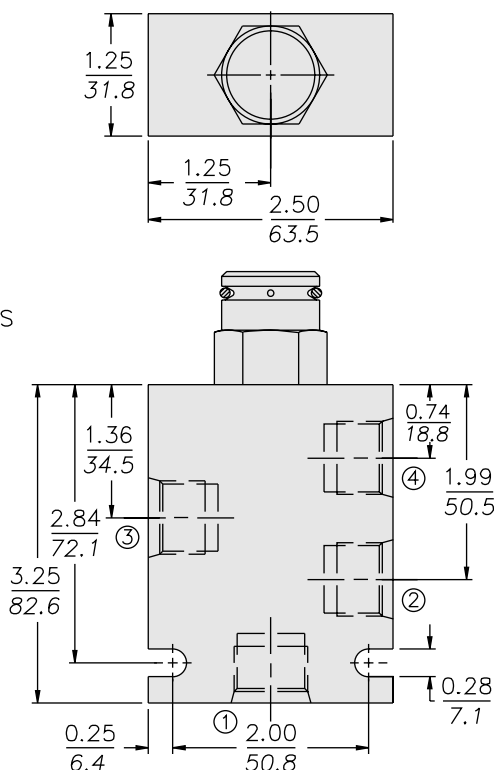
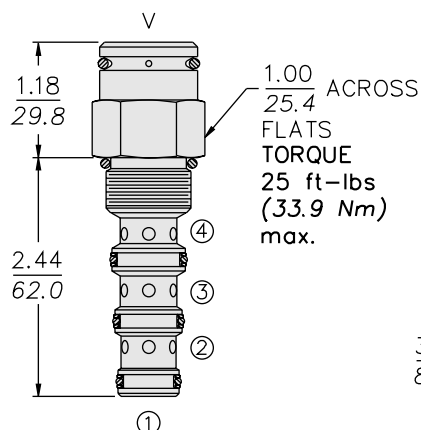


PERFORMANCE (Cartridge Only)



Note: This valve is designed with a dynamic oil-to-atmosphere seal in the vent section. Ambient conditions will cause this vent seal to degrade which will reduce the valve's cycle life. If this could cause a problem, we suggest that a non-vented model be selected, or special seal be used. Consult factory for assistance.

INCH
MILLIMETRE



Standard Ported Body: Weight:
0.34 kg. (0.75 lbs.); Anodized high-strength 6061 T6 aluminum alloy, rated to 240 bar (3500 psi); See page 8.010.1. Ductile iron and steel bodies available; dimensions may differ; consult factory.

PD10-40

None	(Blank)
Open Transition	N
Tall Cap	T

Cartridge Only	0
SAE 6	6T
SAE 8	8T
1/4 in. BSP*	2B
3/8 in. BSP*	3B

*BSP Body
U.K. Mfr. Only

40	2.8 bar (40 psi)
60	4.1 bar (60 psi)
110	7.6 bar (110 psi)
130	9.1 bar (130 psi)
170	11.7 bar (170 psi)
M5.0	5.0 bar (73 psi)
M14.0	14 bar (203 psi)
M15.0	15 bar (217 psi)

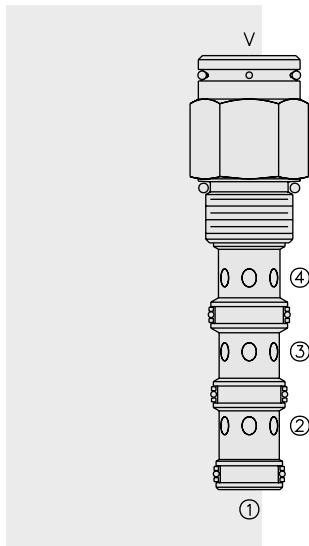
‡ T option required.
Cap Height: 2.21" (56.1 mm)

†Note: 110 psi bias spring is the minimum required for use with sealed spool.

N Buna N (Std.)
NS Buna N with Sealed Spool
 (110 psi spring minimum required)
V Fluorocarbon
VS Fluorocarbon with Sealed Spool
 (110 psi spring minimum required)

DIRECTIONAL VALVES

PD12-40 Piloted 3-Way Spool, External Vent



DESCRIPTION

A screw-in, cartridge-style, pilot-operated, spool-type, hydraulic directional valve for three-way circuits requiring remote pilot actuation.

OPERATION

In neutral (unpiloted), the **PD12-40** allows flow from ③ to ② bidirectionally, while flow is blocked at ④. V is a spring chamber vent-to-atmosphere, which is internally O-ring sealed from the cartridge flow paths.

On remote pilot signal at ①, the valve shifts to open from ③ to ④, while blocking flow at ②.

Because of the vented spring chamber, the cartridge may be fully pressurized at any port without affecting required pilot pressure.

FEATURES

- Hardened spool and cage for long life.
- Cost effective cavity.

RATINGS

Operating Pressure: 240 bar (3500 psi)

Proof Pressure: 420 bar (6090 psi)

Flow: See Performance Chart

Internal Leakage: 164 cc/minute (10 cu. in./minute) max. at 207 bar (3000 psi)

Pilot Pressure Required with 7.6 bar (110 psi) Spring:

To Spool Crossover: 7.6 bar (110 psi)

To Full Spool Shift: 9.1 bar (132 psi)

Oil Volume Required to Full Shift: 1.32 cc (0.08 cu. in.)

Temperature: -40 to 120°C with standard Buna seals

Filtration: See page 9.010.1

Fluids: Mineral-based or synthetics with lubricating properties at viscosities of 7.4 to 420 cSt (50 to 2000 ssu)

Installation: No restrictions; See page 9.020.1

Cavity: VC12-4; See page 9.112.2

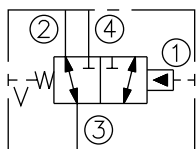
Cavity Tool: CT12-4XX; See page 8.600.1

Seal Kit: SK12-4X-MMM; See page 8.650.1

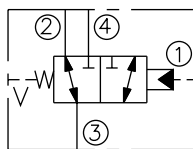
Cap Vent Seal: Part Number 6003121

SYMBOLS

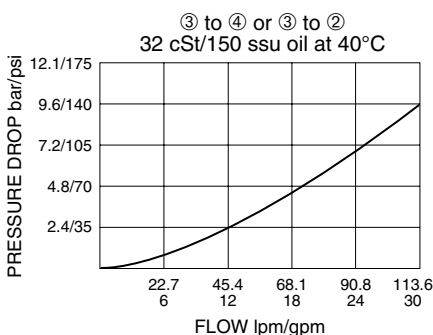
USASI:



ISO:



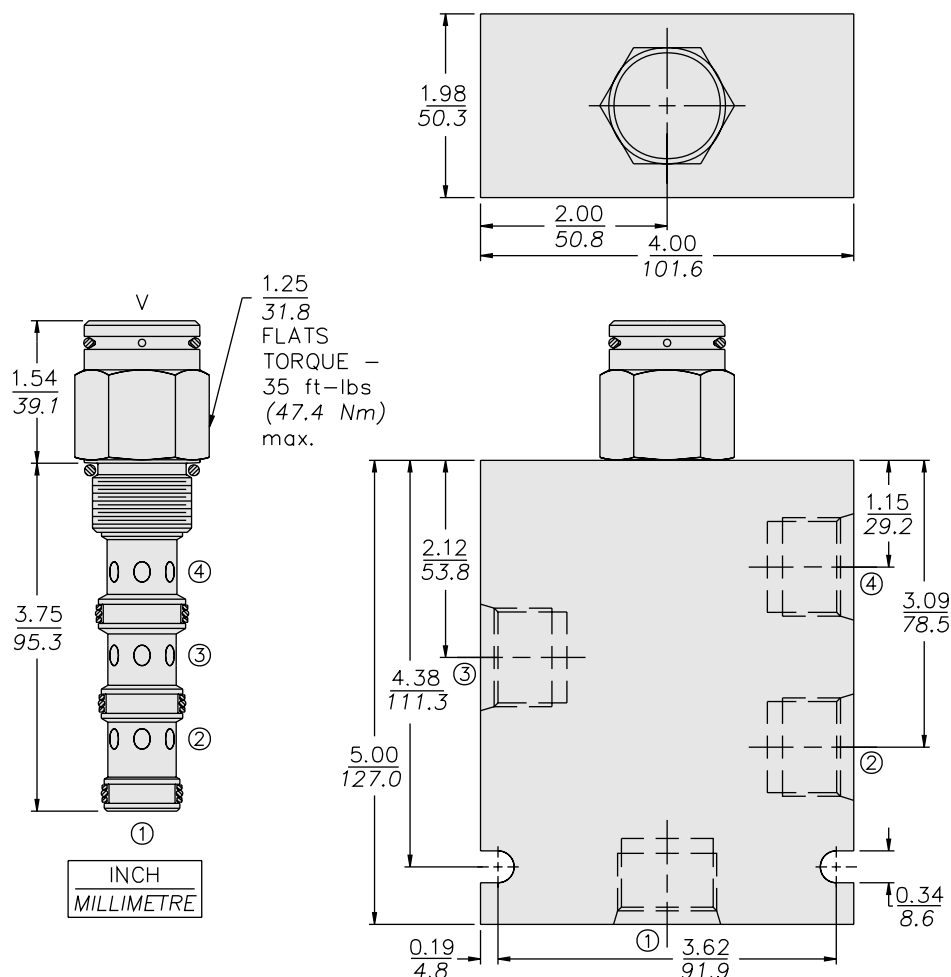
PERFORMANCE (Cartridge Only)



Note: This valve is designed with a dynamic oil-to-atmosphere seal in the vent section. Ambient conditions will cause this vent seal to degrade which will reduce the valve's cycle life. If this could cause a problem, we suggest that a non-vented model be selected, or special seal be used. Consult factory for assistance.

PD12-40

DIMENSIONS



MATERIALS

Cartridge: Weight: 0.28 kg. (0.61 lbs.); Steel with hardened work surfaces; Zinc-plated exposed surfaces; Buna N O-rings and polyester elastomer back-ups standard.

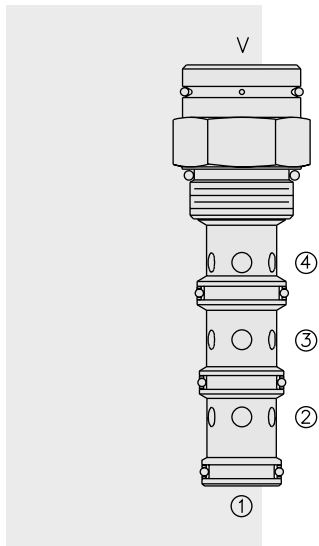
Standard Ported Body: Weight: 1.50 kg. (3.30 lbs.); Anodized high-strength 6061 T6 aluminum alloy, rated to 240 bar (3500 psi); See page 8.012.1. Ductile iron and steel bodies available; dimensions may differ; consult factory.

TO ORDER

PD12-40 - - -			
Option	None (Blank)		
	Open Transition	N	
Porting	Cartridge Only	0	
	SAE 10	10T	
	SAE 12	12T	
Bias Spring			
110 7.6 bar (110 psi)			
170 11.7 bar (170 psi)			
Optional bias springs considered on OEM request.			
Seals			
N Buna N (Std.)			
NS Buna N with Sealed Spool			
V Fluorocarbon			
VS Fluorocarbon with Sealed Spool			

DIRECTIONAL VALVES

PD16-40 Piloted 3-Way Spool, External Vent



DESCRIPTION

A screw-in, cartridge-style, pilot-operated, spool-type, hydraulic directional valve for three-way circuits requiring remote pilot actuation.

OPERATION

In neutral (unpiloted), the **PD16-40** allows flow passage from ③ to ② bidirectionally, while flow is blocked at ④. V is a spring chamber vent-to-atmosphere, which is internally O-ring sealed from the cartridge flow paths.

On remote pilot signal at ①, the valve shifts to open from ③ to ④, while blocking flow at ②.

The vented spring chamber allows PD16-40 to be fully pressurized at any port without affecting required pilot pressure.

FEATURES

- Hardened spool and cage for long life.
- Optional sealed pilot.
- Industry common cavity.

RATINGS

Operating Pressure: 240 bar (3500 psi)

Proof Pressure: 350 bar (5075 psi)

Flow: See Performance Chart

Internal Leakage: 164 cc/minute (10 cu. in./minute) max. at 207 bar (3000 psi)

Pilot Pressure Required:

To Spool Crossover: 7.6 bar (110 psi)

To Full Spool Shift: 9.0 bar (130 psi)

Oil Volume Required to Full Shift: 2.5 cc (0.15 cu. in.)

Temperature: -40 to 120°C with standard Buna seals

Filtration: See page 9.010.1

Fluids: Mineral-based or synthetics with lubricating properties at viscosities of 7.4 to 420 cSt (50 to 2000 ssu)

Installation: No restrictions; See page 9.020.1

Cavity: VC16-4; See page 9.116.1

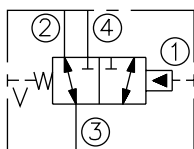
Cavity Tool: CT16-4XX; See page 8.600.1

Seal Kit: SK16-4X-MMM; See page 8.650.1

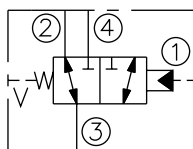
Cap Vent Seal: 6003125

SYMBOLS

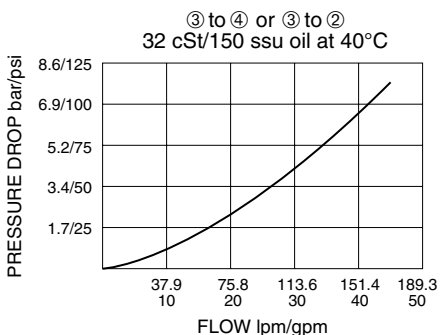
USASI:



ISO:



PERFORMANCE (Cartridge Only)



Note: This valve is designed with a dynamic oil-to-atmosphere seal in the vent section. Ambient conditions will cause this vent seal to degrade which will reduce the valve's cycle life. If this could cause a problem, we suggest that a non-vented model be selected, or special seal be used. Consult factory for assistance.

Technical drawing of the 100 Series Valve Body, showing front, side, and top views with dimensions in inches and millimeters.

Front View Dimensions:

- Overall Height: 1.31 / 33.3
- Overall Width: 4.00 / 101.6
- Section 1 (Bottom): 1.00 / 25.4
- Section 2 (Middle): 3.25 / 82.6
- Section 3 (Top): 2.12 / 53.8
- Section 4 (Top Flange): 4.38 / 111.3
- Section 5 (Top Flange): 5.00 / 127.0 *

Side View Dimensions:

- Overall Height: 1.98 / 50.3
- Overall Width: 2.00 / 50.8
- Section 1 (Bottom): 0.19 / 4.8
- Section 2 (Middle): 3.62 / 91.9
- Section 3 (Top): 4.00 / 101.6

Top View Dimensions:

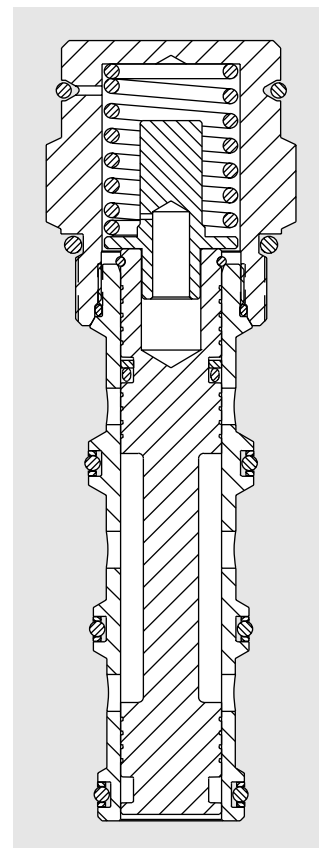
- Overall Width: 4.00 / 101.6
- Section 1 (Bottom): 0.19 / 4.8
- Section 2 (Middle): 3.62 / 91.9
- Section 3 (Top): 4.00 / 101.6

Notes:

- 1.50 / 38.1 ACROSS FLATS TORQUE - 50 ft-lbs (67.7 Nm) max.
- * BSP BODY - 134.9

Legend:

- INCH
- MILLIMETRE



Cartridge: Weight: 0.52 kg. (1.15 lbs.); Steel with hardened work surfaces; Zinc-plated exposed surfaces; Buna N O-rings and polyester elastomer back-ups standard.

Standard Ported Body: Weight: 1.5 kg. (3.3 lbs.); Anodized high-strength 6061 T6 aluminum alloy, rated to 240 bar (3500 psi); See page 8.016.1. Ductile iron and steel bodies available; dimensions may differ; consult factory.

PD16-40

<u>Option</u>	
None (Blank)	
Open Transition	N

Porting

Cartridge Only	0
SAE 12, SAE 6 Pilot	12T
SAE 16, SAE 6 Pilot	16T

Bias Spring[†]

60	4.1 bar (60 psi)
80	5.5 bar (80 psi)
110	7.6 bar (110 psi)
170	11.7 bar (170 psi)

Optional bias springs considered
on OEM request.

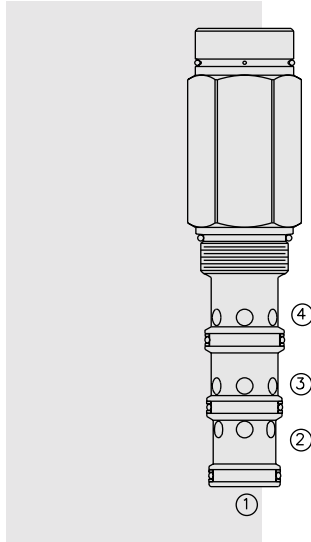
[†]Note: 110 psi bias spring is the minimum required for use with sealed spool.

Seals

N Buna N (Std.)
NS Buna N with Sealed Spool
 (110 psi spring minimum required)
V Fluorocarbon
VS Fluorocarbon with Sealed Spool
 (110 psi spring minimum required)

DIRECTIONAL VALVES

PD42-M40 Piloted 3-Way Spool, External Vent



DESCRIPTION

A screw-in, cartridge-style, pilot-operated, spool-type, hydraulic directional valve for three-way circuits requiring remote pilot actuation.

OPERATION

In neutral (unpiloted), the **PD42-M40** allows flow passage from ③ to ② bidirectionally, while flow is blocked at ④. V is a spring chamber vent-to-atmosphere, which is internally O-ring sealed from the cartridge flow paths.

On remote pilot signal at ①, the valve shifts to open from ③ to ④, while blocking flow at ②.

The vented spring chamber allows PD42-M40 to be fully pressurized at any port without affecting required pilot pressure.

FEATURES

- Hardened spool and cage for long life.
- Optional sealed pilot.
- Industry-standard ISO cavity.

RATINGS

Operating Pressure: 344 bar (5000 psi) with polyurethane seals

Flow: See Performance Chart

Internal Leakage: 246 cc/minute (15 cu. in./minute) max. at 344 bar (5000 psi)

Pilot Pressure Required:

To Spool Crossover: 11.6 bar (172 psi)

To Full Spool Shift: 17 bar (245 psi)

Temperature: -40 to 120°C with standard Buna seals

Filtration: See page 9.010.1

Fluids: Mineral-based or synthetics with lubricating properties at viscosities of 7.4 to 420 cSt (50 to 2000 ssu)

Installation: No restrictions; See page 9.020.1

Cavity: VC42-M4; See page 9.142.1

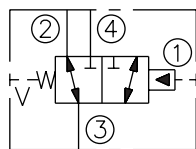
Cavity Tool: CT42-M4XX; See page 8.600.1

Seal Kit: SK42-4X-MMM; See page 8.650.1

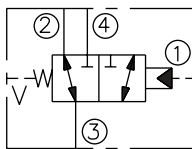
Cap Vent Seal: 6003125

SYMBOLS

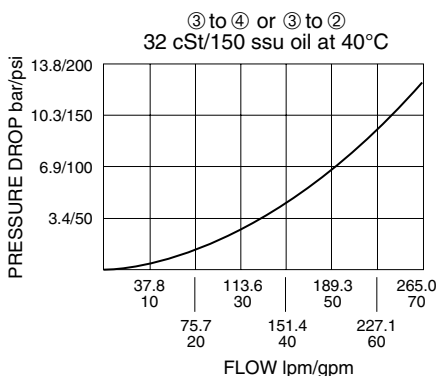
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ISO:



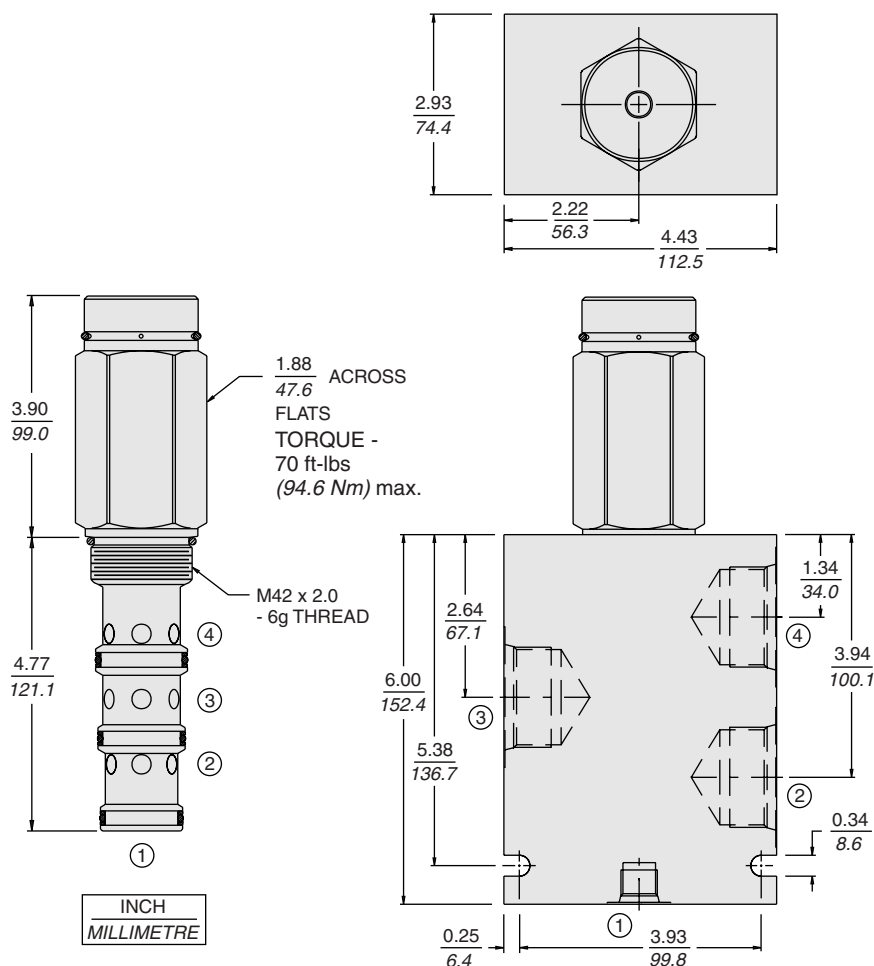
PERFORMANCE (Cartridge Only)



Note: This valve is designed with a dynamic oil-to-atmosphere seal in the vent section. Ambient conditions will cause this vent seal to degrade which will reduce the valve's cycle life. If this could cause a problem, we suggest that a non-vented model be selected, or special seal be used. Consult factory for assistance.

PD42-M40

DIMENSIONS



MATERIALS

Cartridge: Weight: 0.52 kg. (1.15 lbs.); Steel with hardened work surfaces; Zinc-plated exposed surfaces; Buna N O-rings and polyester elastomer back-ups standard.

Standard Ported Body: Weight: 2.8 kg. (6.2 lbs.); Anodized high-strength 6061 T6 aluminum alloy, rated to 240 bar (3500 psi); See page 8.042.1. Ductile iron and steel bodies available; dimensions may differ; consult factory.

TO ORDER

PD42-M40 - - -160[†]

Option
None (Blank)
Open Transition **N**

Porting
Cartridge Only **0**
SAE 16, SAE 6 Pilot **16T**
*SAE 16, SAE 6 Pilot **16TS**
SAE 20, SAE 6 Pilot **20T**

*Steel body for pressures over 3500 psi

Note: All bodies are PD type.

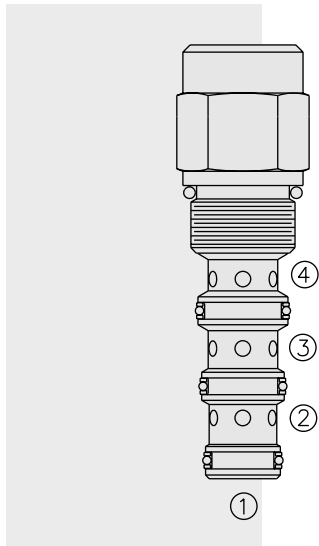
[†]160 psi bias spring standard. Optional bias springs considered on OEM request.

Seals
N Buna N (Std.)
NS Buna N with Sealed Spool
V Fluorocarbon
VS Fluorocarbon with Sealed Spool
P Polyurethane**
PS Polyurethane with Sealed Spool**

**Required for pressures over 3500 psi

DIRECTIONAL VALVES

PD10-41 Piloted 3-Way Spool, Internal Vent



DESCRIPTION

A screw-in, cartridge-style, pilot-operated, spool-type, hydraulic directional valve for three-way circuits requiring remote pilot actuation.

OPERATION

In neutral (unpiloted), the **PD10-41** allows flow from ③ to ④. ② is blocked.

On remote pilot signal at ①, the valve shifts to open from ③ to ②, while blocking flow to ④.

Since ④ is common to the spring chamber, pressure on ④ will directly (1:1) affect the pilot pressure required, and must always be added to the bias spring value.

Note: Consult factory for applications where bi-directional flow is required when the valve is in the normal or spring-offset position.

FEATURES

- Hardened spool and cage for long life.
- Industry common cavity.

RATINGS

Operating Pressure: 240 bar (3500 psi)

Proof Pressure: 350 bar (5075 psi)

Flow: See Performance Chart

Internal Leakage: 82 cc/minute (5 cu. in./minute) max. at 207 bar (3000 psi)

Pilot Pressure Required:

To Spool Crossover – 4.1 bar (60 psi) Spring: 4.7 bar (68.2 psi)
7.6 bar (110 psi) Spring: 7.6 bar (110 psi)

To Full Spool Shift – 4.1 bar (60 psi) Spring: 5.2 bar (75 psi)
7.6 bar (110 psi) Spring: 8.6 bar (125 psi)

Oil Volume Required to Full Shift: 0.65 cc (0.04 cu. in.)

Temperature: -40 to 120°C with standard Buna seals

Filtration: See page 9.010.1

Fluids: Mineral-based or synthetics with lubricating properties at viscosities of 7.4 to 420 cSt (50 to 2000 ssu)

Installation: No restrictions; See page 9.020.1

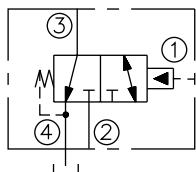
Cavity: VC10-4; See page 9.110.1

Cavity Tool: CT10-4XX; See page 8.600.1

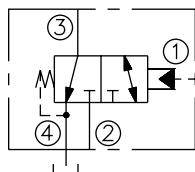
Seal Kit: SK10-4X-MMM; See page 8.650.1

SYMBOLS

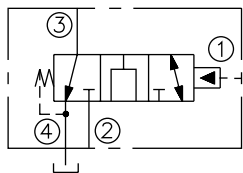
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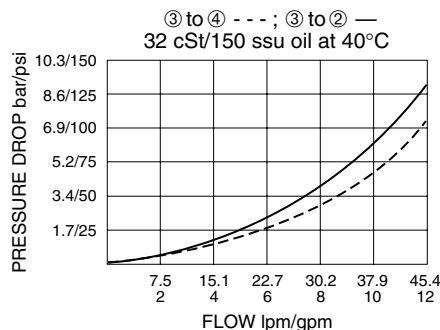
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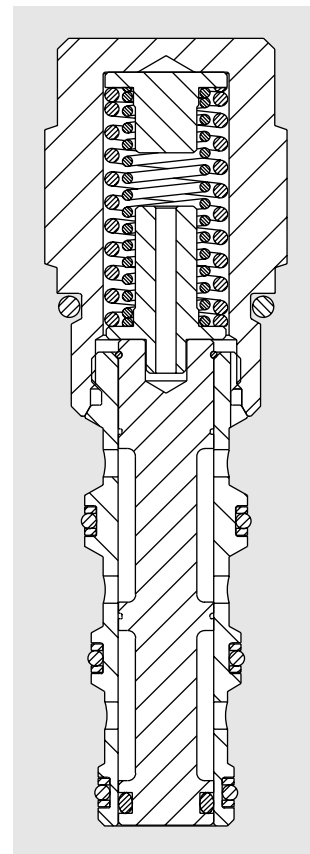
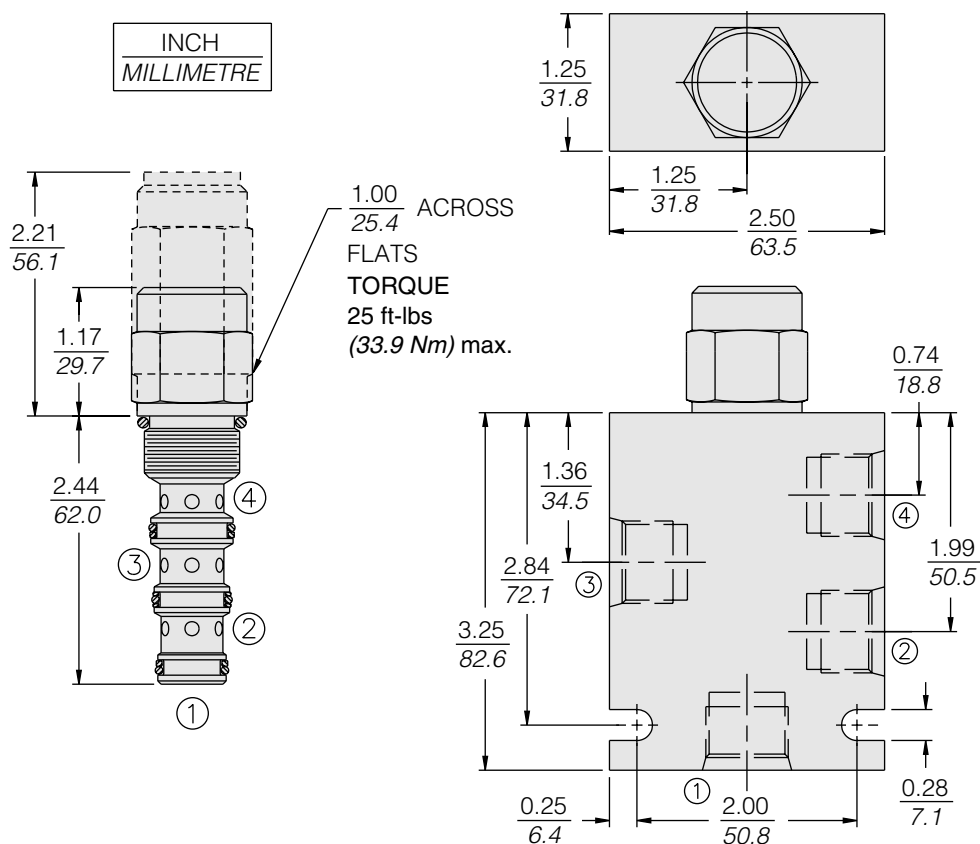


PERFORMANCE (Cartridge Only)



PD10-41

DIMENSIONS



MATERIALS

Cartridge: Weight: 0.16 kg. (0.35 lbs.);
Steel with hardened work surfaces;
Zinc-plated exposed surfaces;
Buna N O-rings and polyester
elastomer back-ups standard.

Standard Ported Body: Weight:
0.34 kg. (0.75 lbs.); Anodized high-
strength 6061 T6 aluminum alloy,
rated to 240 bar (3500 psi); See
page 8.010.1. Ductile iron and steel
bodies available; dimensions may
differ; consult factory.

TO ORDER

PD10-41

Option
None blank
Open Transition **N**
Tall Cap **T**

Porting
Cartridge Only **0**
SAE 6 **6T**
SAE 8 **8T**
1/4 in. BSP* **2B**
3/8 in. BSP* **3B**

*BSP Body
U.K. Mfr. Only

Bias Spring†

60 4.1 bar (60 psi)
110 7.6 bar (110 psi)
170 11.7 bar (170 psi)
***200** 14 bar (203 psi)

*Note: "T" option required for
203 psi bias spring

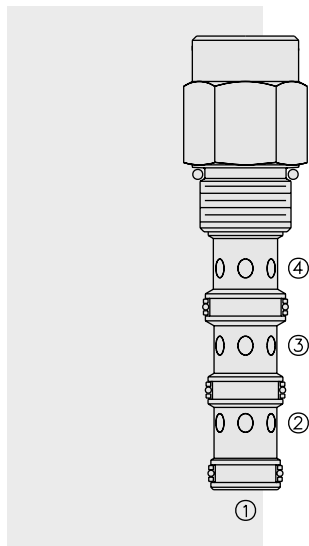
†Note: 110 psi bias spring is the
minimum required for use with
sealed spool.

Seals

N Buna N (Std.)
NS Buna N with Sealed Spool
V Fluorocarbon
VS Fluorocarbon with Sealed Spool

DIRECTIONAL VALVES

PD12-41 Piloted 3-Way Spool, Internal Vent



DESCRIPTION

A screw-in, cartridge-style, pilot-operated, spool-type, hydraulic directional valve for three-way circuits requiring remote pilot actuation.

OPERATION

In neutral (unpiloted), the **PD12-41** allows flow from ③ to ④. ② is blocked.

On remote pilot signal at ①, the valve shifts to open from ③ to ②, while blocking flow to ④.

Since ④ is common to the spring chamber, pressure on ④ will directly (1:1) affect the pilot pressure required, and must always be added to the bias spring value.

Note: Consult factory for applications where bi-directional flow is required when the valve is in the normal or spring-offset position.

FEATURES

- Hardened spool and cage for long life.
- Cost effective cavity.

RATINGS

Operating Pressure: 240 bar (3500 psi)

Proof Pressure: 420 bar (6090 psi)

Flow: See Performance Chart

Internal Leakage: 115 cc/minute (7 cu. in./minute) max. at 207 bar (3000 psi)

Pilot Pressure Required Using 7.6 bar (110 psi) Spring:

To Spool Crossover: 7.6 bar (110 psi)

To Full Spool Shift: 9.1 bar (132 psi)

Oil Volume Required to Full Shift: 1.32 cc (0.08 cu. in.)

Temperature: -40 to 120°C with standard Buna seals

Filtration: See page 9.010.1

Fluids: Mineral-based or synthetics with lubricating properties at viscosities of 7.4 to 420 cSt (50 to 2000 ssu)

Installation: No restrictions; See page 9.020.1

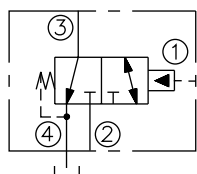
Cavity: VC12-4; See page 9.112.1

Cavity Tool: CT12-4XX; See page 8.600.1

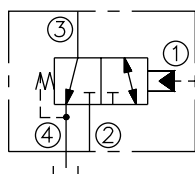
Seal Kit: SK12-4X-MMM; See page 8.650.1

SYMBOLS

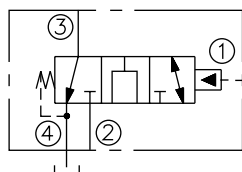
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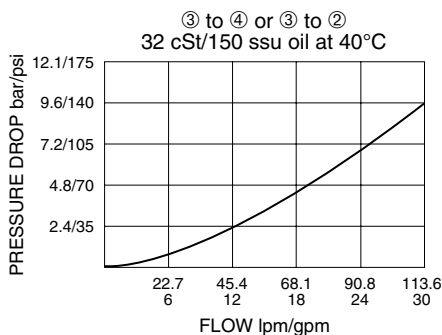
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OPEN TRANSITION:

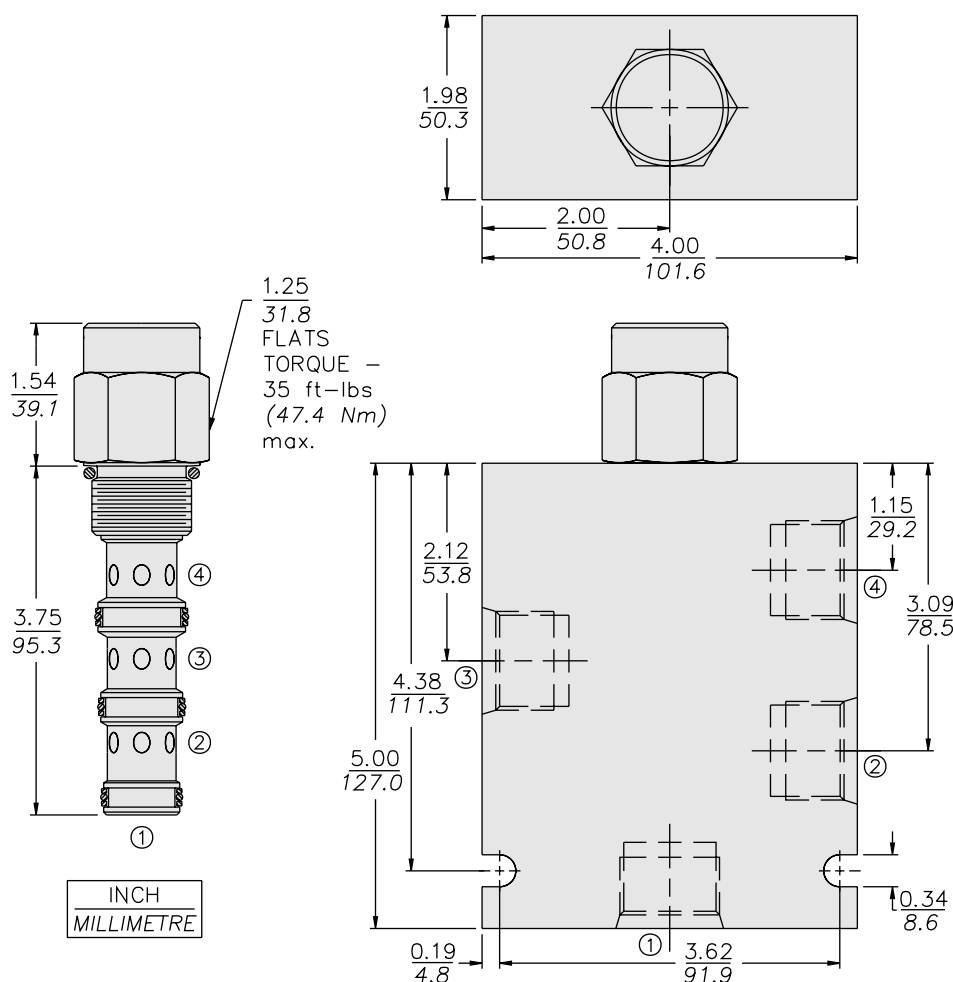


PERFORMANCE (Cartridge Only)



PD12-41

DIMENSIONS



MATERIALS

Cartridge: Weight: 0.28 kg. (0.61 lbs.); Steel with hardened work surfaces; Zinc-plated exposed surfaces; Buna N O-rings and polyester elastomer back-ups standard.

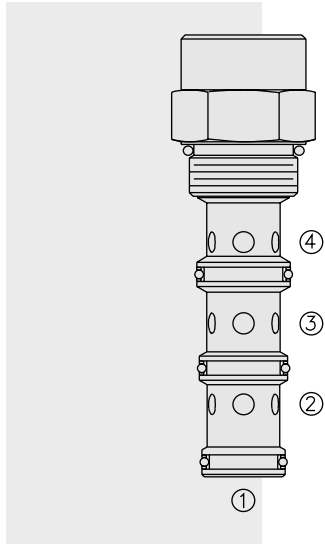
Standard Ported Body: Weight: 1.5 kg. (3.3 lbs.); Anodized high-strength 6061 T6 aluminum alloy, rated to 240 bar (3500 psi); See page 8.012.1. Ductile iron and steel bodies available; dimensions may differ; consult factory.

TO ORDER

PD12-41		-		-		-	
Option		None (Blank)		N		Bias Spring [†]	
Open Transition						60	4.1 bar (60 psi)
						110	7.6 bar (110 psi)
						170	11.7 bar (170 psi)
						Optional bias springs considered on OEM request.	
						[†] Note: 110 psi bias spring is the minimum required for use with sealed spool.	
Porting		Cartridge Only		0		Seals	
		SAE 10		10T		N	Buna N (Std.)
		SAE 12		12T		NS	Buna N with Sealed Spool
						V	Fluorocarbon
						VS	Fluorocarbon with Sealed Spool

DIRECTIONAL VALVES

PD16-41 Piloted 3-Way Spool, Internal Vent



DESCRIPTION

A screw-in, cartridge-style, pilot-operated, spool-type, hydraulic directional valve for three-way circuits requiring remote pilot actuation.

OPERATION

In neutral (unpiloted), the **PD16-41** allows flow from ③ to ④. ② is blocked.

On remote pilot signal at ①, the valve shifts to open from the ③ to ② flow path, while blocking flow to ④.

Note that ④ is common to the spring chamber. Pressure on ④ will directly (1:1) affect required pilot pressure and must always be added to the bias spring value.

Note: Consult factory for applications where bi-directional flow is required when the valve is in the normal or spring-offset position.

FEATURES

- Hardened spool and cage for long life.
- Optional sealed pilot.
- Industry common cavity.

RATINGS

Operating Pressure: 240 bar (3500 psi)

Proof Pressure: 420 bar (6090 psi)

Flow: See Performance Chart

Internal Leakage: 164 cc/minute (10 cu. in./minute) max. at 207 bar (3000 psi)

Pilot Pressure Required:

To Spool Crossover: 7.6 bar (110 psi)

To Full Spool Shift: 9.0 bar (130 psi)

Oil Volume Required to Full Shift: 2.5 cc (0.15 cu. in.)

Temperature: -40 to 120°C with standard Buna seals

Filtration: See page 9.010.1

Fluids: Mineral-based or synthetics with lubricating properties at viscosities of 7.4 to 420 cSt (50 to 2000 ssu)

Installation: No restrictions; See page 9.020.1

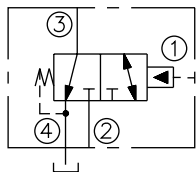
Cavity: VC16-4; See page 9.116.1

Cavity Tool: CT16-4XX; See page 8.600.1

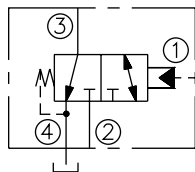
Seal Kit: SK16-4X-MMM; See page 8.650.1

SYMBOLS

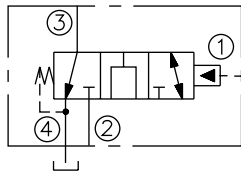
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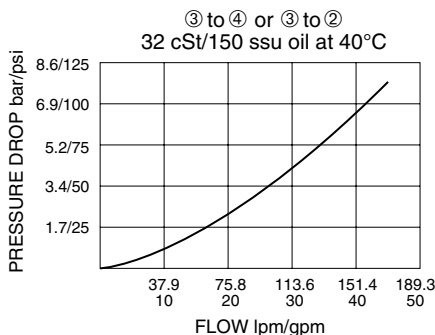
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OPEN TRANSITION:

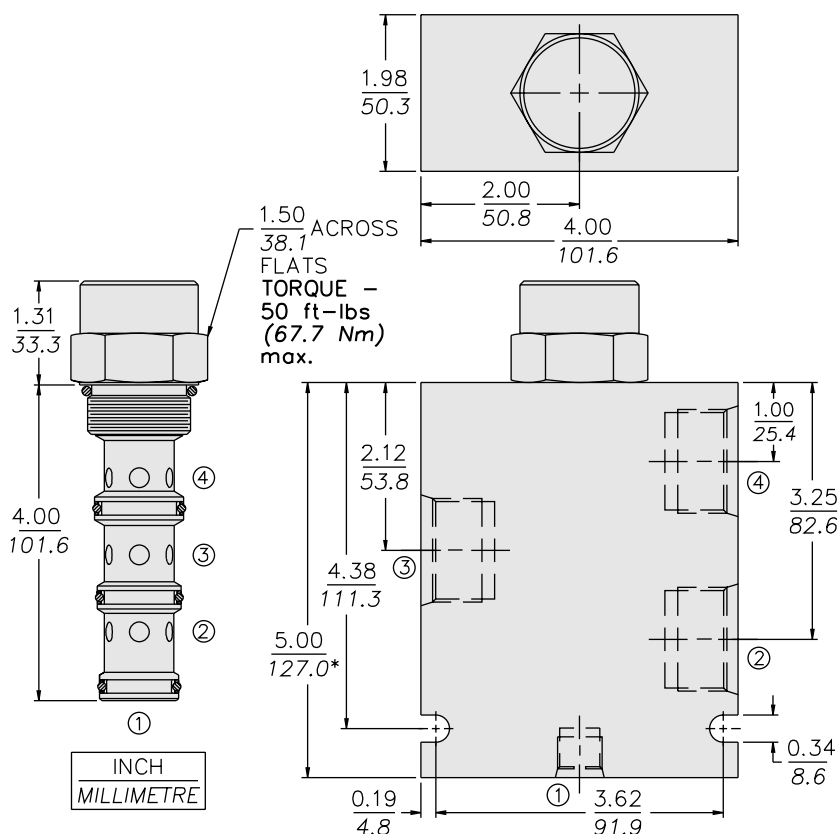


PERFORMANCE (Cartridge Only)



PD16-41

DIMENSIONS



* BSP BODY - 134.9

MATERIALS

Cartridge: Weight: 0.52 kg. (1.15 lbs.); Steel with hardened work surfaces. Zinc-plated exposed surfaces. Buna N O-rings and polyester elastomer back-ups standard.

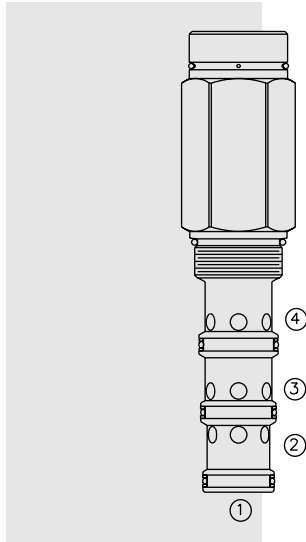
Standard Ported Body: Weight: 1.5 kg. (3.3 lbs.); Anodized high-strength 6061 T6 aluminum alloy, rated to 240 bar (3500 psi); See page 8.016.1. Ductile iron and steel bodies available; dimensions may differ; consult factory.

TO ORDER

PD16-41		-		-		-	
Option							
None (Blank)							
Open Transition	N						
Porting							
Cartridge Only	0						
SAE 12, SAE 6 Pilot	12T						
SAE 16, SAE 6 Pilot	16T						

DIRECTIONAL VALVES

PD42-M41 Piloted 3-Way Spool, Internal Vent



DESCRIPTION

A screw-in, cartridge-style, pilot-operated, spool-type, hydraulic directional valve for three-way circuits requiring remote pilot actuation.

OPERATION

In neutral (unpiloted), the **PD42-M41** allows flow from ③ to ④. ② is blocked.

On remote pilot signal at ①, the valve shifts to open from the ③ to ② flow path, while blocking flow to ④.

Note that ④ is common to the spring chamber. Pressure on ④ will directly (1:1) affect required pilot pressure and must always be added to the bias spring value.

Note: Consult factory for applications where bi-directional flow is required when the valve is in the normal or spring-offset position.

FEATURES

- Hardened spool and cage for long life.
- Optional sealed pilot.
- Industry-standard ISO cavity.

RATINGS

Maximum Operating Pressure: With Polyurethane Seals: Ports ①, ②, & ③: 345 bar (5000 psi); Port ④: 210 bar (3000 psi)

Flow: See Performance Chart

Internal Leakage at Maximum Operating Pressure: Ports ②, ③, & ④: 246 cc/minute (15 cu. in./minute); Port ①: 524 cc/minute (32 cu. in./minute); The sealed pilot version exhibits no leakage at ① at maximum operating pressure.

Pilot Pressure Required:

- To Begin Spool Movement: 11 bar (160 psi)
- To Bring Spool to Cross-Over Point: 16.2 bar (235 psi)
- To Fully Shift the Spool: 18.3 bar (265 psi)

Oil Volume Required to Full Shift: 2.5 cc (0.15 cu. in.)

Temperature: -40 to 120°C with standard Buna seals

Filtration: See page 9.010.1

Fluids: Mineral-based or synthetics with lubricating properties at viscosities of 7.4 to 420 cSt (50 to 2000 ssu)

Installation: No restrictions; See page 9.020.1

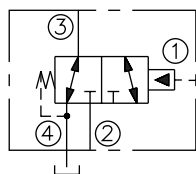
Cavity: VC42-M4; See page 9.142.1

Cavity Tool: CT42-M4XX; See page 8.600.1

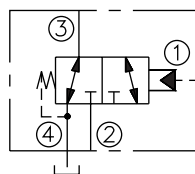
Seal Kit: SK42-4X-MMM; See page 8.650.1

SYMBOLS

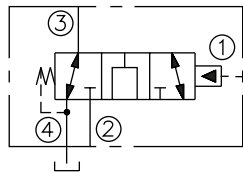
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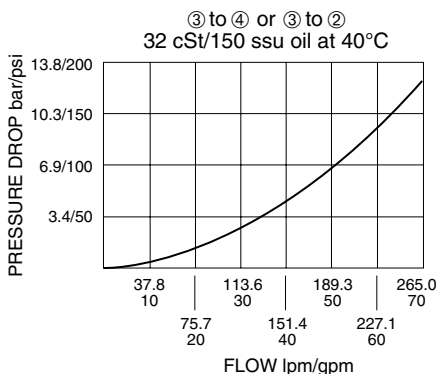
ISO:



OPEN TRANSITION:

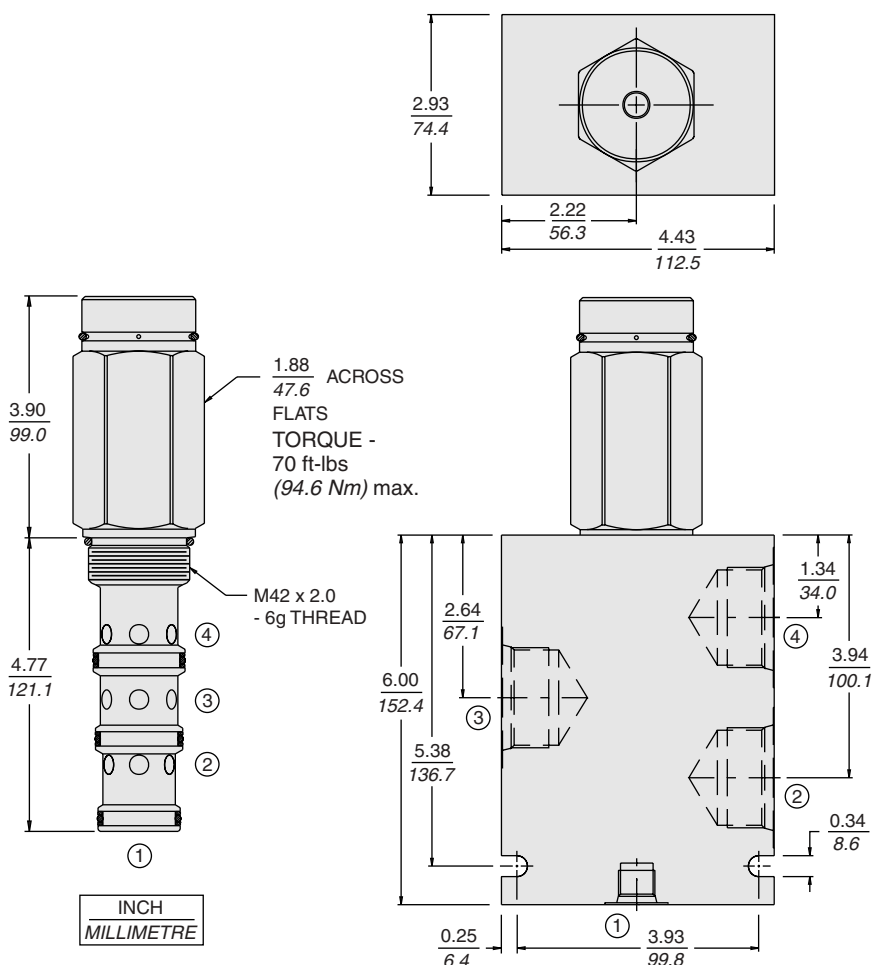


PERFORMANCE (Cartridge Only)



PD42-M41

DIMENSIONS



MATERIALS

Cartridge: Weight: 0.52 kg. (1.15 lbs.); Steel with hardened work surfaces. Zinc-plated exposed surfaces. Buna N O-rings and polyester elastomer back-ups standard.

Standard Ported Body: Weight: 2.8 kg. (6.2 lbs.); Anodized high-strength 6061 T6 aluminum alloy, rated to 240 bar (3500 psi); See page 8.042.1. Ductile iron and steel bodies available; dimensions may differ; consult factory.

TO ORDER

PD42-M41 - - -160 [†]			
Option			
None (Blank)			
Open Transition	N		
Porting			
Cartridge Only	0		
SAE 16, SAE 6 Pilot	16T		
*SAE 16, SAE 6 Pilot	16TS		
SAE 20, SAE 6 Pilot	20T		
Seals			
N	Buna N (Std.)		
NS	Buna N with Sealed Spool		
V	Fluorocarbon		
VS	Fluorocarbon with Sealed Spool		
P	Polyurethane**		
PS	Polyurethane with Sealed Spool**		

*Steel body for pressures over 3500 psi

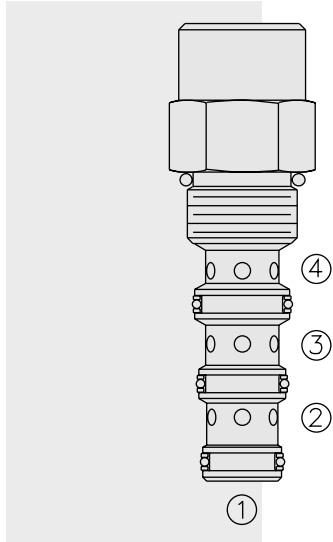
Note: All bodies are PD type.

[†]160 psi bias spring standard. Optional bias springs considered on OEM request.

**Required for pressures over 3500 psi

DIRECTIONAL VALVES

PD10-42 Piloted 3-Way Spool, Internal Vent



DESCRIPTION

A screw-in, cartridge-style, pilot-operated, spool-type, hydraulic directional valve for three-way circuits requiring remote pilot actuation.

OPERATION

In neutral (unpiloted), the **PD10-42** allows flow from ③ to ② bidirectionally. ④ is blocked.

On remote pilot signal at ①, the valve shifts to open from ③ to ④, while blocking flow at ②.

Since ④ is common to the spring chamber, pressure on ④ will directly (1:1) affect the pilot pressure required, and must always be added to the bias spring value.

Note: Consult factory for applications where bi-directional flow is required when the valve is in the normal or spring-offset position.

FEATURES

- Hardened spool and cage for long life.
- Industry common cavity.

RATINGS

Operating Pressure: 240 bar (3500 psi)

Proof Pressure: 350 bar (5075 psi)

Flow: See Performance Chart

Internal Leakage: 82 cc/minute (5 cu. in./minute) max. at 207 bar (3000 psi)

Pilot Pressure Required:

To Spool Crossover – 4.1 bar (60 psi) Spring: 4.7 bar (68.2 psi)
7.6 bar (110 psi) Spring: 7.6 bar (110 psi)

To Full Spool Shift – 4.1 bar (60 psi) Spring: 5.2 bar (75 psi)
7.6 bar (110 psi) Spring: 8.6 bar (125 psi)

Oil Volume Required to Full Shift: 0.65 cc (0.04 cu. in.)

Temperature: -40 to 120°C with standard Buna seals

Filtration: See page 9.010.1

Fluids: Mineral-based or synthetics with lubricating properties at viscosities of 7.4 to 420 cSt (50 to 2000 ssu)

Installation: No restrictions; See page 9.020.1

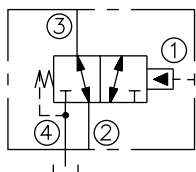
Cavity: VC10-4; See page 9.110.1

Cavity Tool: CT10-4XX; See page 8.600.1

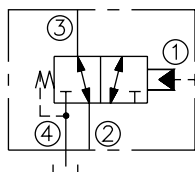
Seal Kit: SK10-4X-MMM; See page 8.650.1

SYMBOLS

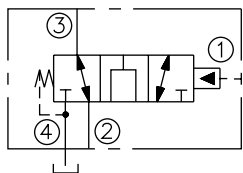
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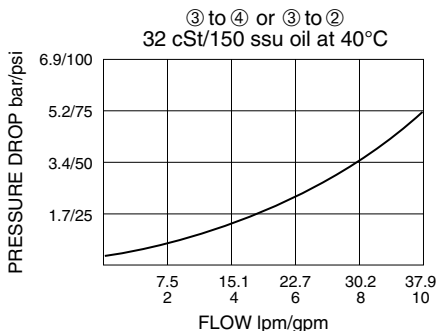
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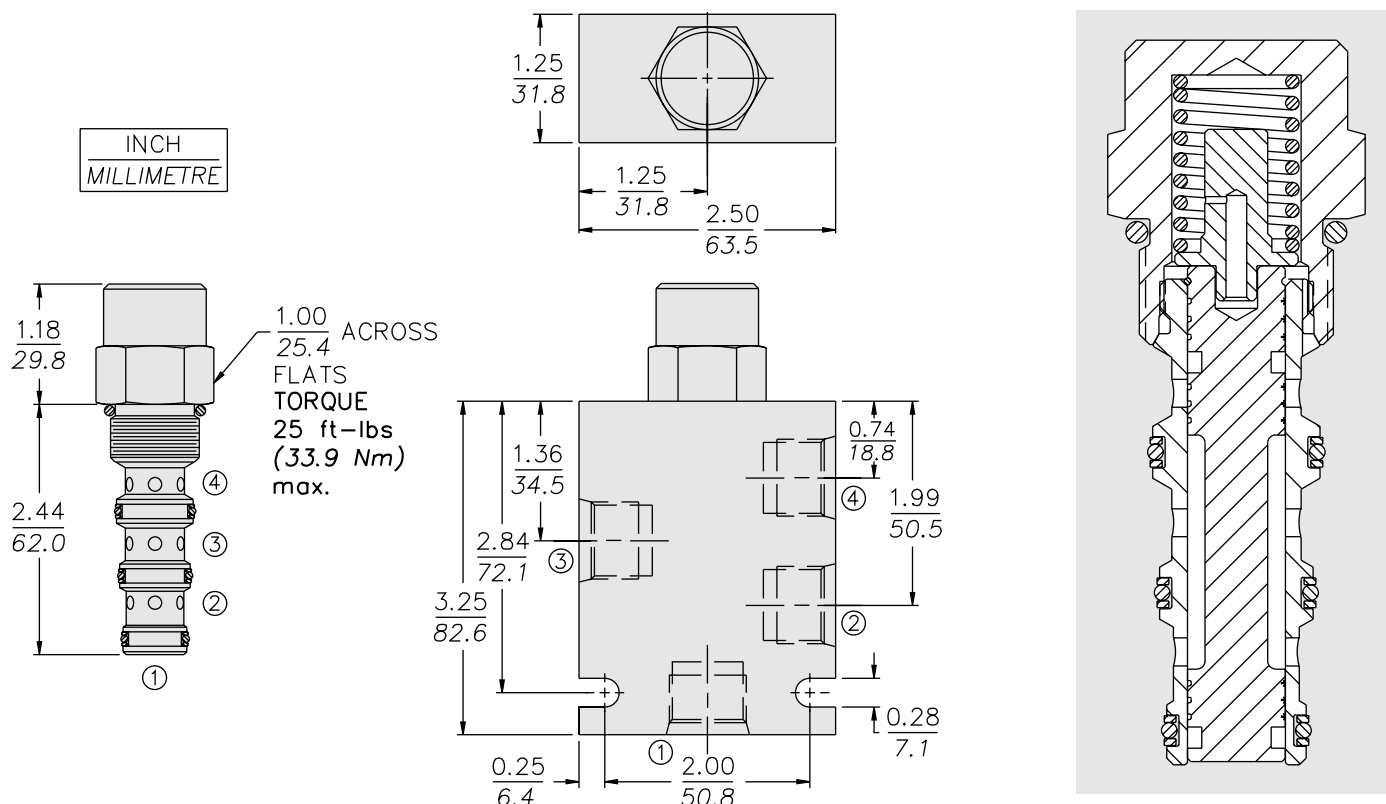


PERFORMANCE (Cartridge Only)



PD10-42

DIMENSIONS



MATERIALS

Cartridge: Weight: 0.16 kg. (0.35 lbs.); Steel with hardened work surfaces. Zinc-plated exposed surfaces. Buna N O-rings and polyester elastomer back-ups standard.

Standard Ported Body: Weight: 0.34 kg. (0.75 lbs.); Anodized high-strength 6061 T6 aluminum alloy, rated to 240 bar (3500 psi); See page 8.010.1. Ductile iron and steel bodies available; dimensions may differ; consult factory.

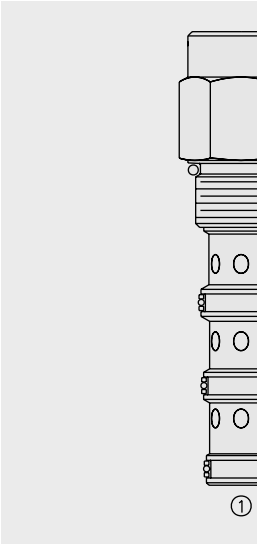
TO ORDER

PD10-42 - - - -			
Option			Bias Spring[†]
None	(Blank)		60 4.1 bar (60 psi)
Open Transition	N		110 7.6 bar (110 psi)
			170 11.7 bar (170 psi)
Porting			Seals
Cartridge Only	0		N Buna N (Std.)
SAE 6	6T		NS Buna N with Sealed Spool
SAE 8	8T		V Fluorocarbon
1/4 in. BSP*	2B		VS Fluorocarbon with Sealed Spool
3/8 in. BSP*	3B		
*BSP Body U.K. Mfr. Only			

[†]Note: 110 psi bias spring is the minimum required for use with sealed spool.

DIRECTIONAL VALVES

PD12-42 Piloted 3-Way Spool, Internal Vent



DESCRIPTION

A screw-in, cartridge-style, pilot-operated, spool-type, hydraulic directional valve for three-way circuits requiring remote pilot actuation.

OPERATION

In neutral (unpiloted), the PD12-42 allows flow from ③ to ② bidirectionally. ④ is blocked.

On remote pilot signal at ①, the valve shifts to open from ③ to ④, while blocking flow at ②.

Since ④ is common to the spring chamber, pressure on ④ will directly (1:1) affect the pilot pressure required, and must always be added to the bias spring value.

Note: Consult factory for applications where bi-directional flow is required when the valve is in the normal or spring-offset position.

FEATURES

- Hardened spool and cage for long life.
- Cost effective cavity.

RATINGS

Operating Pressure: 240 bar (3500 psi)

Proof Pressure: 420 bar (6090 psi)

Flow: See Performance Chart

Internal Leakage: 115 cc/minute (7 cu. in./minute) max. at 207 bar (3000 psi)

Pilot Pressure Required Using 7.6 bar (110 psi) Spring:

To Spool Crossover: 7.6 bar (110 psi)

To Full Spool Shift: 9.1 bar (132 psi)

Oil Volume Required to Full Shift: 1.32 cc (0.08 cu. in.)

Temperature: -40 to 120°C with standard Buna seals

Filtration: See page 9.010.1

Fluids: Mineral-based or synthetics with lubricating properties at viscosities of 7.4 to 420 cSt (50 to 2000 ssu)

Installation: No restrictions; See page 9.020.1

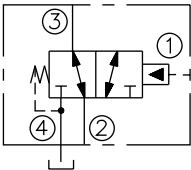
Cavity: VC12-4; See page 9.112.2

Cavity Tool: CT12-4XX; See page 8.600.1

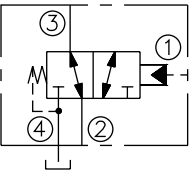
Seal Kit: SK12-4X-MMM; See page 8.650.1

SYMBOLS

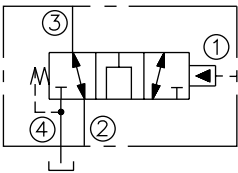
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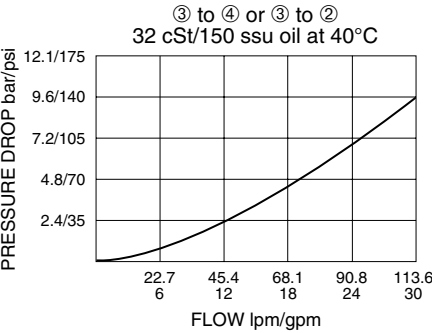
ISO:



OPEN TRANSITION:

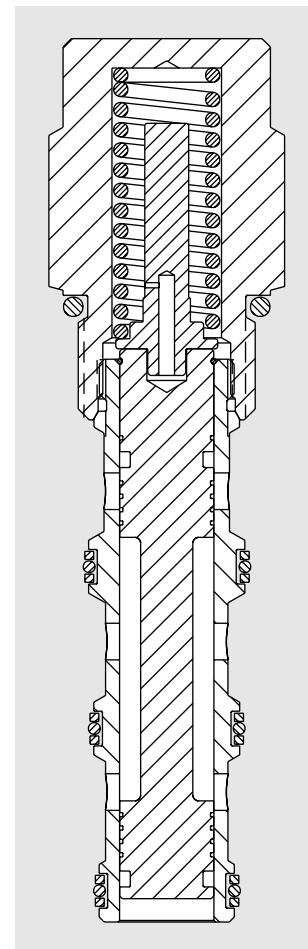
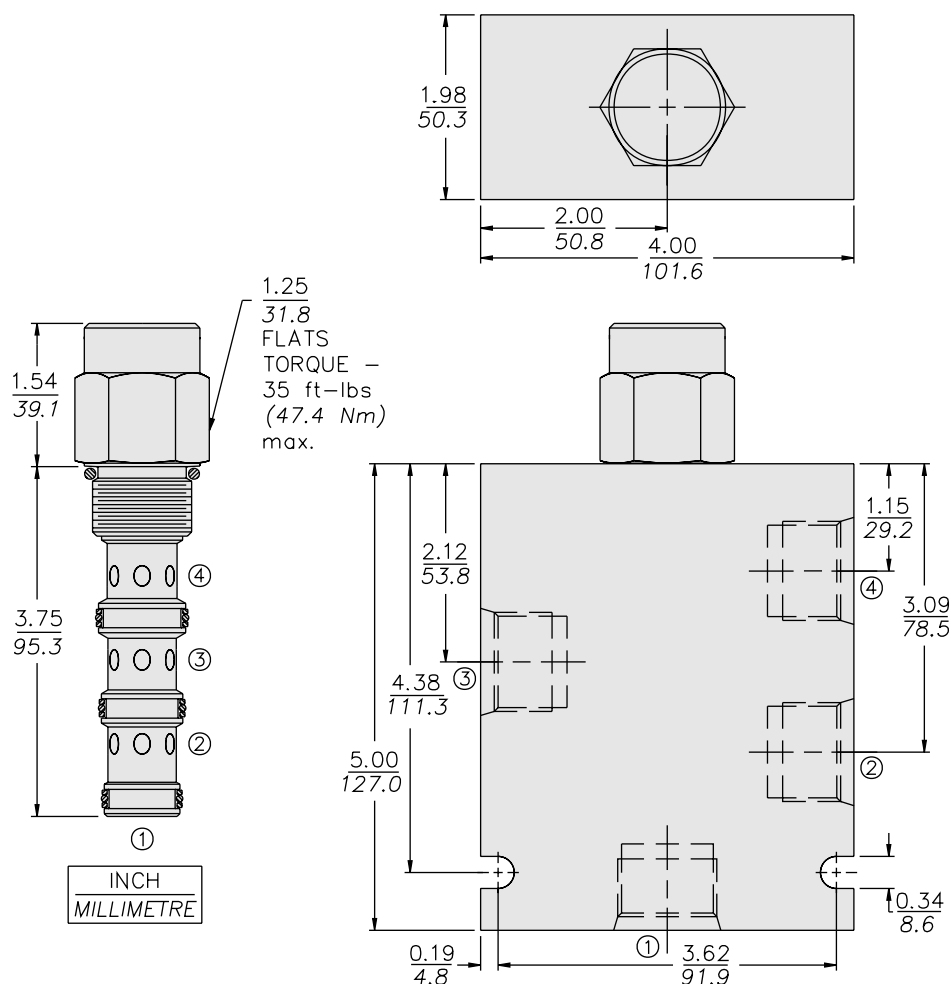


PERFORMANCE (Cartridge Only)



PD12-42

DIMENSIONS



MATERIALS

Cartridge: Weight: 0.28 kg. (0.61 lbs.); Steel with hardened work surfaces. Zinc-plated exposed surfaces. Buna N O-rings and polyester elastomer back-ups standard.

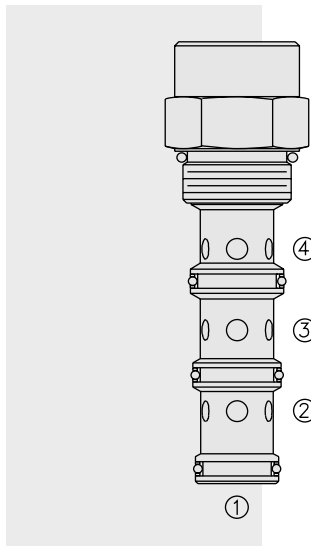
Standard Ported Body: Weight: 1.5 kg. (3.3 lbs.); Anodized high-strength 6061 T6 aluminum alloy, rated to 240 bar (3500 psi); See page 8.012.1. Ductile iron and steel bodies available; dimensions may differ; consult factory.

TO ORDER

PD12-42 - - -			
Option		Bias Spring	
None (Blank)		110	7.6 bar (110 psi)
Open Transition	N	170	11.7 bar (170 psi)
Porting		Optional bias springs considered on OEM request.	
Cartridge Only	0	Seals	
SAE 10	10T	N	Buna N (Std.)
SAE 12	12T	NS	Buna N with Sealed Spool
		V	Fluorocarbon
		VS	Fluorocarbon with Sealed Spool

DIRECTIONAL VALVES

PD16-42 Piloted 3-Way Spool, Internal Vent



DESCRIPTION

A screw-in, cartridge-style, pilot-operated, spool-type, hydraulic directional valve for three-way circuits requiring remote pilot actuation.

OPERATION

In neutral (unpiloted), the **PD16-42** allows flow passage between ③ and ②. ④ is blocked.

On remote pilot signal at ①, the valve shifts to open from ③ to ④, while blocking flow to ②.

Note that ④ is common to the spring chamber. Pressure on ④ will directly (1:1) affect required pilot pressure and must always be added to the bias spring value.

Note: Consult factory for applications where bi-directional flow is required when the valve is in the normal or spring-offset position.

FEATURES

- Hardened spool and cage for long life.
- Optional sealed pilot.
- Industry common cavity.

RATINGS

Operating Pressure: 240 bar (3500 psi)

Proof Pressure: 420 bar (6090 psi)

Flow: See Performance Chart

Internal Leakage: 164 cc/minute (10 cu. in./minute) max. at 207 bar (3000 psi)

Pilot Pressure Required:

To Spool Crossover: 7.6 bar (110 psi)

To Full Spool Shift: 9.0 bar (130 psi)

Oil Volume Required to Full Shift: 2.5 cc (0.15 cu. in.)

Temperature: -40 to 120°C with standard Buna seals

Filtration: See page 9.010.1

Fluids: Mineral-based or synthetics with lubricating properties at viscosities of 7.4 to 420 cSt (50 to 2000 ssu)

Installation: No restrictions; See page 9.020.1

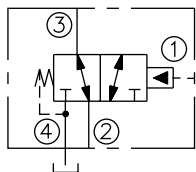
Cavity: VC16-4; See page 9.116.1

Cavity Tool: CT16-4XX; See page 8.600.1

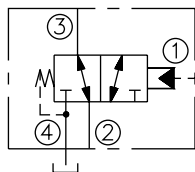
Seal Kit: SK16-4X-MMM; See page 8.650.1

SYMBOLS

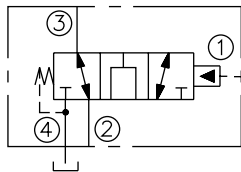
USASI:



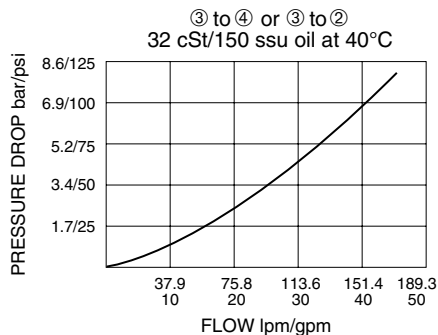
ISO:



OPEN TRANSITION:

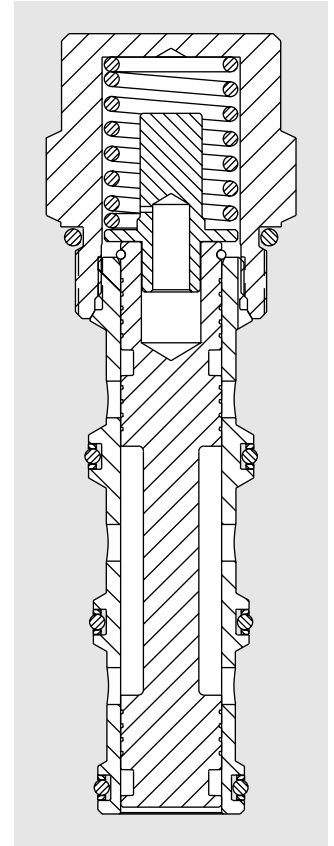
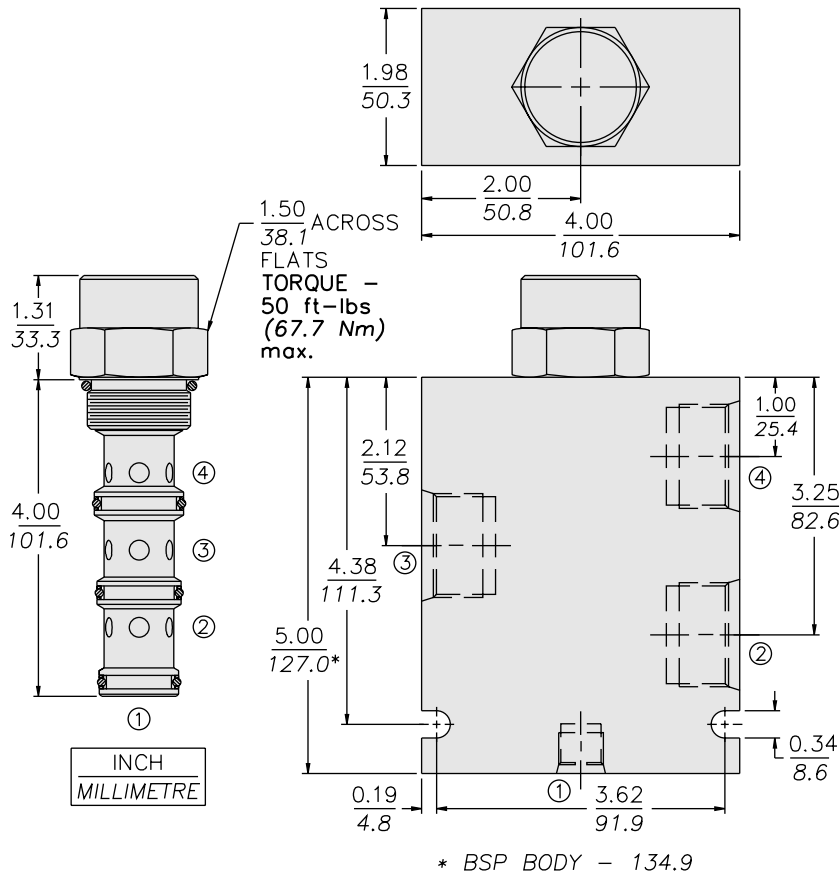


PERFORMANCE (Cartridge Only)



PD16-42

DIMENSIONS



MATERIALS

Cartridge: Weight: 0.52 kg. (1.15 lbs.); Steel with hardened work surfaces. Zinc-plated exposed surfaces. Buna N O-rings and polyester elastomer back-ups standard.

Standard Ported Body: Weight: 1.5 kg. (3.3 lbs.); Anodized high-strength 6061 T6 aluminum alloy, rated to 240 bar (3500 psi); see page 8.016.1. Ductile iron and steel bodies available; dimensions may differ; consult factory.

TO ORDER

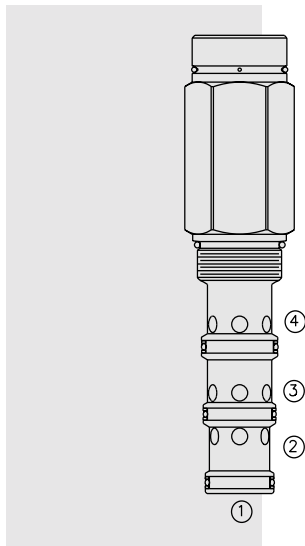
PD16-42 - - -		
Option		
None (Blank)		
Open Transition	N	
Porting		
Cartridge Only	0	
SAE 12, SAE 6 Pilot	12T	
SAE 16, SAE 6 Pilot	16T	
		Bias Spring[†]
		60 4.1 bar (60 psi)
		110 7.6 bar (110 psi)
		170 11.7 bar (170 psi)
		Optional bias springs considered on OEM request.
		[†] Note: 110 psi bias spring is the minimum required for use with sealed spool.

Seals

- N Buna N (Std.)
- NS Buna N with Sealed Spool
- V Fluorocarbon
- VS Fluorocarbon with Sealed Spool

DIRECTIONAL VALVES

PD42-M42 Piloted 3-Way Spool, Internal Vent



DESCRIPTION

A screw-in, cartridge-style, pilot-operated, spool-type, hydraulic directional valve for three-way circuits requiring remote pilot actuation.

OPERATION

In neutral (unpiloted), the **PD42-M42** allows flow passage between ③ and ②. ④ is blocked.

On remote pilot signal at ①, the valve shifts to open from ③ to ④, while blocking flow to ②.

Note that ④ is common to the spring chamber. Pressure on ④ will directly (1:1) affect required pilot pressure and must always be added to the bias spring value.

Note: Consult factory for applications where bi-directional flow is required when the valve is in the normal or spring-offset position.

FEATURES

- Hardened spool and cage for long life.
- Optional sealed pilot.
- Industry-standard ISO cavity.

RATINGS

Maximum Operating Pressure: With Polyurethane Seals: Ports ①, ②, & ③: 345 bar (5000 psi); Port ④: 210 bar (3000 psi)

Flow: See Performance Chart

Internal Leakage at Maximum Operating Pressure: All Ports : 246 cc/minute (15 cu. in./minute); The sealed pilot version exhibits no leakage at maximum operating pressure.

Pilot Pressure Required:

To Begin Spool Movement: 11.9 bar (172 psi)

To Bring Spool to Cross-Over Point: 14.5 bar (210 psi)

To Fully Shift the Spool: 17 bar (245 psi)

Oil Volume Required to Full Shift: 2.5 cc (0.15 cu. in.)

Temperature: -40 to 120°C with standard Buna seals

Filtration: See page 9.010.1

Fluids: Mineral-based or synthetics with lubricating properties at viscosities of 7.4 to 420 cSt (50 to 2000 ssu)

Installation: No restrictions; See page 9.020.1

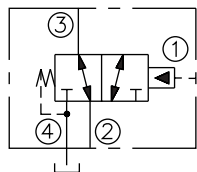
Cavity: VC42-M4; See page 9.142.1

Cavity Tool: CT42-M4XX; See page 8.600.1

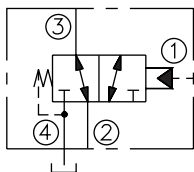
Seal Kit: SK42-4X-MMM; See page 8.650.1

SYMBOLS

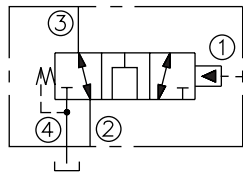
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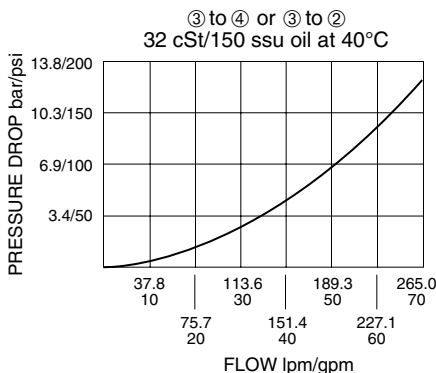
ISO:



OPEN TRANSITION:

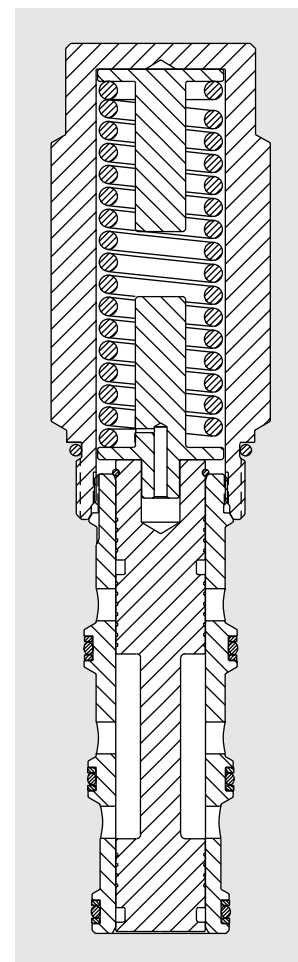
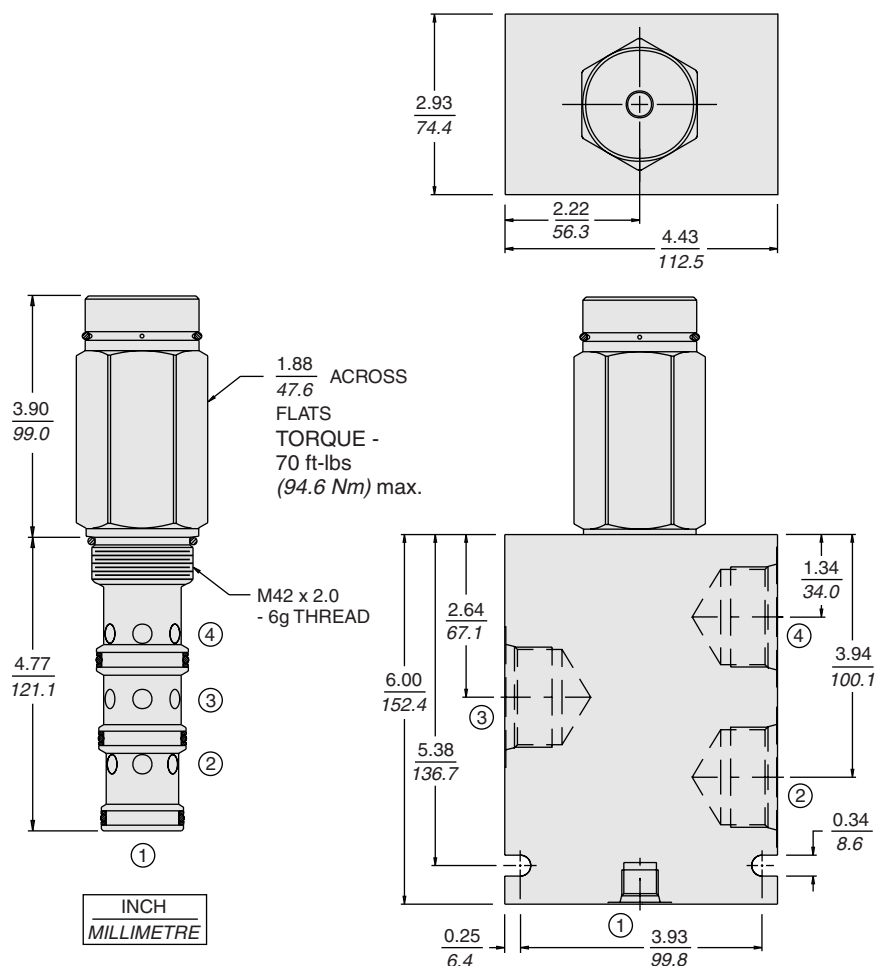


PERFORMANCE (Cartridge Only)



PD42-M42

DIMENSIONS



MATERIALS

Cartridge: Weight: 0.52 kg. (1.15 lbs.); Steel with hardened work surfaces. Zinc-plated exposed surfaces. Buna N O-rings and polyester elastomer back-ups standard.

Standard Ported Body: Weight: 2.8 kg. (6.2 lbs.); Anodized high-strength 6061 T6 aluminum alloy, rated to 240 bar (3500 psi); see page 8.042.1. Ductile iron and steel bodies available; Dimensions may differ; consult factory.

TO ORDER

PD42-M42 - - -160*

Option
None (Blank)
Open Transition **N**

Porting
Cartridge Only **0**
SAE 16, SAE 6 Pilot **16T**
*SAE 16, SAE 6 Pilot **16TS**
SAE 20, SAE 6 Pilot **20T**

*Steel body for pressures over 3500 psi

Note: All bodies are PD type.

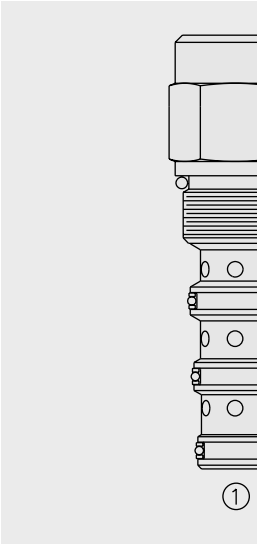
*160 psi bias spring standard. Optional bias springs considered on OEM request.

Seals
N Buna N (Std.)
NS Buna N with Sealed Spool
V Fluorocarbon
VS Fluorocarbon with Sealed Spool
P Polyurethane**
PS Polyurethane with Sealed Spool**

**Required for pressures over 3500 psi

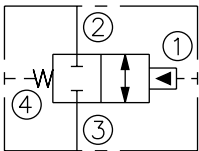
DIRECTIONAL VALVES

PD10-44 Piloted 2-Way Spool

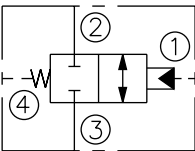


SYMBOLS

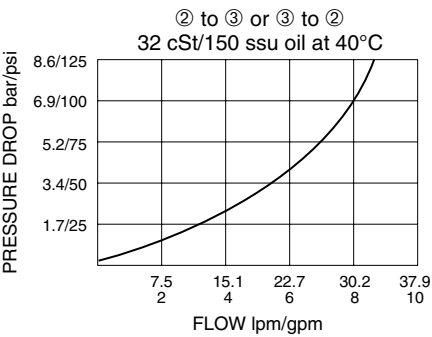
USASI



ISO:



PERFORMANCE (Cartridge Only)



DESCRIPTION

A screw-in, cartridge-style, pilot-operated, spool-type, hydraulic directional valve for three-way circuits requiring remote pilot actuation.

OPERATION

In neutral (unpiloted), the **PD10-44** blocks flow from ③ to ② bidirectionally. The spring chamber is directed to port ④, which is internally O-ring sealed from the cartridge flow paths.

On remote pilot signal at ①, the valve shifts to open from ② to ③, bidirectionally.

Any pressure on port ④ is added to the spring value.

FEATURES

- Hardened spool and cage for long life.
- Industry common cavity.

RATINGS

Operating Pressure: 240 bar (3500 psi)

Flow: See Performance Chart

Internal Leakage: 82 cc/minute (5 cu. in./minute) max. at 207 bar (3000 psi)

Pilot Pressure Required:

To Spool Crossover: 7.6 bar (110 psi) with a 110 psi bias spring

To Full Spool Shift: 8.6 bar (125 psi) with a 110 psi bias spring

Oil Volume Required to Full Shift: 0.65 cc (0.04 cu. in.)

Temperature: -40 to 120°C with standard Buna seals

Filtration: See page 9.010.1

Fluids: Mineral-based or synthetics with lubricating properties at viscosities of 7.4 to 420 cSt (50 to 2000 ssu)

Installation: No restrictions; See page 9.020.1

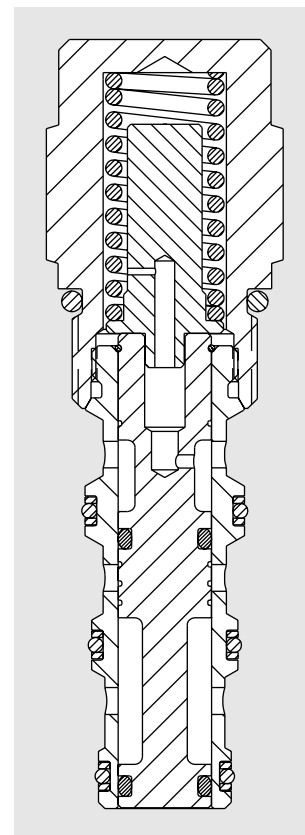
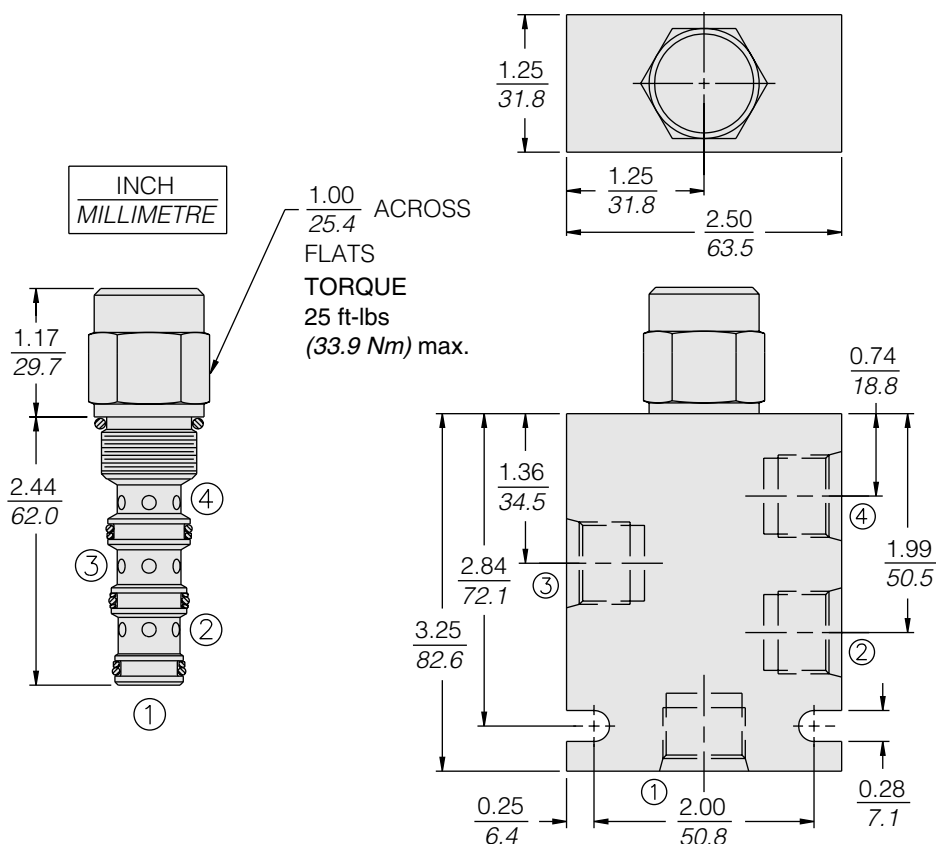
Cavity: VC10-4; See page 9.110.1

Cavity Tool: CT10-4XX; See page 8.600.1

Seal Kit: SK10-4X-MMM; See page 8.650.1

PD10-44

DIMENSIONS



MATERIALS

Cartridge: Weight: 0.16 kg. (0.35 lbs.); Steel with hardened work surfaces; Zinc-plated exposed surfaces; Buna N O-rings and polyester elastomer back-ups standard.

Standard Ported Body: Weight: 0.34 kg. (0.75 lbs.); Anodized high-strength 6061 T6 aluminum alloy, rated to 240 bar (3500 psi); see page 8.010.1. Ductile iron and steel bodies available; dimensions may differ; consult factory.

TO ORDER

PD10-44 -

Porting

Cartridge Only **0**
SAE 6 **6T**
SAE 8 **8T**
1/4 in. BSP* **2B**
3/8 in. BSP* **3B**

*BSP Body
U.K. Mfr. Only

Bias Spring†

60 4.1 bar (60 psi)
110 7.6 bar (110 psi)
170 11.7 bar (170 psi)

Optional bias springs considered on OEM request

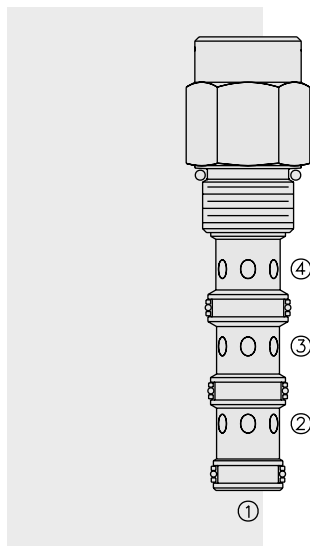
†Note: 110 psi bias spring is the minimum required for use with sealed spool.

Seals

NS Buna N with Sealed Spool
VS Fluorocarbon with Sealed Spool

DIRECTIONAL VALVES

PD12-44 Piloted 2-Way Spool



DESCRIPTION

A screw-in, cartridge-style, pilot-operated, spool-type, hydraulic directional valve for two-way circuits requiring remote pilot actuation.

OPERATION

In neutral (unpiloted), the **PD12-44** blocks flow from ③ to ② bidirectionally. The spring chamber is directed to port ④, which is internally O-ring sealed from the cartridge flow paths.

On remote pilot signal at ①, the valve shifts to open from ② to ③, bidirectionally.

Any pressure on port ④ is added to the spring value.

FEATURES

- Hardened spool and cage for long life.
- Cost effective cavity.

RATINGS

Operating Pressure: 240 bar (3500 psi)

Flow: See Performance Chart

Internal Leakage: 115 cc/minute (7 cu. in./minute) max. at 207 bar (3000 psi)

Pilot Pressure Required Using 7.6 bar (110 psi) Spring:

To Spool Crossover: 7.6 bar (110 psi)

To Full Spool Shift: 9.1 bar (132 psi)

Oil Volume Required to Full Shift: 1.32 cc (0.08 cu. in.)

Temperature: -40 to 120°C with standard Buna seals

Filtration: See page 9.010.1

Fluids: Mineral-based or synthetics with lubricating properties at viscosities of 7.4 to 420 cSt (50 to 2000 ssu)

Installation: No restrictions; See page 9.020.1

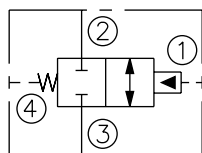
Cavity: VC12-4; See page 9.112.2

Cavity Tool: CT12-4XX; See page 8.600.1

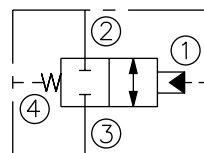
Seal Kit: SK12-4X-MMM; See page 8.650.1

SYMBOLS

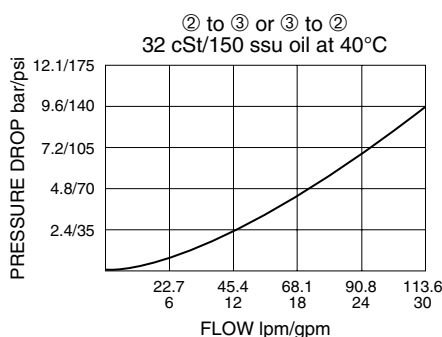
USASI:



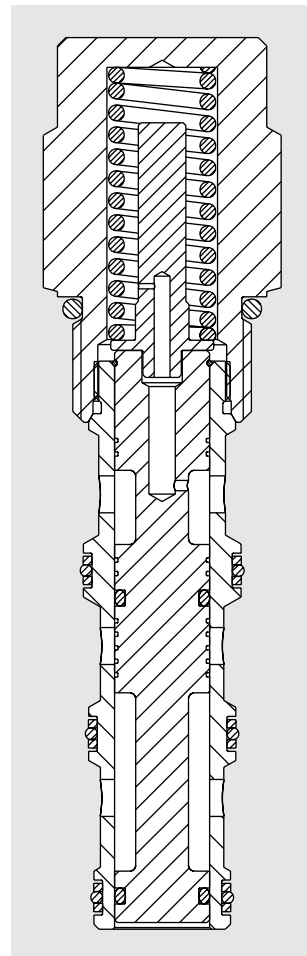
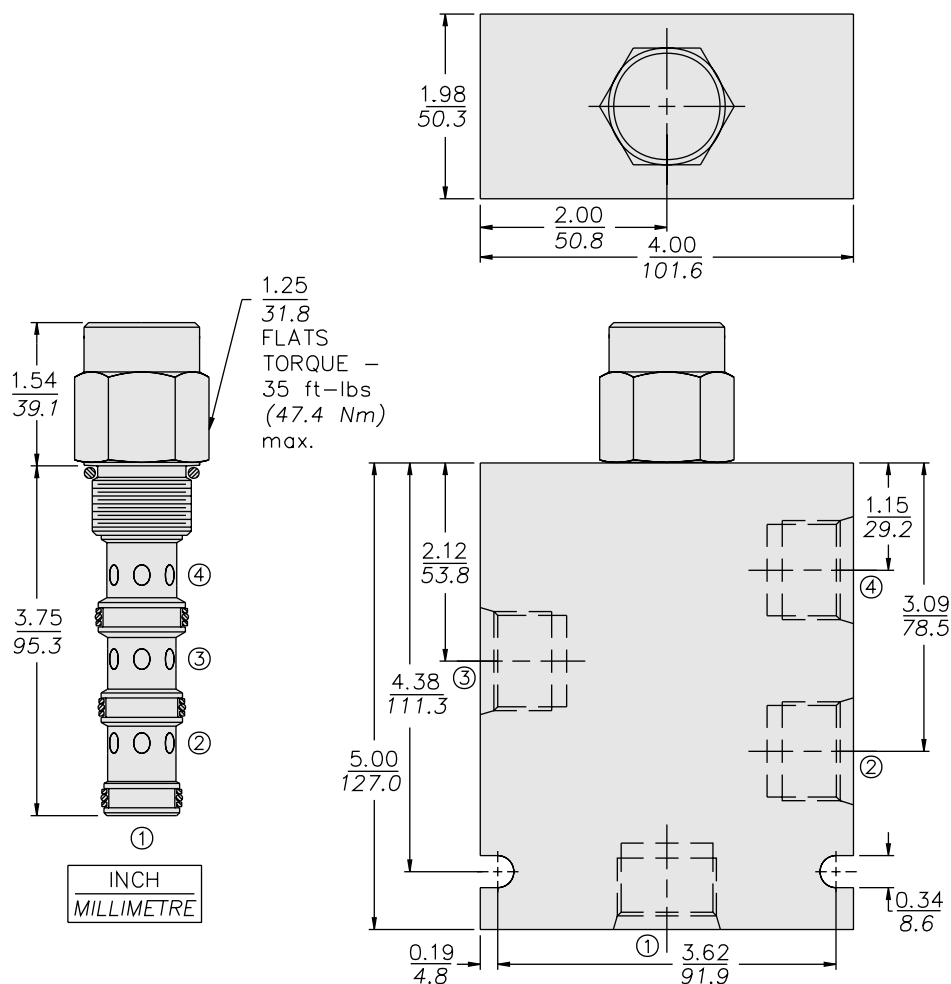
ISO:



PERFORMANCE (Cartridge Only)



DIMENSIONS



MATERIALS

Cartridge: Weight: 0.28 kg. (0.61 lbs.);
Steel with hardened work surfaces.
Zinc-plated exposed surfaces. Buna
N O-rings and polyester elastomer
back-ups standard.

Standard Ported Body: Weight: 1.5 kg.
(3.3 lbs.); Anodized high-strength
6061 T6 aluminum alloy, rated to
240 bar (3500 psi); see page
8.012.1. Ductile iron and steel bodies
available; Dimensions may differ;
consult factory.

TO ORDER

PD12-44 -

Porting
Cartridge Only 0
SAE 10 10T
SAE 12 12T

Bias Spring

110 7.6 bar (110 psi)

170 11.7 bar (170 psi)

Optional bias springs considered
on OEM request.

Seals

N Buna N (Std.)

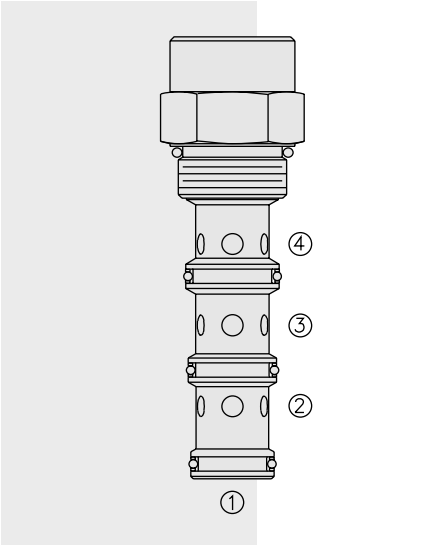
NS Buna N with Sealed Spool

V Fluorocarbon

VS Fluorocarbon with Sealed Spool

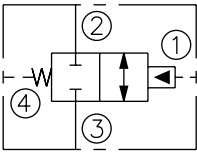
DIRECTIONAL VALVES

PD16-44 Piloted 2-Way Spool

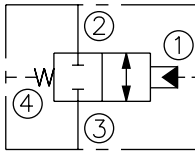


SYMBOLS

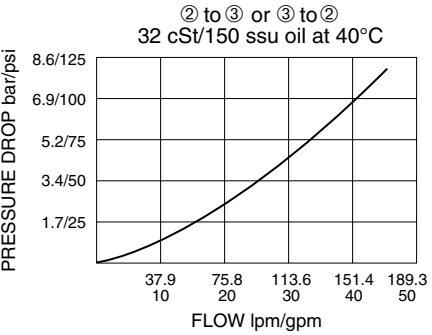
USASI:



ISO:



PERFORMANCE (Cartridge Only)



DESCRIPTION

A screw-in, cartridge-style, pilot-operated, spool-type, hydraulic directional valve for three-way circuits requiring remote pilot actuation.

OPERATION

In neutral (unpiloted), the **PD16-44** blocks flow from ③ to ② bidirectionally. The spring chamber is directed to port ④, which is internally O-ring sealed from the cartridge flow paths.

On remote pilot signal at ①, the valve shifts to open from ② to ③, bidirectionally. Any pressure on port ④ is added to the spring value.

FEATURES

- Hardened spool and cage for long life.
- Optional sealed pilot.
- Industry common cavity.

RATINGS

Operating Pressure: 240 bar (3500 psi)

Flow: See Performance Chart

Internal Leakage: 164 cc/minute (10 cu. in./minute) max. at 207 bar (3000 psi)

Pilot Pressure Required:

To Spool Crossover: 7.6 bar (110 psi) with 110 psi bias spring

To Full Spool Shift: 9.0 bar (130 psi) with 110 psi bias spring

Oil Volume Required to Full Shift: 2.5 cc (0.15 cu. in.)

Temperature: -40 to 120°C with standard Buna seals

Filtration: See page 9.010.1

Fluids: Mineral-based or synthetics with lubricating properties at viscosities of 7.4 to 420 cSt (50 to 2000 ssu)

Installation: No restrictions; See page 9.020.1

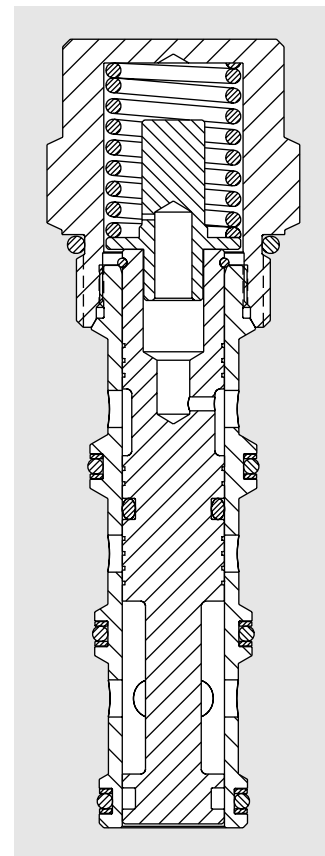
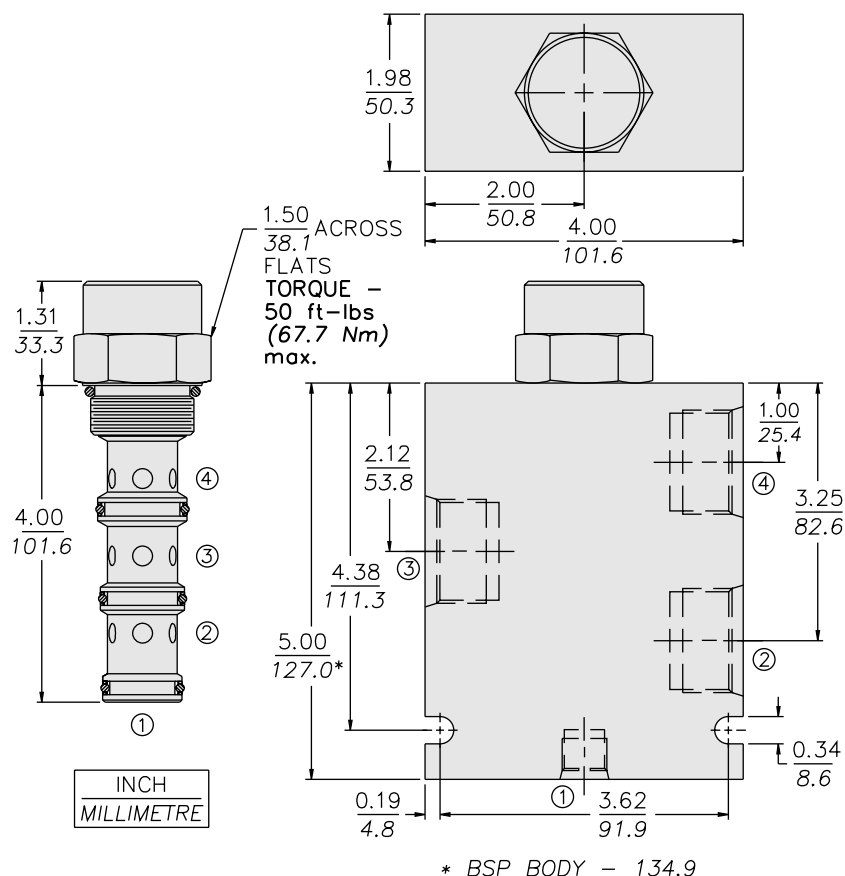
Cavity: VC16-4; See page 9.116.1

Cavity Tool: CT16-4XX; See page 8.600.1

Seal Kit: SK16-4X-MMM; See page 8.650.1

PD16-44

DIMENSIONS



MATERIALS

Cartridge: Weight: 0.52 kg. (1.15 lbs.); Steel with hardened work surfaces. Zinc-plated exposed surfaces. Buna N O-rings and polyester elastomer back-ups standard.

Standard Ported Body: Weight: 1.5 kg. (3.3 lbs.); Anodized high-strength 6061 T6 aluminum alloy, rated to 240 bar (3500 psi); see page 8.016.1. Ductile iron and steel bodies available; dimensions may differ; consult factory.

TO ORDER

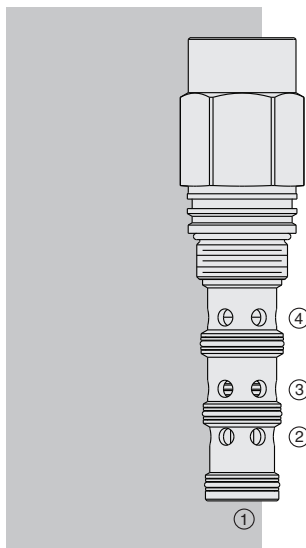
PD16-44 -

Porting
Cartridge Only **0**
SAE 12, SAE 6 Pilot **12T**
SAE 16, SAE 6 Pilot **16T**

Bias Spring
110 7.6 bar (110 psi)
170 11.7 bar (170 psi)
Optional bias springs considered on OEM request.

Seals
N Buna N (Std.)
NS Buna N with Sealed Spool
V Fluorocarbon
VS Fluorocarbon with Sealed Spool

HPD42-M44 HyPerformance™ Piloted 2-Way Spool



DESCRIPTION

A high performance, screw-in, cartridge-style, pilot-operated, spool-type, hydraulic directional valve for two-way circuits requiring remote pilot actuation and vented spring chamber.

OPERATION

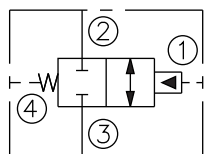
In neutral (unpiloted), the **HPD42-M44** blocks flow from 2 to 3 and 3 to 2 on remote pilot signal at port 1. The valve's spool shifts to allow flow from port 2 to 3 and port 3 to 2. The spring chamber is vented to port 4. Pressure at port 4 will directly (1:1) affect the pilot pressure required and must be added to the bias spring value.

FEATURES

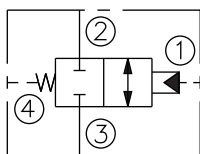
- Multiple function/application potential.
- Smooth shift transition.
- Low pressure drop.
- Hardened spool and cage for long life.
- Optional sealed pilot.
- Industry-standard ISO cavity.
- All HyPerformance products are tested to the rigorous standards of NFPA specification T2.6.1.
- All HyPerformance products are tested at a verification level of 90% and an assurance of 99%.

SYMBOLS

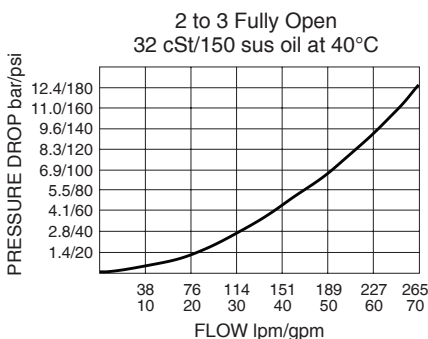
USASI:



ISO:



PERFORMANCE (Cartridge Only)



RATINGS

Operating Pressure: 350 bar (5075 psi); 10% cycle life: 420 bar (6090 psi)

Note: All HyPerformance products are tested for 900K cycles at 350 bar and 100K at 420 bar

Fatigue Rating: 2 million cycles at 420 bar

Burst Pressure: 1380 bar (20000 psi)

Flow: 265 lpm (70 gpm)

Internal Leakage: 310 ml/min (19 cu. in./minute) at 350 bar (5075 psi)

Pilot Pressure Required:

To Spool Crossover: 10.3 bar (150 psi) with 150 psi bias spring

To Full Spool Shift: 17.9 bar (260 psi) with 150 psi bias spring

Oil Volume Required to Full Shift: 6.22 cc (0.38 cu. in.)

Temperature: -54°C to 107°C (-65°F to 225°F) with standard PPDI Urethane seals

Filtration: See page 9.010.1

Fluids: Mineral-based or synthetics with lubricating properties at viscosities of

7.4 to 420 cSt (50 to 2000 sus); See Temperature and Oil Viscosity, page 9.060.1

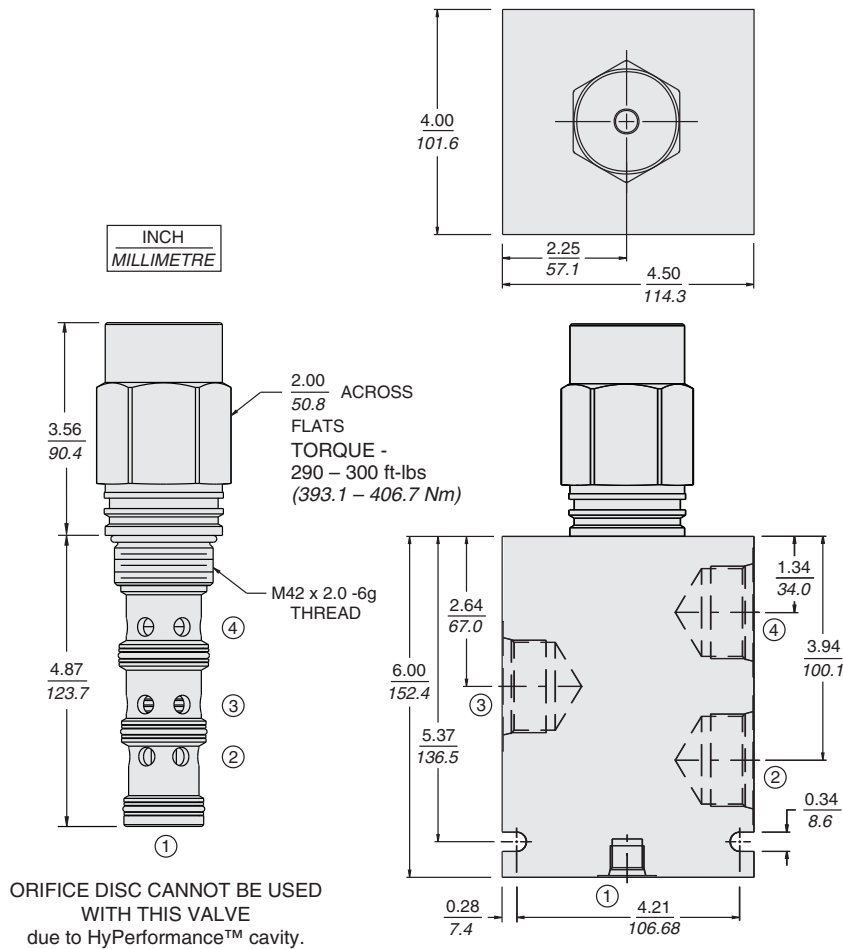
Installation: No restrictions; See page 9.020.1

Cavity: HVC42-M4 See page 9.142.1

Cavity Tool: HCT42-M4XX See page 8.600.1

Seal Kit: SK42-M4U-000 (Urethane) See page 8.650.1

DIMENSIONS



MATERIALS

Cartridge: Weight: 1.9 kg. (4.2 lbs.)
Steel with hardened work surfaces.
Zinc-nickel plated exposed surfaces.
PPDI urethane O-rings and
polyester elastomer back-ups
standard.

Ported Body: Weight: 10.68 kg
(23.56 lbs.) HyPerformance™
Ductile iron (code 'D') standard. PD
type. Rated to 345 bar (5000 psi).

TO ORDER

HPD42-M44

Option

None (Blank)

Porting

Cartridge Only 0
SAE 20 20TD
1-1/4" BSP* 10BD

*BSP body; U.K. mfr. Only

NOTE: All bodies are PD type.

Bias Spring

150 10.3 bar (150 psi)

Seals

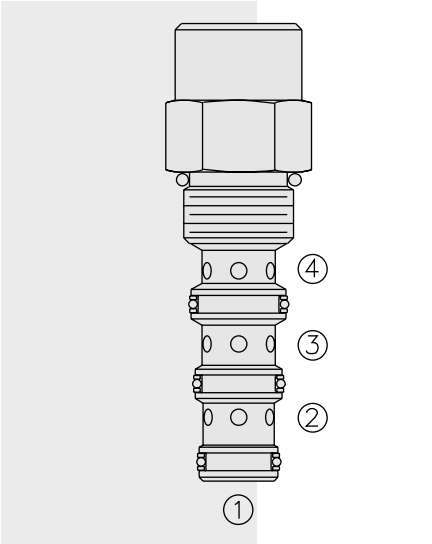
*U PPDI Urethane (Standard)

*US PPDI Urethane with Sealed Spool

* Urethane seals recommended for operating
pressures above 241 bar (3500 psi)

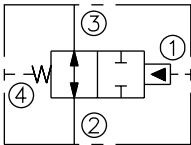
DIRECTIONAL VALVES

PD10-45 Piloted 2-Way Spool

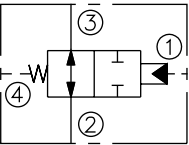


SYMBOLS

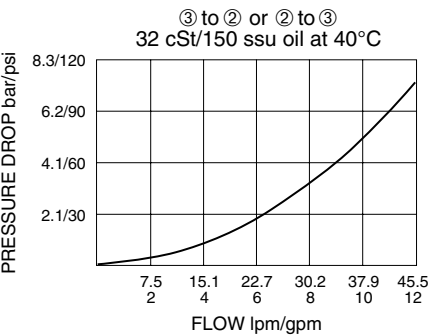
USASI:



ISO:



PERFORMANCE (Cartridge Only)



DESCRIPTION

A screw-in, cartridge-style, pilot-operated, spool-type, hydraulic directional valve for two-way circuits requiring remote pilot actuation and vented spring chamber.

OPERATION

In neutral (unpiloted), the **PD10-45** allows flow from ③ to ② bidirectionally. The spring chamber is directed to port ④.

On remote pilot signal at ①, the valve shifts to block from ③ to ②, bidirectionally.

Since ④ is common to the spring chamber, pressure on ④ will directly (1:1) affect the pilot pressure required, and must always be added to the bias spring value.

FEATURES

- Hardened spool and cage for long life.
- Industry common cavity.

RATINGS

Operating Pressure: 240 bar (3500 psi)

Flow: See Performance Chart

Internal Leakage: at 207 bar (3000 psi) and 38° C (100° F):

From ③ to ② and ④: 82 cc/minute (5 cu. in./minute) max.

From ① to ②: 164 cc/minute (10 cu. in./minute) max.

Pilot Pressure Required:

To Spool Crossover – 4.1 bar (60 psi) Spring: 4.7 bar (68.2 psi)

7.6 bar (110 psi) Spring: 7.6 bar (110 psi)

To Full Spool Shift – 4.1 bar (60 psi) Spring: 5.2 bar (75 psi)

7.6 bar (110 psi) Spring: 8.6 bar (125 psi)

Oil Volume Required to Full Shift: 0.65 cc (0.04 cu. in.)

Temperature: -40 to 120°C with standard Buna seals

Filtration: See page 9.010.1

Fluids: Mineral-based or synthetics with lubricating properties at viscosities of 7.4 to 420 cSt (50 to 2000 ssu)

Installation: No restrictions; See page 9.020.1

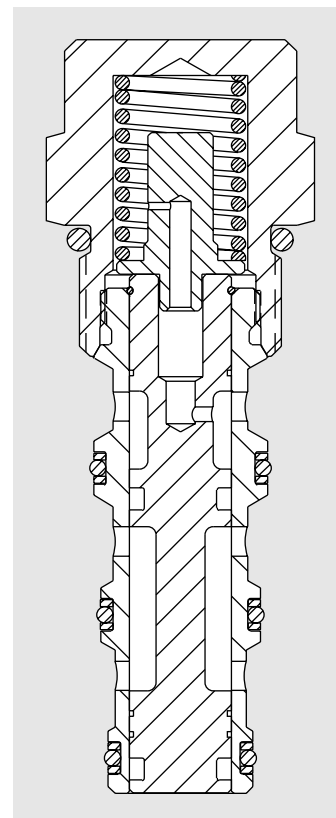
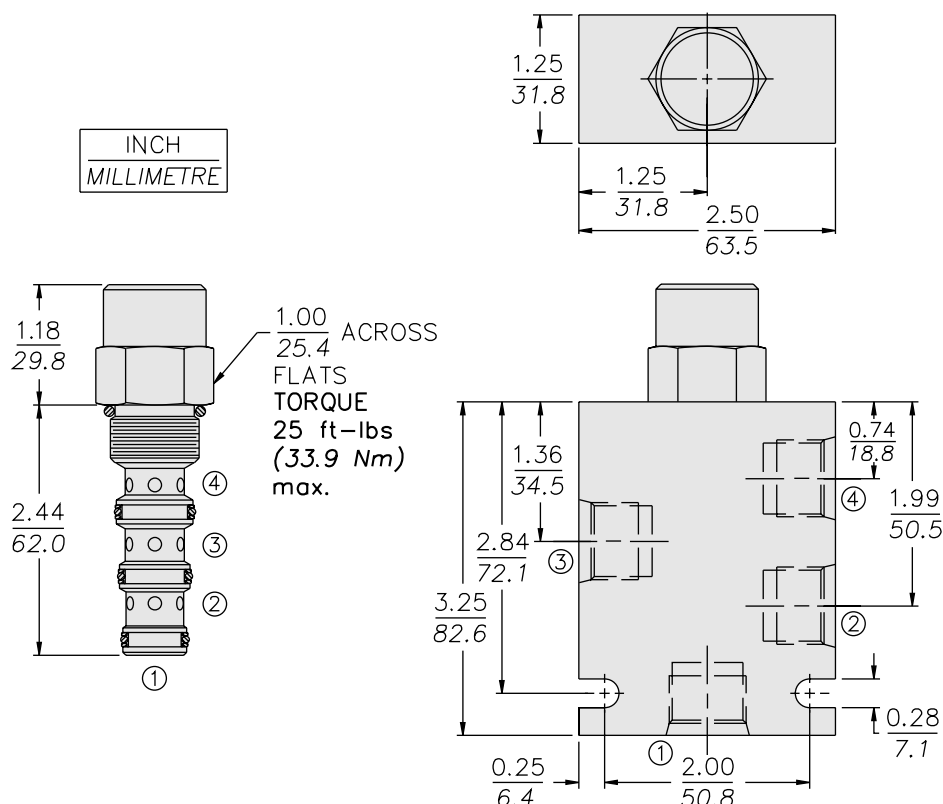
Cavity: VC10-4; See page 9.110.1

Cavity Tool: CT10-4XX; See page 8.600.1

Seal Kit: SK10-4X-MMM; See page 8.650.1

PD10-45

DIMENSIONS



MATERIALS

Cartridge: Weight: 0.16 kg. (0.35 lbs.); Steel with hardened work surfaces. Zinc-plated exposed surfaces. Buna N O-rings and polyester elastomer back-ups standard.

Standard Ported Body: Weight: 0.34 kg. (0.75 lbs.); Anodized high-strength 6061 T6 aluminum alloy, rated to 240 bar (3500 psi); see page 8.010.1. Ductile iron and steel bodies available; dimensions may differ; consult factory.

TO ORDER

PD10-45 -

Porting

Cartridge Only **0**
SAE 6 **6T**
SAE 8 **8T**
1/4 in. BSP* **2B**
3/8 in. BSP* **3B**

*BSP Body
U.K. Mfr. Only

Bias Spring†

60 4.1 bar (60 psi)
110 7.6 bar (110 psi)
170 11.7 bar (170 psi)

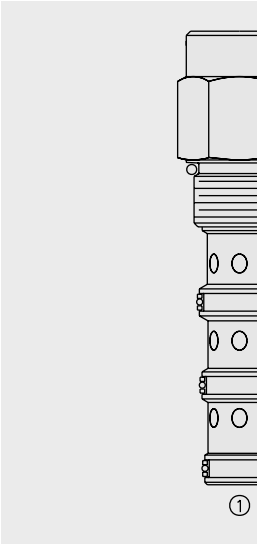
†Note: 110 psi bias spring is the minimum required for use with sealed spool.

Seals

Buna N (Std.) **N**
Buna N with
Sealed Spool **NS**
Fluorocarbon **V**
Fluorocarbon with
Sealed Spool **VS**

DIRECTIONAL VALVES

PD12-45 Piloted 2-Way Spool



DESCRIPTION

A screw-in, cartridge-style, pilot-operated, spool-type, hydraulic directional valve for two-way circuits requiring remote pilot actuation.

OPERATION

In neutral (unpiloted), the **PD12-45** allows flow from ③ to ② bidirectionally. The spring chamber is directed to port ④.

On remote pilot signal at ①, the valve shifts to block from ③ to ②, bidirectionally.

Since ④ is common to the spring chamber, pressure on ④ will directly (1:1) affect the pilot pressure required, and must always be added to the bias spring value.

FEATURES

- Hardened spool and cage for long life.
- Cost effective cavity.

RATINGS

Operating Pressure: 240 bar (3500 psi)

Flow: See Performance Chart

Internal Leakage: 115 cc/minute (7 cu. in./minute) max. at 207 bar (3000 psi)

Pilot Pressure Required Using 7.6 bar (110 psi) Spring:

To Spool Crossover: 7.6 bar (110 psi)

To Full Spool Shift: 9.1 bar (132 psi)

Oil Volume Required to Full Shift: 1.32 cc (0.08 cu. in.)

Temperature: -40 to 120°C with standard Buna seals

Filtration: See page 9.010.1

Fluids: Mineral-based or synthetics with lubricating properties at viscosities of 7.4 to 420 cSt (50 to 2000 ssu)

Installation: No restrictions; See page 9.020.1

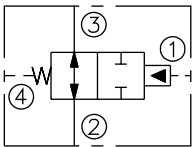
Cavity: VC12-4; See page 9.112.2

Cavity Tool: CT12-4XX; See page 8.600.1

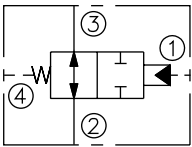
Seal Kit: SK12-4X-MMM; See page 8.650.1

SYMBOLS

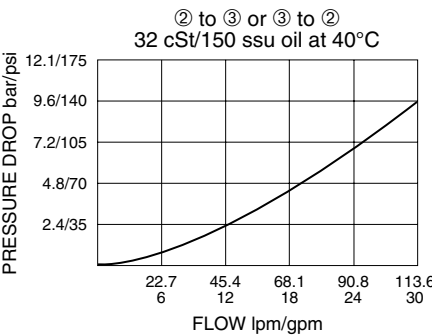
USASI:



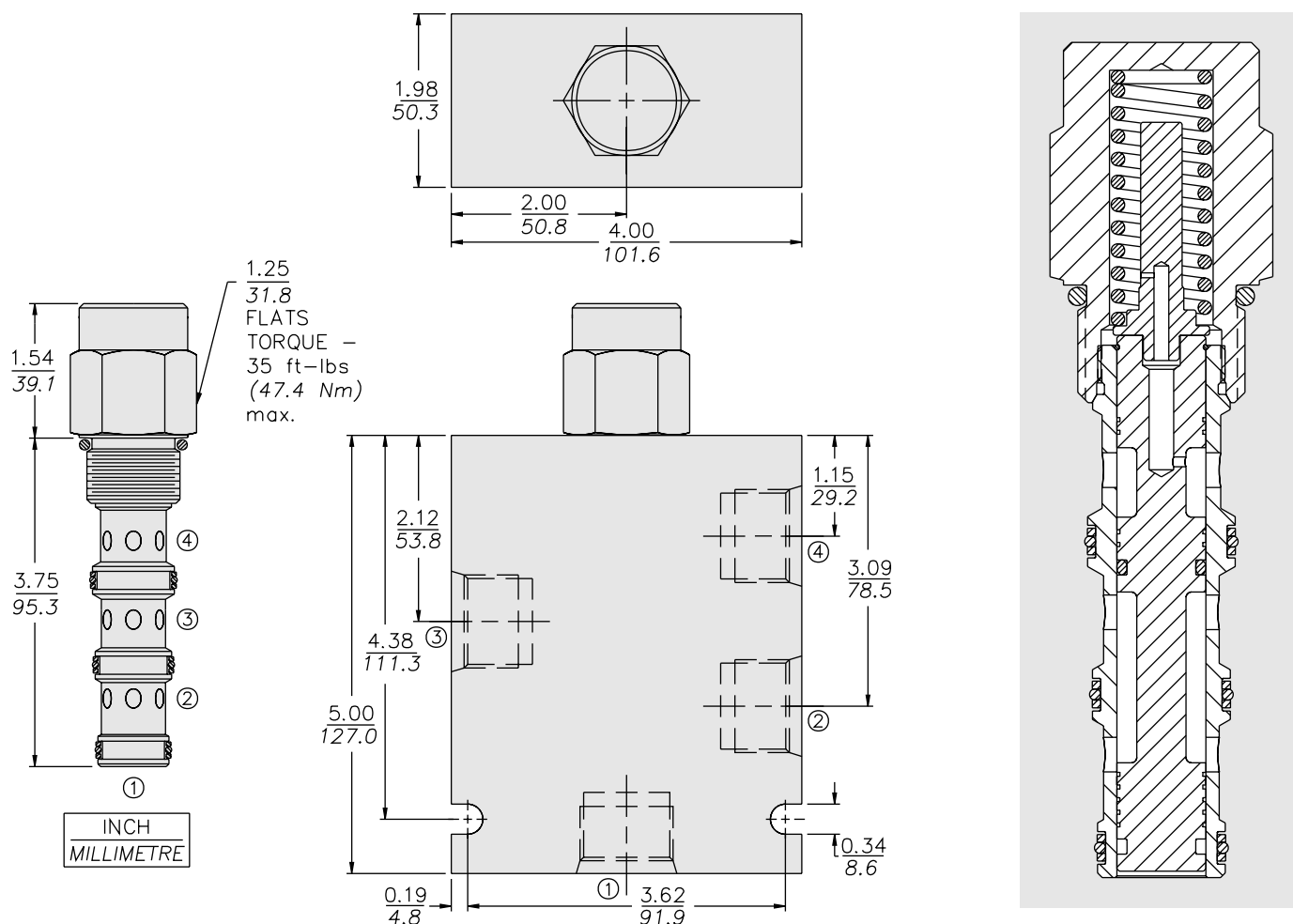
ISO:



PERFORMANCE (Cartridge Only)



DIMENSIONS



MATERIALS

Cartridge: Weight: 0.28 kg. (0.61 lbs.);
Steel with hardened work surfaces.
Zinc-plated exposed surfaces. Buna
N O-rings and polyester elastomer
back-ups standard.

Standard Ported Body: Weight: 1.5 kg.
(3.3 lbs.); Anodized high-strength
6061 T6 aluminum alloy, rated to
240 bar (3500 psi); see page
8.012.1. Ductile iron and steel bodies
available; dimensions may differ;
consult factory.

TO ORDER

PD12-45 -

Porting
Cartridge Only 0
SAE 10 10T
SAE 12 12T

Bias Spring

110 7.6 bar (110 psi)

170 11.7 bar (170 psi)

Optional bias springs considered
on OEM request.

Seals

N Buna N (Std.)

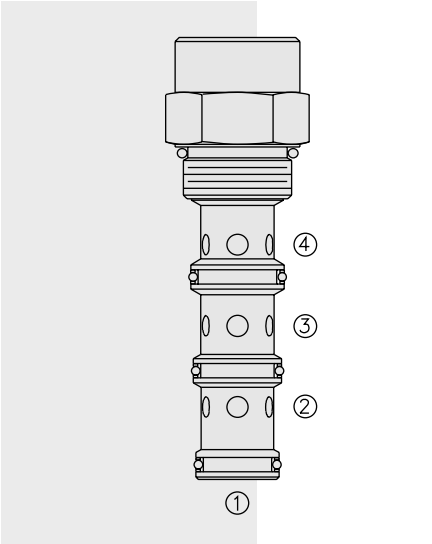
NS Buna N with Sealed Spool

V Fluorocarbon

VS Fluorocarbon with Sealed Spool

DIRECTIONAL VALVES

PD16-45 Piloted 2-Way Spool



DESCRIPTION

A screw-in, cartridge-style, pilot-operated, spool-type, hydraulic directional valve for two-way circuits requiring remote pilot actuation.

OPERATION

In neutral (unpiloted), the PD16-45 allows flow from ③ to ② bidirectionally. The spring chamber is directed to port ④.

On remote pilot signal at ①, the valve shifts to block from ③ to ②, bidirectionally.

Since ④ is common to the spring chamber, pressure on ④ will directly (1:1) affect the pilot pressure required, and must always be added to the bias spring value.

FEATURES

- Hardened spool and cage for long life.
- Optional sealed pilot.
- Industry common cavity.

RATINGS

Operating Pressure: 240 bar (3500 psi)

Flow: See Performance Chart

Internal Leakage: 164 cc/minute (10 cu. in./minute) max. at 207 bar (3000 psi)

Pilot Pressure Required:

To Spool Crossover: 7.6 bar (110 psi)

To Full Spool Shift: 9.0 bar (130 psi)

Oil Volume Required to Full Shift: 2.5 cc (0.15 cu. in.)

Temperature: -40 to 120°C with standard Buna seals

Filtration: See page 9.010.1

Fluids: Mineral-based or synthetics with lubricating properties at viscosities of 7.4 to 420 cSt (50 to 2000 ssu)

Installation: No restrictions; See page 9.020.1

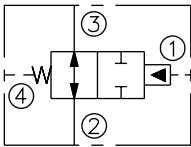
Cavity: VC16-4; See page 9.116.1

Cavity Tool: CT16-4XX; See page 8.600.1

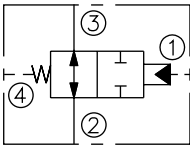
Seal Kit: SK16-4X-MMM; See page 8.650.1

SYMBOLS

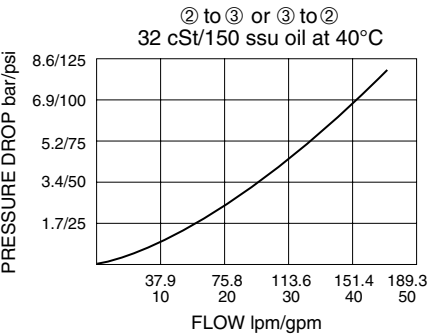
USASI:



ISO:

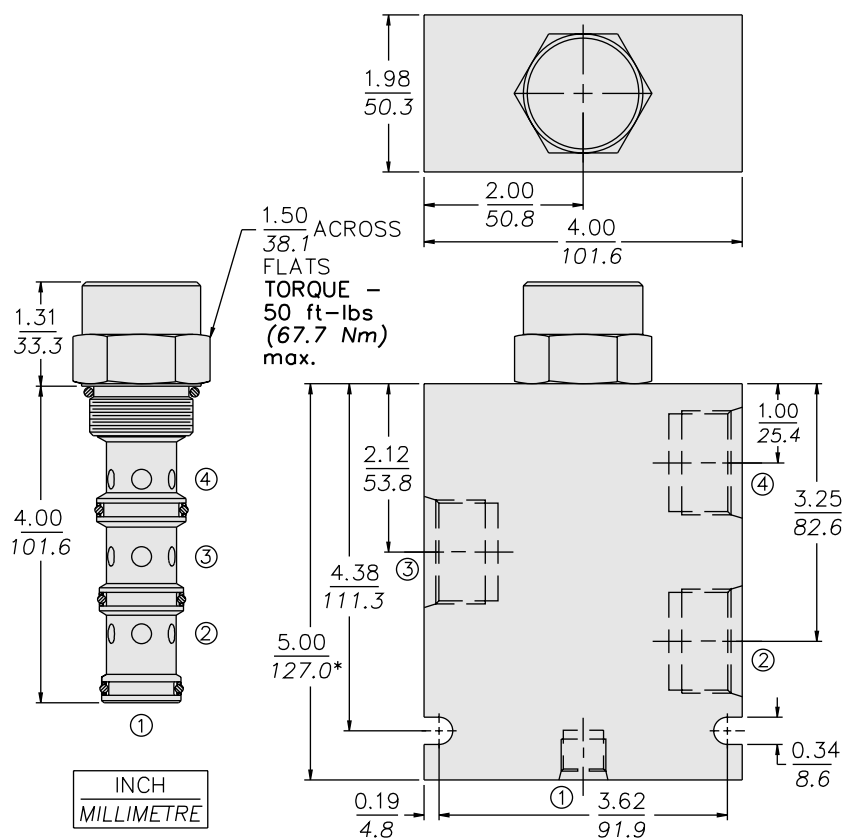


PERFORMANCE (Cartridge Only)



PD16-45

DIMENSIONS



* BSP BODY - 134.9

MATERIALS

Cartridge: Weight: 0.52 kg. (1.15 lbs.); Steel with hardened work surfaces. Zinc-plated exposed surfaces. Buna N O-rings and polyester elastomer back-ups standard.

Standard Ported Body: Weight: 1.5 kg. (3.3 lbs.); Anodized high-strength 6061 T6 aluminum alloy, rated to 240 bar (3500 psi); see page 8.016.1. Ductile iron and steel bodies available; dimensions may differ; consult factory.

TO ORDER

PD16-45 -

Porting
Cartridge Only
SAE 12, SAE 6 Pilot
SAE 16, SAE 6 Pilot

0
12T
16T

Bias Spring[†]

60 4.1 bar (60 psi)
110 7.6 bar (110 psi)
170 11.7 bar (170 psi)

Optional bias springs considered on OEM request.

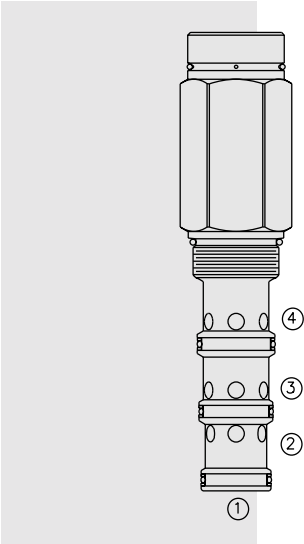
[†]Note: 110 psi bias spring is the minimum required for use with sealed spool.

Seals

N Buna N (Std.)
NS Buna N with Sealed Spool
V Fluorocarbon
VS Fluorocarbon with Sealed Spool

DIRECTIONAL VALVES

PD42-M45 Piloted 2-Way Spool



DESCRIPTION

A screw-in, cartridge-style, pilot-operated, spool-type, hydraulic directional valve for three-way circuits requiring remote pilot actuation.

OPERATION

In neutral (unpiloted), the PD42-M45 allows flow from ③ to ② bidirectionally. The spring chamber is directed to port ④. On remote pilot signal at ①, the valve shifts to block ③ to ② bidirectionally. Note that ④ is common to the spring chamber. Pressure on ④ will directly (1:1) affect required pilot pressure and must always be added to the bias spring value.

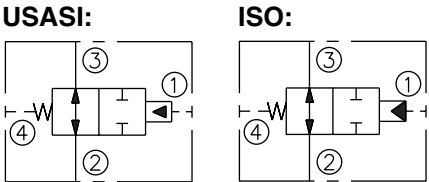
FEATURES

- Hardened spool and cage for long life.
- Optional sealed pilot.
- Industry-standard ISO cavity.

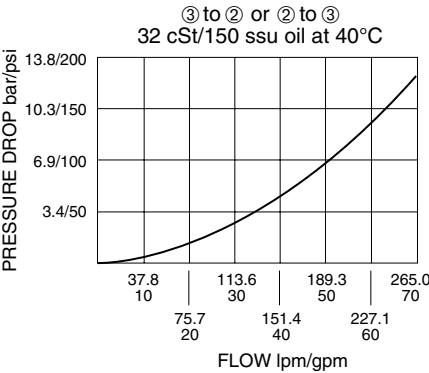
RATINGS

Maximum Operating Pressure: With Polyurethane Seals: Ports ①, ② & ③: 344 bar (5000 psi); Port ④: 210 bar (3000 psi)
Flow: See Performance Chart
Internal Leakage: 246 ml/minute (15 cu. in./minute) max. at 344 bar (5000 psi)
Pilot Pressure Required:
 To Spool Crossover: 13 bar (188 psi)
 To Full Spool Shift: 17.2 to 27.6 bar (250 to 400 psi)
Temperature: -40 to 120°C with standard Buna seals
Filtration: See page 9.010.1
Fluids: Mineral-based or synthetics with lubricating properties at viscosities of 7.4 to 420 cSt (50 to 2000 ssu)
Installation: No restrictions; See page 9.020.1
Cavity: VC42-M4; See page 9.142.1
Cavity Tool: CT42-M4XX; See page 8.600.1
Seal Kit: SK42-4X-MMM; See page 8.650.1

SYMBOLS



PERFORMANCE (Cartridge Only)



Technical drawing of a 1/2 inch NPT x 1/2 inch NPT female adapter. The drawing includes a side view, a top view, and a bottom view. The side view shows a hexagonal body with a threaded section. The top view shows a hexagonal flange with a central hole. The bottom view shows a hexagonal flange with a central hole and four mounting holes. Dimensions are provided in both inches and millimeters. A torque specification is also included.

Dimensions (Inches / Millimeters):

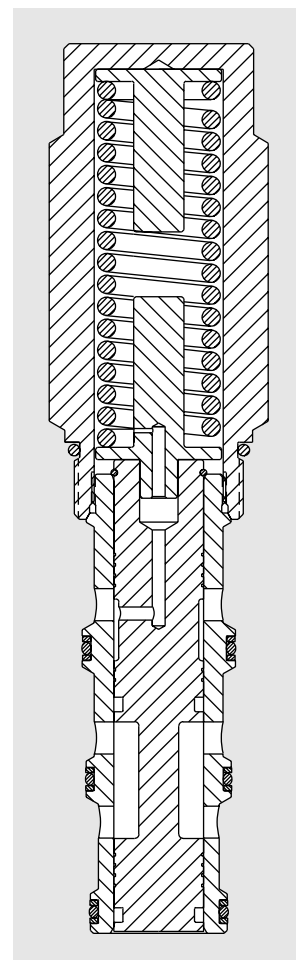
- Overall Length: 3.90 / 99.0
- Hexagonal Body Length: 4.77 / 121.1
- Hexagonal Body Width (Across Flats): 1.88 / 47.6
- Threaded Section Length: 4.77 / 121.1
- Threaded Section Width: 2.22 / 56.3
- Overall Width: 4.43 / 112.5
- Top View Hexagonal Flange Width: 2.22 / 56.3
- Bottom View Hexagonal Flange Width: 2.22 / 56.3
- Bottom View Hexagonal Flange Length: 3.93 / 99.8
- Bottom View Hexagonal Flange Width: 2.22 / 56.3
- Bottom View Hexagonal Flange Thickness: 0.25 / 6.4
- Bottom View Hexagonal Flange Mounting Hole Diameter: 0.34 / 8.6
- Bottom View Hexagonal Flange Mounting Hole Spacing: 3.94 / 100.1
- Bottom View Hexagonal Flange Mounting Hole Spacing (Inner): 1.34 / 34.0
- Bottom View Hexagonal Flange Mounting Hole Spacing (Outer): 2.64 / 67.1
- Bottom View Hexagonal Flange Mounting Hole Spacing (Inner): 5.38 / 136.7
- Bottom View Hexagonal Flange Mounting Hole Spacing (Outer): 6.00 / 152.4

Torque Specification:

1.88 / 47.6 ACROSS FLATS
TORQUE - 70 ft-lbs (94.6 Nm) max.

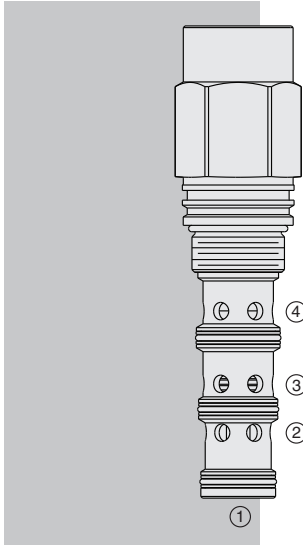
Threaded Section: M42 x 2.0 - 6g THREAD

Scale: INCH / MILLIMETRE



4.363.2

HPD42-M45 HyPerformance™ Piloted 2-Way Spool



DESCRIPTION

A high performance, screw-in, cartridge-style, pilot-operated, spool-type, hydraulic directional valve for two-way circuits requiring remote pilot actuation and vented spring chamber.

OPERATION

In neutral (unpiloted), the **HPD42-M45** allows flow from 3 to 2 bidirectionally. The spring chamber is directed to port 4.

On remote pilot signal at 1, the valve shifts to block 3 to 2 bidirectionally.

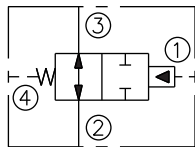
Note that 4 is common to the spring chamber. Pressure on 4 will directly (1:1) affect required pilot pressure and must always be added to the bias spring value.

FEATURES

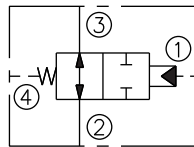
- Multiple function/application potential.
- Smooth shift transition.
- Low pressure drop.
- Hardened spool and cage for long life.
- Optional sealed pilot.
- Industry-standard ISO cavity.
- All HyPerformance products are tested to the rigorous standards of NFPA specification T2.6.1.
- All HyPerformance products are tested at a verification level of 90% and an assurance of 99%.

SYMBOLS

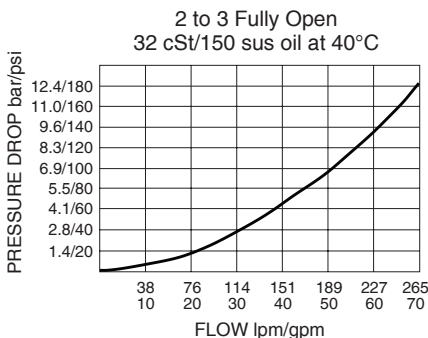
USASI:



ISO:



PERFORMANCE (Cartridge Only)



RATINGS

Operating Pressure: 350 bar (5075 psi); 10% cycle life: 420 bar (6090 psi)

Note: All HyPerformance products are tested for 900K cycles at 350 bar and 100K at 420 bar

Fatigue Rating: 2 million cycles at 420 bar

Burst Pressure: 1380 bar (20000 psi)

Flow: 265 lpm (70 gpm)

Internal Leakage: 560 ml/min (30 cu. in./minute) max at 350 bar (5075 psi)

Pilot Pressure Required:

To Spool Crossover: 5.51 bar (80 psi) with 180 psi bias spring

To Full Spool Shift: 12.4 bar (180 psi) with 180 psi bias spring

Oil Volume Required to Full Shift: 5.07 cu. cm. (0.31 cu. in.)

Temperature: -54°C to 107°C (-65°F to 225°F) with standard PPDI Urethane seals

Filtration: See page 9.010.1

Fluids: Mineral-based or synthetics with lubricating properties at viscosities of

7.4 to 420 cSt (50 to 2000 sus); See Temperature and Oil Viscosity, page 9.060.1

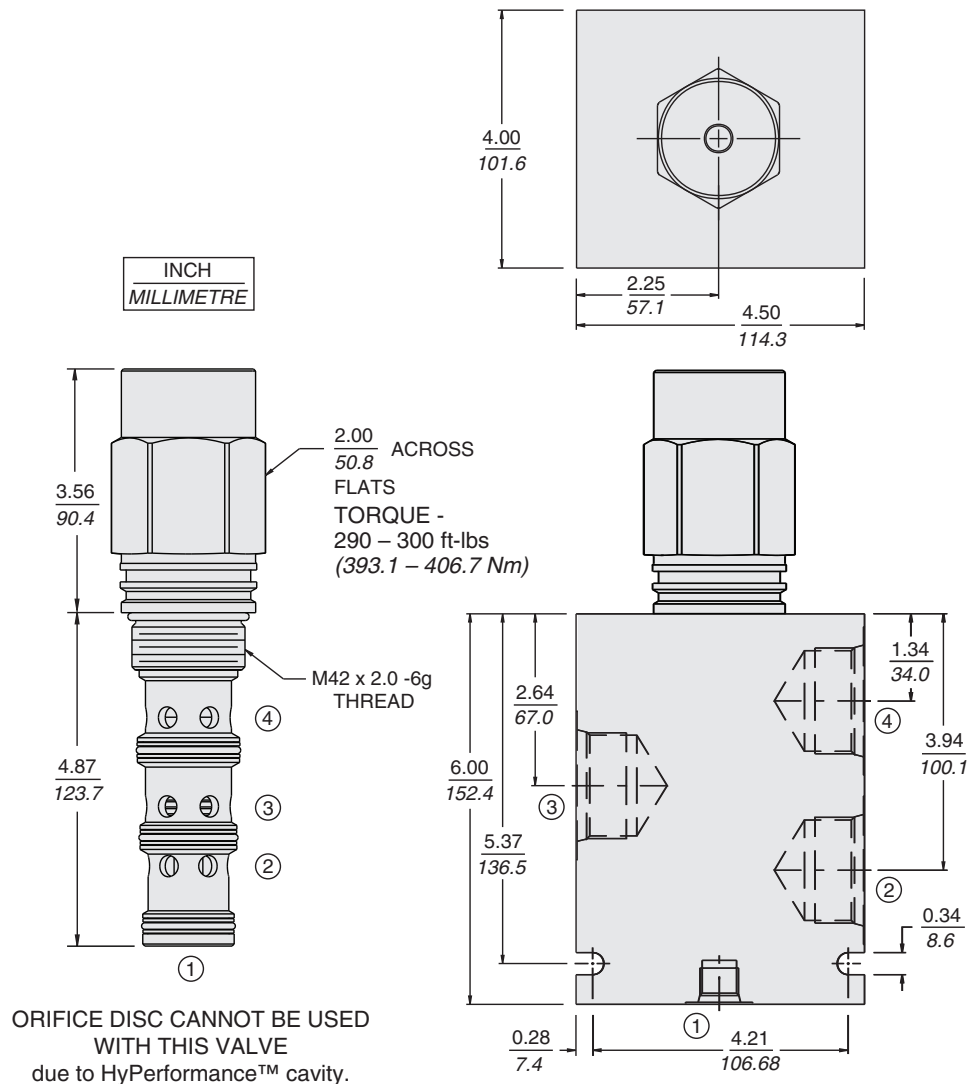
Installation: No restrictions; See page 9.020.1

Cavity: HVC42-M4 See page 9.142.1

Cavity Tool: HCT42-M4XX; See page 8.600.1

Seal Kit: SK42-4X-MMM; See page 8.650.1

DIMENSIONS



MATERIALS

Cartridge: Weight: 1.9 kg. (4.2 lbs.)
Steel with hardened work surfaces.
Zinc-nickel plated exposed
surfaces. PPDl urethane O-rings
and polyester elastomer back-ups
standard.

Ported Body: Weight: 10.68 kg
(23.56 lbs.) HyPerformance™
Ductile iron (code 'D') standard. PD
type. Rated to 345 bar (5000 psi).

TO ORDER

HPD42-M45 - - -180†

Option
None (Blank)

Porting
Cartridge Only 0
SAE 20 20TD
1-1/4" BSP* 10BD

*BSP body; U.K. mfr. Only

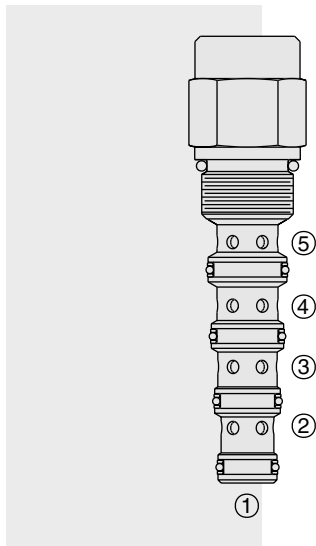
NOTE: All bodies are PD type.

†180 psi bias spring standard.
Optional bias springs considered
on OEM request.

Seals
U PPDl Urethane (Standard)
US PPDl Urethane with
Sealed Spool

DIRECTIONAL VALVES

PD10-50N Piloted 3-Way Spool



DESCRIPTION

A screw-in, cartridge-style, pilot-operated, spool-type, hydraulic directional valve which is open in transition, for three-way circuits requiring remote pilot operation.

OPERATION

In neutral (unpiloted), the **PD10-50N** allows flow from ③ to ② bidirectionally, while flow is blocked from ③ to ④. The spring chamber is vented to tank at port ⑤, and is internally O-ring sealed from the cartridge flow paths.

On remote pilot signal at ①, the valve shifts to block flow from ③ to ②, while opening flow between ③ and ④ bidirectionally. Any pressure at port ⑤ is added to the spring value.

FEATURES

- Hardened spool and cage for long life.
- Cost-effective cavity.

RATINGS

Operating Pressure: 240 bar (3500 psi)

Proof Pressure: 350 bar (5075 psi)

Flow: See Performance Chart

Internal Leakage: 82 cc/minute (5 cu. in./minute) max. at 207 bar (3000 psi)

Pilot Pressure Required using 10.3 bar (150 psi) Spring:

To Spool Crossover: 10.3 bar (150 psi)

To Full Spool Shift: 12.2 bar (177 psi)

Oil Volume Required to Full Shift: 0.44 cc (0.027 cu. in.)

Temperature: -40 to 120°C with standard Buna seals

Filtration: See page 9.010.1

Fluids: Mineral-based or synthetics with lubricating properties at viscosities of 7.4 to 420 cSt (50 to 2000 ssu)

Installation: No restrictions; See page 9.020.1

Cavity: VC10-5; See page 9.110.1

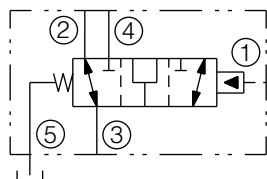
Cavity Tool: CT10-5XX; See page 8.600.1

Seal Kit: SK10-5X-MMMM; See page 8.650.1

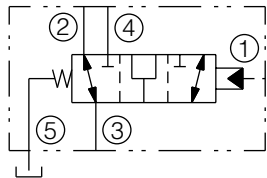
Cap Vent Seal: Part No. 6003117

SYMBOLS

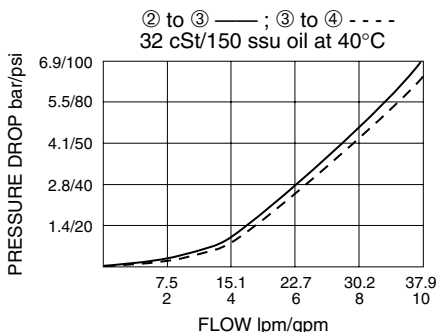
USASI:



ISO:

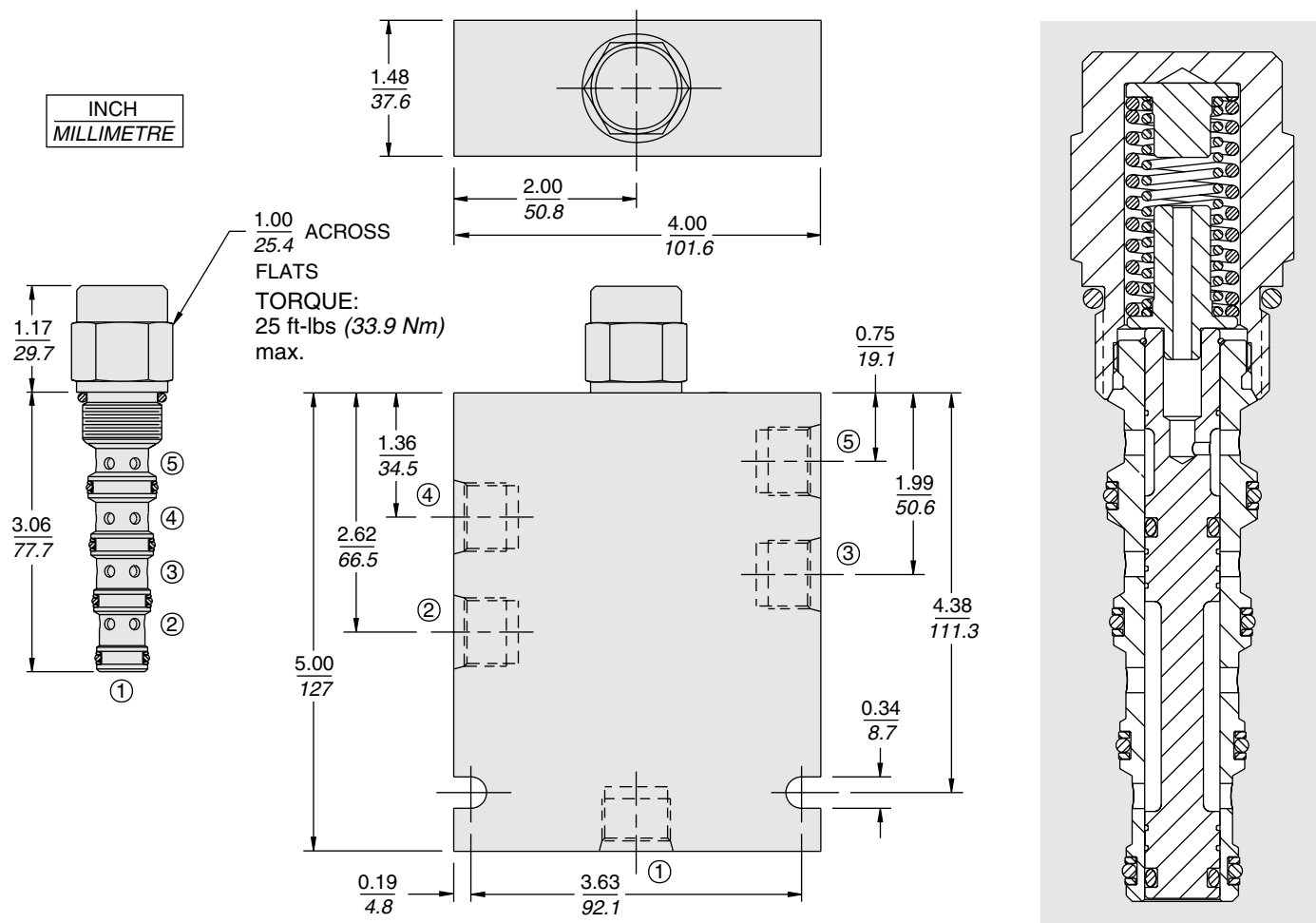


PERFORMANCE (Cartridge Only)



PD10-50N

DIMENSIONS



MATERIALS

Cartridge: Weight: 0.20 kg. (0.44 lbs.);
Steel with hardened work surfaces;
Zinc-plated exposed surfaces; Buna
N O-rings and polyester elastomer
back-ups standard.

Standard Ported Body: Weight:
0.41 kg. (0.85 lbs.); Anodized high-
strength 6061 T6 aluminum alloy,
rated to 240 bar (3500 psi); see page
8.010.1 Ductile iron and steel bodies
available; dimensions may differ;
consult factory.

TO ORDER

PD10-50N-

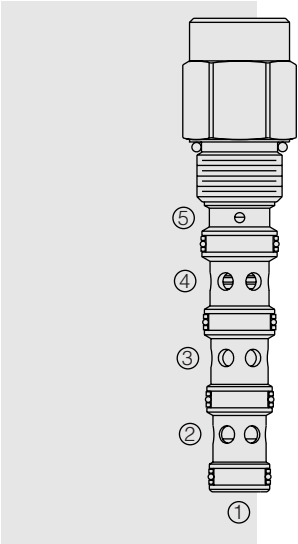
Porting
Cartridge Only **0**
SAE 6 **6T**
SAE 8 **8T**

Bias Spring
150 10.3 bar (150 psi)
230 15.9 bar (230 psi)

Seals
N Buna N (Std.)
NS Buna N with Sealed Spool
V Fluorocarbon
VS Fluorocarbon with Sealed Spool

DIRECTIONAL VALVES

PD12-S50 Piloted 3-Way Spool with Vented Spring



DESCRIPTION

A screw-in, cartridge-style, pilot-operated, spool-type, hydraulic directional valve for three-way circuits requiring remote pilot actuation.

OPERATION

In neutral (unpiloted), the PD12-S50 allows flow from ③ to ② bidirectionally, while flow is blocked at ④.

On remote pilot signal at ①, the valve shifts to open ③ to ④ while blocking ②.

The spring chamber is vented to the tank through port ⑤, which is, optionally, O-ring sealed from the cartridge flow paths. The vented spring chamber allows the valve to be fully pressurized at ports ①, ② and ③ without affecting required pilot pressure. Pressure at ⑤ will affect required pilot pressure.

FEATURES

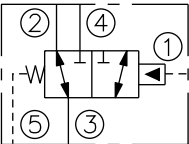
- Hardened spool and cage for long life.
- Optional sealed pilot and spring chamber.

RATINGS

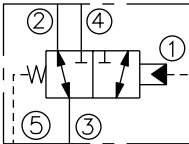
- Maximum Operating Pressure:** 241 bar (3500 psi)
- Flow:** See Performance Chart
- Internal Leakage:** 164 cc/minute (10 cu. in./minute) on all flow ports at maximum operating pressure. The sealed pilot version exhibits no leakage at ports ① and ⑤ at maximum pressure.
- Oil Volume Required to Full Shift:** 1.07 cc (0.065 cu. in.)
- Temperature:** -40 to 120°C with standard Buna seals
- Filtration:** See page 9.010.1
- Fluids:** Mineral-based or synthetics with lubricating properties at viscosities of 7.4 to 420 cSt (50 to 2000 ssu)
- Installation:** No restrictions; See page 9.020.1
- Cavity:** VC12-S5; See page 9.112.1
- Cavity Tool:** CT12-S5; See page 8.600.1
- Seal Kit:** SK12-S5X-MMMM; See page 8.650.1

SYMBOLS

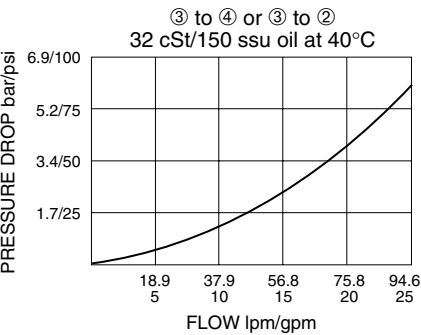
USASI:



ISO:



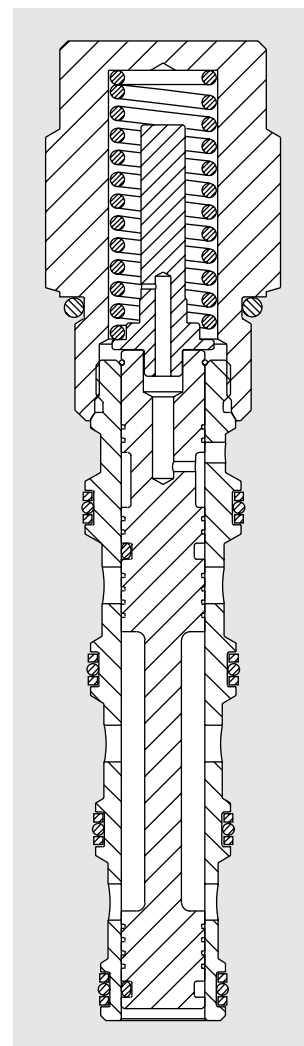
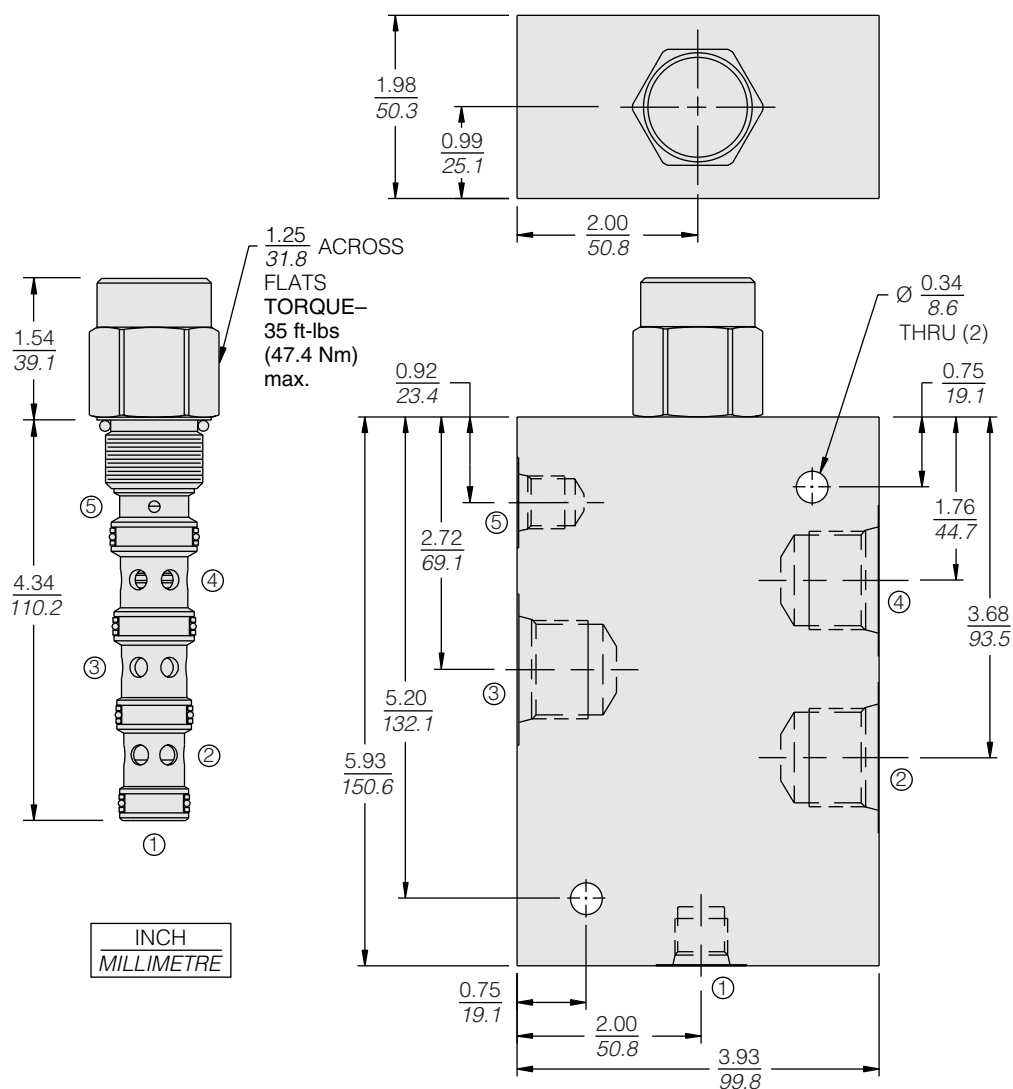
PERFORMANCE (Cartridge Only)



Chamber

PD12-S50

DIMENSIONS



MATERIALS

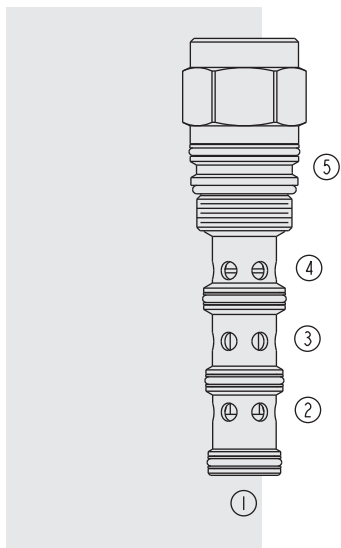
Cartridge: Weight: 0.375 kg. (0.83 lbs.); Steel with hardened work surfaces. Zinc-plated exposed surfaces. Buna N O-rings and polyester elastomer back-ups standard.

Standard Ported Body: Weight: 1.5 kg. (3.3 lbs.); Anodized high-strength 6061 T6 aluminum alloy, rated to 240 bar (3500 psi); see page 8.012.1. Ductile iron and steel bodies available; dimensions may differ; consult factory.

TO ORDER

PD12-S50-		-	-110*
Porting			
Cartridge Only	0		
SAE 10, SAE 6 Pilot	10T		
SAE 12, SAE 6 Pilot	12T		
Note: All bodies are PD type.			
			*110 psi bias spring standard. Optional bias springs considered on OEM request.
			Seals
			N Buna N (Std.)
			NS Buna N with Sealed Pilot
			V Fluorocarbon
			VS Fluorocarbon with Sealed Pilot

PD16-S50 Piloted 3-Way Spool



DESCRIPTION

A screw-in, cartridge-style, pilot-operated, spool-type, hydraulic directional valve.

OPERATION

When in neutral the **PD16-S50** allows flow between ports ③ and ②, while blocking at ④. On remote pilot signal at ①, the valve's spool shifts to allow flow between ③ and ④, while blocking at ②. The spring chamber is vented to the tank through port ⑤. The vented spring chamber allows the valve to be fully pressurized at ports ①, ②, ③, and ④ without affecting required pilot pressure. Pressure at port ⑤ will affect required pilot pressure.

FEATURES

- Hardened spool and cage for long life.
- 50, 70, 100 and 150 psi bias springs available.

RATINGS

Operating Pressure: 240 bar (3500 psi)

Flow: 0–170 lpm (0–45 gpm); See Performance Chart

Internal Leakage at 207 bar (3000 psi): 245 ml/minute (15 cu. in./minute);
Zero leakage from port ① to port ② with sealed spool.

Temperature: -40 to 120°C

Filtration: See page 9.010.1

Fluids: Mineral-based or synthetics with lubricating properties at viscosities of 7.4 to 420 cSt (50 to 2000 sus); See Temperature and Oil Viscosity, page 9.060.1

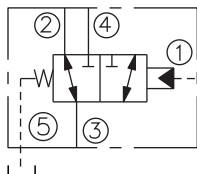
Installation: No restrictions; See page 9.020.1

Cavity: VC16-S5; See page 9.116.1

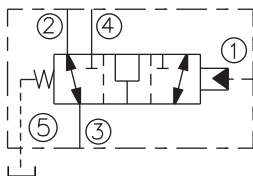
Cavity Tool: CT16-S5XX; See page 8.600.1

Seal Kit: SK16-S5X-MMMM; See page 8.650.1

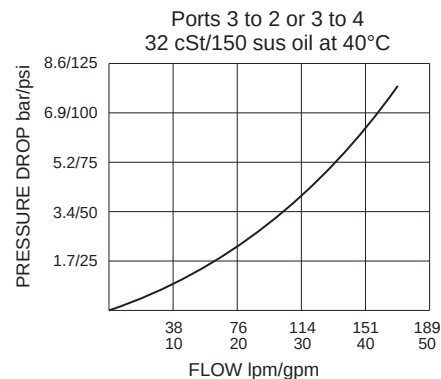
SYMBOLS



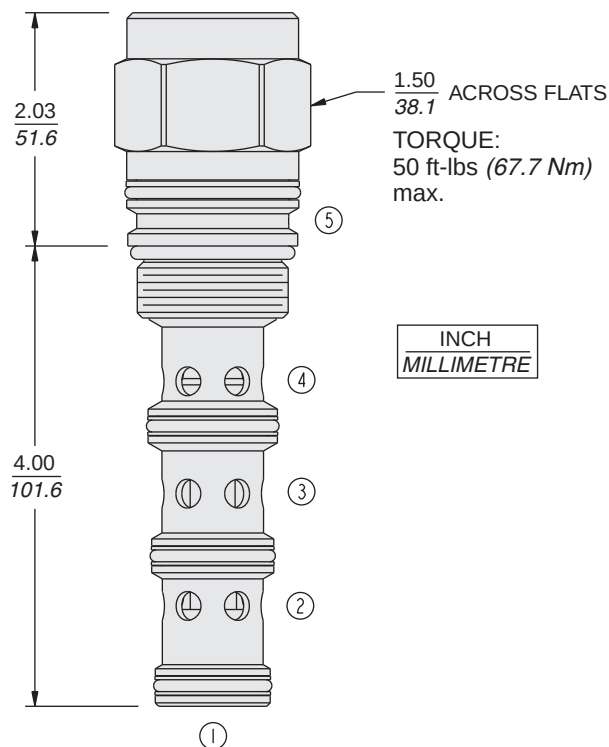
Open Transition Option:



PERFORMANCE (Cartridge Only)



DIMENSIONS



MATERIALS

Cartridge: Weight: 0.68 kg. (1.50 lbs.)
Steel with hardened work surfaces.
Zinc-plated exposed surfaces.
Buna N O-rings and polyester elastomer back-ups standard.

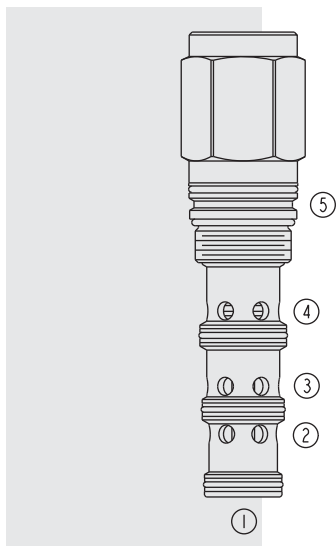
Ported Body: Consult factory.

TO ORDER

PD16-S50							
Option		Bias Spring [†]		Seals			
None	(Blank)	50	3.4 bar (50 psi)	N	Buna N (Std.)		
Open Transition	N	70	4.8 bar (70 psi)	V	Fluorocarbon		
		100	6.9 bar (100 psi)	P	Polyurethane		
		150	10.3 bar (150 psi)	NS	Buna N w/Sealed Spool		
				VS	Fluorocarbon w/Sealed Spool		
				PS	Polyurethane w/Sealed Spool		

[†]Note: 100 psi bias spring minimum required for use with sealed spool.

PD42-S50 Piloted 3-Way Spool



DESCRIPTION

A screw-in, cartridge-style, pilot-operated, spool-type, hydraulic directional valve for three-way circuits requiring remote pilot actuation.

OPERATION

In neutral (unpiloted), the **PD42-S50** allows flow from ③ to ② bidirectionally, while flow is blocked at ④.

On remote pilot signal at ①, the valve shifts to open ③ to ④ while blocking ②.

The spring chamber is vented to the tank through port ⑤, which is common to the spring chamber. Pressure on port ⑤ will directly (1:1) affect the pilot pressure required and must be added to the bias spring value.

FEATURES

- Hardened spool and cage for long life.
- Optional open transition (ports ②, ③ and ④).

RATINGS

Maximum Operating Pressure: 345 bar (5000 psi)

Flow: See Performance Chart

Internal Leakage: 245 ml/minute (15 cu. in./minute) at 345 bar (5000 psi).

Temperature: -40 to 120°C with standard Buna seals

Filtration: See page 9.010.1

Fluids: Mineral-based or synthetics with lubricating properties at viscosities of 7.4 to 420 cSt (50 to 2000 sus); See Temperature and Oil Viscosity, page 9.060.1

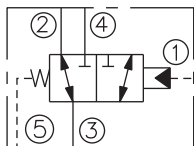
Installation: No restrictions; See page 9.020.1

Cavity: VC42-S5; See page 9.142.1

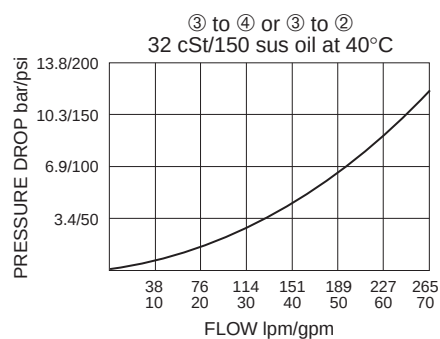
Cavity Tool: CT42-S5; See page 8.600.1

Seal Kit: SK42-S5X-BMMM; See page 8.650.1

SYMBOL



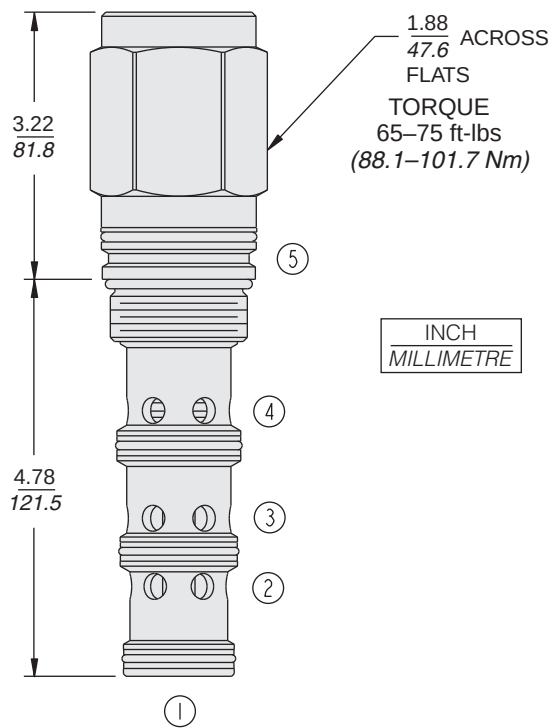
PERFORMANCE (Cartridge Only)



with Vented Spring Chamber

PD42-S50

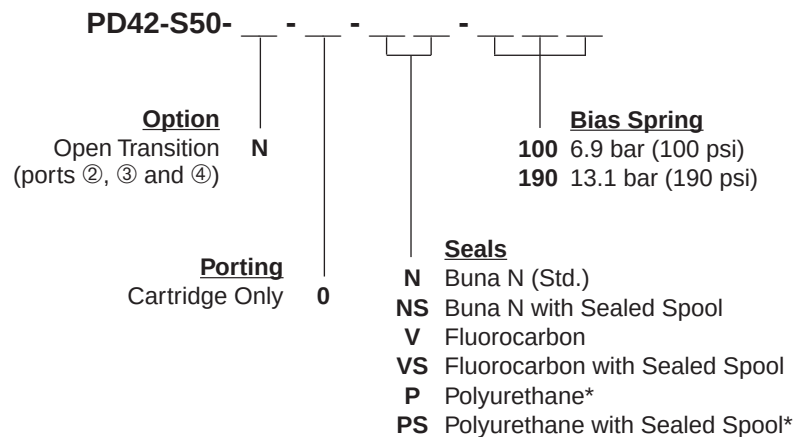
DIMENSIONS



MATERIALS

Cartridge: Weight: 1.60 kg. (3.5 lbs.)
Steel with hardened work surfaces.
Zinc-plated exposed surfaces.
Buna N O-rings and polyester
elastomer back-ups standard.

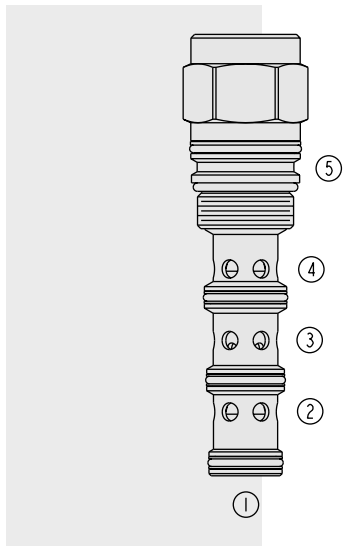
TO ORDER



* Required for pressure over 241 bar (3500 psi)

DIRECTIONAL VALVES

PD16-S51 Piloted 3-Way Spool



DESCRIPTION

A screw-in, cartridge-style, pilot-operated, spool-type, hydraulic directional valve.

OPERATION

When in neutral the **PD16-S51** allows flow between ports ②, ③ and ④. On remote pilot signal at ①, the valve's spool shifts to block all ports. The spring chamber is vented to the tank through port ⑤. The vented spring chamber allows the valve to be fully pressurized at ports ①, ②, ③, and ④ without affecting required pilot pressure. Pressure at port ⑤ will affect required pilot pressure.

FEATURES

- Hardened spool and cage for long life.
- 70, 90 and 140 psi bias springs available.

RATINGS

Operating Pressure: 240 bar (3500 psi)

Flow: 0–151 lpm (0–40 gpm); See Performance Chart

Internal Leakage at 207 bar (3000 psi): 410 ml/minute (25 cu. in./minute) between ports ③ and ②. 820 ml/minute (50 cu. in./minute) between ports ③ and ④.

Pilot Pressure Required: 4.1 bar (60 psi) minimum

Oil Volume Required to Full Shift: 1.83 cc (0.11 cu. in.)

Temperature: -40 to 120°C

Filtration: See page 9.010.1

Fluids: Mineral-based or synthetics with lubricating properties at viscosities of 7.4 to 420 cSt (50 to 2000 ssu)

Installation: No restrictions; See page 9.020.1

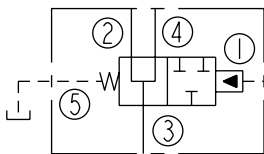
Cavity: VC16-S5; See page 9.116.1

Cavity Tool: CT16-S5XX; See page 8.600.1

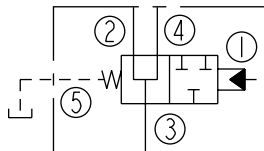
Seal Kit: SK16-S5X-BMMM; See page 8.650.1

SYMBOLS

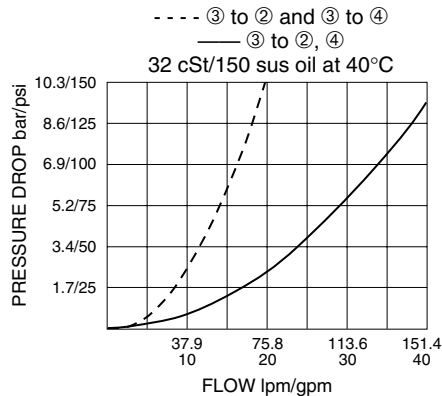
USASI:



ISO:

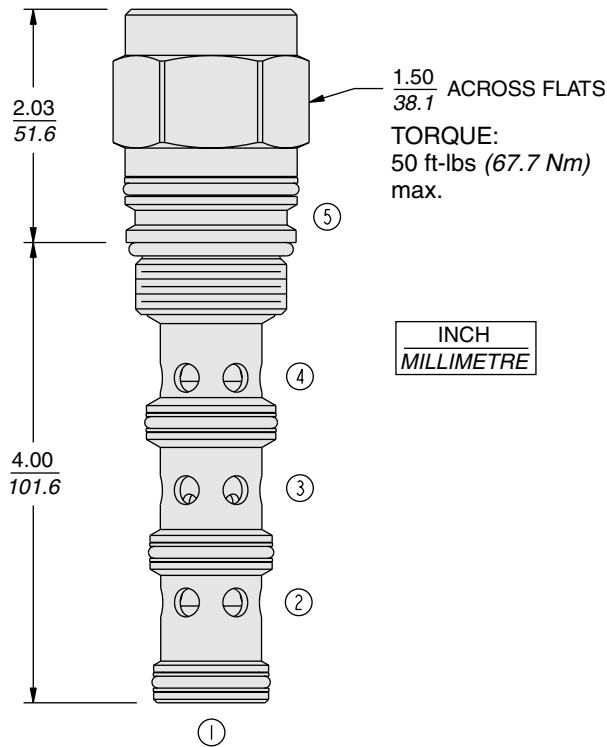


PERFORMANCE (Cartridge Only)



PD16-S51

DIMENSIONS



MATERIALS

Cartridge: Weight: 0.25 kg. (0.55 lbs.); Steel with hardened work surfaces. Zinc-plated exposed surfaces. Buna N O-rings and polyester elastomer back-ups standard.

Ported Body: Consult factory.

TO ORDER

PD16-S51 -

Porting
Cartridge Only 0

Bias Spring[†]

70 4.8 bar (70 psi)
90 6.2 bar (90 psi)
140 9.7 bar (140 psi)

Optional bias springs considered on OEM request.

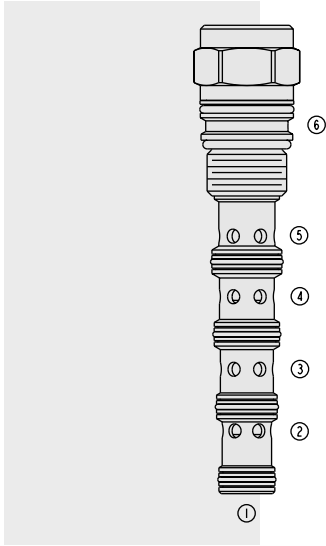
[†]Note: 90 psi bias spring is the minimum required for use with sealed spool.

Seals

N Buna N (Std.)
V Fluorocarbon
NS Buna N w/Sealed Spool ① to ② only
VS Fluorocarbon w/Sealed Spool ① to ② only

DIRECTIONAL VALVES

PD12-S60N Piloted, 2-Position, 4-Way Spool



DESCRIPTION

A screw-in, cartridge-style, pilot-operated, 2-position, 4-way, spool-type, hydraulic directional valve.

OPERATION

In the neutral position, the **PD12-S60N** allows flow between ports ② and ③ and between ports ④ and ⑤. On remote pilot signal at ①, the valve shifts to allow flow between ports ③ and ④, and between ports ② and ⑤.

The spring chamber is vented to the tank through port ⑥. The vented spring chamber allows the valve to be fully pressurized at ports ①, ②, ③, ④ and ⑤ without affecting required pilot pressure. Pressure at ⑥ will affect required pilot pressure.

FEATURES

- Hardened spool and cage for long life.
- 110 and 170 psi bias springs available.

RATINGS

Maximum Operating Pressure: 240 bar (3500 psi)

Flow: 0 to 56 lpm (0 to 15 gpm); See Performance Chart

Internal Leakage: Maximum leakage at 240 bar (3500 psi):
197 ml/minute (12 cu. in./minute).

Temperature: -40 to 120°C (-40 to 248°F)

Filtration: See page 9.010.1

Fluids: Mineral-based or synthetics with lubricating properties at viscosities of
7.4 to 420 cSt (50 to 2000 sus)

Installation: No restrictions; See page 9.020.1

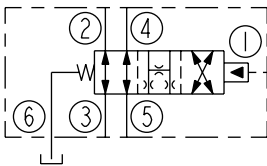
Cavity: VC12-S6; See page 9.112.1

Cavity Tool: CT12-S6XX; See page 8.600.1

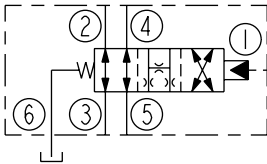
Seal Kit: SK12-S6X-BMMM; See page 8.650.1

SYMBOLS

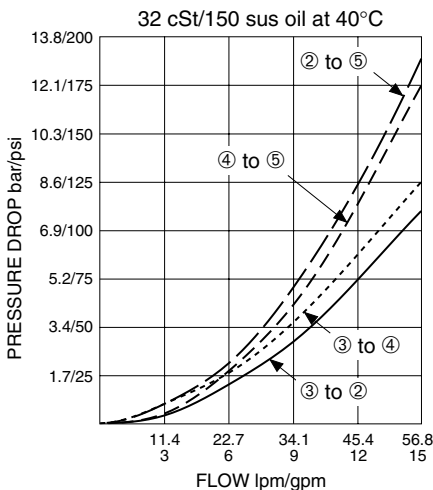
USASI:



ISO:

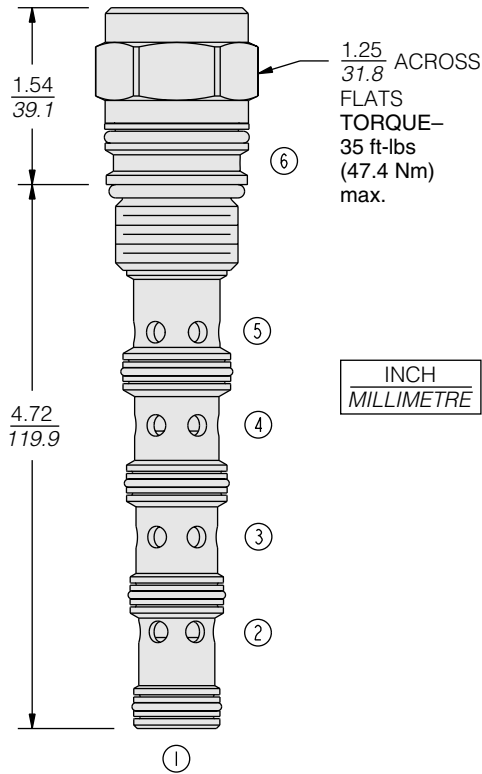


PERFORMANCE (Cartridge Only)



PD12-S60N

DIMENSIONS



MATERIALS

Cartridge: Weight: 0.21 kg. (0.46 lbs.);
Steel with hardened work surfaces.
Zinc-plated exposed surfaces.
Buna N O-rings and polyester elastomer back-ups standard.

Ported Body: Test housing available;
see page 8.012.1.

TO ORDER

PD12-S60N-

Porting
Cartridge Only

0

Bias Spring

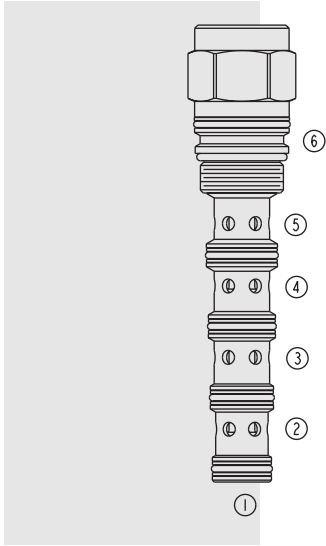
110 7.6 bar (110 psi)
170 11.7 bar (170 psi)

Seals

- N** Buna N (Std.)
- NS** Buna N with Sealed Spool between ① and ②
- V** Fluorocarbon
- VS** Fluorocarbon with Sealed Spool between ① and ②

PD16-S60N Piloted 4-Way Spool

PD16-S60N Piloted 4-Way Spool



DESCRIPTION

A screw-in, cartridge-style, pilot-operated, spool-type, hydraulic directional valve.

OPERATION

When in neutral the **PD16-S60N** allows flow between ports ② and ③, and between ports ④ and ⑤. On remote pilot signal at ①, the valve's spool shifts to allow flow between ③ and ④ and between ② and ⑤. The spring chamber is vented to the tank through port ⑥. The vented spring chamber allows the valve to be fully pressurized at ports ①, ②, ③ and ④ without affecting required pilot pressure. Pressure at port ⑥ will affect required pilot pressure.

FEATURES

- Hardened spool and cage for long life.
- 60, 80, 110 and 170 psi bias springs available.

RATINGS

Operating Pressure: 240 bar (3500 psi)

Flow: 0–95 lpm (0–25 gpm); See Performance Chart

Maximum Internal Leakage: at 207 bar (3000 psi): 164 ml/minute (10 cu. in./minute)

Pilot Pressure Required: 4.1 bar (60 psi) minimum

Oil Volume Required to Full Shift: 1.5 cc (0.09 cu. in.)

Temperature: -40 to 120°C

Filtration: See page 9.010.1

Fluids: Mineral-based or synthetics with lubricating properties at viscosities of 7.4 to 420 cSt (50 to 2000 ssu)

Installation: No restrictions; See page 9.020.1

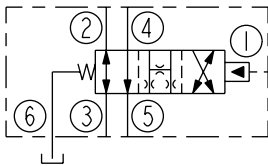
Cavity: VC16-S6; See page 9.116.1

Cavity Tool: CT16-S6XX; See page 8.600.1

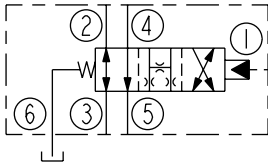
Seal Kit: SK16-S6X-BMMMM; See page 8.650.1

SYMBOLS

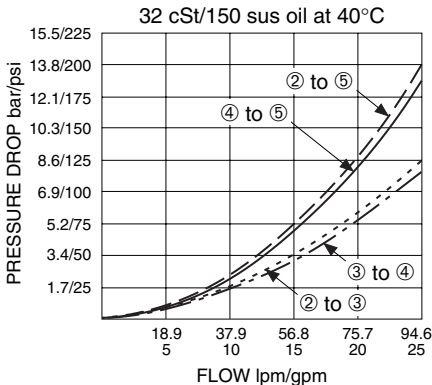
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ISO:

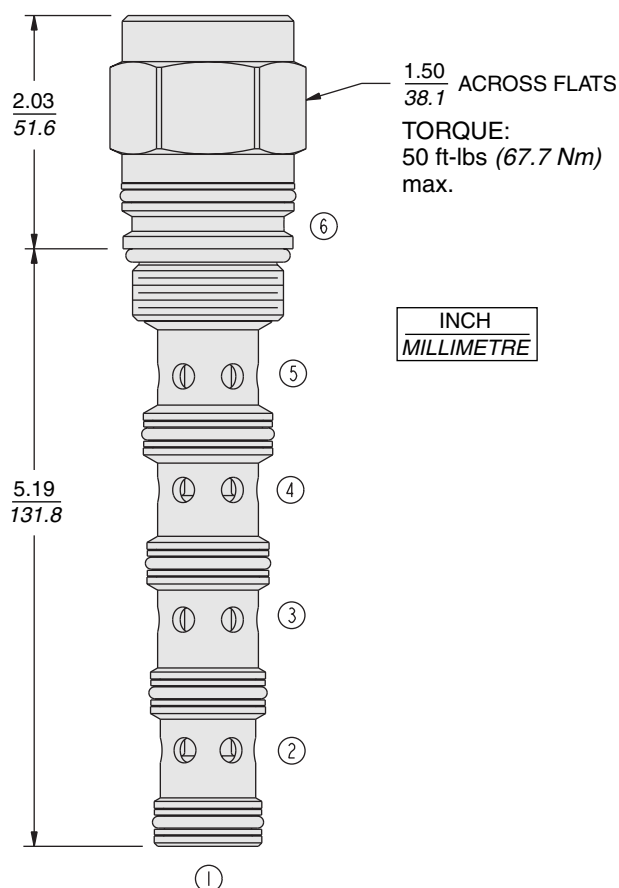


PERFORMANCE (Cartridge Only)



PD16-S60N

DIMENSIONS



MATERIALS

Cartridge: Weight: 0.25 kg. (0.55 lbs.);
Steel with hardened work surfaces.
Zinc-plated exposed surfaces. Buna
N O-rings and polyester elastomer
back-ups standard.

Ported Body: Consult factory.

TO ORDER

PD16-S60N -

Porting
Cartridge Only 0

Bias Spring[†]

60 4.1 bar (60 psi)
80 5.5 bar (80 psi)
110 7.6 bar (110 psi)
170 11.7 bar (170 psi)

Optional bias springs considered
on OEM request.

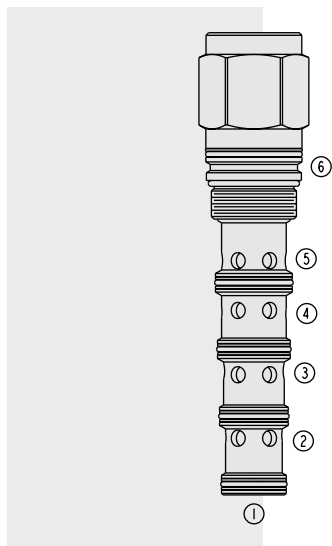
[†]Note: 110 psi bias spring is the
minimum required for use with
sealed spool.

Seals

N Buna N (Std.)
V Fluorocarbon
NS Buna N w/Sealed Spool ① to ② only
VS Fluorocarbon w/Sealed Spool ① to ② only

DIRECTIONAL VALVES

PD42-S60N Piloted, 2-Position, 4-Way Spool



DESCRIPTION

A screw-in, cartridge-style, pilot-operated, 2-position, 4-way, spool-type, hydraulic directional valve.

OPERATION

In the neutral position, the **PD42-S60N** allows flow between ports ② and ③ and from ④ to ⑤. On remote pilot signal at ①, the valve shifts to allow flow between ports ③ and ④, and from ② to ⑤.

The spring chamber is vented to the tank through port ⑥. The vented spring chamber allows the valve to be fully pressurized at ports ①, ②, ③, ④ and ⑤ without affecting required pilot pressure. Pressure at ⑥ will affect required pilot pressure.

FEATURES

- Hardened spool and cage for long life.

RATINGS

Maximum Operating Pressure: ports ②, ③ and ④: 324 bar (4700 psi);
Port ①: 28 bar (400 psi)

Flow: 0 to 189 lpm (0 to 50 gpm); See Performance Chart

Internal Leakage: Maximum leakage at 207 bar (3000 psi):
1.31 liters/minute (80 cu. in./minute).

Temperature: -40 to 120°C (-40 to 248°F)

Filtration: See page 9.010.1

Fluids: Mineral-based or synthetics with lubricating properties at viscosities of
7.4 to 420 cSt (50 to 2000 sus)

Installation: No restrictions; See page 9.020.1

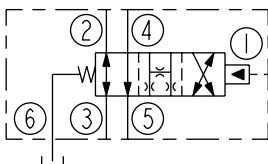
Cavity: VC42-S6; See page 9.142.1

Cavity Tool: CT42-S6XX; See page 8.600.1

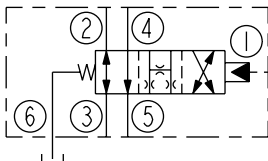
Seal Kit: SK42-S6X-BMMMM; See page 8.650.1

SYMBOLS

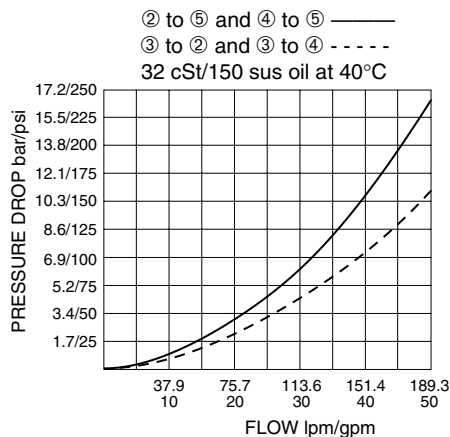
USASI:



ISO:

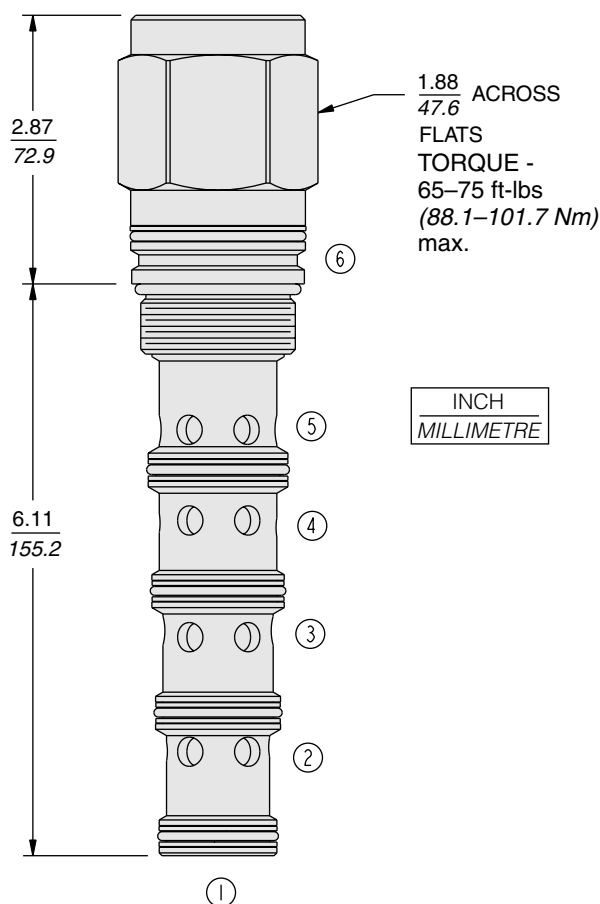


PERFORMANCE (Cartridge Only)



PD42-S60N

DIMENSIONS



MATERIALS

Cartridge: Weight: 1.6 kg. (3.5 lbs.);
Steel with hardened work surfaces.
Zinc-plated exposed surfaces.
Buna N O-rings and polyester elastomer back-ups standard.

Test Body: Consult Factory

TO ORDER

PD42-S60N - - -170[‡]

Porting
Cartridge Only 0

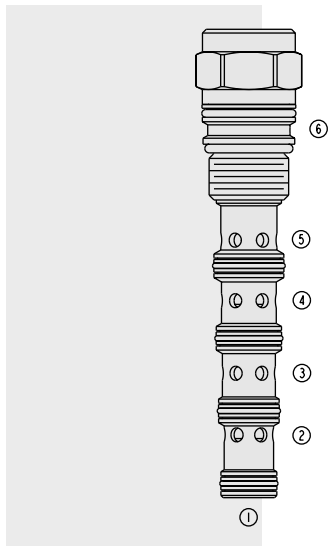
[‡]170 psi (11.7 bar) bias spring standard. Optional bias springs considered on OEM request.

Seals

- N** Buna N (Std.)
- NS** Buna N with Sealed Spool between ① and ②
- P** Polyurethane
- PS** Polyurethane with Sealed Spool between ① and ②
- V** Fluorocarbon
- VS** Fluorocarbon with Sealed Spool between ① and ②

DIRECTIONAL VALVES

PD12-S61N Piloted, 2-Position, 4-Way Spool



DESCRIPTION

A screw-in, cartridge-style, pilot-operated, 2-position, 4-way, spool-type, hydraulic directional valve.

OPERATION

In the neutral position, the **PD12-S61N** allows flow between ports ② and ③ and between ports ④ and ⑤. On remote pilot signal at ①, the valve shifts to allow flow between ports ③ and ④, while blocking ports ② and ⑤.

The spring chamber is vented to the tank through port ⑥. The vented spring chamber allows the valve to be fully pressurized at ports ①, ②, ③, ④ and ⑤ without affecting required pilot pressure. Pressure at ⑥ will affect required pilot pressure.

FEATURES

- Hardened spool and cage for long life.
- 110 and 170 psi bias springs available.

RATINGS

Maximum Operating Pressure: 240 bar (3500 psi)

Flow: 0 to 56 lpm (0 to 15 gpm); See Performance Chart

Internal Leakage: Maximum leakage at 240 bar (3500 psi):
197 ml/minute (12 cu. in./minute).

Temperature: -40 to 120°C (-40 to 248°F)

Filtration: See page 9.010.1

Fluids: Mineral-based or synthetics with lubricating properties at viscosities of
7.4 to 420 cSt (50 to 2000 sus)

Installation: No restrictions; See page 9.020.1

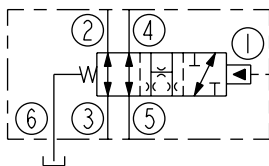
Cavity: VC12-S6; See page 9.112.1

Cavity Tool: CT12-S6XX; See page 8.600.1

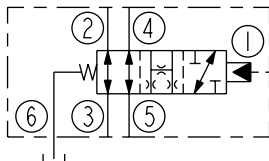
Seal Kit: SK12-S6X-BMMM; See page 8.650.1

SYMBOLS

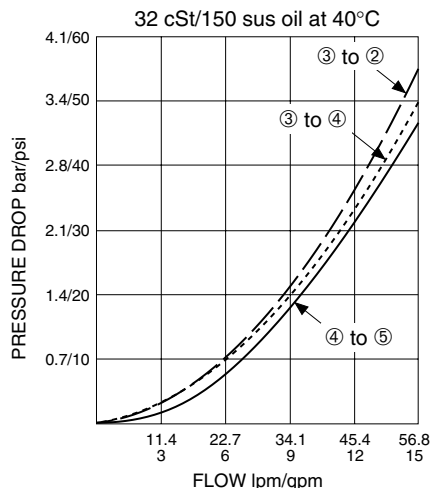
USASI:



ISO:

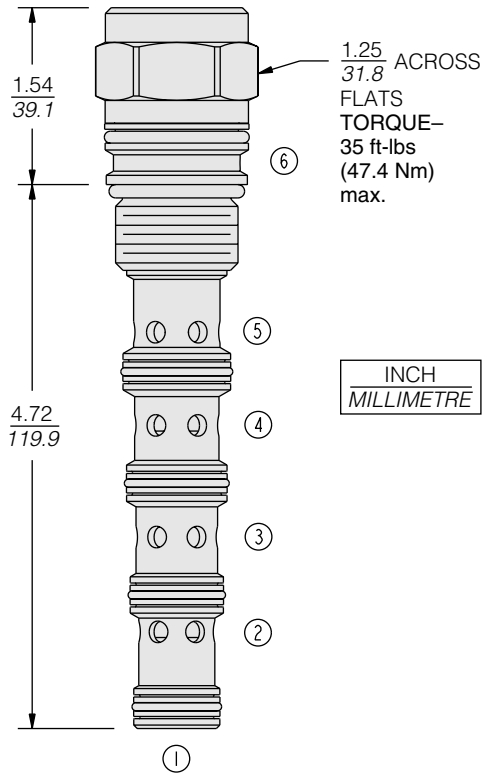


PERFORMANCE (Cartridge Only)



PD12-S61N

DIMENSIONS



MATERIALS

Cartridge: Weight: 0.21 kg. (0.46 lbs.);
Steel with hardened work surfaces.
Zinc-plated exposed surfaces.
Buna N O-rings and polyester
elastomer back-ups standard.

Ported Body: Test housing available;
see page 8.012.1.

TO ORDER

PD12-S61N-

Porting
Cartridge Only

0

Bias Spring

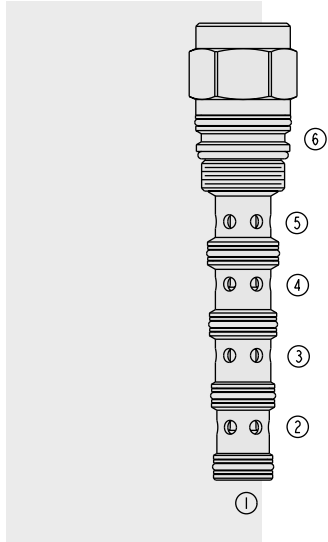
110 7.6 bar (110 psi)
170 11.7 bar (170 psi)

Seals

- N** Buna N (Std.)
- NS** Buna N with Sealed Spool between ① and ②
- V** Fluorocarbon
- VS** Fluorocarbon with Sealed Spool between ① and ②

DIRECTIONAL VALVES

PD16-S61N Piloted 4-Way Spool



DESCRIPTION

A screw-in, cartridge-style, pilot-operated, spool-type, hydraulic directional valve.

OPERATION

When in neutral the **PD16-S61N** allows flow between ports ② and ③, and between ports ④ and ⑤. On remote pilot signal at ①, the valve's spool shifts to allow flow between ③ and ④ while blocking ② and ⑤. The spring chamber is vented to the tank through port ⑥. The vented spring chamber allows the valve to be fully pressurized at ports ①, ②, ③, ④ and ⑤ without affecting required pilot pressure. Pressure at port ⑥ will affect required pilot pressure.

FEATURES

- Hardened spool and cage for long life.
- 60, 110 and 170 psi bias springs available.

RATINGS

Operating Pressure: 240 bar (3500 psi)

Flow: 0–151 lpm (0–40 gpm); See Performance Chart

Maximum Internal Leakage: at 207 bar (3000 psi): 164 ml/minute (10 cu. in./minute)

Pilot Pressure Required: 4.1 bar (60 psi) minimum

Oil Volume Required to Full Shift: 1.5 cc (0.09 cu. in.)

Temperature: -40 to 120°C

Filtration: See page 9.010.1

Fluids: Mineral-based or synthetics with lubricating properties at viscosities of 7.4 to 420 cSt (50 to 2000 ssu)

Installation: No restrictions; See page 9.020.1

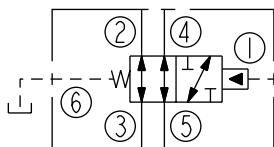
Cavity: VC16-S6; See page 9.116.1

Cavity Tool: CT16-S6XX; See page 8.600.1

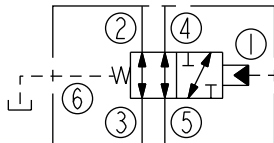
Seal Kit: SK16-S6X-BMMMM; See page 8.650.1

SYMBOLS

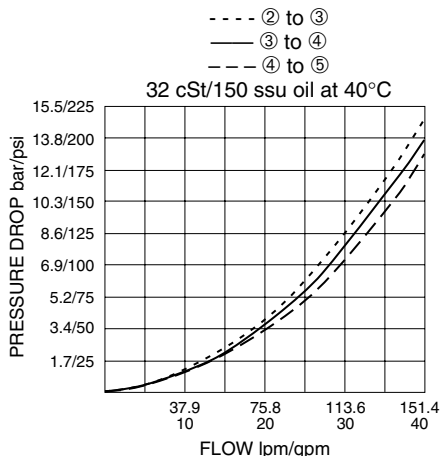
USASI:



ISO:

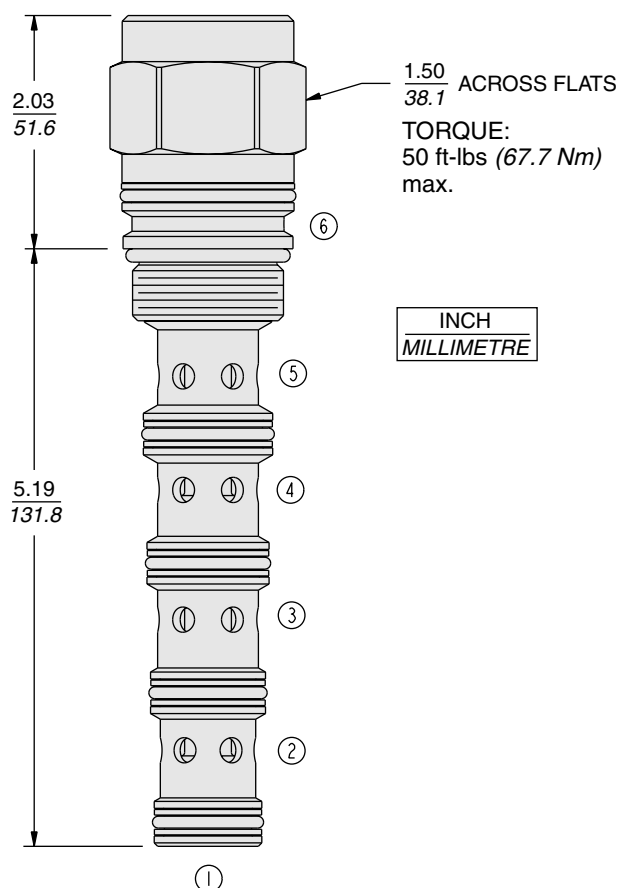


PERFORMANCE (Cartridge Only)



PD16-S61N

DIMENSIONS



MATERIALS

Cartridge: Weight: 0.25 kg. (0.55 lbs.);
Steel with hardened work surfaces.
Zinc-plated exposed surfaces. Buna
N O-rings and polyester elastomer
back-ups standard.

Ported Body: Consult factory.

TO ORDER

PD16-S61N -

Porting
Cartridge Only 0

Bias Spring[†]

60 4.1 bar (60 psi)
110 7.6 bar (110 psi)
170 11.7 bar (170 psi)

Optional bias springs considered
on OEM request.

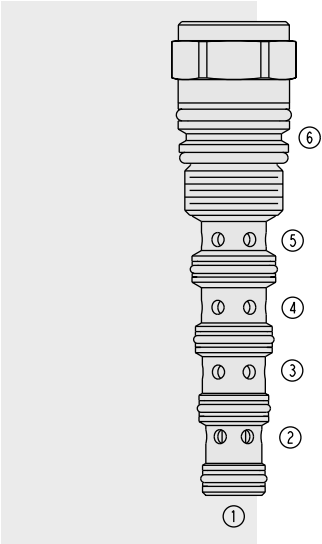
[†]Note: 110 psi bias spring is the
minimum required for use with
sealed spool.

Seals

N Buna N (Std.)
V Fluorocarbon
NS Buna N w/Sealed Spool ① to ② only
VS Fluorocarbon w/Sealed Spool ① to ② only

DIRECTIONAL VALVES

PD10-S62 Piloted Directional Valve



DESCRIPTION

A screw-in, cartridge-style, pilot-operated, spool-type, hydraulic cartridge valve.

OPERATION

In the neutral position, the **PD10-S62** allows flow between ports ② and ③ and between ports ④ and ⑤ bidirectionally. When the remote pilot signal at ① exceeds the force of the bias spring, the spool shifts to block flow at all ports.

The spring chamber is vented to the tank through port ⑥. The vented spring chamber allows the valve to be fully pressurized at ports ①, ②, ③, ④ and ⑤ without affecting required pilot pressure. Pressure at ⑥ will affect required pilot pressure.

FEATURES

- Hardened spool and cage for long life.
- Optional sealed spool between ports ① and ②.

RATINGS

Maximum Operating Pressure: 250 bar (3625 psi) with standard Buna N seals.

Maximum Total Input Flow: 53 lpm (14 gpm) in any combination of flows between ports ② and ③, and ports ④ and ⑤ (e.g., 2 & 12 gpm, 7 & 7 gpm, or 10 & 4 gpm).

Internal Leakage: Maximum leakage at 250 bar (3625 psi):
131 ml/minute (8 cu. in./minute).

Temperature: -40 to 120°C (-40 to 248°F)

Filtration: See page 9.010.1

Fluids: Mineral-based or synthetics with lubricating properties at viscosities of
7.4 to 420 cSt (50 to 2000 sus)

Installation: No restrictions; See page 9.020.1

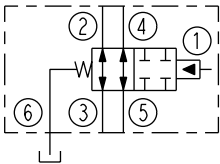
Cavity: VC10-S6; See page 9.110.1

Cavity Tool: CT10-S6X; See page 8.600.1

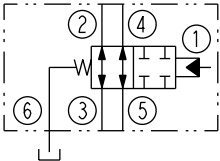
Seal Kit: SK10-S6X-BMMMM; See page 8.650.1

SYMBOLS

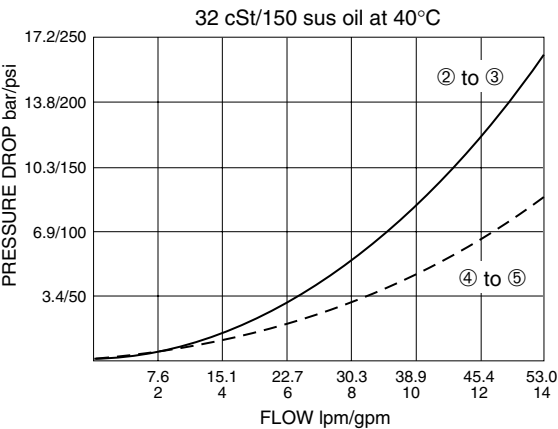
USASI:



ISO:



PERFORMANCE (Cartridge Only)



Technical drawing of a 1000 Series Torque Wrench. The drawing shows the wrench with various dimensions and callouts:

- Overall Length:** 3.06 INCH / 77.8 MILLIMETRE
- Head Length:** 1.17 INCH / 29.7 MILLIMETRE
- Head Width:** 1.00 INCH / 25.4 MILLIMETRE (ACROSS FLATS)
- TORQUE:** 24 – 25 ft-lbs (32.5 – 35.3 Nm)
- Callouts:** 1, 2, 3, 4, 5, 6
- Unit Conversion:** INCH / MILLIMETRE

Cartridge: Weight: 0.20 kg. (0.45 lbs.);
Steel with hardened work surfaces.
Zinc-plated exposed surfaces.
Buna N O-rings and polyester
elastomer back-ups standard.

PD10-S62-

Porting
Cartridge Only

0

Bias Spring
150 10.3 bar (100 psi)
230* 15.9 bar (230 psi)

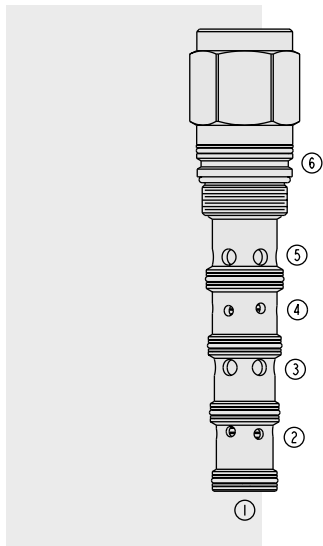
*Required for NS or VS seal option

Seals
N Buna N (Std.)
NS* Buna N with Sealed Spool between ① and ②
V Fluorocarbon
VS* Fluorocarbon with Sealed Spool between ① and ②

*NS and VS seal options require 230 psi spring

DIRECTIONAL VALVES

PD42-S67B Piloted, 4-Way Spool-Type Valve



DESCRIPTION

A screw-in, cartridge-style, pilot-operated spool-type hydraulic directional valve.

OPERATION

When the PD42-S67B is in neutral position, flow is allowed between ports ②, ③ and ⑤. When the remote pilot signal at ① exceeds the force of the bias spring, the spool shifts to allow flow between ③ and ④, and between ② and ⑤. On remote pilot signal at ⑥, the spool shifts to allow flow between ③ and ②, and between ④ and ⑤.

FEATURES

- Hardened spool and cage for long life.

RATINGS

Operating Pressure: 342 bar (4700 psi) at ports ②, ③ and ④;
28 bar (400 psi) at ports ① and ⑥ with standard Buna N seals.

Flow: 0–189 lpm (0–50 gpm); See Performance Chart

Temperature: -40 to 120°C with Buna N seals

Filtration: See page 9.010.1

Fluids: Mineral-based or synthetics with lubricating properties at viscosities of 7.4 to 420 cSt (50 to 2000 ssu)

Installation: No restrictions; See page 9.020.1

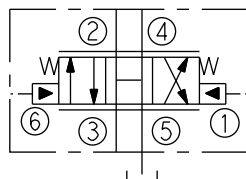
Cavity: VC42-S6; See page 9.142.1

Cavity Tool: CT42-S6X; See page 8.600.1

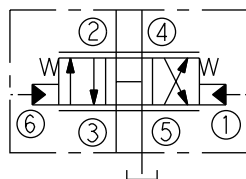
Seal Kit: SK42-S6X-BMMMM; See page 8.650.1

SYMBOLS

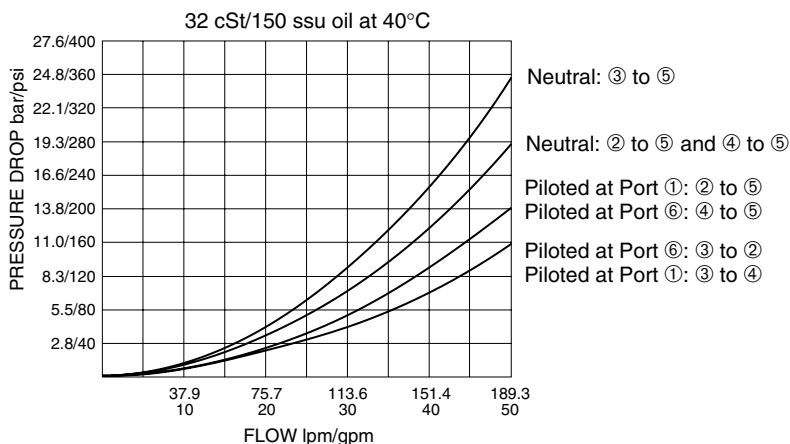
USASI:



ISO:

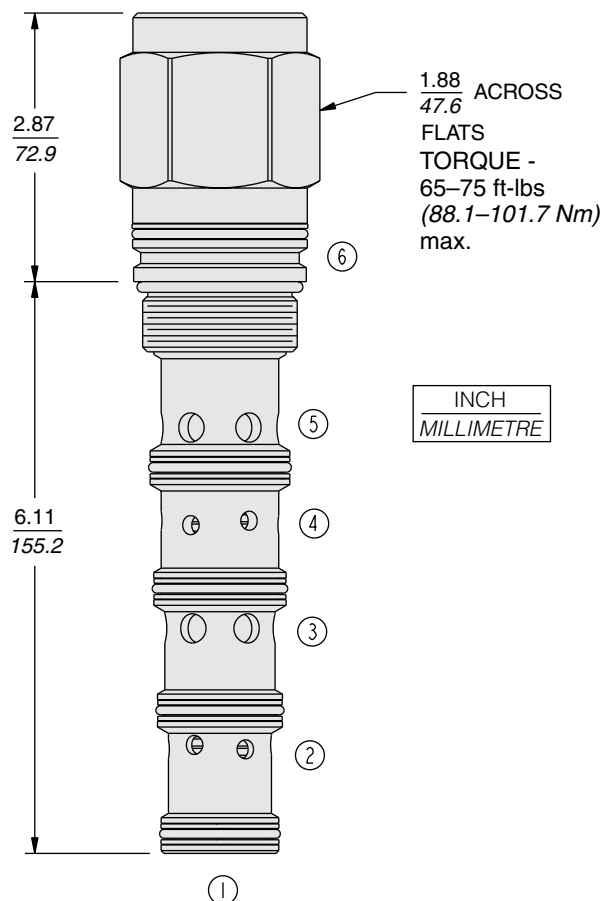


PERFORMANCE (Cartridge Only)



PD42-S67B

DIMENSIONS



MATERIALS

Cartridge: Weight: 1.6 kg. (3.5 lbs.);
Steel with hardened work surfaces.
Zinc-plated exposed surfaces.
Buna N O-rings and polyester elastomer back-ups standard.

Test Body: Consult Factory

TO ORDER

PD42-S67B - - -170[‡]

Porting
Cartridge Only 0

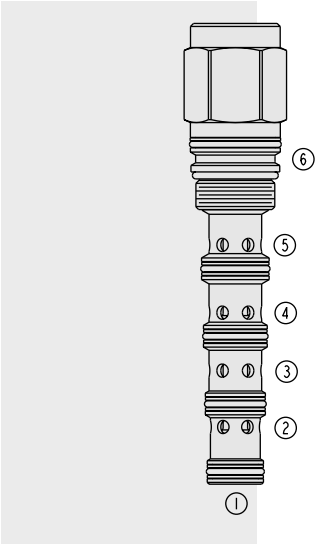
[‡]170 psi (11.7 bar) bias spring standard. Optional bias springs considered on OEM request.

Seals

- N** Buna N (Std.)
- P** Polyurethane (for pressures over 240 bar/3500 psi)
- V** Fluorocarbon

DIRECTIONAL VALVES

PD16-S67D Piloted 4-Way Spool-Type Valve



DESCRIPTION

A screw-in, cartridge-style, pilot-operated, spool-type, hydraulic directional valve.

OPERATION

When the PD16-S67D is in neutral position, flow is allowed between ports ②, ④ and ⑤. When the remote pilot signal at ① exceeds the force of the bias spring, the spool shifts to allow flow between ③ and ④, and between ② and ⑤. On remote pilot signal at ⑥, the spool shifts to allow flow between ③ and ②, and between ④ and ⑤.

FEATURES

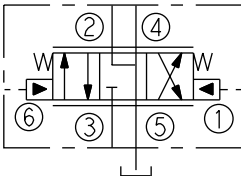
- Hardened spool and cage for long life.
- 110 and 170 psi bias springs available.

RATINGS

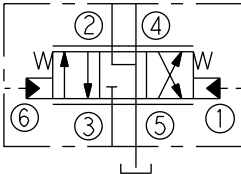
- Operating Pressure:** 240 bar (3500 psi)
Flow: 0–94.6 lpm (0–25 gpm); See Performance Chart
Maximum Internal Leakage: at 207 bar (3000 psi): 164 ml/minute (10 cu. in./minute)
Temperature: -40 to 120°C
Filtration: See page 9.010.1
Fluids: Mineral-based or synthetics with lubricating properties at viscosities of 7.4 to 420 cSt (50 to 2000 ssu)
Installation: No restrictions; See page 9.020.1
Cavity: VC16-S6; See page 9.116.1
Cavity Tool: CT16-S6XX; See page 8.600.1
Seal Kit: SK16-S6X-BMMMM; See page 8.650.1

SYMBOLS

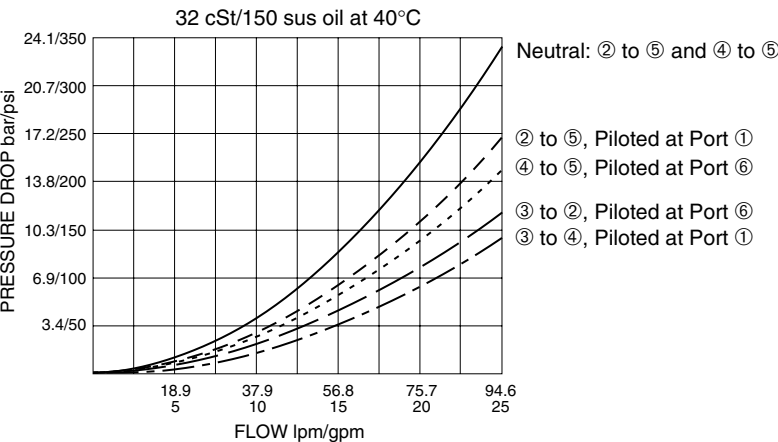
USASI:



ISO:

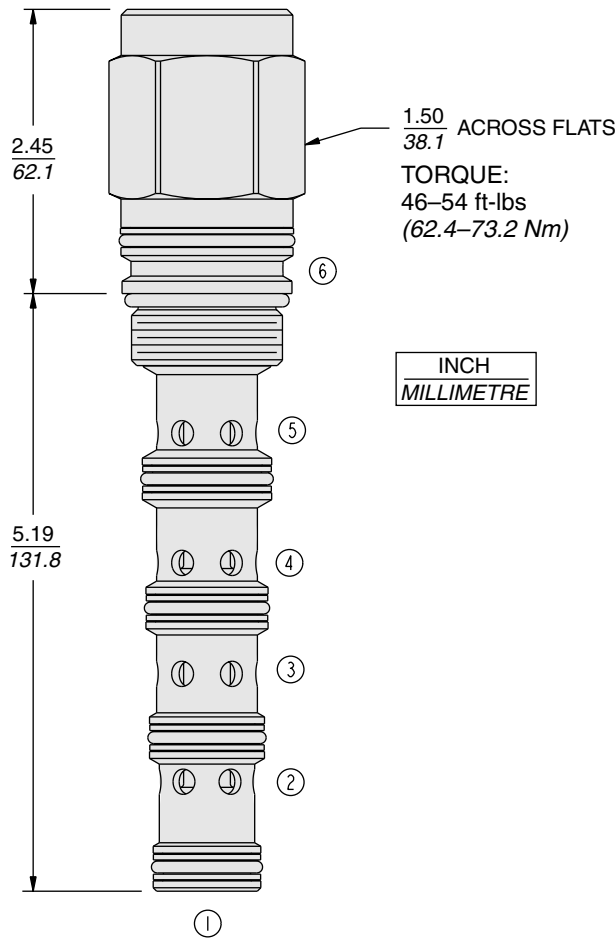


PERFORMANCE (Cartridge Only)



PD16-S67D

DIMENSIONS



MATERIALS

Cartridge: Weight: 0.85 kg. (1.88 lbs.);
Steel with hardened work surfaces.
Zinc-plated exposed surfaces. Buna
N O-rings and polyester elastomer
back-ups standard.

Ported Body: Consult factory.

TO ORDER

PD16-S67D -

Porting
Cartridge Only **0**

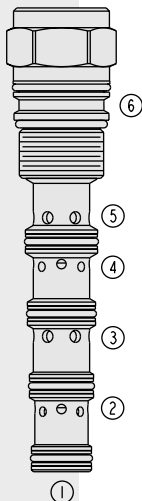
Bias Spring[†]
110 7.6 bar (110 psi)
170 11.7 bar (170 psi)
Optional bias springs considered
on OEM request.

Seals
N Buna N (Std.)
V Fluorocarbon

DIRECTIONAL VALVES

PE12-S67C Proportional, Pilot Operated

U.S. Patent
6,554,014



DESCRIPTION

A screw-in, cartridge-style, proportional, spring-centered, pilot-operated spool-type hydraulic directional valve.

OPERATION

When the PE12-S67C is in neutral position all ports are blocked. When the remote pilot signal at ① exceeds the force of the bias spring, the spool shifts proportionally to the applied pilot pressure to allow flow from ③ to ④ through a load such as a hydraulic cylinder or motor, and from ② to ⑤ and to tank. On remote pilot signal at ⑥, the valve's spool shifts proportionally to the applied pressure in the opposite direction, reversing the flow direction. **The valve's spool is symmetrical, providing meter-in and meter-out control.**

FEATURES

- Hardened spool and cage for long life.
- Excellent metering characteristics.
- Good linearity.

RATINGS

Maximum Operating Pressure: Ports ③ and ⑤: 345 bar (5000 psi)
Ports ② and ④: 240 bar (3500 psi)
Ports ① and ⑥: 27.6 bar (400 psi)

Flow: See Performance Chart

Internal Leakage: 50 ml/minute (3 cu. in./minute) at 207 bar (3000 psi)

Temperature: -40 to 120°C with standard Buna N seals

Filtration: See page 9.010.1

Fluids: Mineral-based or synthetics with lubricating properties at viscosities of 7.4 to 420 cSt (50 to 2000 ssu)

Installation: No restrictions; See page 9.020.1

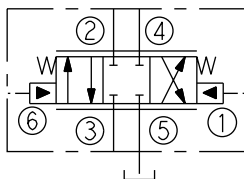
Cavity: VC12-S6; See page 9.112.1

Cavity Tool: CT12-S6; See page 8.600.1

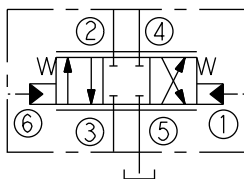
Seal Kit: SK12-6X-BMMMM; See page 8.650.1

SYMBOLS

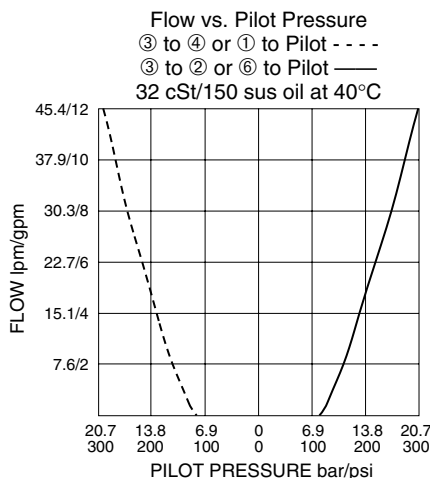
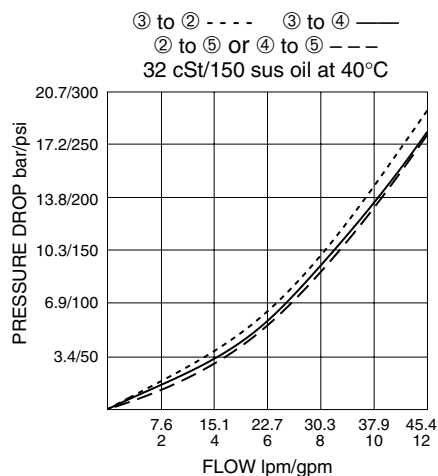
USASI:



ISO:



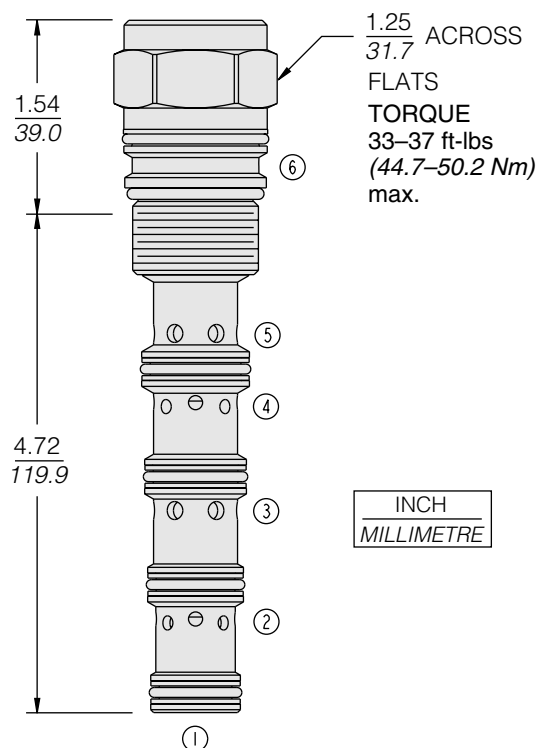
PERFORMANCE (Cartridge Only)



PE12-S67C

DIMENSIONS

U.S. Patent 6,554,014



MATERIALS

Cartridge: Weight: 0.45 kg. (0.98 lbs.);
Steel with hardened work surfaces.
Zinc-plated exposed surfaces.
Buna N O-rings and polyester
elastomer back-ups standard.

Ported Body: Test housing available;
see page 8.012.1.

TO ORDER

PE12-S67C - -

Porting
Cartridge Only 0

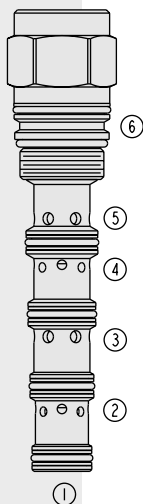
Seals

- N** Buna N (Std.)
- P** Polyurethane (for pressures over 240 bar/3500 psi)
- V** Fluorocarbon

DIRECTIONAL VALVES

PE16-S67C Proportional, Pilot Operated

U.S. Patent
6,554,014



DESCRIPTION

A screw-in, cartridge-style, proportional, spring-centered, pilot-operated spool-type hydraulic directional valve.

OPERATION

When the **PE16-S67C** is in neutral position all ports are blocked. When the remote pilot signal at ① exceeds the force of the bias spring, the spool shifts proportionally to the applied pilot pressure to allow flow from ③ to ④ through a load such as a hydraulic cylinder or motor, and from ② to ⑤ and to tank. When the pilot signal at ⑥ exceeds the force of the bias spring the spool shifts proportionally to the applied force to allow flow from ③ to ② and from ④ to ⑤. When the pilot signal is less than the force of the bias spring, the spool will return to the center position. **The valve's spool is symmetrical, providing meter-in and meter-out control.**

FEATURES

- Hardened spool and cage for long life.
- Cost-effective cavity.
- Excellent metering characteristics.
- Good linearity.

RATINGS

Maximum Operating Pressure: Port ③: 345 bar (5000 psi)
Ports ② and ④: 240 bar (3500 psi)
Ports ① and ⑥: 27.6 bar (400 psi)

Flow: See Performance Chart

Internal Leakage: 295 cc/minute (18 cu. in./minute) at 207 bar (3000 psi)

Temperature: -40 to 120°C with standard Buna N seals

Filtration: See page 9.010.1

Fluids: Mineral-based or synthetics with lubricating properties at viscosities of 7.4 to 420 cSt (50 to 2000 ssu)

Installation: No restrictions; See page 9.020.1

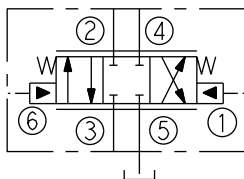
Cavity: VC16-S6; See page 9.116.1

Cavity Tool: CT16-S6; See page 8.600.1

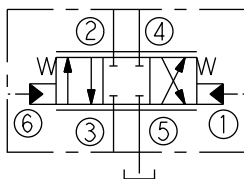
Seal Kit: SK16-S6P-BMMMM; See page 8.650.1

SYMBOLS

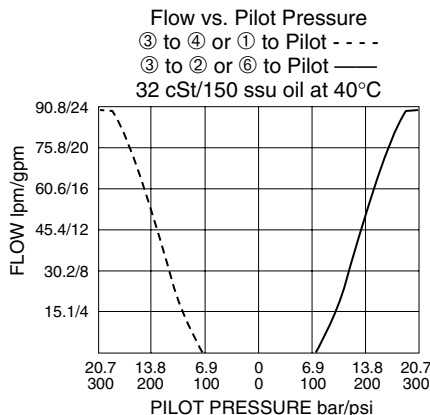
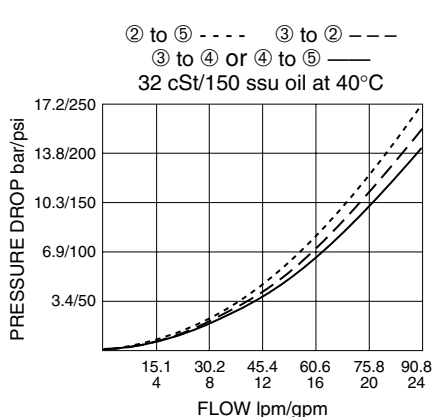
USASI:



ISO:



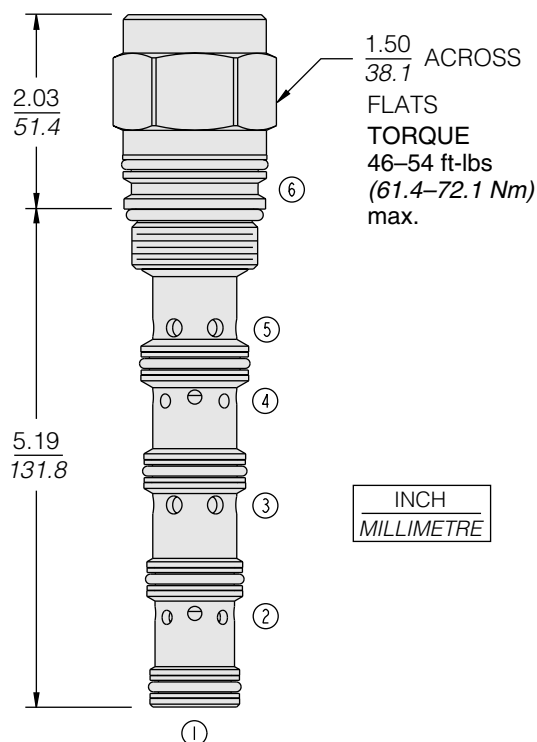
PERFORMANCE (Cartridge Only)



PE16-S67C

DIMENSIONS

U.S. Patent 6,554,014



MATERIALS

Cartridge: Weight: 0.76 kg. (1.68 lbs.);
Steel with hardened work surfaces.
Zinc-plated exposed surfaces.
Buna N O-rings and polyester
elastomer back-ups standard.

Test Body: Consult Factory

TO ORDER

PE16-S67C - -

Porting
Cartridge Only 0

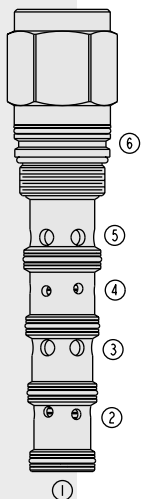
Seals

N Buna N (Std.)
P Polyurethane (for pressures over 240 bar/3500 psi)
V Fluorocarbon

DIRECTIONAL VALVES

PE42-S67C Proportional, Pilot Operated

U.S. Patent
6,554,014



DESCRIPTION

A screw-in, cartridge-style, proportional, spring-centered, pilot-operated spool-type hydraulic directional valve.

OPERATION

When the **PE42-S67C** is in neutral position all ports are blocked. When the remote pilot signal at ① exceeds the force of the bias spring, the spool shifts proportionally to the applied pilot pressure to allow flow from ③ to ④ through a load such as a hydraulic cylinder or motor, and from ② to ⑤ and to tank. When the pilot signal at ⑥ exceeds the force of the bias spring the spool shifts proportionally to the applied force to allow flow from ③ to ② and from ④ to ⑤. When the pilot signal is less than the force of the bias spring, the spool will return to the center position. **The valve's spool is symmetrical, providing meter-in and meter-out control.**

FEATURES

- Hardened spool and cage for long life.
- Cost-effective cavity.
- Excellent metering characteristics.
- Good linearity.

RATINGS

Maximum Operating Pressure: Port ③: 345 bar (5000 psi)

Ports ② and ④: 240 bar (3500 psi)

Ports ① and ⑥: 27.6 bar (400 psi)

Flow: 0–170 lpm (0–45 gpm); See Performance Chart

Internal Leakage: 590 cc/minute (36 cu. in./minute) at 207 bar (3000 psi)

Temperature: -40 to 120°C with Buna N seals

Filtration: See page 9.010.1

Fluids: Mineral-based or synthetics with lubricating properties at viscosities of 7.4 to 420 cSt (50 to 2000 ssu)

Installation: No restrictions; See page 9.020.1

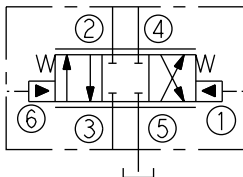
Cavity: VC42-S6; See page 9.142.1

Cavity Tool: CT42-S6; See page 8.600.1

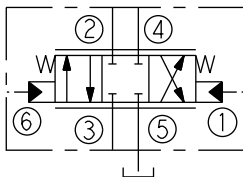
Seal Kit: SK42-S6X-BMMMM; See page 8.650.1

SYMBOLS

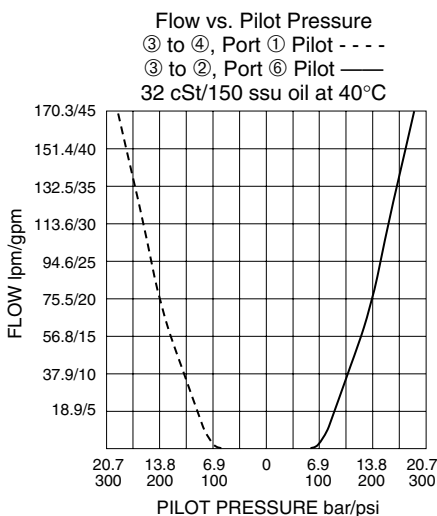
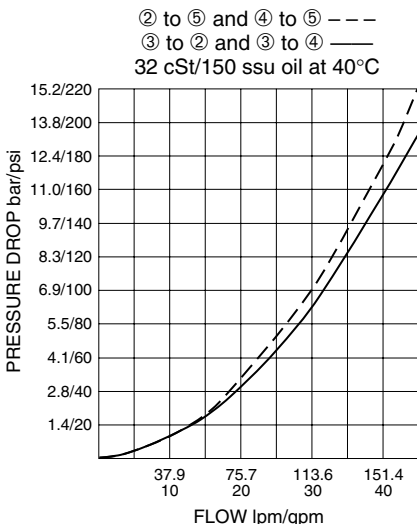
USASI:



ISO:



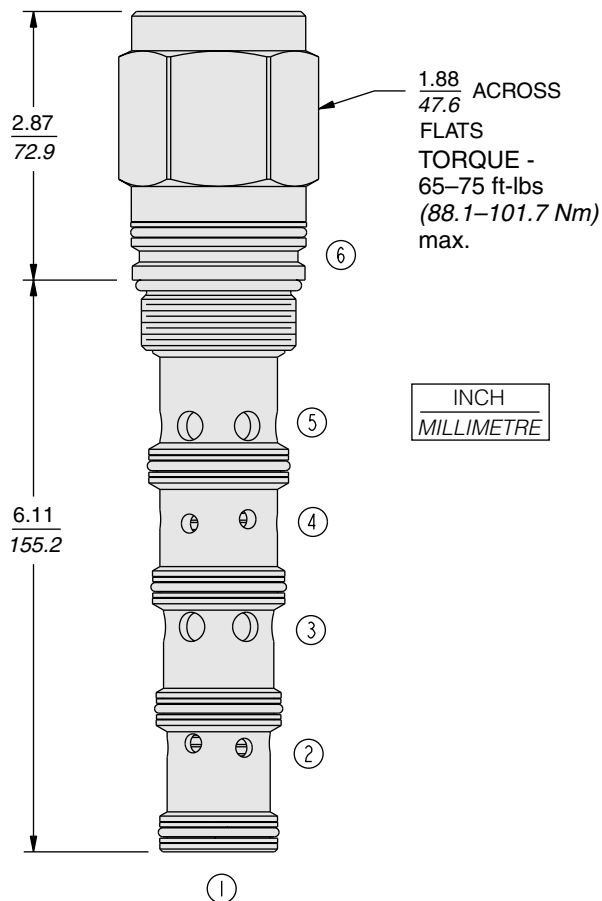
PERFORMANCE (Cartridge Only)



PE42-S67C

DIMENSIONS

U.S. Patent 6,554,014



MATERIALS

Cartridge: Weight: 0.76 kg. (1.68 lbs.);
Steel with hardened work surfaces.
Zinc-plated exposed surfaces.
Buna N O-rings and polyester
elastomer back-ups standard.

Test Body: Consult Factory

TO ORDER

PE42-S67C - -

Porting
Cartridge Only **0**

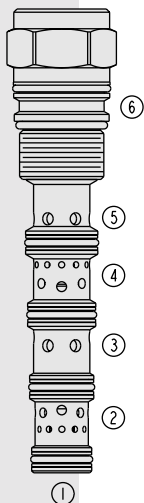
Seals

- N** Buna N (Std.)
- P** Polyurethane (for pressures over 240 bar/3500 psi)
- V** Fluorocarbon

DIRECTIONAL VALVES

PE12-S67D Proportional, Pilot Operated

U.S. Patent
6,554,014



DESCRIPTION

A screw-in, cartridge-style, proportional, spring-centered, pilot-operated spool-type hydraulic directional valve.

OPERATION

When the PE12-S67D is in neutral position, port ③ is blocked while ②, ④ and ⑤ are connected to each other. When the remote pilot signal at ① exceeds the force of the bias spring, the spool shifts proportionally to the applied pilot pressure to allow flow from ③ to ④ through a load such as a hydraulic cylinder or motor, and from ② to ⑤ and to tank. On remote pilot signal at ⑥, the valve's spool shifts proportionally to the applied pressure in the opposite direction, reversing the flow direction. **The valve's spool is symmetrical, providing meter-in and meter-out control.**

FEATURES

- Hardened parts for long life.
- Excellent metering characteristics.
- Good linearity.

RATINGS

Maximum Operating Pressure:

Ports ③ and ⑤: 345 bar (5000 psi), polyurethane seals are recommended.

Ports ② and ④: 240 bar (3500 psi)

Ports ① and ⑥: 27.6 bar (400 psi)

Flow: See Performance Chart

Internal Leakage: 36 ml/minute (2.2 cu. in./minute) at 207 bar (3000 psi)

Temperature: -40 to 120°C with standard Buna N seals

Filtration: See page 9.010.1

Fluids: Mineral-based or synthetics with lubricating properties at viscosities of 7.4 to 420 cSt (50 to 2000 sus)

Installation: No restrictions; See page 9.020.1

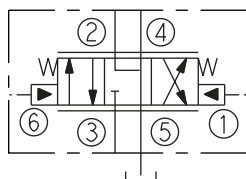
Cavity: VC12-S6; See page 9.112.1

Cavity Tool: CT12-S6; See page 8.600.1

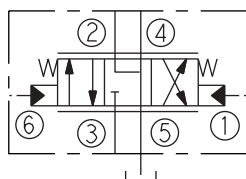
Seal Kit: SK12-6X-BMMMM; See page 8.650.1

SYMBOLS

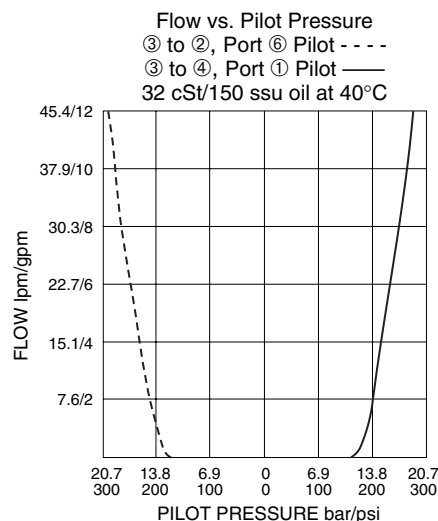
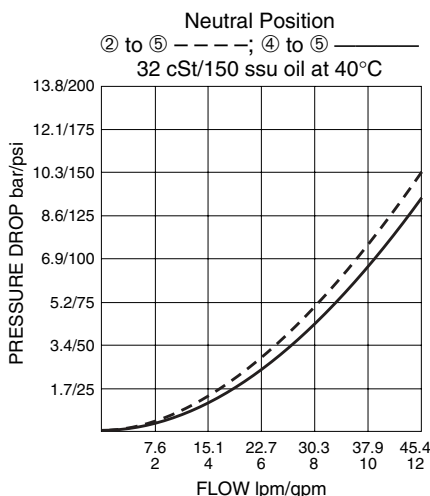
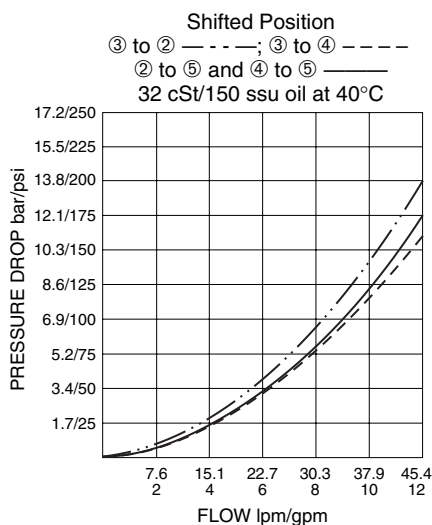
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ISO:

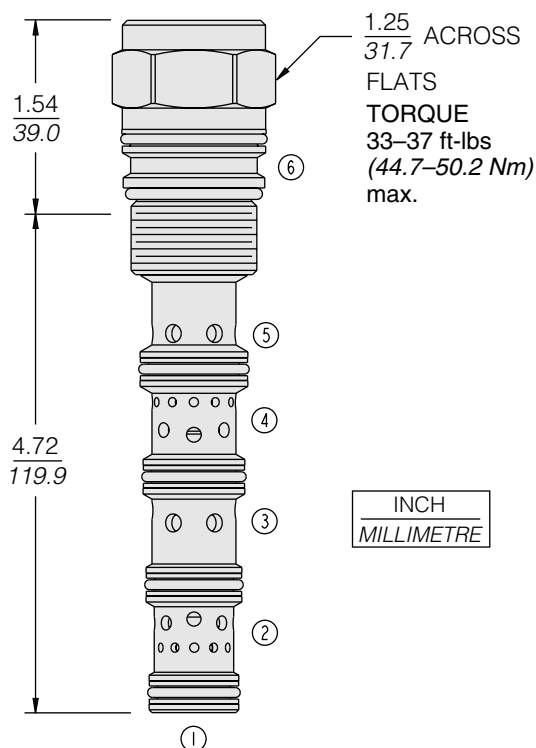


PERFORMANCE (Cartridge Only)



DIMENSIONS

U.S. Patent 6,554,014



MATERIALS

Cartridge: Weight: 0.45 kg. (0.98 lbs.);
Steel with hardened work surfaces.
Zinc-plated exposed surfaces.
Buna N O-rings and polyester
elastomer back-ups standard.

Ported Body: Test housing available;
see page 8.012.1.

TO ORDER

PE12-S67D - -

Porting
Cartridge Only 0

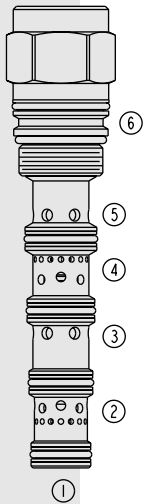
Seals

- N** Buna N (Std.)
- P** Polyurethane (for pressures over 240 bar/3500 psi)
- V** Fluorocarbon

DIRECTIONAL VALVES

PE16-S67D Proportional, Pilot Operated

U.S. Patent
6,554,014



DESCRIPTION

A screw-in, cartridge-style, proportional, spring-centered, pilot-operated spool-type hydraulic directional valve.

OPERATION

When the **PE16-S67D** is in neutral position, inlet port ③ is blocked while ports ②, ④ and ⑤ are connected to each other. With remote pilot signal at port ①, the valve's spool shifts proportionally to the applied pilot pressure to allow flow from ③ to ④ through a load such as a hydraulic cylinder or motor, and then from ② to ⑤ and to tank. On remote pilot signal at ⑥, the spool shifts proportionally to the applied pressure in the opposite direction, reversing the flow direction. **The spool is symmetrical, providing both meter-in and meter-out control.**

FEATURES

- Hardened spool and cage for long life.
- Cost-effective cavity.
- Excellent metering characteristics.
- Good linearity.

RATINGS

Maximum Operating Pressure: Port ③: 345 bar (5000 psi)

Ports ② and ④: 240 bar (3500 psi)

Ports ① and ⑥: 27.6 bar (400 psi)

Flow: See Performance Chart

Internal Leakage: 197 ml/minute (12 cu. in./minute) at 207 bar (3000 psi) maximum

Temperature: -40 to 120°C with Buna N seals

Filtration: See page 9.010.1

Fluids: Mineral-based or synthetics with lubricating properties at viscosities of 7.4 to 420 cSt (50 to 2000 ssu)

Installation: No restrictions; See page 9.020.1

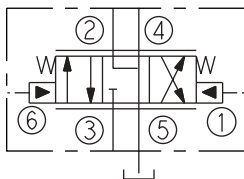
Cavity: VC16-S6; See page 9.116.1

Cavity Tool: CT16-S6; See page 8.600.1

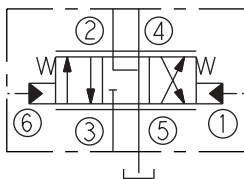
Seal Kit: SK16-S6X-BMMMM; See page 8.650.1

SYMBOLS

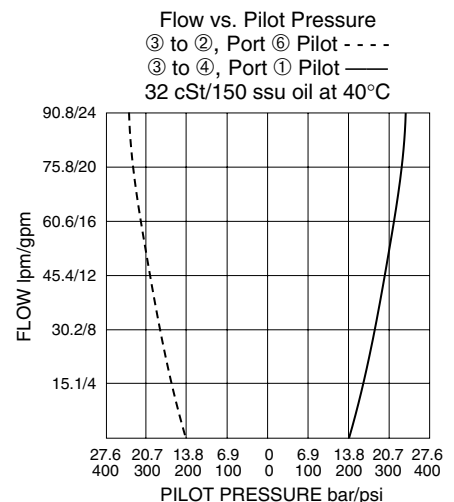
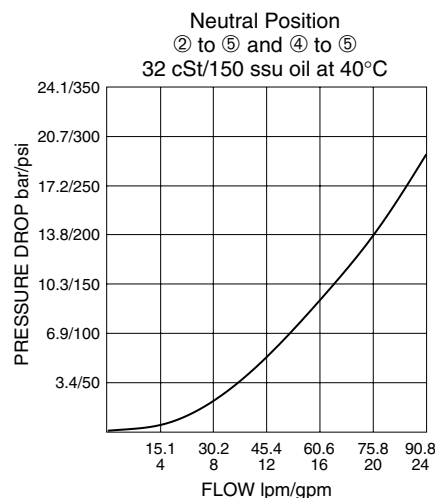
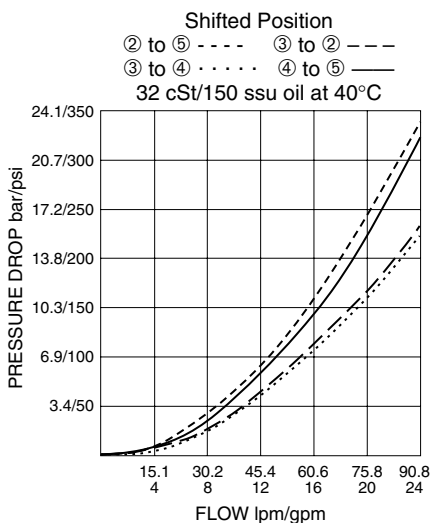
USASI:



ISO:



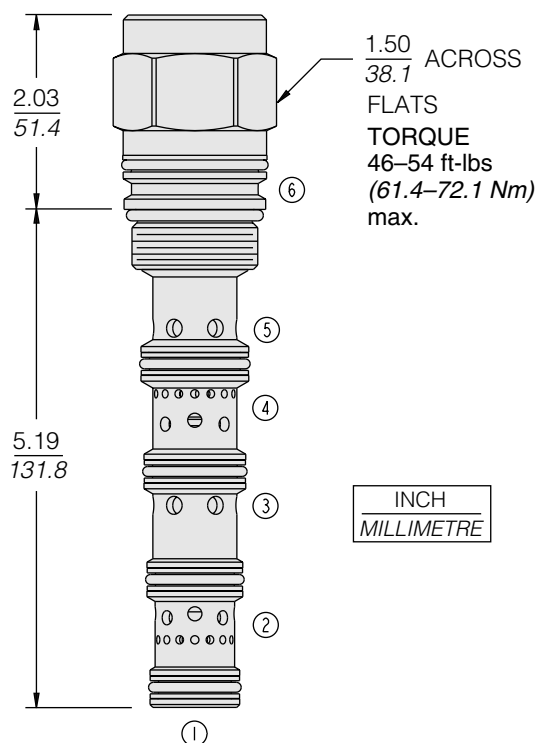
PERFORMANCE (Cartridge Only)



PE16-S67D

DIMENSIONS

U.S. Patent 6,554,014



MATERIALS

Cartridge: Weight: 0.76 kg. (1.68 lbs.);
Steel with hardened work surfaces.
Zinc-plated exposed surfaces.
Buna N O-rings and polyester
elastomer back-ups standard.

Test Body: Consult Factory

TO ORDER

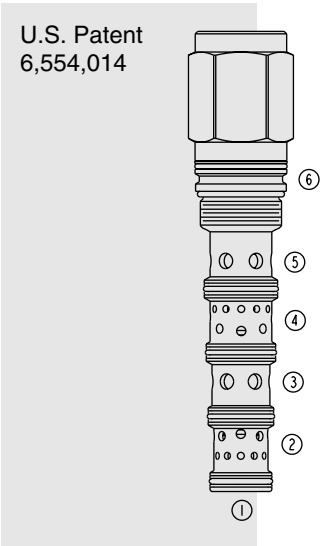
PE16-S67D - -
Porting
Cartridge Only **0**

Seals

- N** Buna N (Std.)
- P** Polyurethane (for pressures over 240 bar/3500 psi)
- V** Fluorocarbon

DIRECTIONAL VALVES

PE42-S67D Proportional, Pilot Operated



DESCRIPTION

A screw-in, cartridge-style, proportional, spring-centered, pilot-operated spool-type hydraulic directional valve.

OPERATION

When the PE42-S67D is in neutral position port ③ is blocked and ports ②, ④ and ⑤ are connected to each other. When the remote pilot signal at ① exceeds the force of the bias spring the spool shifts proportionally to the applied pilot pressure to allow flow from ③ to ④ and from ② to ⑤, and to tank. On remote pilot signal at ⑥, the spool shifts proportionally to the applied force in the opposite direction, thus reversing the flow direction. **The spool is symmetrical and provides meter-in and meter-out control.**

FEATURES

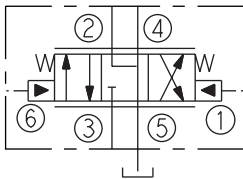
- Hardened spool and cage for long life.
- Excellent metering characteristics.
- Good linearity.

RATINGS

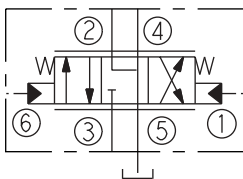
Maximum Operating Pressure: Port ③: 345 bar (5000 psi)
Ports ② and ④: 240 bar (3500 psi)
Ports ① and ⑥: 27.6 bar (400 psi)

SYMBOLS

USASI:



ISO:



Flow: See Performance Chart

Internal Leakage: 737 ml/minute (45 cu. in./minute) at 207 bar (3000 psi)

Temperature: -40 to 120°C with standard Buna N seals

Filtration: See page 9.010.1

Fluids: Mineral-based or synthetics with lubricating properties at viscosities of 7.4 to 420 cSt (50 to 2000 ssu)

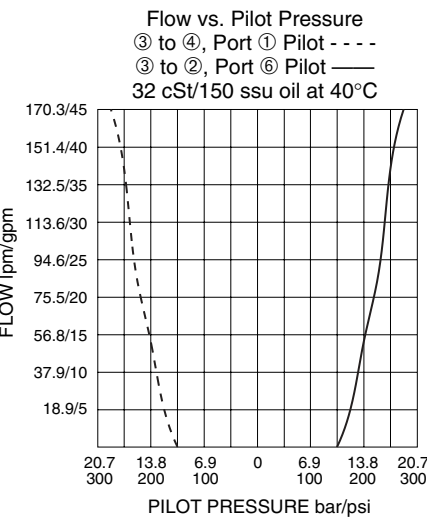
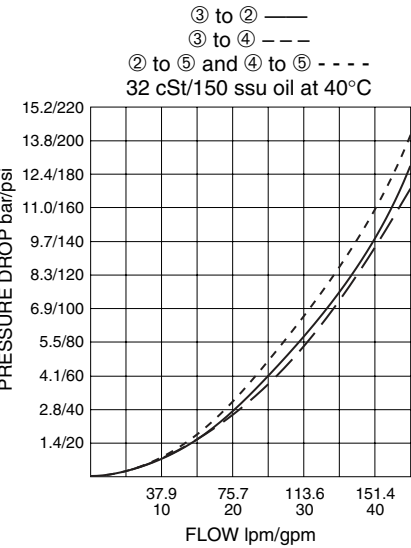
Installation: No restrictions; See page 9.020.1

Cavity: VC42-S6; See page 9.142.1

Cavity Tool: CT42-S6; See page 8.600.1

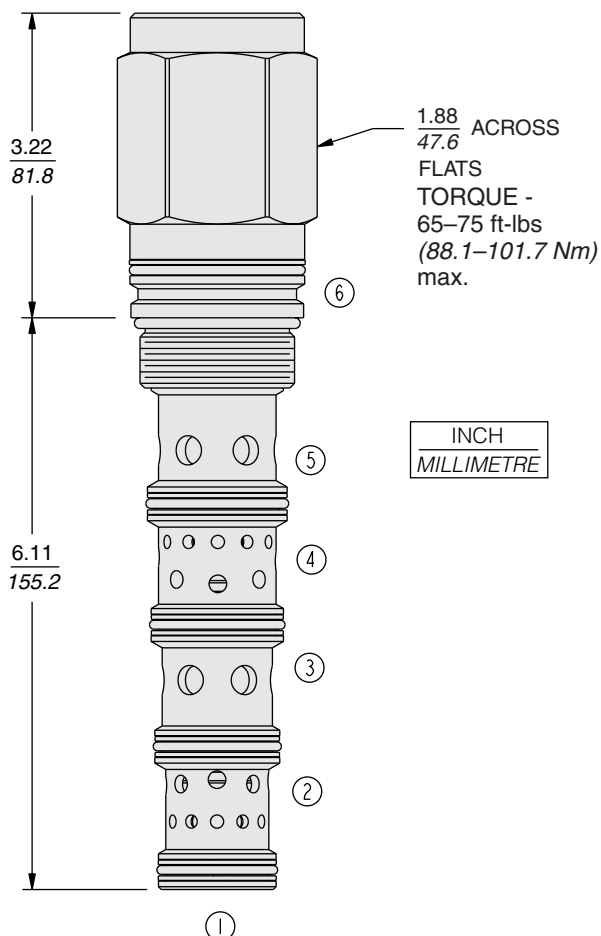
Seal Kit: SK42-S6X-BMMMM; See page 8.650.1

PERFORMANCE (Cartridge Only)



DIMENSIONS

U.S. Patent 6,554,014



MATERIALS

Cartridge: Weight: 0.76 kg. (1.68 lbs.);
Steel with hardened work surfaces.
Zinc-plated exposed surfaces.
Buna N O-rings and polyester elastomer back-ups standard.

Ported Body: Test housing available;
see page 8.042.1

TO ORDER

PE42-S67D - -

Porting
Cartridge Only **0**

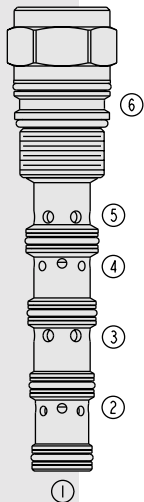
Seals

- N** Buna N (Std.)
- P** Polyurethane (for pressures over 240 bar/3500 psi)
- V** Fluorocarbon

DIRECTIONAL VALVES

PE12-S67H Proportional, Pilot Operated

U.S. Patent
6,554,014



DESCRIPTION

A screw-in, cartridge-style, proportional, spring-centered, pilot-operated spool-type hydraulic directional valve.

OPERATION

When the PE12-S67H is in neutral position port ③ is blocked and ports ②, ④ and ⑤ are in communication with each other. When the remote pilot signal at ① exceeds the force of the bias spring, the spool shifts proportionally to the applied pilot pressure to allow flow from ③ to ④, through a load such as a hydraulic cylinder or motor, and from ② to ⑤ and to tank. On remote pilot signal at ⑥, the spool shifts proportionally to the applied pressure in the opposite direction, thus reversing the flow direction. **The valve's spool is symmetrical, providing meter-in and meter-out control.**

FEATURES

- Hardened spool and cage for long life.
- Excellent metering characteristics.
- Good linearity.

RATINGS

Maximum Operating Pressure: Ports ③ and ⑤: 345 bar (5000 psi)
Ports ② and ④: 240 bar (3500 psi)
Ports ① and ⑥: 27.6 bar (400 psi)

Orifice Diameter: Between ports ② and ④ and port ⑤ in neutral position: 0.030 in.

Flow: See Performance Chart

Internal Leakage: 100 ml/minute (6 cu. in./minute) at 207 bar (3000 psi)

Temperature: -40 to 120°C with standard Buna N seals

Filtration: See page 9.010.1

Fluids: Mineral-based or synthetics with lubricating properties at viscosities of 7.4 to 420 cSt (50 to 2000 ssu)

Installation: No restrictions; See page 9.020.1

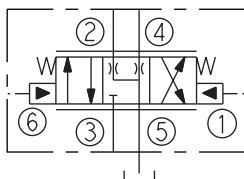
Cavity: VC12-S6; See page 9.112.1

Cavity Tool: CT12-S6; See page 8.600.1

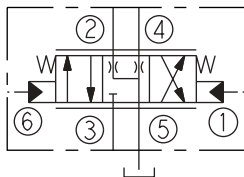
Seal Kit: SK12-6X-BMMMM; See page 8.650.1

SYMBOLS

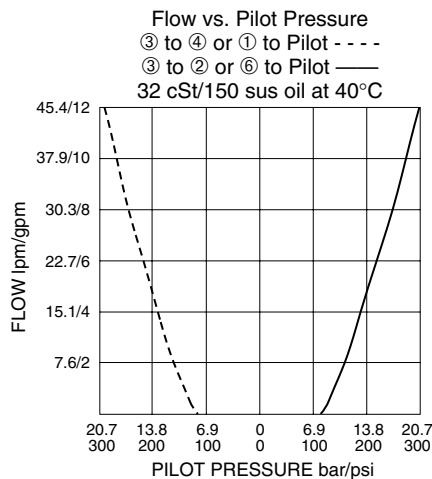
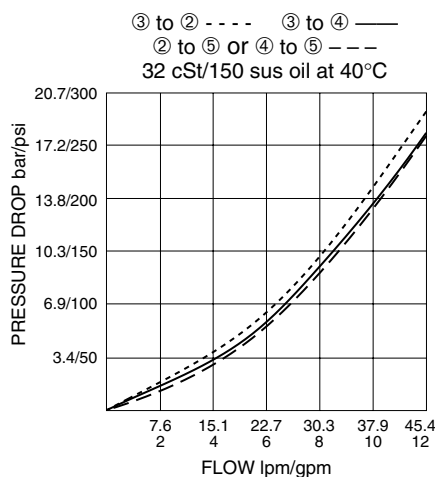
USASI:



ISO:



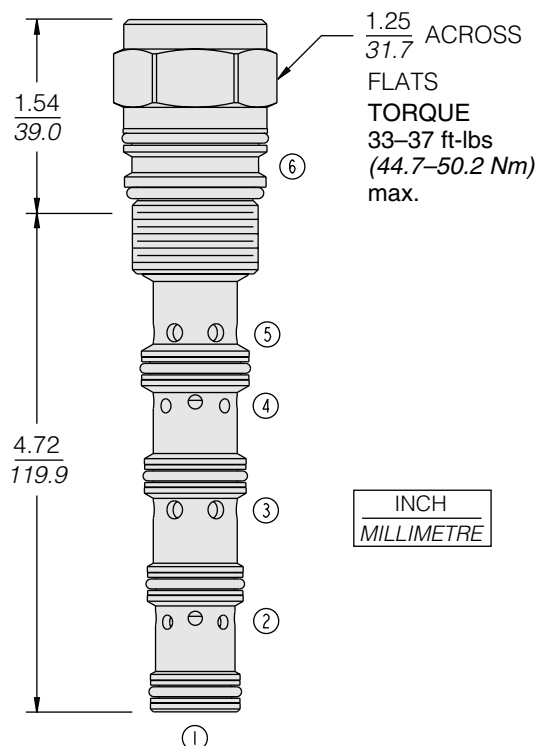
PERFORMANCE (Cartridge Only)



PE12-S67H

DIMENSIONS

U.S. Patent 6,554,014



MATERIALS

Cartridge: Weight: 0.98 kg. (0.45 lbs.);
Steel with hardened work surfaces.
Zinc-plated exposed surfaces.
Buna N O-rings and polyester
elastomer back-ups standard.

Ported Body: Test housing available;
see page 8.012.1.

TO ORDER

PE12-S67H - -

Porting
Cartridge Only **0**

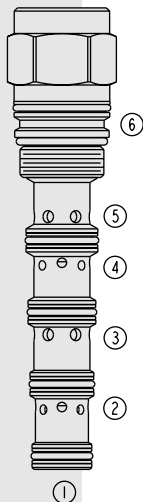
Seals

- N** Buna N (Std.)
- P** Polyurethane (for pressures over 240 bar/3500 psi)
- V** Fluorocarbon

DIRECTIONAL VALVES

PE16-S67H Proportional, Pilot Operated

U.S. Patent
6,554,014



DESCRIPTION

A screw-in, cartridge-style, proportional, spring-centered, pilot-operated spool-type hydraulic directional valve.

OPERATION

When the PE16-S67H is in neutral position port ③ is blocked and ports ②, ④ and ⑤ are in communication with each other. When the remote pilot signal at ① exceeds the force of the bias spring, the spool shifts proportionally to the applied pilot pressure to allow flow from ③ to ④, through a load such as a hydraulic cylinder or motor, and from ② to ⑤ and to tank. On remote pilot signal at ⑥, the spool shifts proportionally to the applied pressure in the opposite direction, thus reversing the flow direction. **The valve's spool is symmetrical, providing meter-in and meter-out control.**

FEATURES

- Hardened spool and cage for long life.
- Cost-effective cavity.
- Excellent metering characteristics.
- Good linearity.

RATINGS

Maximum Operating Pressure: Port ③: 345 bar (5000 psi)

Ports ② and ④: 240 bar (3500 psi)

Ports ① and ⑥: 27.6 bar (400 psi)

Orifice Diameter: Between ports ② and ④ and port ⑤ in neutral position: 0.030 in.

Flow: See Performance Chart

Internal Leakage: 590 ml/minute (36 cu. in./minute) at 207 bar (3000 psi)

Temperature: -40 to 120°C with standard Buna N seals

Filtration: See page 9.010.1

Fluids: Mineral-based or synthetics with lubricating properties at viscosities of 7.4 to 420 cSt (50 to 2000 ssu)

Installation: No restrictions; See page 9.020.1

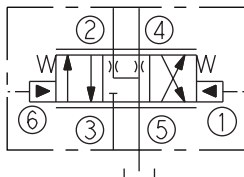
Cavity: VC16-S6; See page 9.116.1

Cavity Tool: CT16-S6; See page 8.600.1

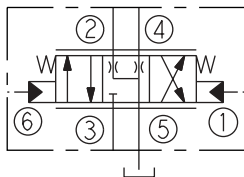
Seal Kit: SK16-S6P-BMMMM; See page 8.650.1

SYMBOLS

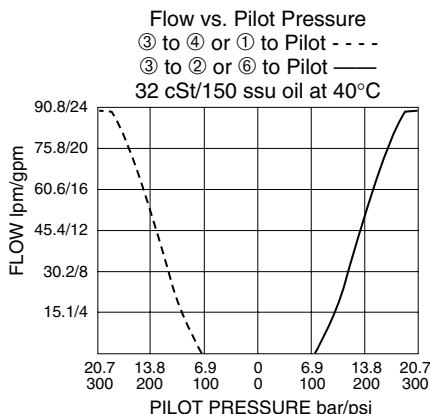
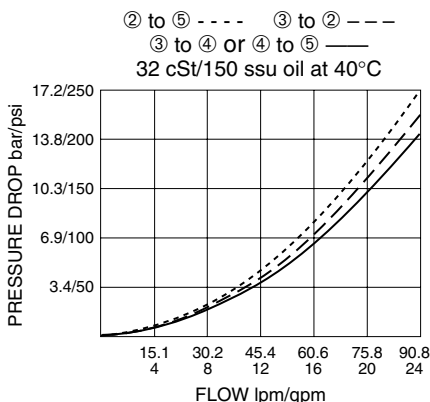
USASI:



ISO:



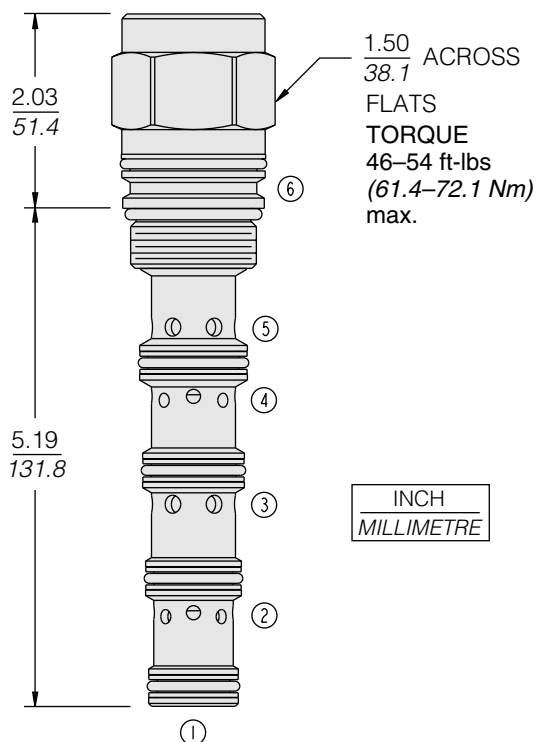
PERFORMANCE (Cartridge Only)



PE16-S67H

DIMENSIONS

U.S. Patent 6,554,014



MATERIALS

Cartridge: Weight: 0.76 kg. (1.68 lbs.);
Steel with hardened work surfaces.
Zinc-plated exposed surfaces.
Buna N O-rings and polyester
elastomer back-ups standard.

Test Body: Consult Factory

TO ORDER

PE16-S67H - -
Porting
Cartridge Only **0**

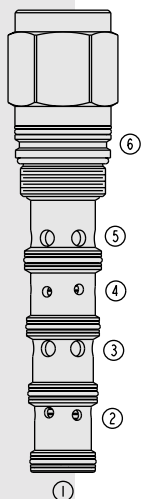
Seals

- N** Buna N (Std.)
- P** Polyurethane (for pressures over 240 bar/3500 psi)
- V** Fluorocarbon

DIRECTIONAL VALVES

PE42-S67H Proportional, Pilot Operated

U.S. Patent
6,554,014



DESCRIPTION

A screw-in, cartridge-style, proportional, spring-centered, pilot-operated spool-type hydraulic directional valve with neutral position bleed-to-tank.

OPERATION

When the **PE42-S67H** is in neutral position port ③ is blocked and ports ② and ④ are connected to ⑤. When the remote pilot signal at ① exceeds the force of the bias spring the spool shifts proportionally to the applied pilot pressure to allow flow from ③ to ④ through a load such as a hydraulic cylinder or motor, and then from ② to ⑤, and to tank. When the pilot signal at ⑥ exceeds the force of the bias spring the spool shifts proportionally to the applied force to allow flow from ③ to ② and from ④ to ⑤. When the pilot signal is less than the force of the bias spring the spool will return to the center position. **The spool is symmetrical and provides meter-in and meter-out control.**

FEATURES

- Hardened spool and cage for long life.
- Cost-effective cavity.
- Excellent metering characteristics.
- Good linearity.

RATINGS

Maximum Operating Pressure: Port ③: 345 bar (5000 psi)

Ports ② and ④: 240 bar (3500 psi)

Ports ① and ⑥: 27.6 bar (400 psi)

Orifice Diameter: Between ports ② and ④ and port ⑤ in neutral position: 0.030 in.

Flow: 0–170 lpm (0–45 gpm); See Performance Chart

Internal Leakage: 1180 ml/minute (72 cu. in./minute) at 207 bar (3000 psi)

Temperature: -40 to 120°C with standard Buna N seals

Filtration: See page 9.010.1

Fluids: Mineral-based or synthetics with lubricating properties at viscosities of 7.4 to 420 cSt (50 to 2000 ssu)

Installation: No restrictions; See page 9.020.1

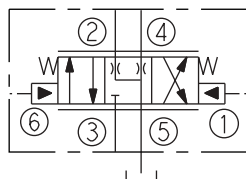
Cavity: VC42-S6; See page 9.142.1

Cavity Tool: CT42-S6; See page 8.600.1

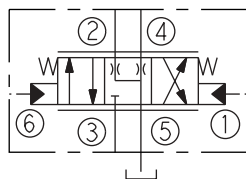
Seal Kit: SK42-S6X-BMMMM; See page 8.650.1

SYMBOLS

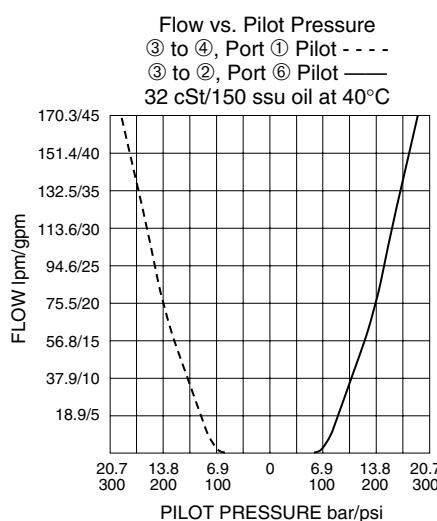
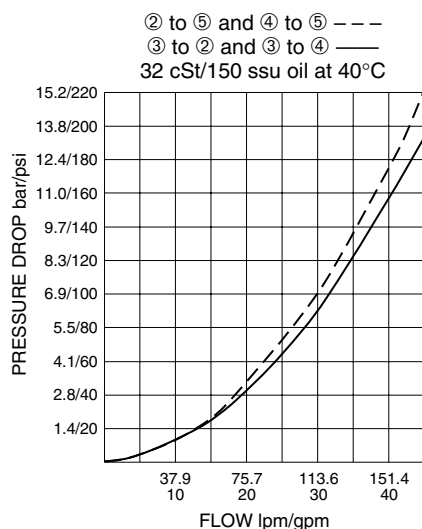
USASI:



ISO:



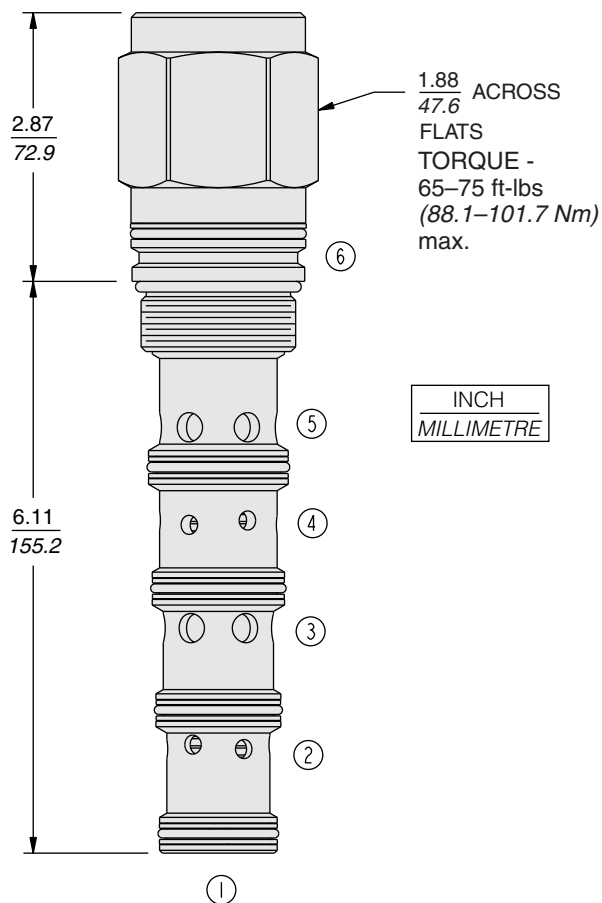
PERFORMANCE (Cartridge Only)



PE42-S67H

DIMENSIONS

U.S. Patent 6,554,014



MATERIALS

Cartridge: Weight: 0.76 kg. (1.68 lbs.);
Steel with hardened work surfaces.
Zinc-plated exposed surfaces.
Buna N O-rings and polyester
elastomer back-ups standard.

Test Body: Consult Factory

TO ORDER

PE42-S67H - -

Porting
Cartridge Only 0

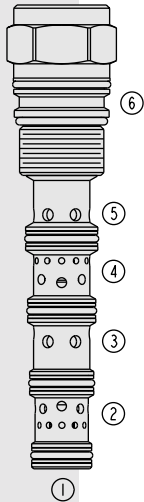
Seals

- N** Buna N (Std.)
- P** Polyurethane (for pressures over 240 bar/3500 psi)
- V** Fluorocarbon

DIRECTIONAL VALVES

PE12-S67K Proportional, Pilot Operated

U.S. Patent
6,554,014



DESCRIPTION

A screw-in, cartridge-style, proportional, spring-centered, pilot-operated spool-type hydraulic directional valve.

OPERATION

When the **PE12-S67K** is in the neutral position, port ③ is blocked while ②, ④ and ⑤ are connected to each other. When the remote pilot signal at ① exceeds the force of the bias spring, the spool shifts proportionally to the applied pilot pressure to allow flow from ③ to ④ through a load such as a hydraulic cylinder or motor, and from ② to ⑤ and to tank. On remote pilot signal at ⑥, the valve's spool shifts proportionally to the applied pressure in the opposite direction, reversing the flow direction.

The valve's spool is non-symmetrical, providing meter-in control.

FEATURES

- Hardened parts for long life.
- Excellent metering characteristics.
- Good linearity.

RATINGS

Maximum Operating Pressure:

Ports ③ and ⑤: 345 bar (5000 psi), polyurethane seals are recommended.

Ports ② and ④: 240 bar (3500 psi)

Ports ① and ⑥: 27.6 bar (400 psi)

Flow: See Performance Chart

Internal Leakage: 36 ml/minute (2.2 cu. in./minute) at 207 bar (3000 psi)

Temperature: -40 to 120°C with standard Buna N seals

Filtration: See page 9.010.1

Fluids: Mineral-based or synthetics with lubricating properties at viscosities of 7.4 to 420 cSt (50 to 2000 sus)

Installation: No restrictions; See page 9.020.1

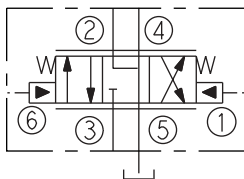
Cavity: VC12-S6; See page 9.112.1

Cavity Tool: CT12-S6; See page 8.600.1

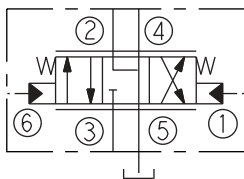
Seal Kit: SK12-6X-BMMMM; See page 8.650.1

SYMBOLS

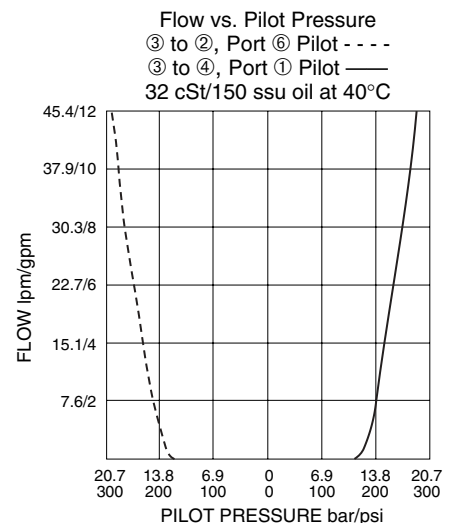
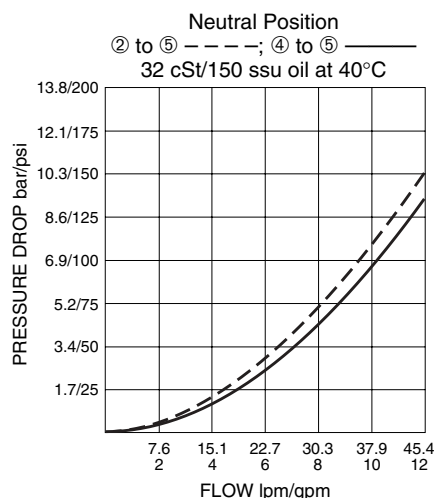
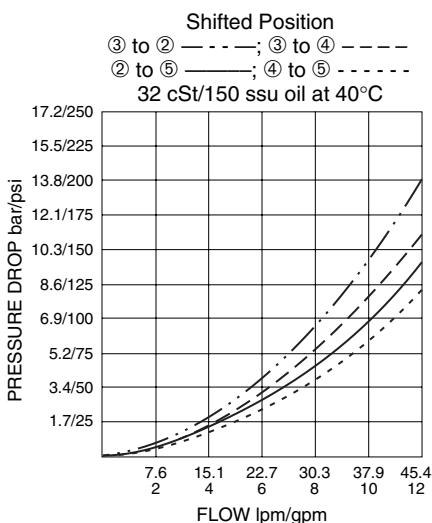
USASI:



ISO:

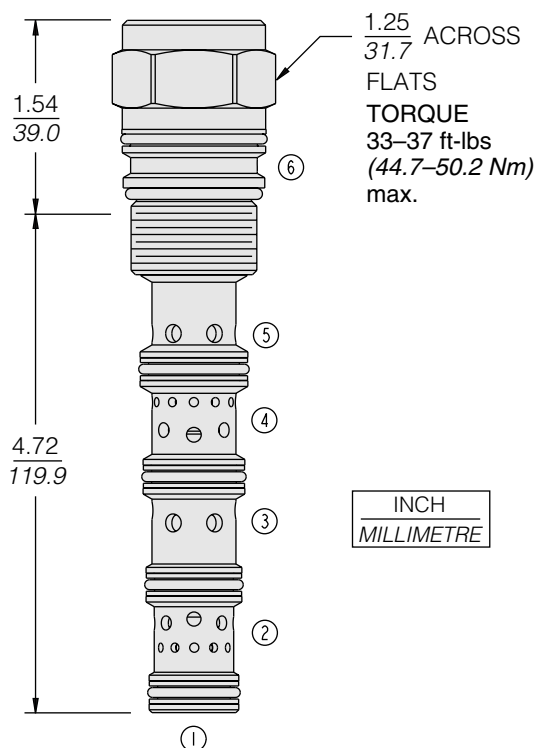


PERFORMANCE (Cartridge Only)



DIMENSIONS

U.S. Patent 6,554,014



MATERIALS

Cartridge: Weight: 0.45 kg. (0.98 lbs.);
Steel with hardened work surfaces.
Zinc-plated exposed surfaces.
Buna N O-rings and polyester
elastomer back-ups standard.

Ported Body: Test housing available;
see page 8.012.1.

TO ORDER

PE12-S67K - -

Porting
Cartridge Only **0**

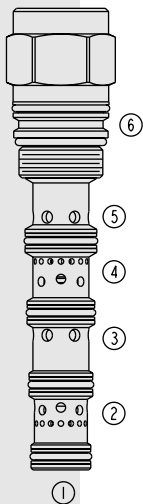
Seals

- N** Buna N (Std.)
- P** Polyurethane (for pressures over 240 bar/3500 psi)
- V** Fluorocarbon

DIRECTIONAL VALVES

PE16-S67K Proportional, Pilot Operated

U.S. Patent
6,554,014



DESCRIPTION

A screw-in, cartridge-style, proportional, spring-centered, pilot operated spool valve.

OPERATION

When the **PE16-S67K** is in neutral position, inlet port ③ is blocked while ports ②, ④ and ⑤ are connected to each other. With remote pilot signal at port ①, the valve's spool shifts proportionally to the applied pilot pressure to allow flow from ③ to ④ through a load such as a hydraulic cylinder or motor, and then from ② to ⑤ and to tank. Port ② is open during transition. On remote pilot signal at ⑥, the spool shifts proportionally to the applied pressure in the opposite direction, reversing the flow direction. Port ④ is open during transition. **The spool is non-symmetrical, providing only meter-in control.**

FEATURES

- Hardened spool and cage for long life.
- Cost-effective cavity.
- Excellent metering characteristics.
- Good linearity.

RATINGS

Maximum Operating Pressure: Port ③: 345 bar (5000 psi)
Ports ② and ④: 240 bar (3500 psi)
Ports ① and ⑥: 27.6 bar (400 psi)

Flow: See Performance Chart

Internal Leakage: 197 ml/minute (12 cu. in./minute) at 207 bar (3000 psi) maximum

Temperature: -40 to 120°C with Buna N seals

Filtration: See page 9.010.1

Fluids: Mineral-based or synthetics with lubricating properties at viscosities of 7.4 to 420 cSt (50 to 2000 ssu)

Installation: No restrictions; See page 9.020.1

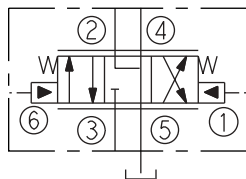
Cavity: VC16-S6; See page 9.116.1

Cavity Tool: CT16-S6; See page 8.600.1

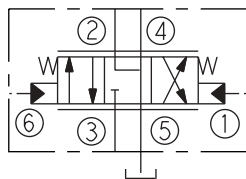
Seal Kit: SK16-S6X-BMMMM; See page 8.650.1

SYMBOLS

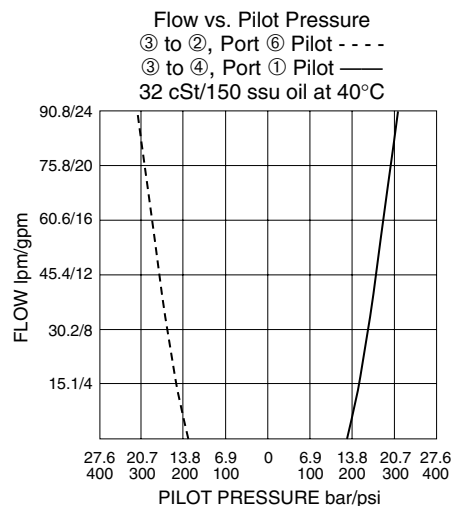
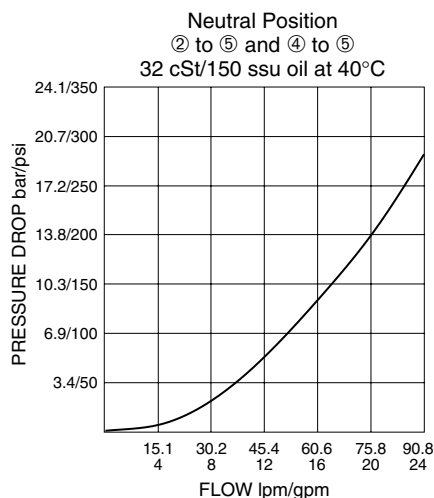
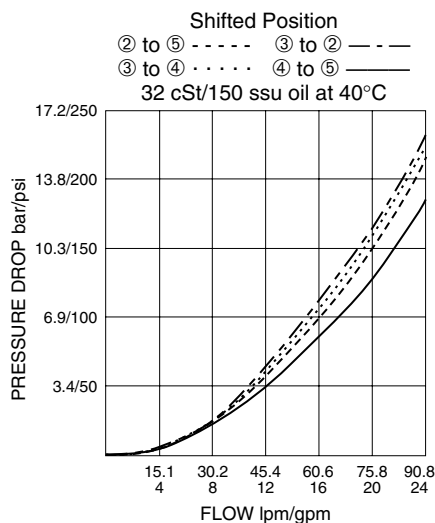
USASI:



ISO:

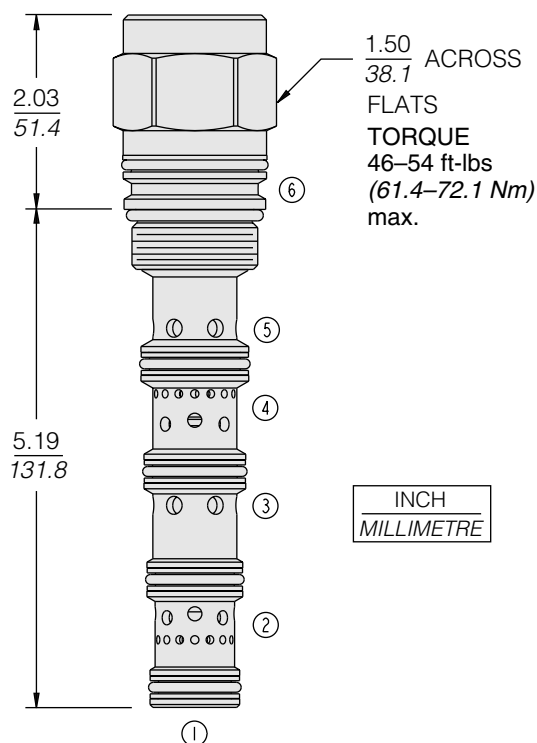


PERFORMANCE (Cartridge Only)



DIMENSIONS

U.S. Patent 6,554,014



MATERIALS

Cartridge: Weight: 0.76 kg. (1.68 lbs.);
Steel with hardened work surfaces.
Zinc-plated exposed surfaces.
Buna N O-rings and polyester
elastomer back-ups standard.

Test Body: Consult Factory

TO ORDER

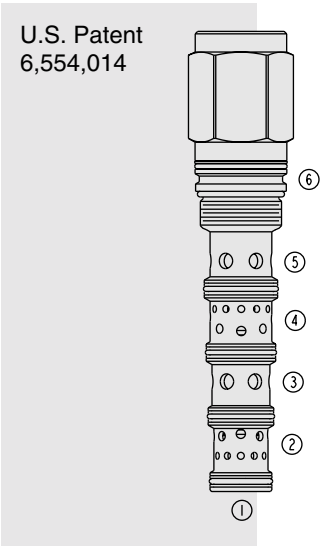
PE16-S67K - -
Porting
Cartridge Only **0**

Seals

- N** Buna N (Std.)
- P** Polyurethane (for pressures over 240 bar/3500 psi)
- V** Fluorocarbon

DIRECTIONAL VALVES

PE42-S67K Proportional, Pilot Operated



DESCRIPTION

A screw-in, cartridge-style, proportional, spring-centered, pilot-operated spool-type hydraulic directional valve.

OPERATION

When the PE42-S67K is in neutral position port ③ is blocked and ports ②, ④ and ⑤ are connected to each other. When the remote pilot signal at ① exceeds the force of the bias spring, the spool shifts proportionally to the applied pilot pressure to allow flow from ③ to ④ and from ② to ⑤, and to tank. On remote pilot signal at ⑥, the spool shifts proportionally to the applied force in the opposite direction, thus reversing the flow direction. **The spool is non-symmetrical, providing only meter-in control.**

FEATURES

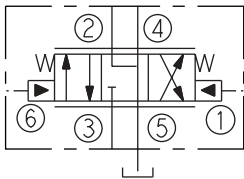
- Hardened spool and cage for long life.
- Excellent metering characteristics.
- Good linearity.

RATINGS

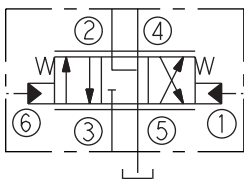
Maximum Operating Pressure: Port ③: 345 bar (5000 psi)
Ports ② and ④: 240 bar (3500 psi)
Ports ① and ⑥: 27.6 bar (400 psi)

SYMBOLS

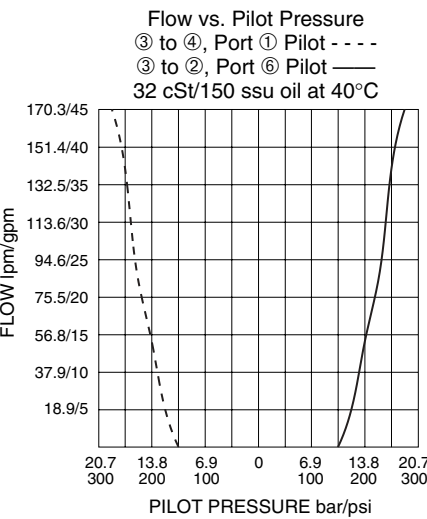
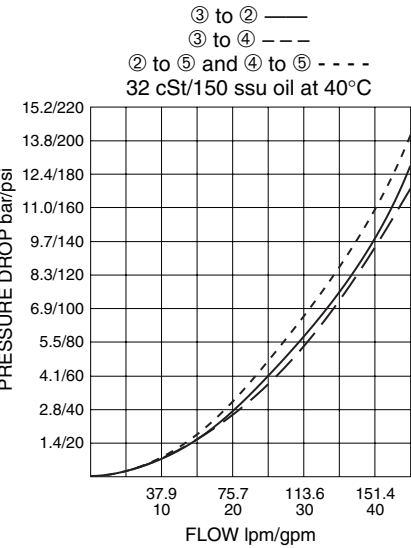
USASI:



ISO:

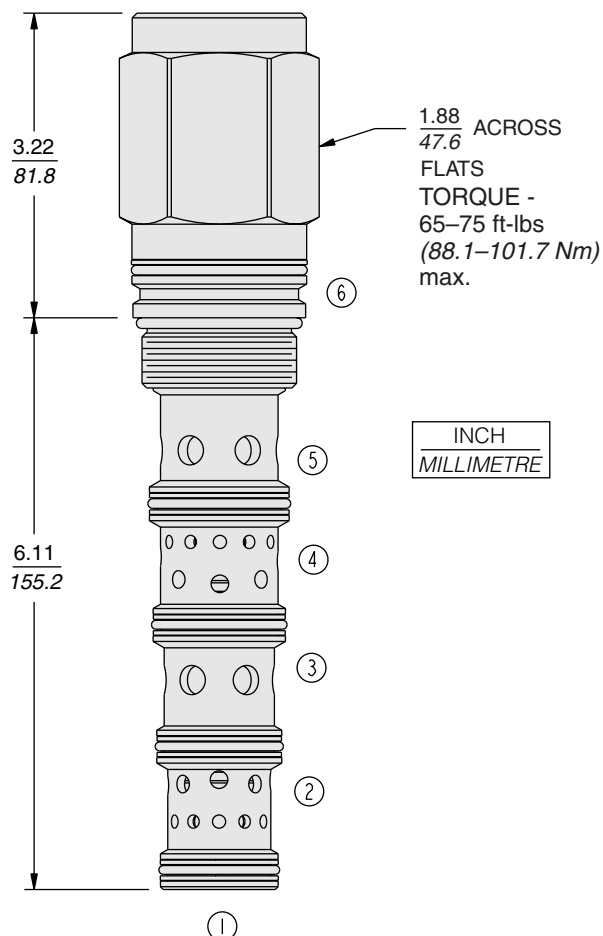


PERFORMANCE (Cartridge Only)



DIMENSIONS

U.S. Patent 6,554,014



MATERIALS

Cartridge: Weight: 0.76 kg. (1.68 lbs.);
Steel with hardened work surfaces.
Zinc-plated exposed surfaces.
Buna N O-rings and polyester elastomer back-ups standard.

Ported Body: Test housing available;
see page 8.042.1

TO ORDER

PE42-S67K - -

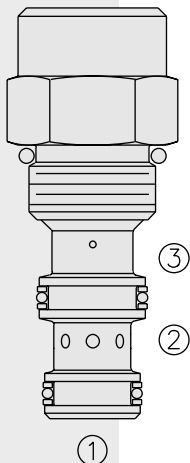
Porting
Cartridge Only 0

Seals

- N** Buna N (Std.)
- P** Polyurethane (for pressures over 240 bar/3500 psi)
- V** Fluorocarbon

DIRECTIONAL VALVES

EP08-35 Piloted Directional Element



DESCRIPTION

A spool-type, screw-in, cartridge-style, hydraulic directional element, with multi-function potential when used with other directional, pressure, or flow control devices.

OPERATION

The EP08-35 is a spring-biased blocking valve which will shift to allow full flow from ① to ② only when pressure at ① exceeds the cumulative pressure of ③, plus the bias spring pressure value.

EP08-35 is a pilot-to-close directional valve.

With no pressure at ③, flow will be allowed from ① to ② once the bias spring force is overcome with pressure at ①.

FEATURES

- Multiple function/application potential.
- Low pressure drop.
- Industry common cavity
- Compact size.

RATINGS

Maximum Operating Pressure: 345 bar (5000 psi) with steel or ductile housing;
240 bar (3500 psi) with aluminum housing

Flow Rate: See Performance Chart

Maximum Internal Leakage: 115 ml per minute (7 cu. in. per minute)
at 345 bar (5000 psi)

Bias Springs:

Code 10	0.7 bar (10 psi)
Code 40	2.8 bar (40 psi)
Code 80	5.5 bar (80 psi)
Code 110	7.6 bar (110 psi)
Code 150	10.3 bar (150 psi)

Temperature: -40 to 120°C with standard Buna N seals

Filtration: See page 9.010.1

Fluids: Mineral-based or synthetics with lubricating properties at viscosities of 7.4 to 420 cSt (50 to 2000 ssu)

Installation: No restrictions; See page 9.020.1

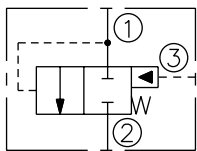
Cavity: VC08-3; See page 9.108.1

Cavity Tool: CT08-3XX; See page 8.600.1

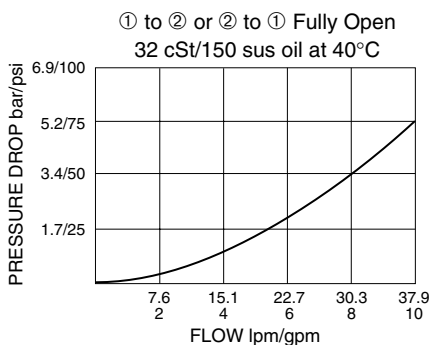
Seal Kit: SK08-3X-MM; See page 8.650.1

SYMBOLS

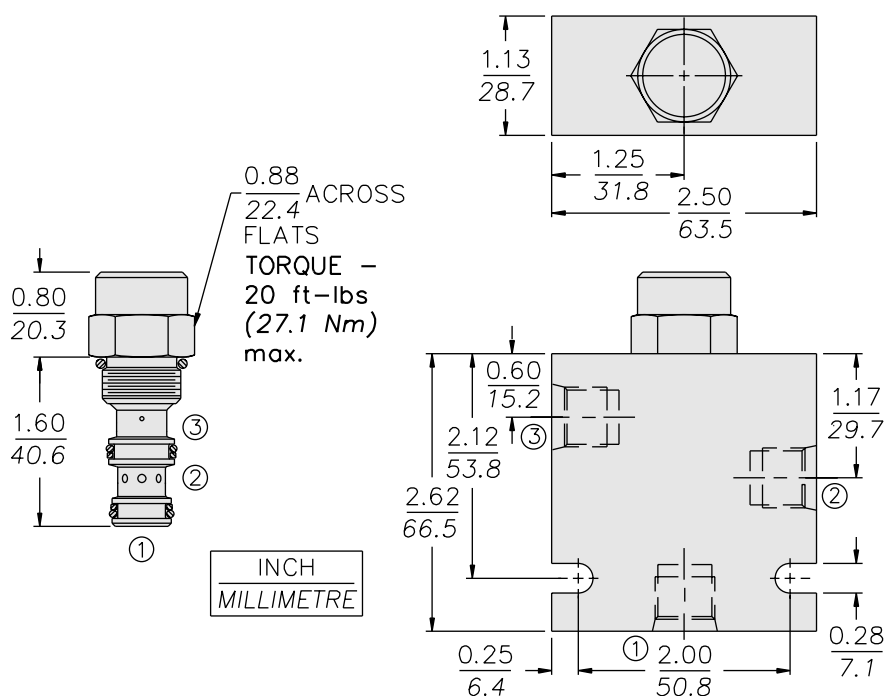
USAS/ISO:



PERFORMANCE (Cartridge Only)



DIMENSIONS



MATERIALS

Cartridge: Weight: 0.11 kg. (0.25 lbs.);
Steel with hardened work surfaces.
Zinc-plated exposed surfaces. Buna
N O-rings and back-ups standard.

Ported Body: Weight: 0.64 kg.
(1.4 lbs.), Steel, zinc-plated (code
"S"); or **Ductile Iron (code "D")**
standard, consult factory for weight,
dimensions may differ from
illustration; rated to 345 bar
(5000 psi); See page 8.008.1.

Ported Body: Weight: 0.36 kg.
(0.80 lbs.); Anodized high-strength
6061 T6 aluminum alloy, rated to
240 bar (3500 psi); See page
8.008.1.

TO ORDER

EP08-35 -

Porting

Cartridge Only **0**
SAE 6 (Ductile) **6TD**
SAE 6 (Steel) **6TS**
SAE 6 (Alum.) **6T**

Note: Aluminum body
rated for 240 bar
(3500 psi) max.

Bias Spring

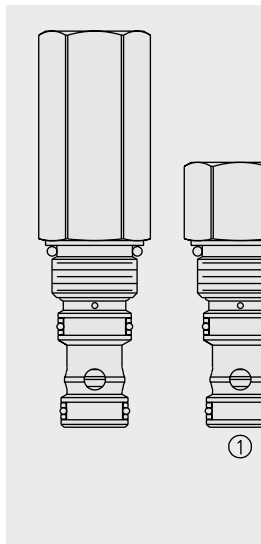
10 0.7 bar (10 psi)
40 2.8 bar (40 psi)
80 5.5 bar (80 psi)
110 7.6 bar (110 psi)
150 10.3 bar (150 psi)

Seals

Buna N (Std.) **N**
Fluorocarbon **V**
Polyurethane **P**

DIRECTIONAL VALVES

EP10-S35 Piloted Spool-Type Logic Element



DESCRIPTION

A spool-type, screw-in, cartridge-style, hydraulic directional element, with multi-function potential when used with other directional, pressure, or flow control devices.

OPERATION

The EP10-S35 is a spring-biased blocking valve which will shift to allow full flow from ① to ② only when pressure at ① exceeds the cumulative pressure of ③, plus the bias spring pressure value.

EP10-S35 is a pilot-to-close directional valve.

With no pressure at ③, flow will be allowed from ① to ② once the bias spring force is overcome with pressure at ①.

FEATURES

- Multiple function/application potential.
- Low pressure drop.
- Industry common cavity.

RATINGS

Operating Pressure: 350 bar (5000 psi) cartridge; 240 bar (3500 psi) standard aluminum housing; 350 bar (5000 psi) ductile iron and steel housings.

Flow: See Performance Chart

Internal Leakage: 164 cc/minute (10 cu. in./minute) max. at 207 bar (3000 psi)

Bias Spring Pressure Options:

- 0.7 bar (10 psi);
- 2.8 bar (40 psi);
- 5.5 bar (80 psi);
- 7.6 bar (110 psi)
- 11.0 bar (160 psi)

Note: Tall cap option required for 11.0 bar (160 psi) spring.

Temperature: -40 to 120°C with standard Buna seals

Filtration: See page 9.010.1

Fluids: Mineral-based or synthetics with lubricating properties at viscosities of 7.4 to 420 cSt (50 to 2000 ssu)

Installation: No restrictions; See page 9.020.1

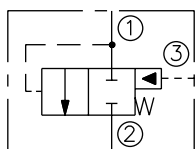
Cavity: VC10-S3; See page 9.110.1

Cavity Tool: CT10-S3XX; See page 8.600.1

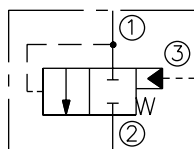
Seal Kit: SK10-3X-MM; See page 8.650.1

SYMBOLS

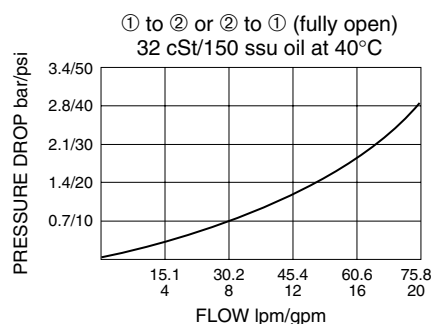
USASI:



ISO:

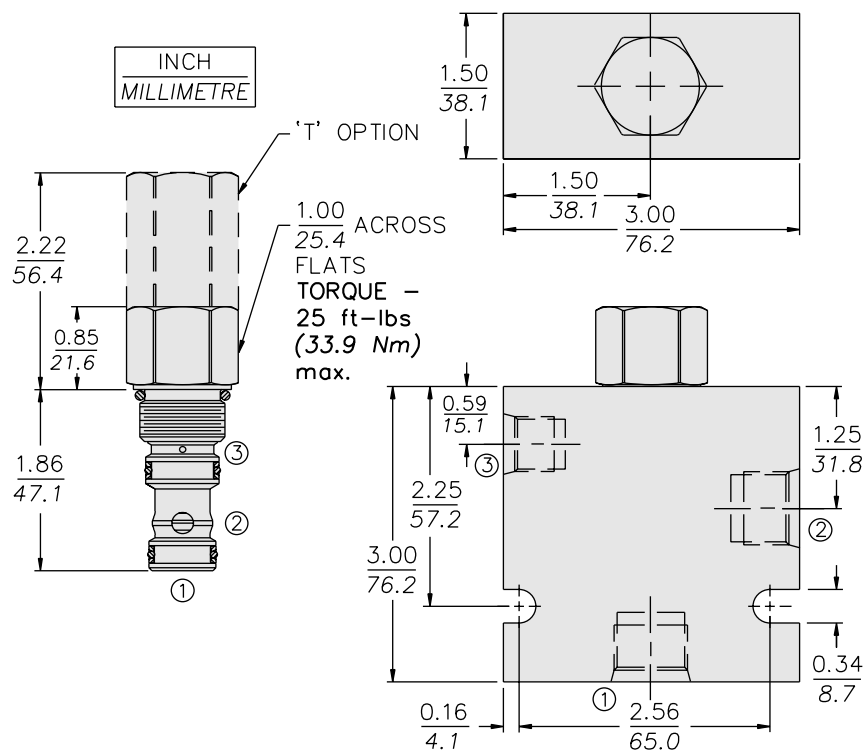


PERFORMANCE (Cartridge Only)

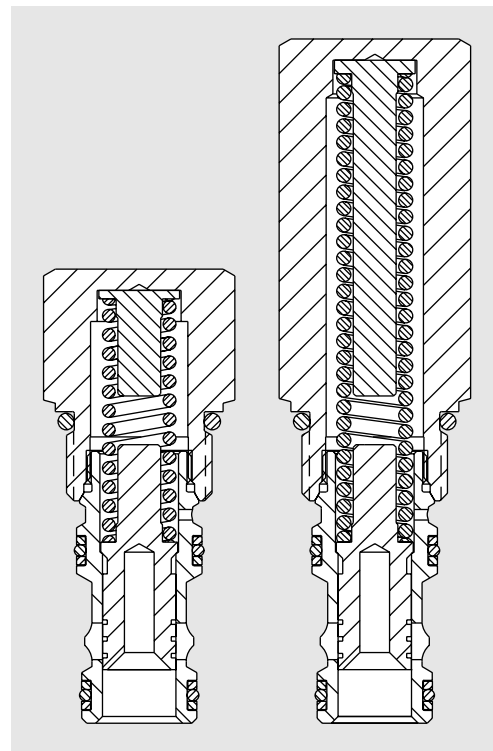


EP10-S35

DIMENSIONS



ORIFICE DISCS SHOULD NOT BE
USED WITH THIS PRODUCT.



MATERIALS

Cartridge: Weight: 0.15 kg. (0.32 lbs.);
Steel with hardened work surfaces.
Zinc-plated exposed surfaces. Buna
N O-rings and polyester elastomer
back-ups standard.

Standard Ported Body: Weight:
0.32 kg. (0.70 lbs.). Anodized high-
strength 6061 T6 aluminum alloy,
rated to 240 bar (3500 psi); see page
8.010.1. Ductile iron (8TD) and steel
(8TS) bodies are available for
pressures up to 350 bar (5000 psi);
Weight and dimensions may differ.
Consult factory.

TO ORDER

EP10-S35

Option
None (Blank)
Tall Cap **T**

Porting
Cartridge Only **0**
SAE 8* **8T**
SAE 8* **8TS**
SAE 8* **8TD**
SAE 10* **10T**
SAE 12* **12T**

*SAE 6 pilot port

Ductile iron (8TD) and
Steel (8TS) bodies are
available for pressures up
to 350 bar (5000 psi).

Bias Spring

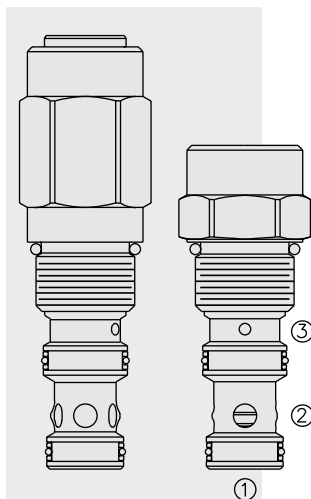
10 0.7 bar (10 psi)
40 2.8 bar (40 psi)
80 5.52 bar (80 psi)
110 7.6 bar (110 psi)
***160** 11.0 bar (160 psi)
***230** 15.9 bar (230 psi)

‡ T Option required

Seals

N Buna N (Std.)
V Fluorocarbon
P Polyurethane
(for pressures over
240 bar [3500 psi])

EP12-S35 Piloted Spool-Type Logic Element



DESCRIPTION

A spool-type, screw-in, cartridge-style, hydraulic directional element, with multi-function potential when used with other directional, pressure, or flow control devices.

OPERATION

The EP12-S35 is a spring-biased blocking valve which will shift to allow full flow from ① to ② only when pressure at ① exceeds the cumulative pressure of ③, plus the bias spring pressure value.

EP10-S35 is a pilot-to-close directional valve.

With no pressure at ③, flow will be allowed from ① to ② once the bias spring force is overcome with pressure at ①.

FEATURES

- Multiple function/application potential.
- Low pressure drop.
- Industry common cavity.
- Manual override option available with 80 psi spring only.

RATINGS

Operating Pressure: 350 bar (5000 psi) cartridge; 240 bar (3500 psi) standard aluminum housing

Flow: See Performance Chart

Internal Leakage: 131 cc/minute (8 cu. in./minute) max. at 350 bar (5000 psi)

Bias Spring Pressure Options:

7.0 bar (100 psi)

11.0 bar (160 psi) Tall Cap option required

16.5 bar (240 psi) Tall Cap option required

Temperature: -40 to 120°C with standard Buna seals

Filtration: See page 9.010.1

Fluids: Mineral-based or synthetics with lubricating properties at viscosities of 7.4 to 420 cSt (50 to 2000 ssu)

Installation: No restrictions; See page 9.020.1

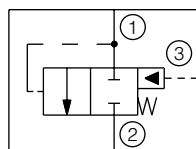
Cavity: VC12-S3; See page 9.112.1

Cavity Tool: CT12-S3XX; See page 8.600.1

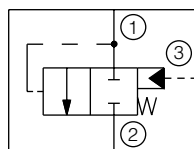
Seal Kit: SK12-3X-MM; See page 8.650.1

SYMBOLS

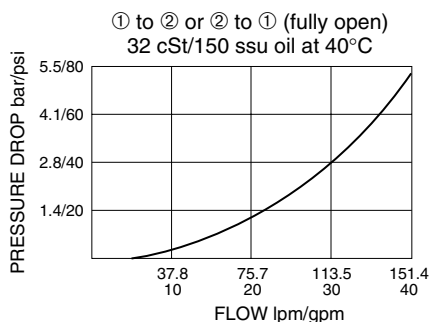
USASI:



ISO:

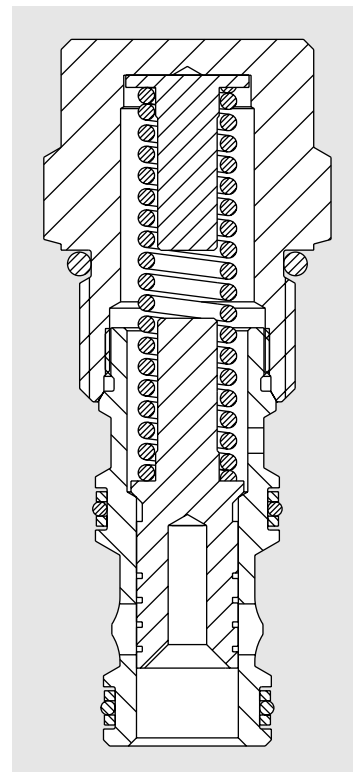
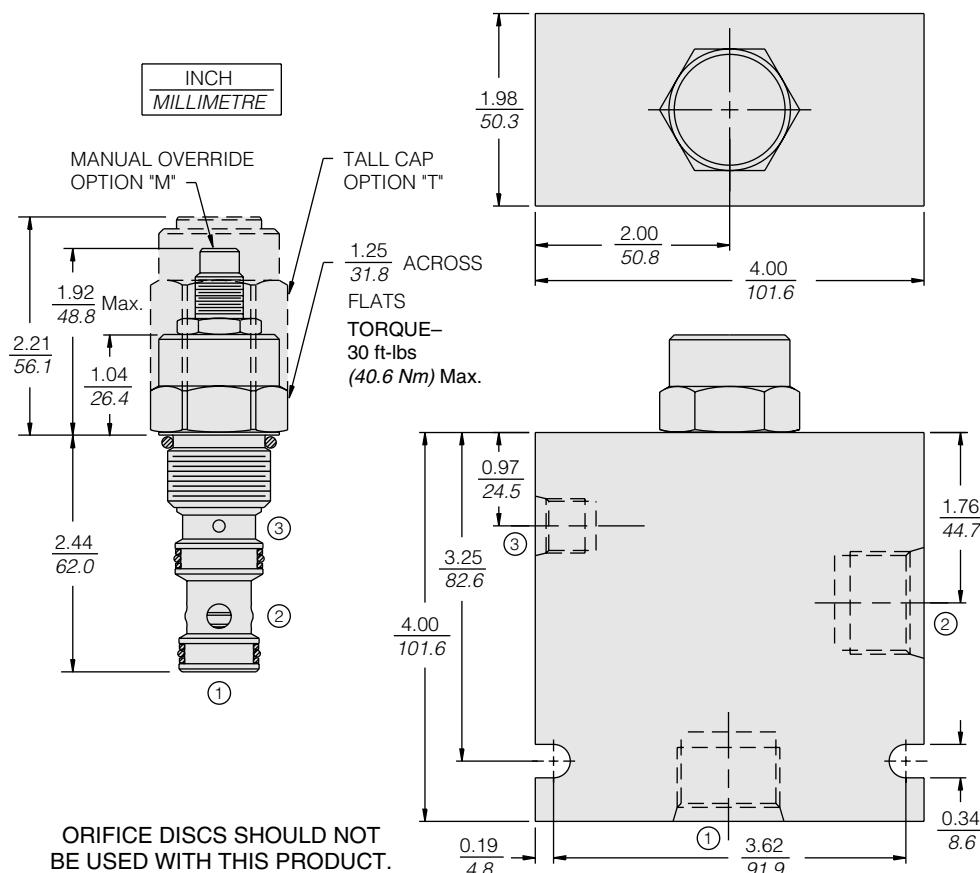


PERFORMANCE (Cartridge Only)



EP12-S35

DIMENSIONS



MATERIALS

Cartridge: Weight: 0.23 kg. (0.5 lbs.);
Steel with hardened work surfaces.
Zinc-plated exposed surfaces. Buna
N O-rings and polyester elastomer
back-ups standard.

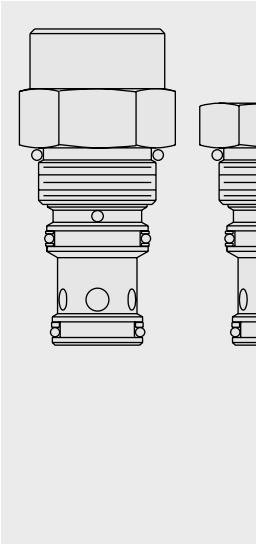
Standard Ported Body: Weight:
1.13 kg. (2.5 lbs.). Anodized high-
strength 6061 T6 aluminum alloy,
rated to 240 bar (3500 psi); see page
8.010.1. Ductile iron and steel bodies
available; dimensions may differ;
consult factory.

TO ORDER

EP12-S35 - - -			
Option		Bias Spring	
None	(Blank)	10	0.7 bar (10 psi)
Tall Cap	T	80	5.5 bar (80 psi)
Manual Override	M	100	7 bar (100 psi)
Manual Override available with 80 psi spring only.		†160	11 bar (160 psi)
		†240	16.5 bar (240 psi)
		‡ T Option required	
Porting		Seals	
Cartridge Only	0	N	Buna N (Std.)
SAE 12*	12T	V	Fluorocarbon
*SAE 6 pilot port		P	Polyurethane (for pressures over 240 bar [3500 psi])

DIRECTIONAL VALVES

EP16-S35 Piloted Spool-Type Logic Element



DESCRIPTION

A spool-type, screw-in, cartridge-style, hydraulic directional element, with multi-function potential when used with other directional, pressure, or flow control devices.

OPERATION

The EP16-S35 is a spring-biased blocking valve which will shift to allow full flow from ① to ② only when pressure at ① exceeds the cumulative pressure of ③, plus the bias spring pressure value.

EP16-S35 is a pilot-to-close directional valve.

With no pressure at ③, flow will be allowed from ① to ② once the bias spring force is overcome with pressure at ①.

FEATURES

- Multiple function/application potential.
- Low pressure drop.
- Industry common cavity.

RATINGS

Operating Pressure: 240 bar (3500 psi)

Proof Pressure: 420 bar (6090 psi)

Flow: See Performance Chart

Internal Leakage: 164 cc/minute (10 cu. in./minute) max. at 207 bar (3000 psi)

Temperature: -40 to 120°C with standard Buna seals

Filtration: See page 9.010.1

Fluids: Mineral-based or synthetics with lubricating properties at viscosities of 7.4 to 420 cSt (50 to 2000 ssu)

Installation: No restrictions; See page 9.020.1

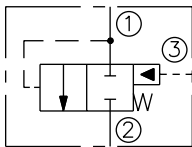
Cavity: VC16-S3; See page 9.116.1

Cavity Tool: CT16-S3XX; See page 8.600.1

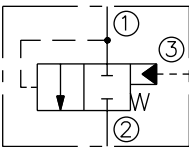
Seal Kit: SK16-3X-MM; See page 8.650.1

SYMBOLS

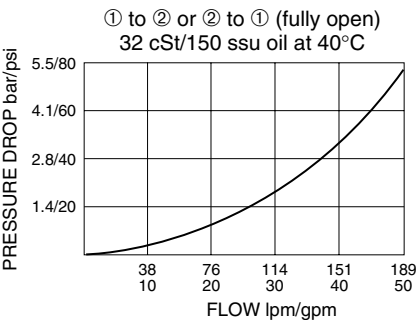
USASI:



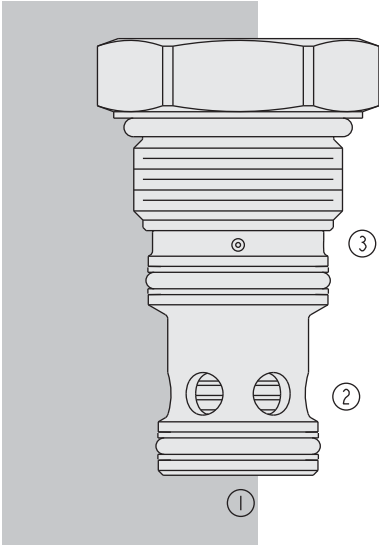
ISO:



PERFORMANCE (Cartridge Only)



HEP16-S35 HyPerformance™ Piloted Spool-Type



DESCRIPTION

A high-pressure spool-type, screw-in, cartridge-style, hydraulic directional element, with multi-function potential when used with other directional, pressure, or flow control devices.

OPERATION

The **HEP16-S35** is a spring-biased blocking valve which will shift to allow full flow from ① to ② only when pressure at ① exceeds the cumulative pressure of ③, plus the bias spring pressure value.

HEP16-S35 is a pilot-to-close directional valve.

With no pressure at ③, flow will be allowed from ① to ② once the bias spring force is overcome with pressure at ①.

FEATURES

- Multiple function/application potential.
- Low pressure drop.

¶ All HyPerformance products are tested to the rigorous standards of the NFPA specification T2.6.1.

Å All HyPerformance valves are tested at a verification level of 90% and an assurance of 99%.

RATINGS

Operating Pressure: 350 bar (5075 psi); 10% cycle life: 420 bar (6090 psi)

Note: All HyPerformance products are tested for 900K cycles at 350 bar and 100K at 420 bar.

Proof Pressure: 690 bar (10000 psi)

Burst Pressure: 1380 bar (20000 psi)

Flow: 190 lpm (50 gpm)

Internal Leakage: 164 ml/minute (10 cu. in./minute) max. at 350 bar (5075 psi)

Operating Temperature: -54 to 107°C (-65 to 225°F) with Urethane seals

Filtration: See page 9.010.1

Fluids: Mineral-based or synthetics with lubricating properties at viscosities of 7.4 to 420 cSt (50 to 2000 sus); See Temperature and Oil Viscosity, page 9.060.1

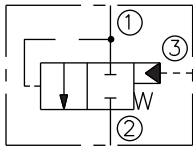
Installation: No restrictions; See page 9.020.1

Cavity: HVC16-S3; See page 9.116.1

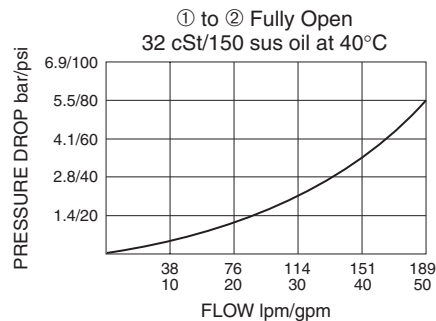
Cavity Tool: HCT16-S3XX; See page 8.600.1

Seal Kit: SK16-S3X-X; See page 8.650.1

SYMBOL



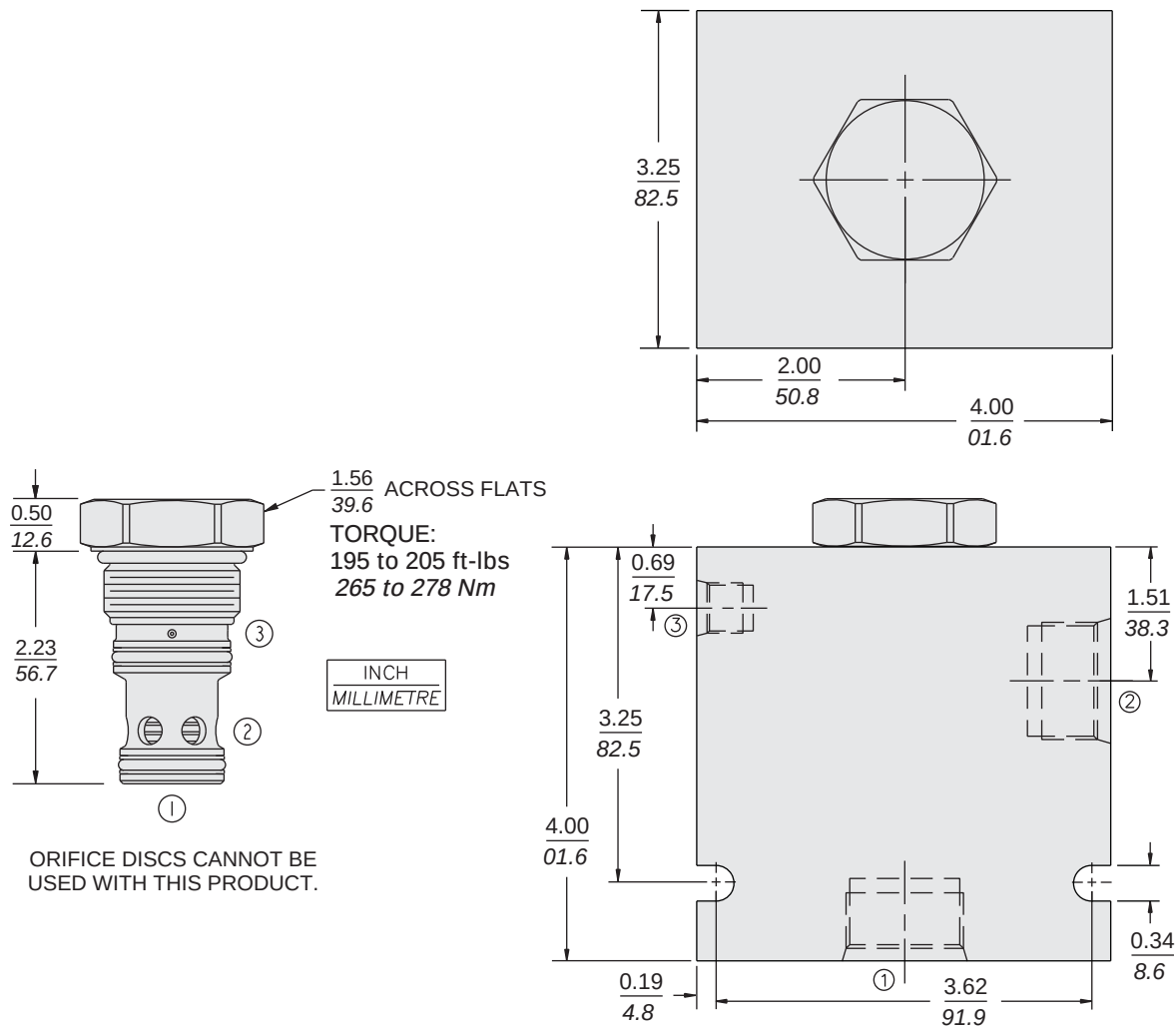
PERFORMANCE (Cartridge Only)



Logic Element

HEP16-S35

DIMENSIONS



MATERIALS

Cartridge: Weight: 0.30 kg. (0.67 lbs.)
Steel with hardened work surfaces.
Zinc-nickel plated exposed surfaces.
PPDI Urethane seals with no backup rings standard.

Ported Body: Weight: 5.34 kg. (11.77 lbs.); HyPerformance™
Ductile iron (code 'D') standard.
Rated to 345 bar (5000 psi).

TO ORDER

HEP16-S35 -

Porting
Cartridge Only **0**
SAE 16 **16TD**
1 in. BSP* **8BD**
*BSP Body; U.K. Mfr. Only

Bias Spring Value

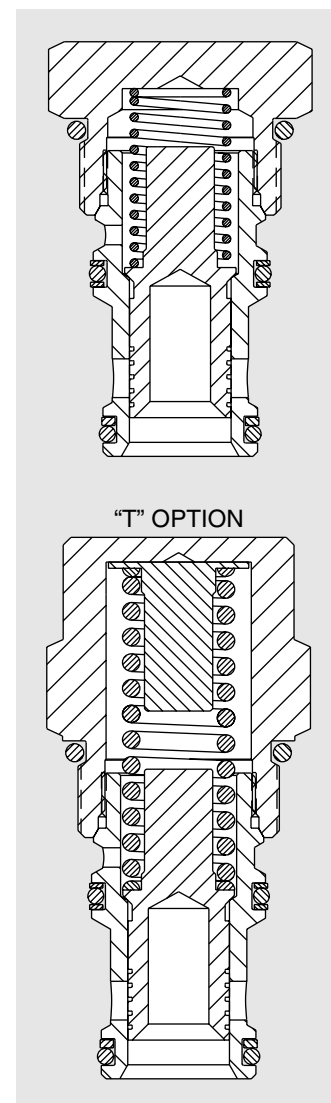
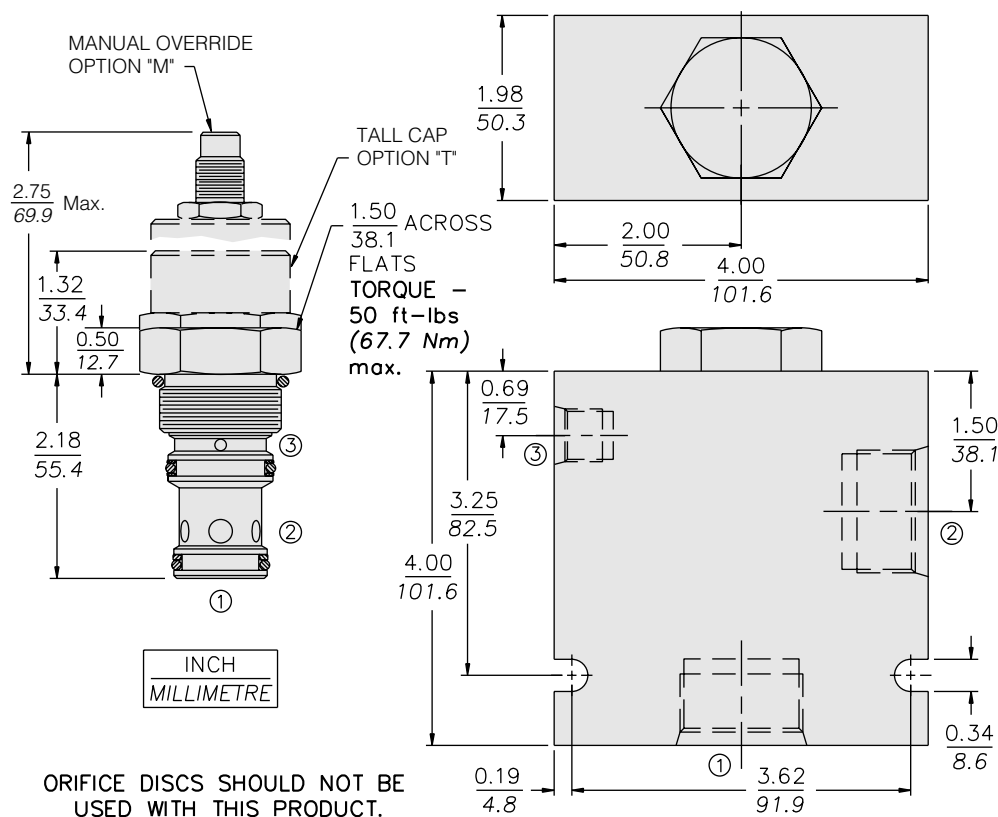
10 0.7 bar (10 psi)
20 1.4 bar (20 psi)
40 2.8 bar (40 psi)
70 4.8 bar (70 psi)

Seals

U PPDI Urethane — Recommended for pressures above 241 bar (3500 psi)

EP16-S35

DIMENSIONS



MATERIALS

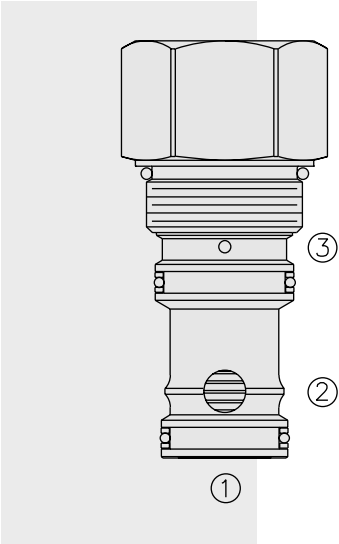
Cartridge: Weight: 0.27 kg. (0.60 lbs.);
Steel with hardened work surfaces.
Zinc-plated exposed surfaces. Buna
N O-rings and polyester elastomer
back-ups standard.

Standard Ported Body: Weight:
1.50 kg. (3.3 lbs.). Anodized high-
strength 6061 T6 aluminum alloy,
rated to 240 bar (3500 psi); see page
8.016.1. Ductile iron and steel bodies
available; dimensions may differ;
consult factory.

TO ORDER

EP16-S35		-		-		-	
Option						Bias Spring	
None	(Blank)					10	0.7 bar (10 psi)
Tall Cap	T					20	1.4 bar (20 psi)
Manual Override	M					40	2.8 bar (40 psi)
Manual Override available with 90 psi, 110 psi, 160 psi and 240 psi bias springs only.						70	4.8 bar (70 psi)
						*90	6.2 bar (90 psi)
						*110	7.6 bar (110 psi)
						*160	11.0 bar (160 psi)
						*240	16.5 bar (240 psi)
						‡ T Option Required	
Porting						Seals	
Cartridge Only	0					N	Buna N (Std.)
SAE 16 w/SAE 6 Pilot Port	16T					V	Fluorocarbon

EP20-S35 Piloted Spool-Type Logic Element



DESCRIPTION

A spool-type, screw-in, cartridge-style, hydraulic directional element, with multi-function potential when used with other directional, pressure, or flow control devices.

OPERATION

The EP20-S35 is a spring-biased blocking valve which will shift to allow full flow from ① to ② only when pressure at ① exceeds the cumulative pressure of ③, plus the bias spring pressure value.

EP20-S35 is a pilot-to-close directional valve.

With no pressure at ③, flow will be allowed from ① to ② once the bias spring force is overcome with pressure at ①.

FEATURES

- Multiple function/application potential.
- Low pressure drop.
- Industry common cavity.

RATINGS

Maximum Operating Pressure: Cartridge Only: Ports ① & ②: 345 bar (5000 psi); Port ③: 320 bar (4600 psi); Polyurethane seals are recommended for 5000 psi operation. Aluminum bodies for this product are rated for 3500 psi.

Flow: See Performance Chart

Internal Leakage: 164 cc/minute (10 cu. in./minute) max. at 345 bar (5000 psi)

Bias Spring Pressure Options: 5.5 bar (80 psi); 11.0 bar (160 psi)

Temperature: -40 to 120°C with standard Buna seals

Filtration: See page 9.010.1

Fluids: Mineral-based or synthetics with lubricating properties at viscosities of 7.4 to 420 cSt (50 to 2000 ssu)

Installation: No restrictions; See page 9.020.1

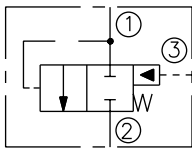
Cavity: VC20-S3; See page 9.120.1

Cavity Tool: CT20-S3XX; See page 8.600.1

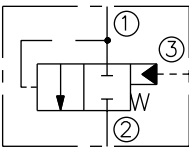
Seal Kit: SK20-3X-MM; See page 8.650.1

SYMBOLS

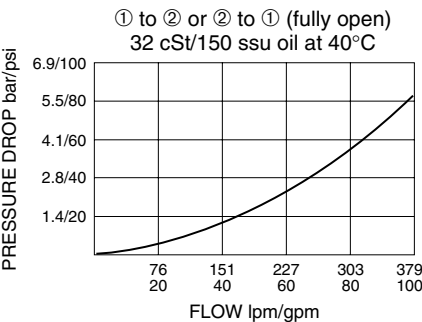
USASI:



ISO:

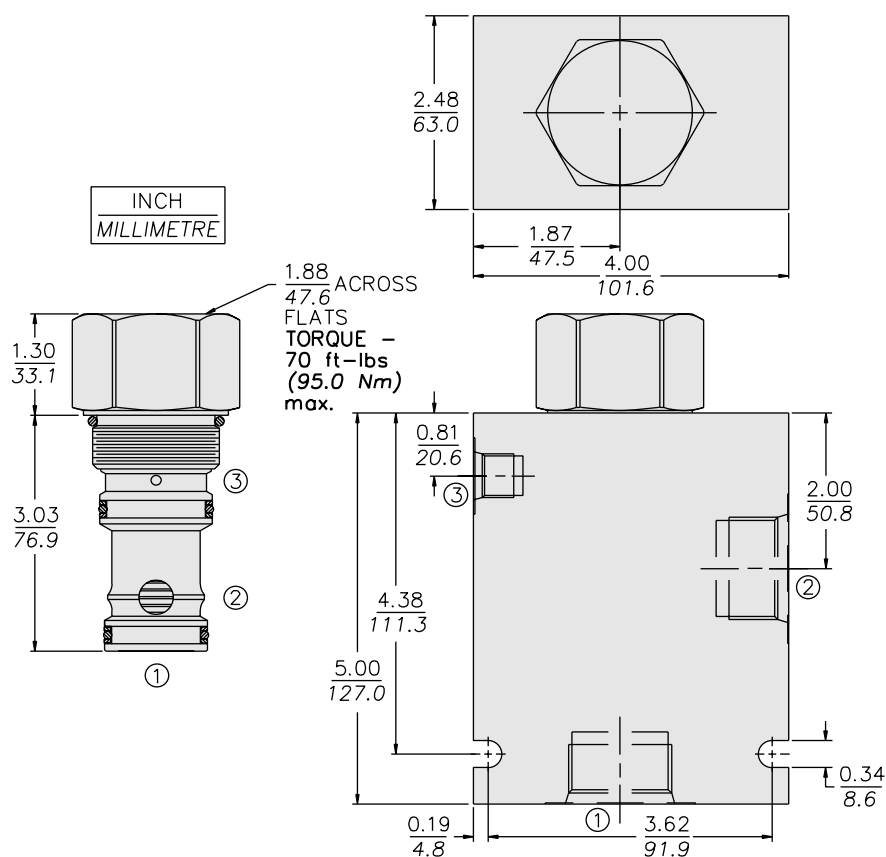


PERFORMANCE (Cartridge Only)

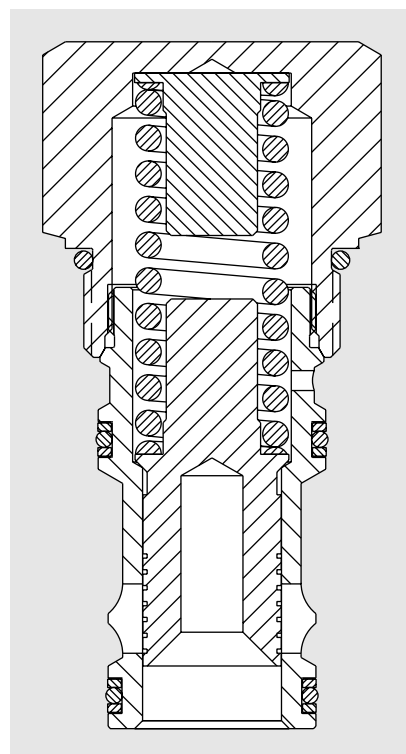


EP20-S35

DIMENSIONS



ORIFICE DISCS SHOULD NOT BE
USED WITH THIS PRODUCT.



MATERIALS

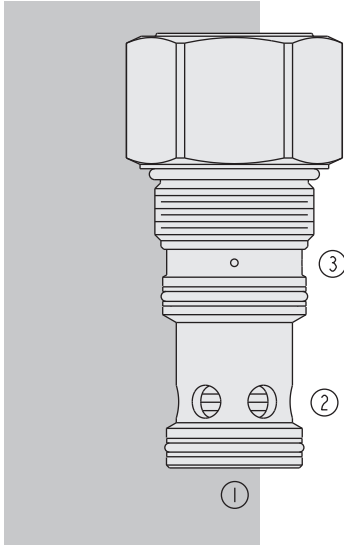
Cartridge: Weight: 0.82 kg. (1.8 lbs.);
Steel with hardened work surfaces.
Zinc-plated exposed surfaces. Buna
N O-rings and polyester elastomer
back-ups standard.

Standard Ported Body: Weight: 1.65
kg. (3.65 lbs.). Anodized high-
strength 6061 T6 aluminum alloy,
rated to 240 bar (3500 psi); see page
8.020.1. Ductile iron and steel bodies
available; dimensions may differ;
consult factory.

TO ORDER

EP20-S35 -		
Porting		
Cartridge Only	0	
SAE 16 w/SAE 6 Pilot Port	16T	
Bias Spring		
20	1.4 bar (20 psi)	
80	5.52 bar (80 psi)	
160	11.0 bar (160 psi)	
Seals		
N	Buna N (Std.)	
V	Fluorocarbon	
P	Polyurethane (for pressures over 240 bar [3500 psi])	

HEP42-S35 HyPerformance™ Piloted Spool-Type



DESCRIPTION

A high-pressure spool-type, screw-in, cartridge-style, hydraulic directional element, with multi-function potential when used with other directional, pressure, or flow control devices.

OPERATION

The **HEP42-S35** is a spring-biased blocking valve which will shift to allow full flow from 1 to 2 only when pressure at 1 exceeds the cumulative pressure of 3, plus the bias spring pressure value.

HEP42-S35 is a pilot-to-close directional valve.

With no pressure at 3, flow will be allowed from 1 to 2 once the bias spring force is overcome with pressure at 1.

FEATURES

- Multiple function/application potential.
- Low pressure drop.
- All HyPerformance products are tested to the rigorous standards of the NFPA specification T2.6.1.
- All HyPerformance valves are tested at a verification level of 90% and an assurance of 99%.

RATINGS

Operating Pressure: 350 bar (5075 psi); 10% cycle life: 420 bar (6090 psi)

Note: All HyPerformance products are tested for 900K cycles at 350 bar and 100K at 420 bar.

Fatigue Rating: 2 million cycles at 420 bar

Burst Pressure: 1380 bar (20000 psi)

Flow: 379 lpm (100 gpm)

Internal Leakage: 164 ml/minute (10 cu. in./minute) max. at 350 bar (5075 psi)

Operating Temperature: -40 to 100°C (-40 to 212°F) with Buna N seals
 -26 to 204°C (-15 to 400°F) with Fluorocarbon seals
 -54 to 107°C (-65 to 225°F) with Urethane seals

Ambient Temperature: -40 to 90°C

Filtration: See page 9.010.1

Fluids: Mineral-based or synthetics with lubricating properties at viscosities of 7.4 to 420 cSt (50 to 2000 sus); See Temperature and Oil Viscosity, page 9.060.1

Installation: No restrictions; See page 9.020.1

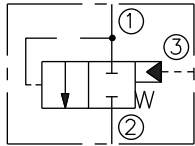
Cavity: HVC42-S3; See page 9.142.1

Cavity Tool: HCT42-S3XX; See page 8.600.1

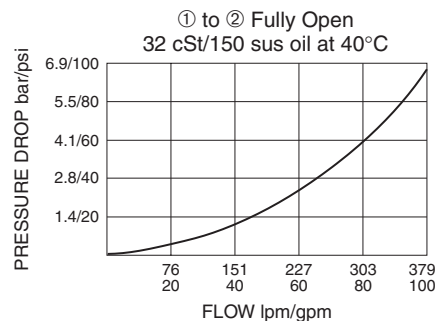
Seal Kit: SK42-S3X-X; See page 8.650.1

SYMBOLS

USAS/ISO:



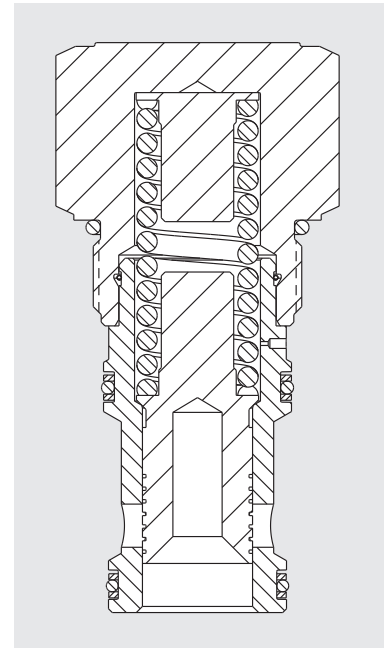
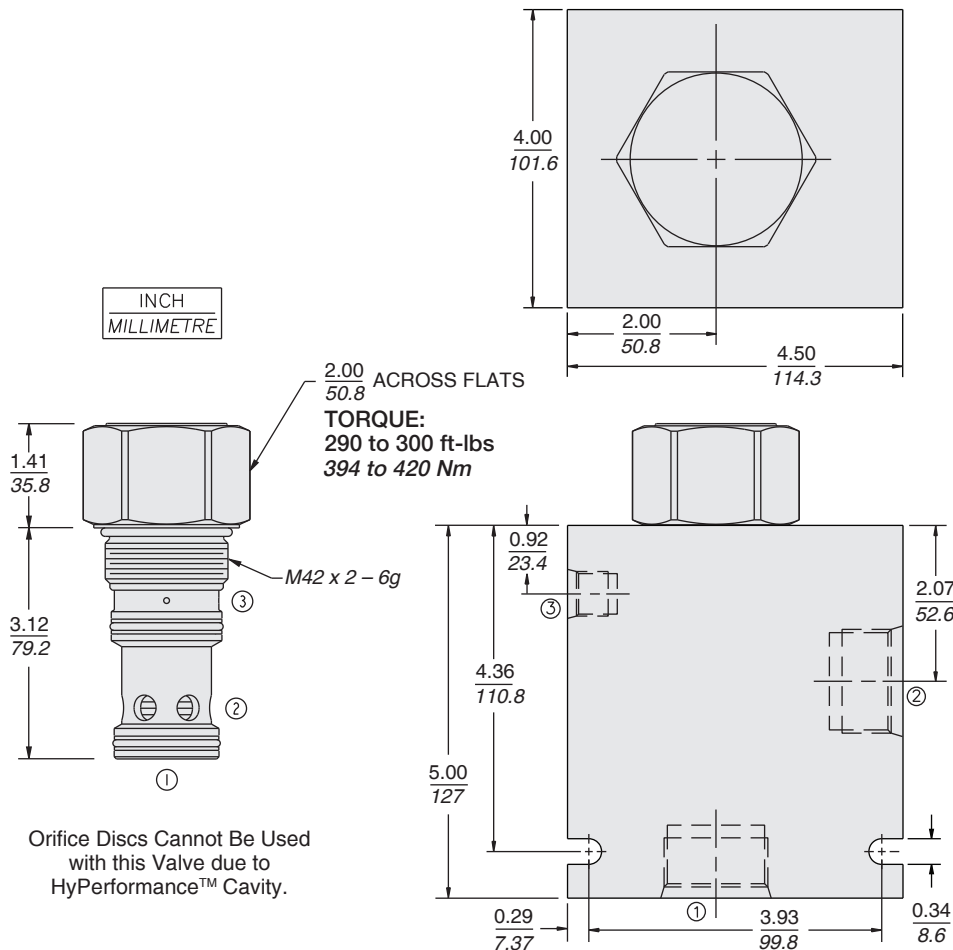
PERFORMANCE (Cartridge Only)



Logic Element

HEP42-S35

DIMENSIONS



MATERIALS

Cartridge: Weight: 1.04 kg. (2.30 lbs.)
Steel with hardened work surfaces.
Zinc-nickel plated exposed surfaces.
PPDI Urethane seals with no backup rings standard.

Ported Body: Weight: 9.03 kg. (19.9 lbs.); HyPerformance™
Ductile iron (code 'D') standard.
Rated to 345 bar (5000 psi).

TO ORDER

HEP42-S35 -

Porting
Cartridge Only 0
SAE 20 20TD
1-1/4 in. BSP* 10BD
*BSP Body; U.K. Mfr. Only

Bias Spring Value

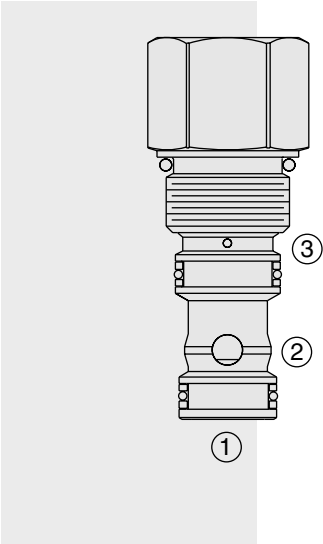
20 1.4 bar (20 psi)
50 3.4 bar (50 psi)
80 5.5 bar (80 psi)
175 12.1 bar (175 psi)

Seals

N Buna N
V Fluorocarbon
U PPDI Urethane — Recommended for pressures above 241 bar (3500 psi)

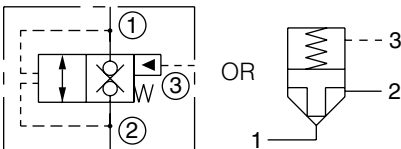
DIRECTIONAL VALVES

EP10-S38 Piloted Poppet-Type Logic Element

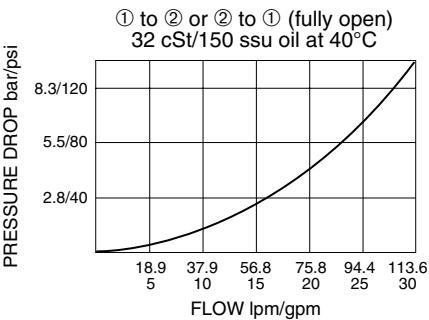


SYMBOLS

USAS/ISO:



PERFORMANCE (Cartridge Only)



DESCRIPTION

A spool-type, screw-in, cartridge-style, hydraulic directional element, with multi-function potential when used with other directional, pressure, or flow control devices.

OPERATION

The EP10-S38 is a spring-biased poppet valve which will block ① to ② or ② to ① until pressure at ① or ② exceeds the cumulative pressure at ③ and bias spring. With no pressure at ③, flow will be allowed from ① to ② or ② to ① once the bias spring force is overcome with pressure at ① or ②. When the element is in closed state, the ratio of areas ① and ② is 1:1, and the ratio of areas ① or ② to ③ is 1:2.

For more information about the operation of this valve, see page 9.100.1.

FEATURES

- Multiple function/application potential.
- Low pressure drop.
- Industry common cavity.

RATINGS

Operating Pressure: 350 bar (5000 psi) cartridge; 240 bar (3500 psi) standard aluminum housing

Flow: See Performance Chart

Internal Leakage: 0.2 cc/minute (.01 cu. in./minute) max. at 240 bar (3500 psi)

Bias Spring Pressure: 11.0 bar (160 psi)

Temperature: -40 to 120°C with standard Buna seals

Filtration: See page 9.010.1

Fluids: Mineral-based or synthetics with lubricating properties at viscosities of 7.4 to 420 cSt (50 to 2000 ssu)

Installation: No restrictions; See page 9.020.1

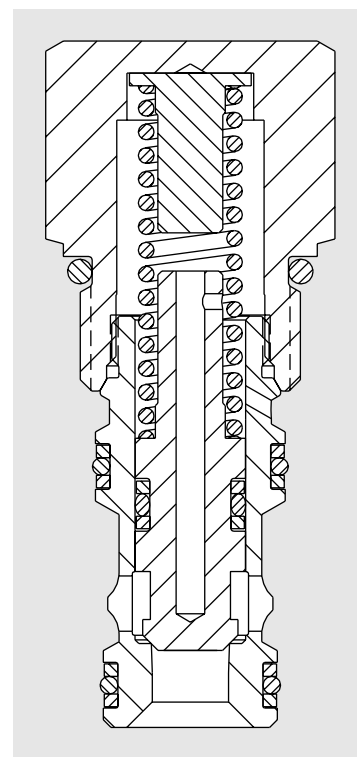
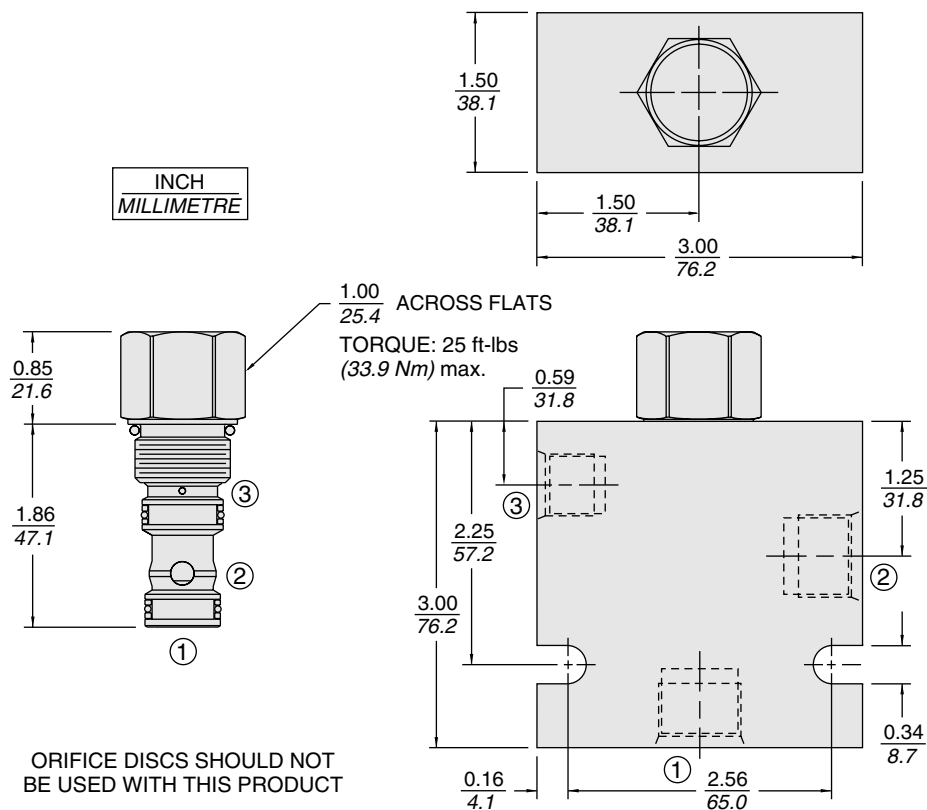
Cavity: VC10-S3; See page 9.110.1

Cavity Tool: CT10-S3XX; See page 8.600.1

Seal Kit: SK10-3X-MM; See page 8.650.1

EP10-S38

DIMENSIONS



MATERIALS

Cartridge: Weight: 0.15 kg. (0.32 lbs.); Steel with hardened work surfaces. Zinc-plated exposed surfaces. Buna N O-rings and polyester elastomer back-ups standard.

Standard Ported Body: Weight: 0.32 kg. (0.70 lbs.). Anodized high-strength 6061 T6 aluminum alloy, rated to 240 bar (3500 psi); see page 8.010.1. Ductile iron and steel bodies available; dimensions may differ; consult factory.

TO ORDER

EP10-S38 -

Porting
Cartridge Only 0
SAE 8* 8T
SAE 10* 10T
SAE 12* 12T

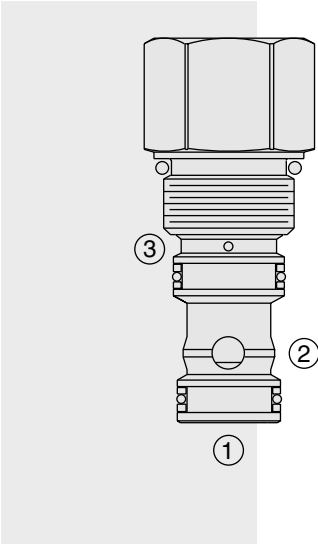
*SAE 6 pilot port

Bias Spring
80 5.52 bar (80 psi)
160 11.0 bar (160 psi)

Seals
N Buna N (Std.)
V Fluorocarbon
P Polyurethane
(for pressures over 240 bar [3500 psi])

DIRECTIONAL VALVES

EP20-S38 Piloted Poppet-Type Logic Element



DESCRIPTION

A spool-type, screw-in, cartridge-style, hydraulic directional element, with multi-function potential when used with other directional, pressure, or flow control devices.

OPERATION

The EP20-S38 is a spring-biased poppet valve which will block 1 to 2 or 2 to 1 until pressure at 1 or 2 exceeds the cumulative pressure at 3 and bias spring. With no pressure at 3, flow will be allowed from 1 to 2 or 2 to 1 once the bias spring force is overcome with pressure at 1 or 2. When the element is in the closed state, the ratio of areas 1 and 2 is 1:1, and the ratio of areas 1 or 2 to 3 is 1:2.

FEATURES

- Multiple function/application potential.
- Low pressure drop.
- Industry common cavity.

RATINGS

Maximum Operating Pressure: Cartridge Only: Ports 1 & 2, 241 bar (3500 psi)

Flow: See Performance Chart

Internal Leakage: 0.6 cc/minute (12 drops/minute) max. at 241 bar (3500 psi)

Bias Spring Pressure Options: 2.8 bar (40 psi); 11.0 bar (160 psi)

Temperature: -40 to 120°C with standard Buna seals

Filtration: See page 9.010.1

Fluids: Mineral-based or synthetics with lubricating properties at viscosities of 7.4 to 420 cSt (50 to 2000 ssu)

Installation: No restrictions; See page 9.020.1

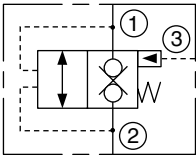
Cavity: VC20-S3; See page 9.120.1

Cavity Tool: CT20-S3XX; See page 8.600.1

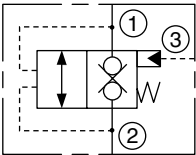
Seal Kit: SK20-3X-MM; See page 8.650.1

SYMBOLS

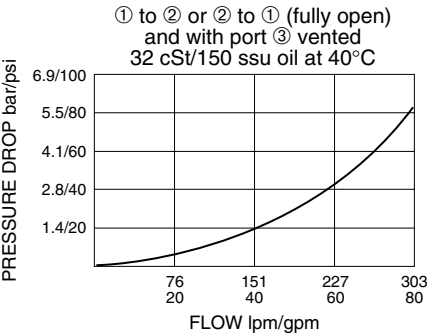
USASI:



ISO:



PERFORMANCE (Cartridge Only)



INCH
MILLIMETRE

1.30
33.1

3.03
76.9

1.88
47.6

ACROSS FLATS

TORQUE: 70 ft-lbs
(95.0 Nm) max.

2.48
63.0

1.87
47.5

4.00
101.6

0.81
20.6

4.38
111.3

5.00
127.0

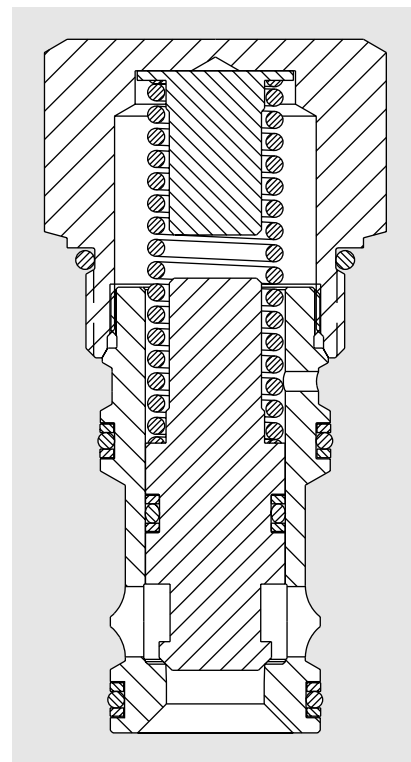
2.00
50.8

0.19
4.8

3.62
91.9

0.34
8.6

ORIFICE DISCS SHOULD NOT
BE USED WITH THIS PRODUCT



Cartridge: Weight: 0.82 kg. (1.8 lbs.);
Steel with hardened work surfaces.
Zinc-plated exposed surfaces. Buna
N O-rings and polyester elastomer
back-ups standard.

Standard Ported Body: Weight: 1.65 kg. (3.65 lbs.). Anodized high-strength 6061 T6 aluminum alloy, rated to 240 bar (3500 psi); see page 8.020.1. Ductile iron and steel bodies can be made available; dimensions may differ; consult factory.

EP20-S38 -

Porting

Cartridge Only **0**

SAE 16 w/SAE 6 Pilot Port **16T**

Bias Spring

40 2.8 bar (40 psi)

80 5.5 bar (80 psi)

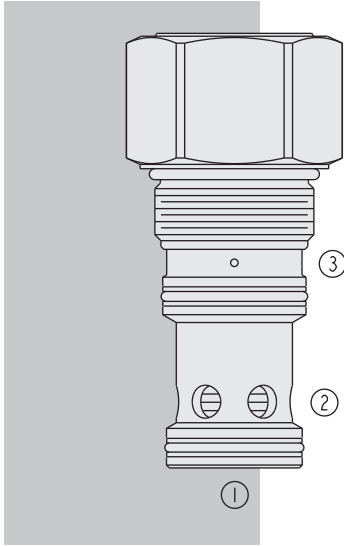
160 11.0 bar (160 psi)

Seals

N Buna N (Std.)

V Fluorocarbon

HEP42-S39 HyPerformance™ Vented Poppet-type



DESCRIPTION

A high pressure, poppet-type, screw-in, cartridge-style, spring-biased, bi-directional blocking-type hydraulic valve with two built-in checks. When used in conjunction with a small pilot solenoid valve, the HEP42-S39 is ideal for either high-flow double-blocking circuits or selector circuits. The integral two-check system prevents leakage, maintaining the pilot signal regardless of the transition or the work-port pressure changes.

OPERATION

The HEP42-S39 will allow flow from 1 to 2 or 2 to 1 only when 3 is vented to create a pressure differential across the internal orifice which exceeds the pressure value of the bias spring. When the element is in the neutral (closed) state, the ratio of areas 1 and 2 is 1:1, and the ratio of areas 1 or 2 to 3 is 1:2.

FEATURES

- Multiple function/application potential.
- Low pressure drop.
- All HyPerformance products are tested to the rigorous standards of the NFPA specification T2.6.1.
- All HyPerformance valves are tested at a verification level of 90% and an assurance of 99%.

RATINGS

Operating Pressure: 350 bar (5075 psi); 10% cycle life: 420 bar (6090 psi)

Note: All HyPerformance products are tested for 900K cycles at 350 bar and 100K at 420 bar.

Proof Pressure: 690 bar (10000 psi)

Burst Pressure: 1380 bar (20000 psi)

Flow: 284 lpm (75 gpm)

Internal Leakage: 12 drops per minute max. at 350 bar (5075 psi)

Operating Temperature: -54 to 107°C (-65 to 225°F) with Urethane seals

Filtration: See page 9.010.1

Fluids: Mineral-based or synthetics with lubricating properties at viscosities of

7.4 to 420 cSt (50 to 2000 sus); See Temperature and Oil Viscosity, page 9.060.1

Installation: No restrictions; See page 9.020.1

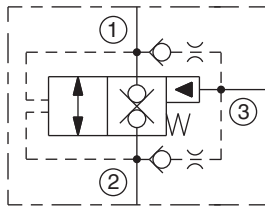
Cavity: HVC42-S3; See page 9.142.1

Cavity Tool: HCT42-S3XX; See page 8.600.1

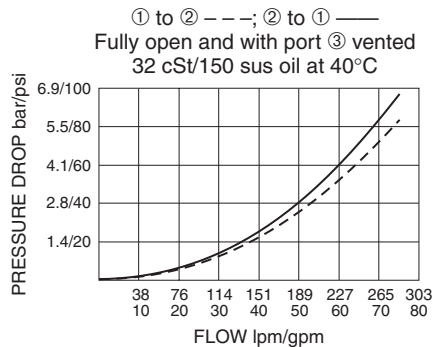
Seal Kit: SK42-S3X-MM; See page 8.650.1

SYMBOLS

USAS/ISO:



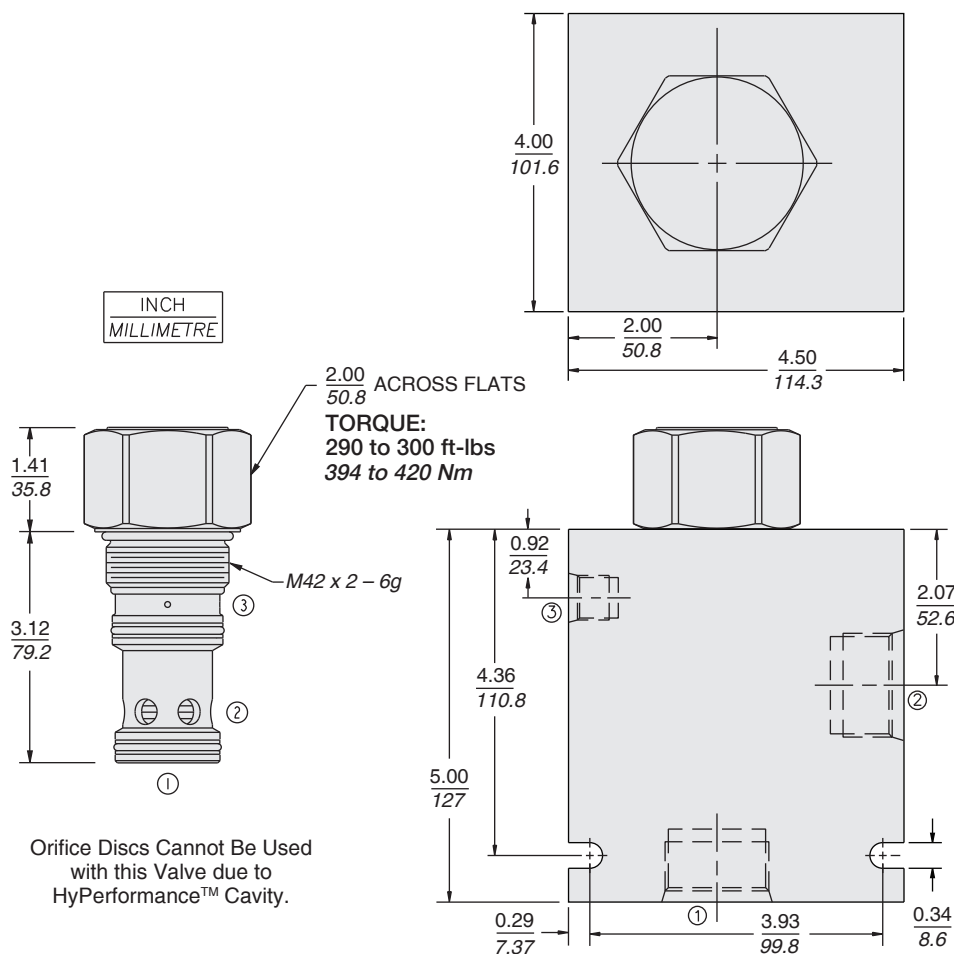
PERFORMANCE (Cartridge Only)



Logic Element w/Built-in Checks

HEP42-S39

DIMENSIONS



MATERIALS

Cartridge: Weight: 1.04 kg. (2.30 lbs.)
Steel with hardened work surfaces.
Zinc-nickel plated exposed surfaces.
PPDI Urethane seals with no backup rings standard.

Ported Body: Weight: 9.03 kg. (19.9 lbs.); HyPerformance™
Ductile iron (code 'D') standard.
Rated to 345 bar (5000 psi).

TO ORDER

HEP42-S39 - - - 160

Porting

Cartridge Only 0
SAE 20 20TD
1-1/4 in. BSP* 10BD
*BSP Body; U.K. Mfr. Only

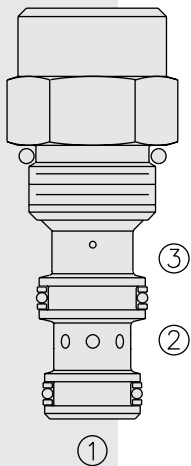
Bias Spring Value

160 11.0 bar (160 psi)

Seals

U PPDI Urethane — Recommended for pressures above 241 bar (3500 psi)

EV58-34 Vented Directional Element



DESCRIPTION

A spool-type, screw-in, cartridge-style, hydraulic directional element, with multi-function potential when used with other directional, pressure, or flow control valves.

OPERATION

The **EV58-34** is a spring-biased blocking valve which will shift to allow full flow from ① to ② only when port ③ is vented to create a pressure drop across the internal orifice which exceeds the pressure of the bias spring value.

FEATURES

- Multiple function/application potential.
- Low pressure drop.
- Industry common cavity
- Compact size.

RATINGS

Maximum Operating Pressure: 345 bar (5000 psi) with steel or ductile housing; 207 bar (3000 psi) with aluminum housing.

Flow Rate: Up to 37.9 lpm (10 gpm)

Maximum Internal Leakage:

131 ml per minute (8 cu. in. per minute) at 207 bar (3000 psi)

229 ml per minute (14 cu. in. per minute) at 345 bar (5000 psi)

Bias Springs:

Code 10 0.7 bar (10 psi)

Code 40 2.8 bar (40 psi)

Code 80 5.5 bar (80 psi)

Code 110 7.6 bar (110 psi)

Code 150 10.3 bar (150 psi)

Temperature: -40 to 160°C

Filtration: See page 9.010.1

Fluids: Mineral-based or synthetics with lubricating properties at viscosities of 7.4 to 420 cSt (50 to 2000 sus); See Temperature and Oil Viscosity, page 9.060.1

Installation: No restrictions; See page 9.020.1

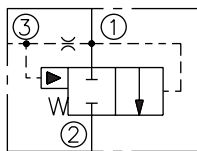
Cavity: VC08-3; See page 9.108.1

Cavity Tool: CT08-3XX; See page 8.600.1

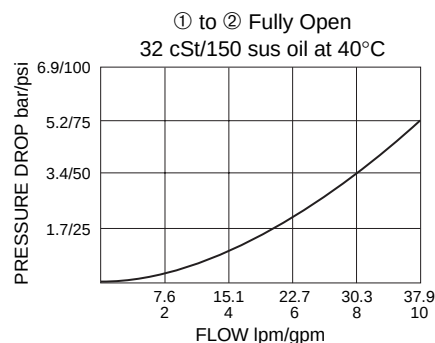
Seal Kit: SK08-3X-MM; See page 8.650.1

SYMBOLS

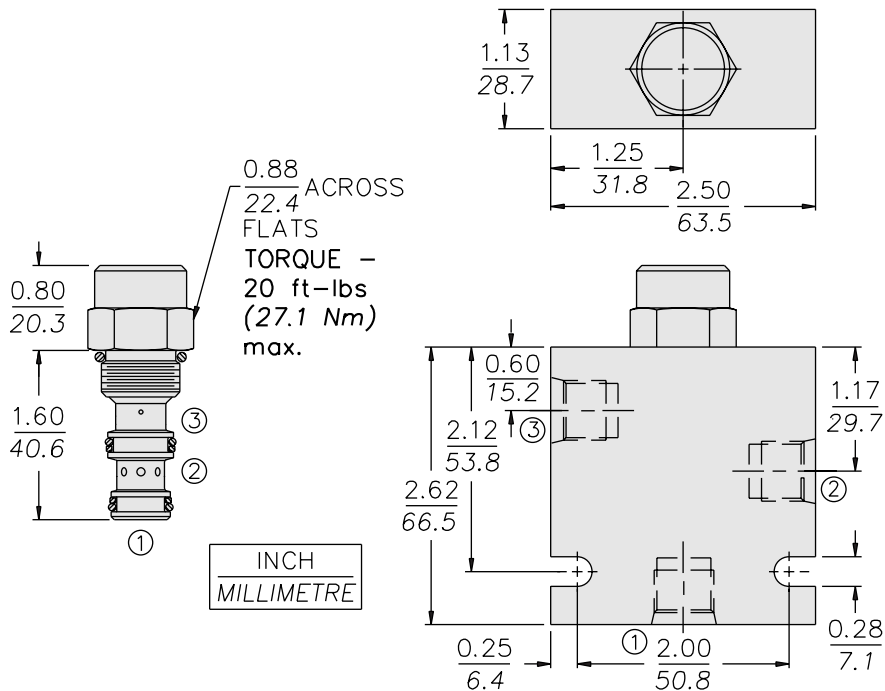
USASI/ISO:



PERFORMANCE (Cartridge Only)



DIMENSIONS



MATERIALS

Cartridge: Weight: 0.11 kg. (0.25 lbs.)
Steel with hardened work surfaces.
Zinc-plated exposed surfaces.
Buna N O-rings and back-ups standard.

Ported Body: Weight: 0.64 kg.
(1.4 lbs.) Ductile Iron (code "D") standard, dimensions may differ from illustration; rated to 345 bar (5000 psi). See page 8.008.1

Ported Body: Weight: 0.36 kg.
(0.80 lbs.) Anodized high-strength 6061 T6 aluminum alloy, rated to 207 bar (3000 psi). See page 8.008.1

TO ORDER

EV58-34 -

Porting

Cartridge Only **0**
SAE 6 (Ductile) **6TD**
SAE 6 (Alum.) **6T**

Note: Aluminum body rated for 207 bar (3000 psi) max.

Bias Spring

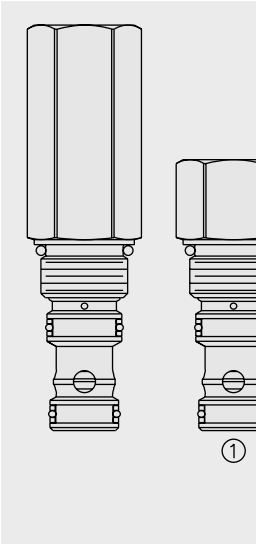
10 0.7 bar (10 psi)
40 2.8 bar (40 psi)
80 5.5 bar (80 psi)
110 7.6 bar (110 psi)
150 10.3 bar (150 psi)

Seals

Buna N (Std.) **N**
Fluorocarbon **V**
Polyurethane **P**

DIRECTIONAL VALVES

EV10-S34 Vented Spool-Type Logic Element



DESCRIPTION

A spool-type, screw-in, cartridge-style, hydraulic directional element, with multi-function potential when used with other directional, pressure, or flow control devices.

OPERATION

The EV10-S34 is a spring-biased blocking valve which will shift to allow full flow from ① to ② only when ③ is vented to create a pressure drop across the internal orifice which exceeds the pressure value of the selected bias spring force.

EV10-S34 is a vent-to-open directional valve.

FEATURES

- Multiple function/application potential.
- Smooth shift transition.
- Low pressure drop.
- Industry common cavity.

RATINGS

Operating Pressure: 345 bar (5000 psi) cartridge; 240 bar (3500 psi) standard aluminum housing

Flow: See Performance Chart

Internal Leakage: 164 cc/minute (10 cu. in./minute) max. at 207 bar (3000 psi)

Bias Spring Pressure Options:

- 0.7 bar (10 psi);
- 2.8 bar (40 psi);
- 5.5 bar (80 psi);
- 7.6 bar (110 psi);
- 11.0 bar (160 psi);

Note: Tall cap option required for 11.0 bar (160 psi) spring.

Temperature: -40 to 120°C with standard Buna seals

Filtration: See page 9.010.1

Fluids: Mineral-based or synthetics with lubricating properties at viscosities of 7.4 to 420 cSt (50 to 2000 ssu)

Installation: No restrictions; See page 9.020.1

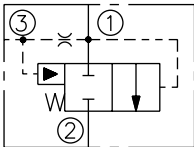
Cavity: VC10-S3; See page 9.110.1

Cavity Tool: CT10-S3XX; See page 8.600.1

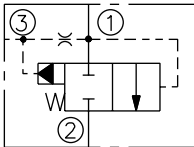
Seal Kit: SK10-3X-MM; See page 8.650.1

SYMBOLS

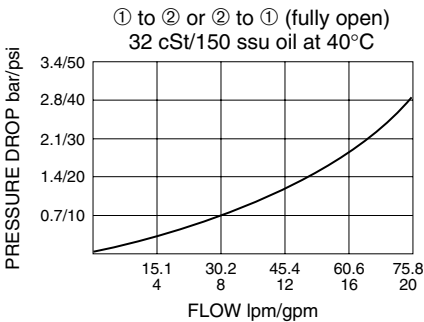
USASI:



ISO:

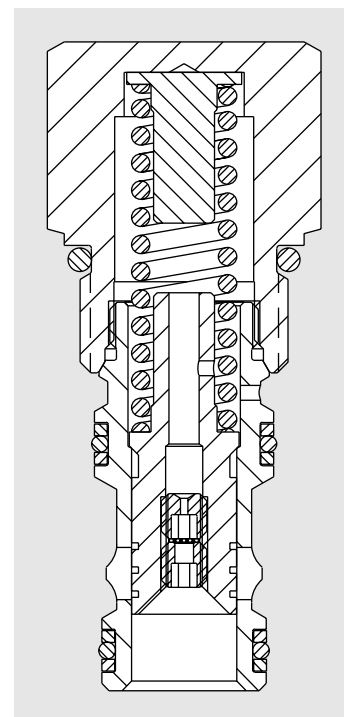
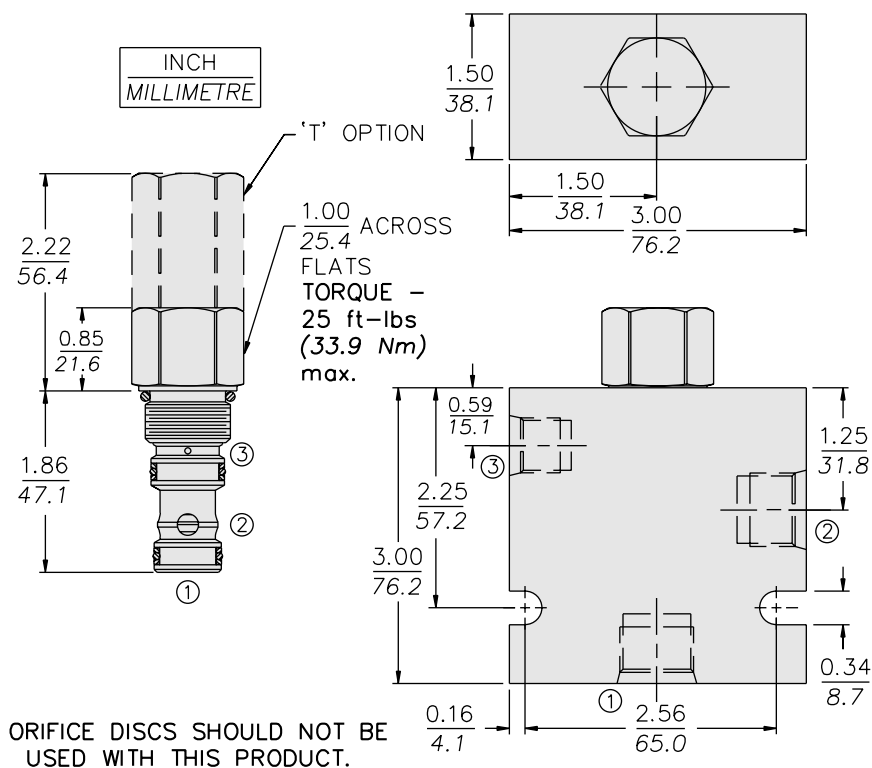


PERFORMANCE (Cartridge Only)



EV10-S34

DIMENSIONS



MATERIALS

Cartridge: Weight: 0.15 kg. (0.32 lbs.); Steel with hardened work surfaces; Zinc-plated exposed surfaces; Buna N O-rings and polyester elastomer back-ups standard.

Standard Ported Body: Weight: 0.32 kg. (0.70 lbs.). Anodized high-strength 6061 T6 aluminum alloy, rated to 240 bar (3500 psi); see page 8.010.1. Ductile iron and steel bodies available; dimensions may differ; consult factory.

TO ORDER

EV10-S34

Option
None (Blank)
Tall Cap T

Porting
Cartridge Only
SAE 8* 0
SAE 10* 8T
SAE 12* 10T
SAE 12* 12T

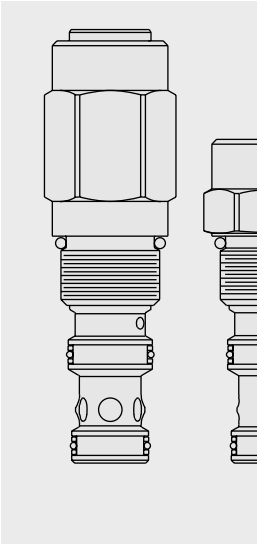
*SAE 6 vent port

Bias Spring
10 0.7 bar (10 psi)
40 2.8 bar (40 psi)
80 5.52 bar (80 psi)
110 7.6 bar (110 psi)
*160 11.0 bar (160 psi)
*230 15.9 bar (230 psi)

‡ T Option required

Seals
N Buna N (Std.)
V Fluorocarbon
P Polyurethane
(for pressures over
240 bar [3500 psi])

EV12-S34 Vented Spool-Type Logic Element



DESCRIPTION

A spool-type, screw-in, cartridge-style, hydraulic directional element, with multi-function potential when used with other directional, pressure, or flow control devices.

OPERATION

The EV12-S34 is a spring-biased blocking valve which will shift to allow full flow from ① to ② only when ③ is vented to create a pressure drop across the internal orifice which exceeds the pressure value of the selected bias spring force.

EV12-S34 is a vent-to-open directional valve.

FEATURES

- Multiple function/application potential.
- Smooth shift transition.
- Low pressure drop.
- Industry common cavity.

RATINGS

Operating Pressure: 345 bar (5000 psi) cartridge; 240 bar (3500 psi) standard aluminum housing

Flow: See Performance Chart

Internal Leakage: 164 cc/minute (10 cu. in./minute) max. at 207 bar (3000 psi)

Bias Spring Pressure: 7.6 bar (110 psi)

Temperature: -40 to 120°C with standard Buna seals

Filtration: See page 9.010.1

Fluids: Mineral-based or synthetics with lubricating properties at viscosities of 7.4 to 420 cSt (50 to 2000 ssu)

Installation: No restrictions; See page 9.020.1

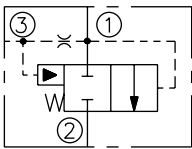
Cavity: VC12-S3; See page 9.112.1

Cavity Tool: CT12-S3XX; See page 8.600.1

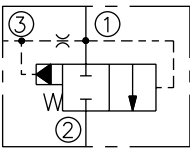
Seal Kit: SK12-3X-MM; See page 8.650.1

SYMBOLS

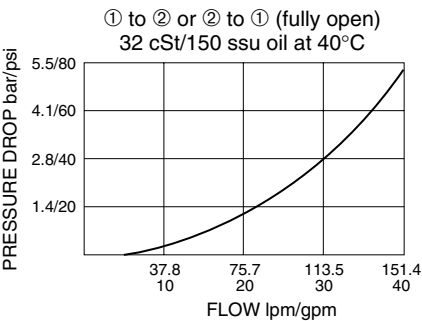
USASI:



ISO:

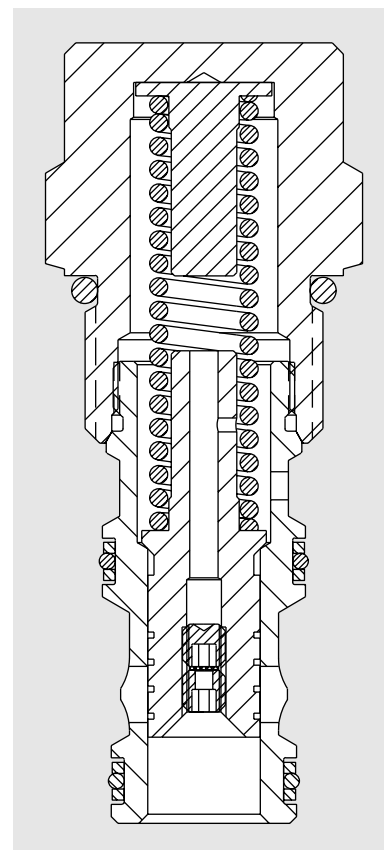
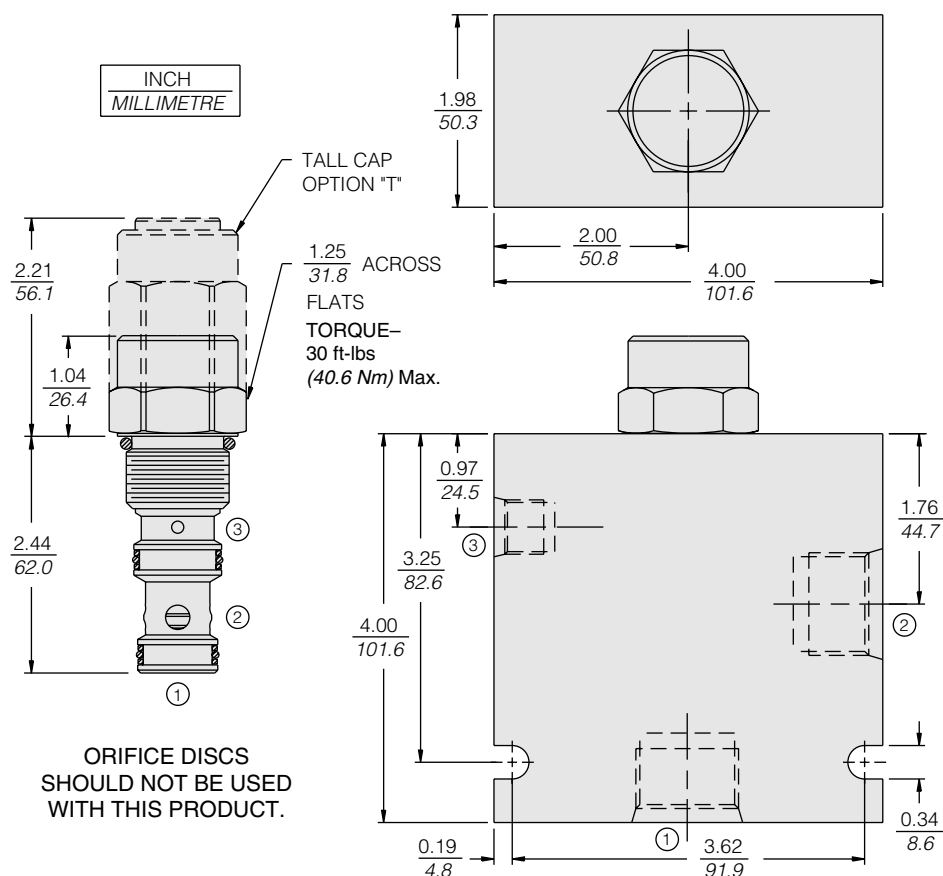


PERFORMANCE (Cartridge Only)



EV12-S34

DIMENSIONS



MATERIALS

Cartridge: Weight: 0.23 kg. (0.5 lbs.);
Steel with hardened work surfaces;
Zinc-plated exposed surfaces; Buna
N O-rings and polyester elastomer
back-ups standard.

Standard Ported Body: Weight:
1.13 kg. (2.5 lbs.). Anodized high-
strength 6061 T6 aluminum alloy,
rated to 240 bar (3500 psi); see page
8.010.1. Ductile iron and steel bodies
available; dimensions may differ;
consult factory.

TO ORDER

EV12-S34

Option

None (Blank)
Tall Cap **T**

Porting

Cartridge Only **0**
SAE 12* **12T**

*SAE 6 vent port

Bias Spring

10 0.7 bar (10 psi)
80 5.5 bar (80 psi)
100 7 bar (100 psi)
***160** 11 bar (160 psi)
***240** 16.5 bar (240 psi)

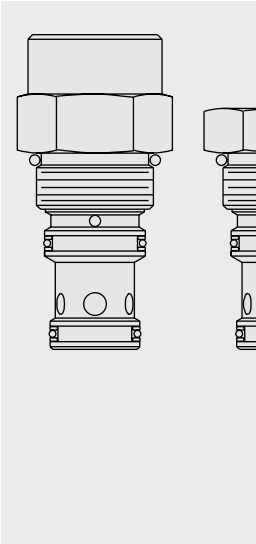
‡ T Option required

Seals

N Buna N (Std.)
V Fluorocarbon
P Polyurethane
(for pressures over
240 bar [3500 psi])

DIRECTIONAL VALVES

EV16-S34 Vented Spool-Type Logic Element



DESCRIPTION

A spool-type, screw-in, cartridge-style, hydraulic directional element, with multi-function potential when used with other directional, pressure, or flow control devices.

OPERATION

The EV16-S34 is a spring-biased blocking valve which will shift to allow full flow from ① to ② only when ③ is vented to create a pressure drop across the internal orifice which exceeds the pressure value of the selected bias spring force.

EV16-S34 is a vent-to-open directional valve.

FEATURES

- Multiple function/application potential.
- Smooth shift transition.
- Low pressure drop.
- Industry common cavity.

RATINGS

Operating Pressure: 240 bar (3500 psi)

Proof Pressure: 420 bar (6090 psi)

Flow: See Performance Chart

Internal Leakage: 164 cc/minute (10 cu. in./minute) max. at 207 bar (3000 psi)

Temperature: -40 to 120°C with standard Buna seals

Filtration: See page 9.010.1

Fluids: Mineral-based or synthetics with lubricating properties at viscosities of 7.4 to 420 cSt (50 to 2000 ssu)

Installation: No restrictions; See page 9.020.1

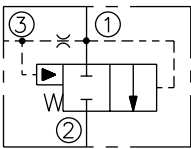
Cavity: VC16-S3; See page 9.116.1

Cavity Tool: CT16-S3XX; See page 8.600.1

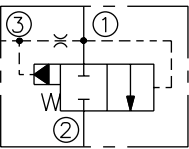
Seal Kit: SK16-3X-MM; See page 8.650.1

SYMBOLS

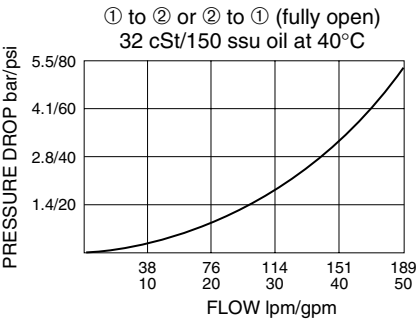
USASI:



ISO:

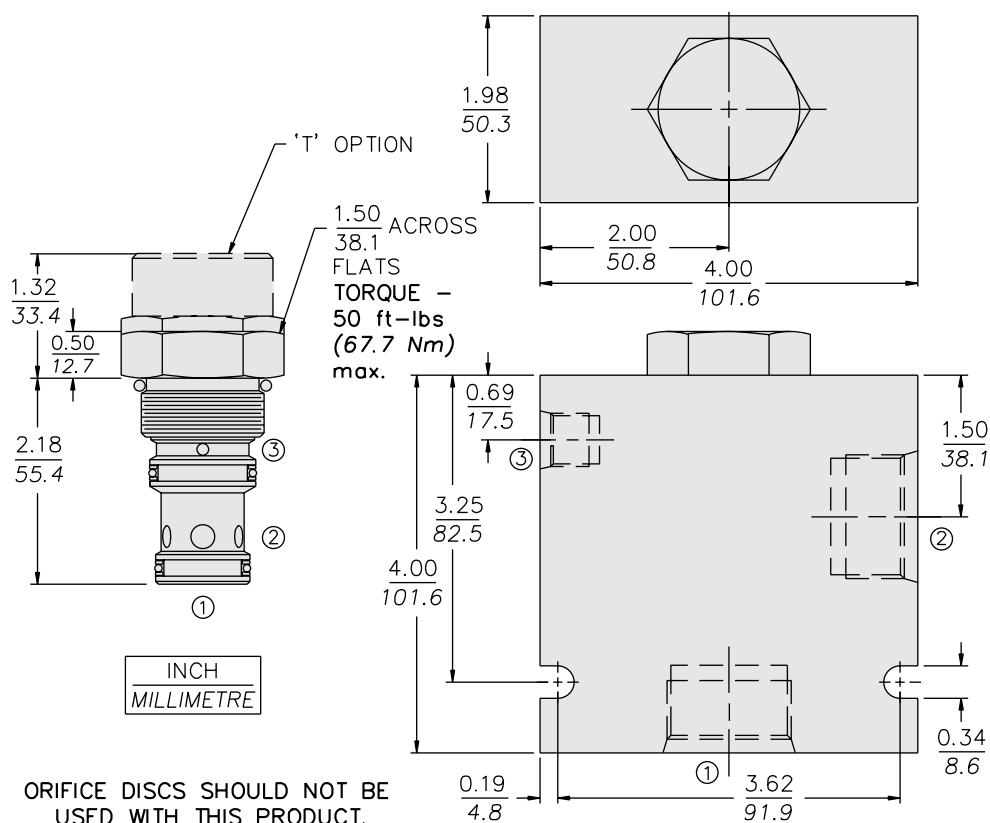


PERFORMANCE (Cartridge Only)



EV16-S34

DIMENSIONS



ORIFICE DISCS SHOULD NOT BE USED WITH THIS PRODUCT.

MATERIALS

Cartridge: Weight: 0.27 kg. (0.60 lbs.); Steel with hardened work surfaces; Zinc-plated exposed surfaces; Buna N O-rings and polyester elastomer back-ups standard.

Standard Ported Body: Weight: 1.50 kg. (3.3 lbs.). Anodized high-strength 6061 T6 aluminum alloy, rated to 240 bar (3500 psi); see page 8.016.1. Ductile iron and steel bodies available; dimensions may differ; consult factory.

TO ORDER

EV16-S34

Option

None (Blank)
Tall Cap T

Porting

Cartridge Only 0
SAE 16 w/SAE 6 Vent Port 16T

Bias Spring (Crack)

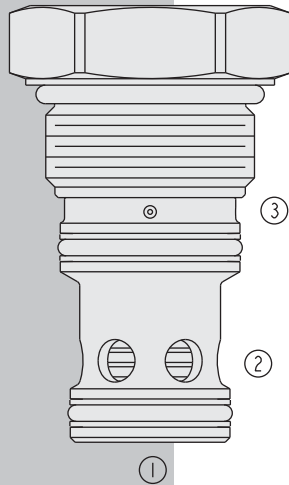
10 0.7 bar (10 psi)
20 1.4 bar (20 psi)
40 2.8 bar (40 psi)
70 4.8 bar (70 psi)
*90 6.2 bar (90 psi)
*110 7.6 bar (110 psi)
*160 11.0 bar (160 psi)

‡ T option required

Seals

N Buna N (Std.)
V Fluorocarbon

HEV16-S34 HyPerformance™ Vented Spool-Type



DESCRIPTION

A high-pressure spool-type, screw-in, cartridge-style, hydraulic directional element, with multi-function potential when used with other directional, pressure, or flow control devices.

OPERATION

The **HEV16-S34** is a spring-biased blocking valve which will shift to allow full flow from ① to ② only when ③ is vented to create a pressure drop across the internal orifice which exceeds the pressure of the selected bias spring.

HEV16-S34 is a vent-to-open directional valve.

FEATURES

- Multiple function/application potential.
- Smooth shift transition.
- Low pressure drop.
- All HyPerformance products are tested to the rigorous standards of the NFPA specification T2.6.1.
- All HyPerformance valves are tested at a verification level of 90% and an assurance of 99%.

RATINGS

Operating Pressure: 350 bar (5075 psi); 10% cycle life: 420 bar (6090 psi)

Note: All HyPerformance products are tested for 900K cycles at 350 bar and 100K at 420 bar.

Proof Pressure: 690 bar (10000 psi)

Burst Pressure: 1380 bar (20000 psi)

Flow: Up to 190 lpm (50 gpm)

Internal Leakage: 164 ml/minute (10 cu. in./minute) max. at 350 bar (5075 psi)

Operating Temperature: -54 to 107°C (-65 to 225°F) with Urethane seals

Filtration: See page 9.010.1

Fluids: Mineral-based or synthetics with lubricating properties at viscosities of 7.4 to 420 cSt (50 to 2000 sus); See Temperature and Oil Viscosity, page 9.060.1

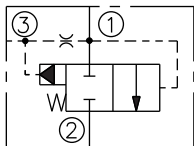
Installation: No restrictions; See page 9.020.1

Cavity: HVC16-S3; See page 9.116.1

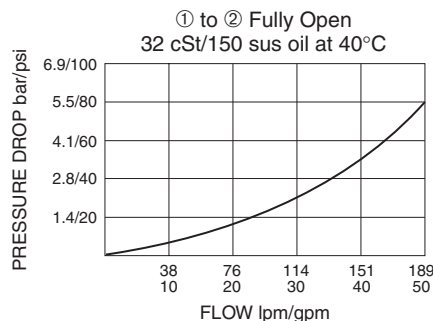
Cavity Tool: HCT16-S3XX; See page 8.600.1

Seal Kit: SK16-S3X-X; See page 8.650.1

SYMBOL



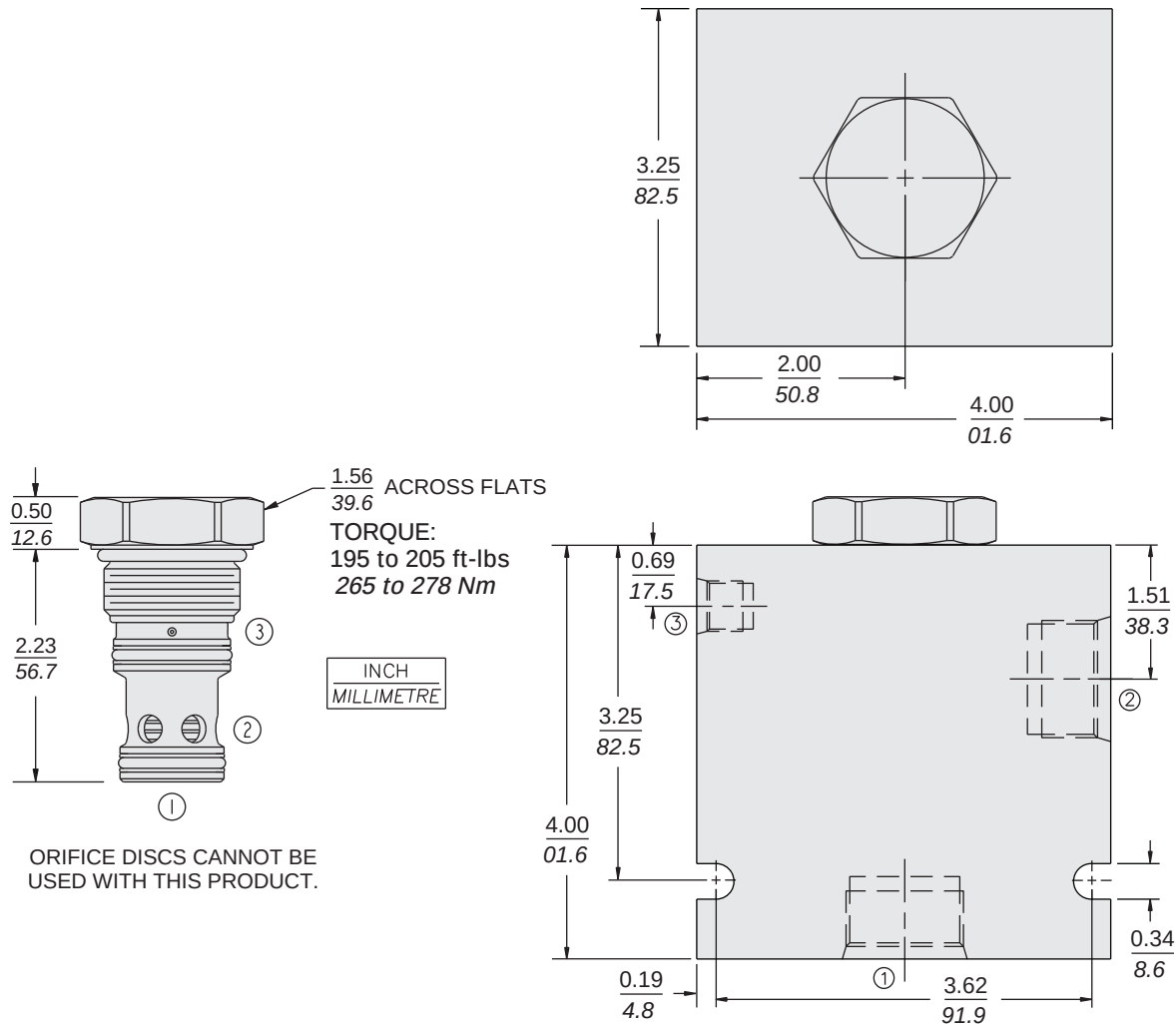
PERFORMANCE (Cartridge Only)



Logic Element

HEV16-S34

DIMENSIONS



MATERIALS

Cartridge: Weight: 0.30 kg. (0.67 lbs.)
 Steel with hardened work surfaces.
 Zinc-nickel plated exposed surfaces.
 PPDI Urethane seals with no backup rings standard.

Ported Body: Weight: 5.34 kg. (11.77 lbs.); HyPerformance™
 Ductile iron (code 'D') standard.
 Rated to 345 bar (5000 psi).

TO ORDER

HEV16-S34 -

Porting
 Cartridge Only 0
 SAE 16 16TD
 1 in. BSP* 8BD
 *BSP Body; U.K. Mfr. Only

Bias Spring Value

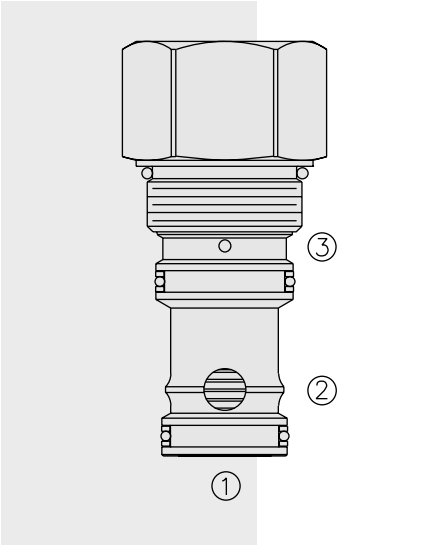
10 0.7 bar (10 psi)
 20 1.4 bar (20 psi)
 40 2.8 bar (40 psi)
 80 5.5 bar (80 psi)

Seals

U PPDI Urethane — Recommended for pressures above 241 bar (3500 psi)

DIRECTIONAL VALVES

EV20-S34 Vented Spool-Type Logic Element



DESCRIPTION

A spool-type, screw-in, cartridge-style, hydraulic directional element, with multi-function potential when used with other directional, pressure, or flow control devices.

OPERATION

The EV20-S34 is a spring-biased blocking valve which will shift to allow full flow from ① to ② only when ③ is vented to create a pressure drop across the internal orifice which exceeds the pressure value of the selected bias spring force.

EV20-S34 is a vent-to-open directional valve.

FEATURES

- Multiple function/application potential.
- Smooth shift transition.
- Low pressure drop.
- Industry common cavity.

RATINGS

Maximum Operating Pressure: Cartridge Only: Ports ① & ②: 345 bar (5000 psi); Port ③: 320 bar (4600 psi); Polyurethane seals are recommended for 5000 psi operation. Aluminum bodies for this product are rated for 3500 psi.

Flow: See Performance Chart

Internal Leakage: 164 cc/minute (10 cu. in./minute) max. at 320 bar (4600 psi)

Bias Spring Pressure Options: 3.5 bar (50 psi); 5.5 bar (80 psi); 11.0 bar (160 psi)

Temperature: -40 to 120°C with standard Buna seals

Filtration: See page 9.010.1

Fluids: Mineral-based or synthetics with lubricating properties at viscosities of 7.4 to 420 cSt (50 to 2000 ssu)

Installation: No restrictions; See page 9.020.1

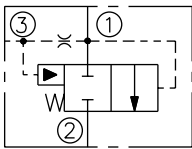
Cavity: VC20-S3; See page 9.120.1

Cavity Tool: CT20-S3XX; See page 8.600.1

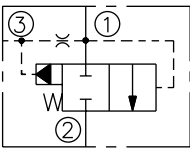
Seal Kit: SK20-3X-MM; See page 8.650.1

SYMBOLS

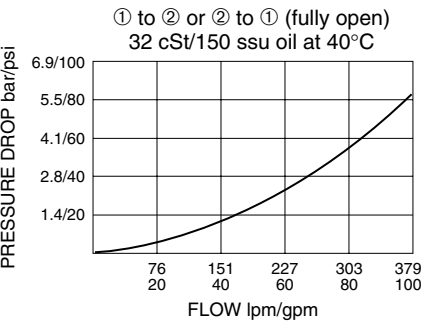
USASI:



ISO:

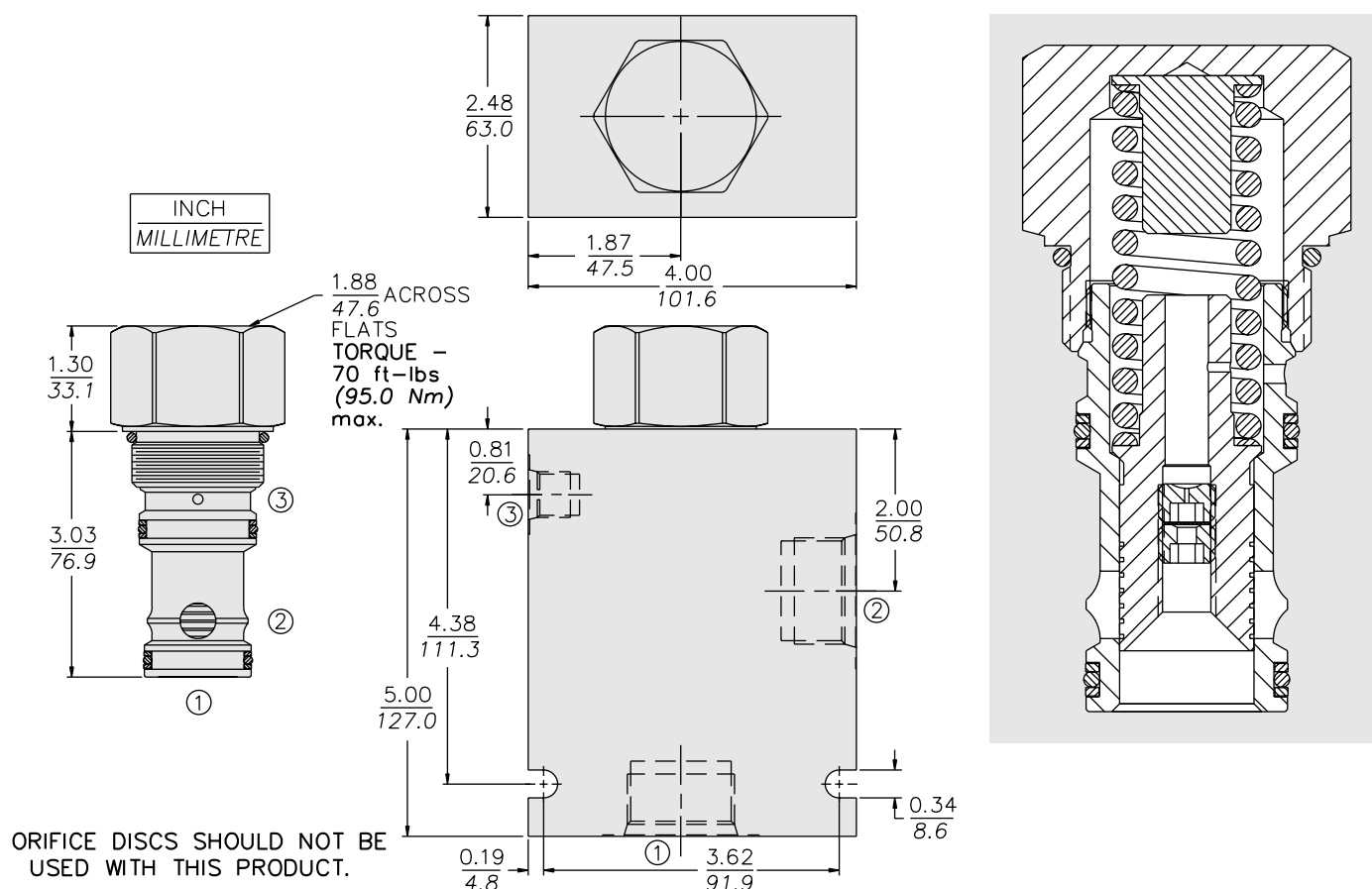


PERFORMANCE (Cartridge Only)



EV20-S34

DIMENSIONS



MATERIALS

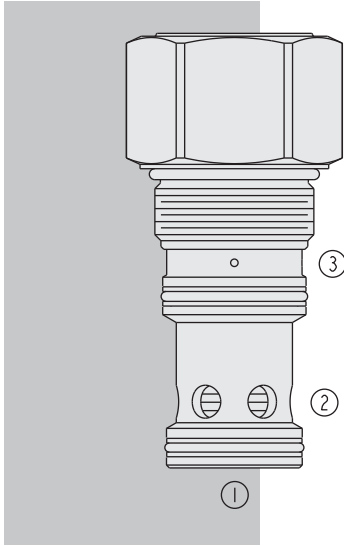
Cartridge: Weight: 0.82 kg. (1.8 lbs.); Steel with hardened work surfaces; Zinc-plated exposed surfaces; Buna N O-rings and polyester elastomer back-ups standard.

Standard Ported Body: Weight: 1.65 kg. (3.65 lbs.). Anodized high-strength 6061 T6 aluminum alloy, rated to 240 bar (3500 psi); see page 8.020.1. Ductile iron and steel bodies available; dimensions may differ; consult factory.

TO ORDER

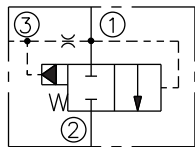
EV20-S34 -		
Porting		Bias Spring (Crack)
Cartridge Only	0	20 1.36 bar (20 psi)
SAE 16 w/SAE 6 Vent Port	16T	50 3.5 bar (50 psi)
		80 5.5 bar (80 psi)
		160 11.0 bar (160 psi)
Seals		
N Buna N (Std.)		
V Fluorocarbon		
P Polyurethane		
(for pressures over 240 bar [3500 psi])		

HEV42-S34 HyPerformance™ Vented Spool-Type

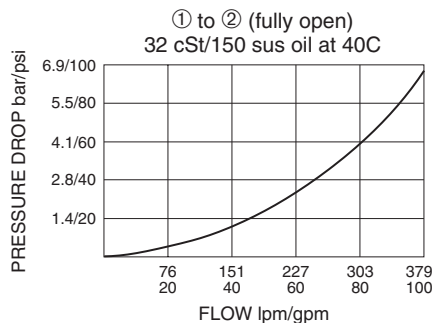


SYMBOLS

USAS/ISO:



PERFORMANCE (Cartridge Only)



DESCRIPTION

A high-pressure spool-type, screw-in, cartridge-style, hydraulic directional element, with multi-function potential when used with other directional, pressure, or flow control devices.

OPERATION

The **HEV42-S34** is a spring-biased blocking valve which will shift to allow full flow from 1 to 2 only when 3 is vented to create a pressure drop across the internal orifice which exceeds the pressure value of the selected bias spring force.

HEV42-S34 is a vent-to-open directional valve.

FEATURES

- Multiple function/application potential.
- Smooth shift transition.
- Low pressure drop.
- All HyPerformance products are tested to the rigorous standards of the NFPA specification T2.6.1.
- All HyPerformance valves are tested at a verification level of 90% and an assurance of 99%.

RATINGS

Operating Pressure: 350 bar (5075 psi); 10% cycle life: 420 bar (6090 psi)

Note: All HyPerformance products are tested for 900K cycles at 350 bar and 100K at 420 bar.

Fatigue Rating: 2 million cycles at 420 bar

Burst Pressure: 1380 bar (20000 psi)

Flow: Up to 379 lpm (100 gpm)

Internal Leakage: 164 ml/minute (10 cu. in./minute) max. at 350 bar (5075 psi)

Operating Temperature: -54 to 107°C (-65 to 225°F) with Urethane seals

Filtration: See page 9.010.1

Fluids: Mineral-based or synthetics with lubricating properties at viscosities of 7.4 to 420 cSt (50 to 2000 sus); See Temperature and Oil Viscosity, page 9.060.1

Installation: No restrictions; See page 9.020.1

Cavity: HVC42-S3; See page 9.142.1

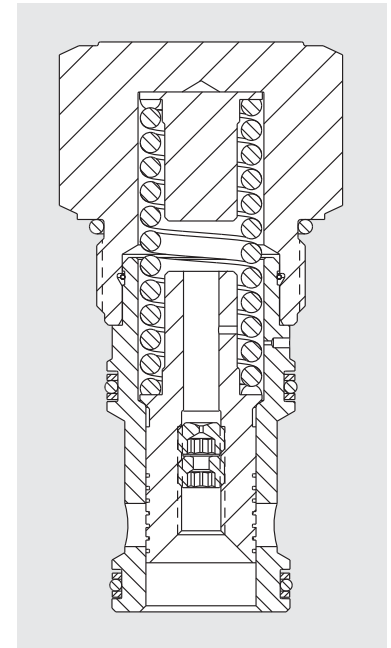
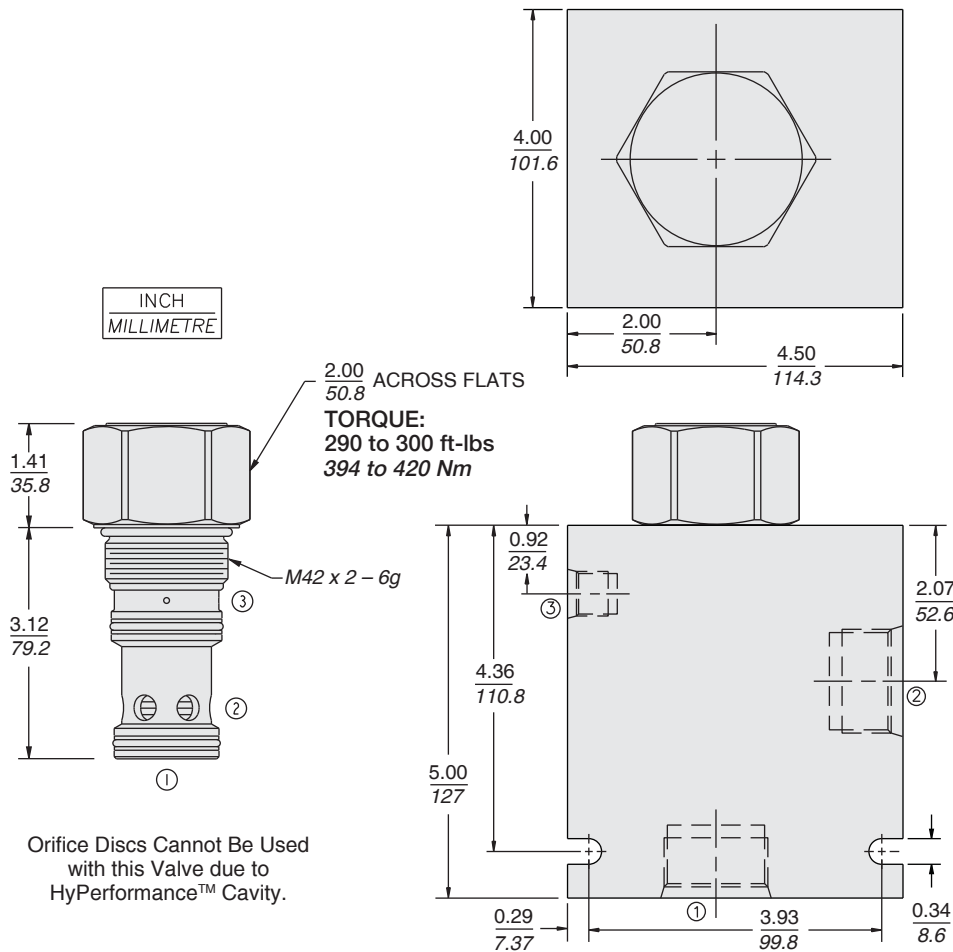
Cavity Tool: HCT42-S3XX; See page 8.600.1

Seal Kit: SK42-S3X-X; See page 8.650.1

Logic Element

HEV42-S34

DIMENSIONS



MATERIALS

Cartridge: Weight: 1.04 kg. (2.30 lbs.)
Steel with hardened work surfaces.
Zinc-nickel plated exposed surfaces.
PPDI Urethane seals with no backup rings standard.

Ported Body: Weight: 9.03 kg. (19.9 lbs.); HyPerformance™
Ductile iron (code 'D') standard.
Rated to 345 bar (5000 psi).

TO ORDER

HEV42-S34 -

Porting

Cartridge Only 0
SAE 20 20TD
1-1/4 in. BSP* 10BD
*BSP Body; U.K. Mfr. Only

Bias Spring Value

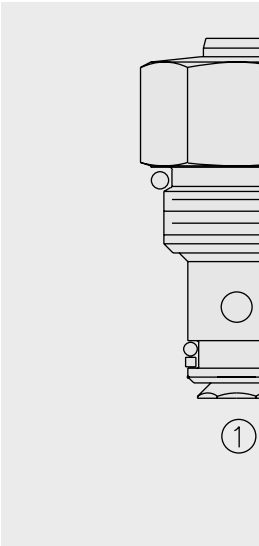
20 1.4 bar (20 psi)
50 3.4 bar (50 psi)
80 5.5 bar (80 psi)
175 12.1 bar (175 psi)

Seals

U PPDI Urethane — Recommended for pressures above 241 bar (3500 psi)

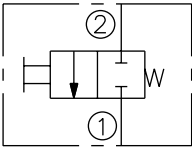
DIRECTIONAL VALVES

MV08-22 Manual Release Valve



SYMBOLS

USAS/ISO:



DESCRIPTION

A cam-operated, two-way, normally-closed poppet-type directional valve.

OPERATION

The MV08-22 blocks flow in the ② to ① flow path until cam force is supplied sufficient to overcome the spring bias plus load force.

Note: For applications requiring the ① to ② flow path, consult factory.

FEATURES

- Hardened seat and poppet for long life.
- Stainless steel cam button.

RATINGS

Operating Pressure: 207 bar (3000 psi)

Flow: 15.1 lpm (4 gpm)

Internal Leakage: 0.15 cc/minute (3 drops/minute) max. from 20.7 to 207 bar (300 to 3000 psi) on port ②

Required Cam Force for Operation Port ② Loaded:

- No load: 9.1 kgs. (20 lbs.)
- 69 bar (1000 psi): 20.9 kgs. (46 lbs.)
- 138 bar (2000 psi): 32.7 kgs. (72 lbs.)
- 207 bar (3000 psi): 44.5 kgs. (98 lbs.)

Temperature: -40 to 120°C

Filtration: See page 9.010.1

Fluids: Mineral-based or synthetics with lubricating properties at viscosities of 7.4 to 420 cSt (50 to 2000 ssu)

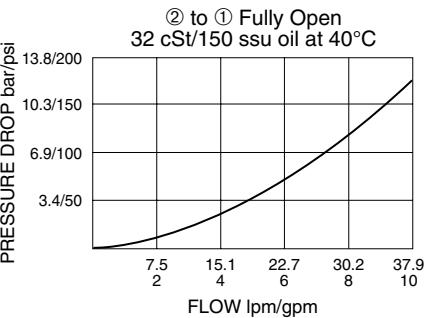
Installation: Position unlimited. 11.9 mm (15/32 in.) diameter drill, 32.5 mm (1.28 in.) from spotface required minimum.

Cavity: VC08-2, Cavity Variation "A"; See page 9.108.1

Cavity Tool: CT08-2; See page 8.600.1

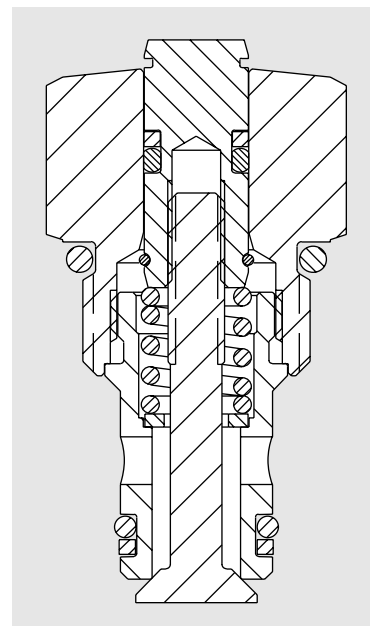
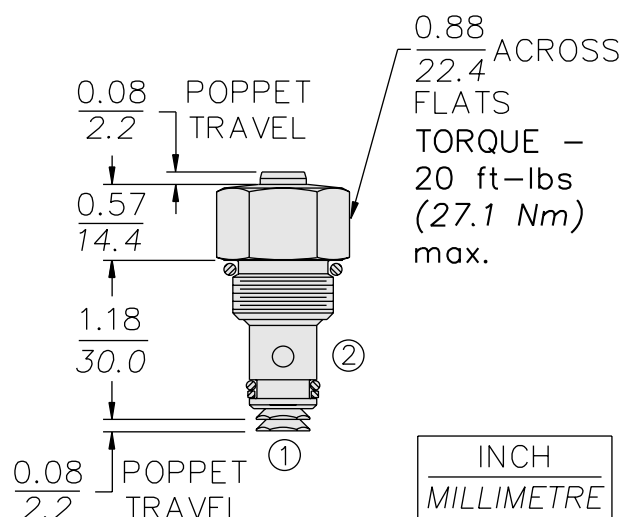
Seal Kit: SK08-2X-T; See page 8.650.1

PERFORMANCE (Cartridge Only)



MV08-22

DIMENSIONS



ORIFICE DISCS SHOULD NOT BE USED WITH THIS PRODUCT.

MATERIALS

Cartridge: Weight: 0.05 kg. (0.12 lbs.); Stainless steel pin; Steel with hardened work surfaces; Zinc-plated exposed surfaces; Buna N O-rings and back-up standard.

Standard Ported Body: None; consult factory.

TO ORDER

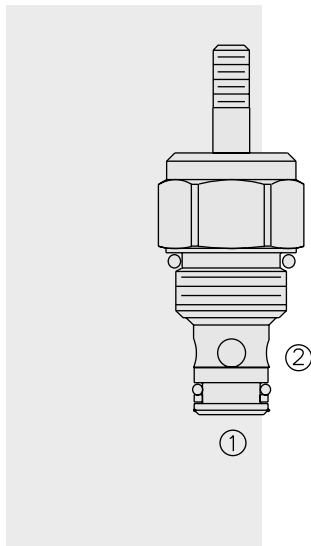
MV08-22-0-

Seals

- N** Buna N (Std.)
- V** Fluorocarbon

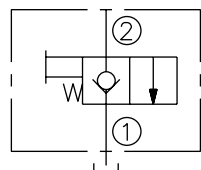
DIRECTIONAL VALVES

MP08-20 Manual, Spring Return, Pull-to-Open

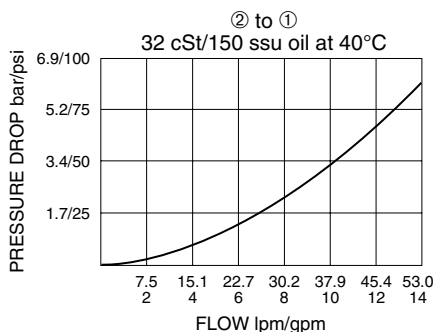


SYMBOLS

USAS/ISO:



PERFORMANCE (Cartridge Only)



DESCRIPTION

A manual, 2-way, pull-to-open, screw-in hydraulic directional valve.

OPERATION

The MP08-20 blocks flow from ② to ① until an operator pulls the shaft outward.

Note: Pressure at port ① will directly act on the spool and spring. Port ① is intended to be a tank port only.

The bias spring allows for up to 12.4 bar (180 psi) back-pressure at ① before the valve will open.

FEATURES

- Hardened seat for long life and low leakage.
- Remains closed to 12.4 bar (180 psi) back-pressure.
- Industry common cavity.

RATINGS

Operating Pressure:

Port ②: 207 bar (3000 psi)

Port ①: 12.4 bar (180 psi) max.

Proof Pressure: 350 bar (5075 psi)

Flow: See Performance Chart

Internal Leakage ② to ①: 0.25 cc/minute (5 drops/minute) max. at 207 bar (3000 psi)

Mechanical Pull Effort Required at Rated Pressure: 4.5 kg. (10.0 lbs.) initial;
6.8 kg. (15.0 lbs.) full shift

Temperature: -40 to 120°C

Filtration: See page 9.010.1

Fluids: Mineral-based or synthetics with lubricating properties at viscosities of
7.4 to 420 cSt (50 to 2000 ssu)

Installation: No restrictions; See page 9.020.1

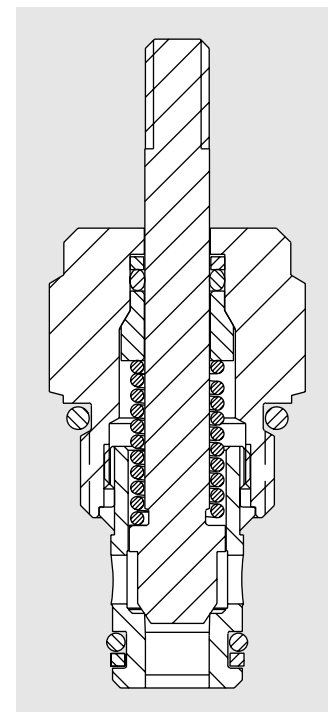
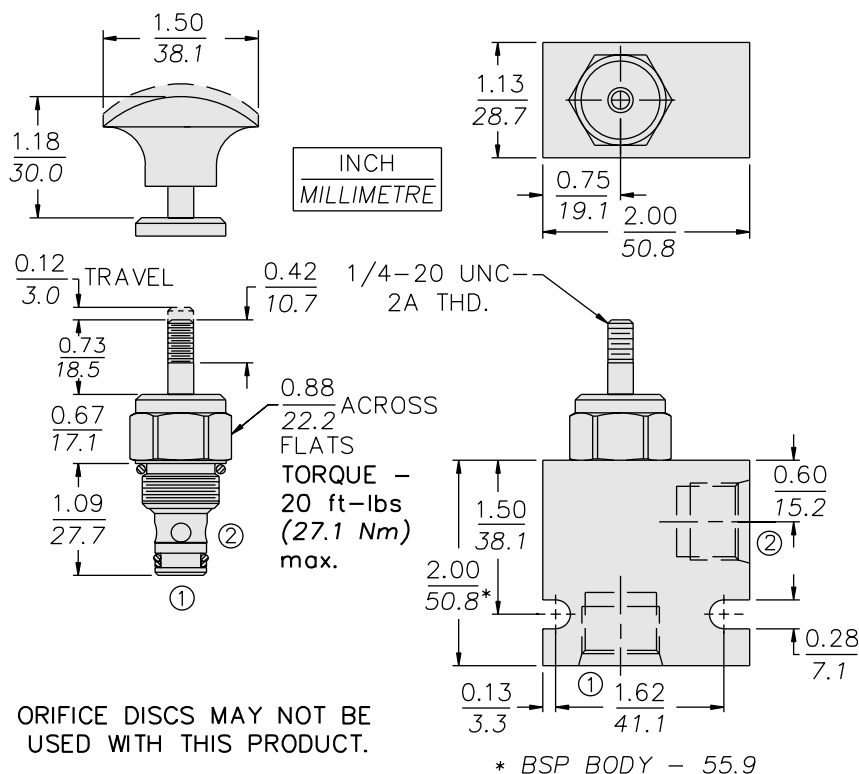
Cavity: VC08-2; See page 9.108.1

Cavity Tool: CT08-2XX; See page 8.600.1

Seal Kit: SK08-2X-T; See page 8.650.1

MP08-20

DIMENSIONS



MATERIALS

Cartridge: Weight: 0.10 kg. (0.22 lbs.); Steel with hardened work surfaces; Zinc-plated exposed surfaces; Buna N O-rings and back-ups standard; Plastic knob optional.

Standard Ported Body: Weight: 0.16 kg. (0.35 lbs.); Anodized high-strength 6061 T6 aluminum alloy, rated to 240 bar (3500 psi); see page 8.008.1. Ductile iron and steel bodies available; dimensions may differ; consult factory.

TO ORDER

MP08-20

Option

Threaded Shaft w/Spring Return **T**

Black Plastic Knob w/Spring Return **K**

Red Plastic Knob w/Spring Return **J**

Seals

N Buna N (Std.)

V Fluorocarbon

Porting

Cartridge Only **0**

SAE 4 **4T**

SAE 6 **6T**

SAE 8 **8T**

1/4 in. BSP* **2B**

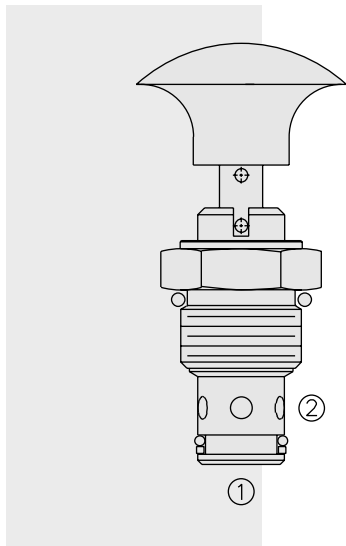
3/8 in. BSP* **3B**

1/2 in. BSP* **4B**

*BSP Body;
U.K. Mfr. Only

DIRECTIONAL VALVES

MP10-20 Manual, Spring Return, Pull-to-Open



DESCRIPTION

A manual, 2-way, pull-to-open, screw-in hydraulic directional valve.

OPERATION

The MP10-20 blocks flow from ② to ① until an operator pulls the shaft outward.

The bias spring allows for up to 12.4 bar (180 psi) back-pressure at ① before the valve will open.

Note: Pressure at port ① will directly act on the spool and spring. Port ① is intended to be a tank port only.

A unique 90° rotational lock is optional for positive “open” position holding. The valve resets to spring return-to-close with a 90° turn from the locked-open position.

FEATURES

- Hardened seat for long life and low leakage.
- Remains closed to 12.4 bar (180 psi) back-pressure.
- Optional rotational lock position.
- Industry common cavity.

RATINGS

Operating Pressure: 207 bar (3000 psi)

Proof Pressure: 350 bar (5075 psi)

Flow: See Performance Chart

Internal Leakage ② to ①: 0.25 cc/minute (5 drops/minute) max. at 207 bar (3000 psi)

Mechanical Pull Effort Required at Rated Pressure: 7.3 kg. (16 lbs.)

Temperature: -40 to 120°C

Filtration: See page 9.010.1

Fluids: Mineral-based or synthetics with lubricating properties at viscosities of 7.4 to 420 cSt (50 to 2000 ssu)

Installation: No restrictions; See page 9.020.1

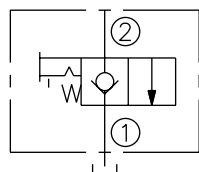
Cavity: VC10-2; See page 9.110.1

Cavity Tool: CT10-2XX; See page 8.600.1

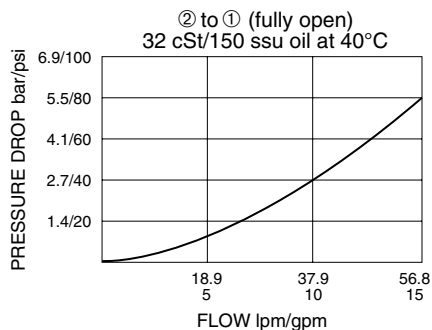
Seal Kit: SK10-2X-T; See page 8.650.1

SYMBOLS

USAS/ISO:

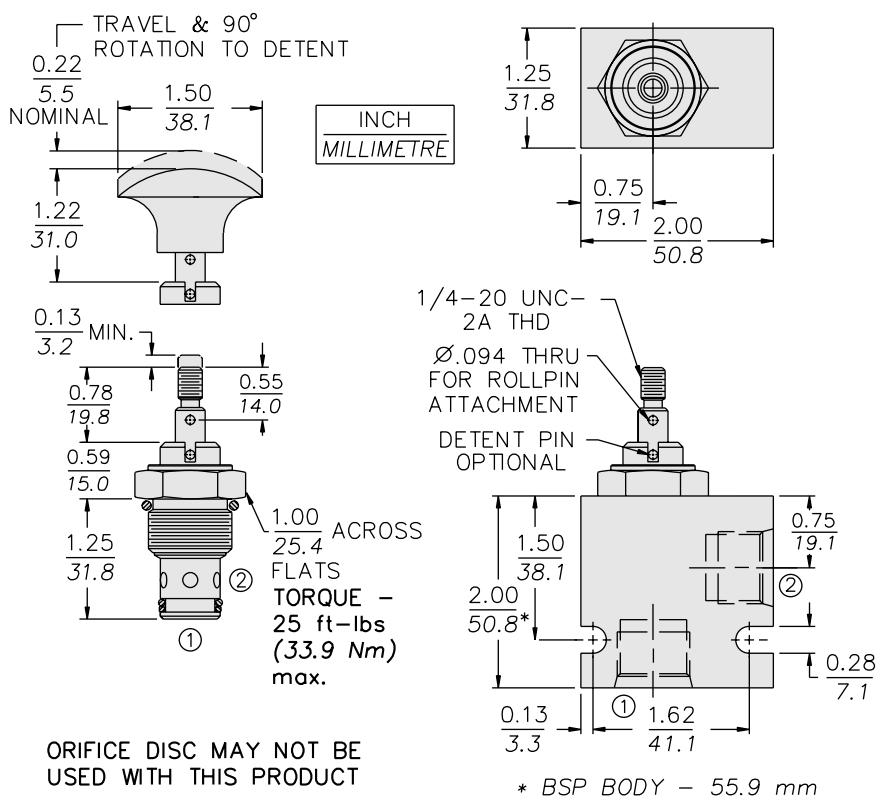


PERFORMANCE (Cartridge Only)

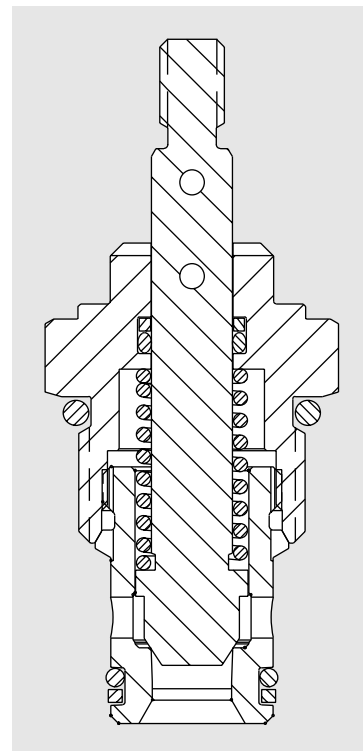


MP10-20

DIMENSIONS



ORIFICE DISC MAY NOT BE USED WITH THIS PRODUCT



MATERIALS

Cartridge: Weight: 0.11 kg. (0.25 lbs.); Steel with hardened work surfaces; Zinc-plated exposed surfaces; Buna N O-rings and polyester elastomer back-ups standard; Plastic knob optional.

Standard Ported Body: Weight: 0.16 kg. (0.35 lbs.); Anodized high-strength 6061 T6 aluminum alloy, rated to 240 bar (3500 psi); see page 8.010.1. Ductile iron and steel bodies available; dimensions may differ; consult factory.

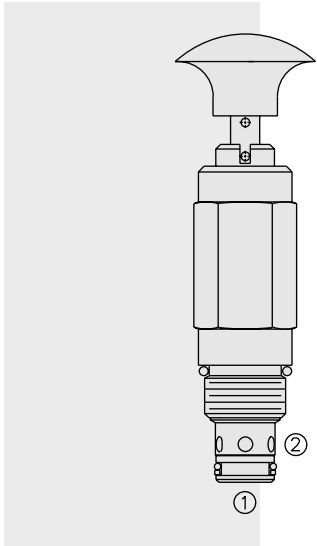
TO ORDER

MP10-20		-		-	
Option				Seals	
Threaded Shaft/ Spring Return	T			N	Buna N (Std.)
Threaded Shaft/ Lock Position Pin	R			V	Fluorocarbon
Black Plastic Knob/ Spring Return	K			Porting	
Black Plastic Knob/ Lock Position Pin	D			0	Cartridge Only
Red Plastic Knob/ Spring Return	J			6T	SAE 6
Red Plastic Knob/ Lock Position Pin	L			8T	SAE 8
				2B	1/4 in. BSP*
				3B	3/8 in. BSP*
				4B	1/2 in. BSP*

*BSP Body;
U.K. Mfr. Only

DIRECTIONAL VALVES

MP10-22 Manual, Spring Return, Pull-to-Open



DESCRIPTION

A manual, 2-way, normally closed, pull-to-open, spring-return, screw-in, hydraulic cartridge, system unloading valve for higher tank pressure applications.

OPERATION

The **MP10-22** blocks flow from ② to ① until an operator pulls the shaft outward.

The bias spring allows for up to 27.6 bar (400 psi) back-pressure at ① before the valve will open.

When passing high flow rates, a combination of the differential pressure across the valve (flowing ② to ①) and ② downstream back-pressure may require the operator to push the shaft to close.

Note: Pressure at port ① will directly act on the spool and spring. Port ① is intended to be a tank port only.

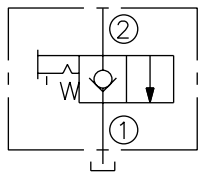
A unique 90° rotational lock is optional for positive “open” position holding. The valve resets to spring return-to-close with a 90° turn from the locked-open position.

FEATURES

- Hardened seat for long life and low leakage.
- Remains closed to 27.6 bar (400 psi) back-pressure.
- Optional rotational lock position.
- Industry common cavity.

SYMBOLS

USASI/ISO:



RATINGS

Operating Pressure: 207 bar (3000 psi)

Proof Pressure: 350 bar (5075 psi)

Flow: See Performance Chart

Internal Leakage ② to ①: 0.25 cc/minute (5 drops/minute) max. at 207 bar (3000 psi)

Mechanical Pull Effort Required: 14.1 kg. (31 lbs.) installed; 16.3 kg. (36 lbs.) to travel 3.18 mm (0.125 in.); 17.3 kg. (39 lbs.) to detent

Temperature: -40 to 120°C

Filtration: See page 9.010.1

Fluids: Mineral-based or synthetics with lubricating properties at viscosities of 7.4 to 420 cSt (50 to 2000 ssu)

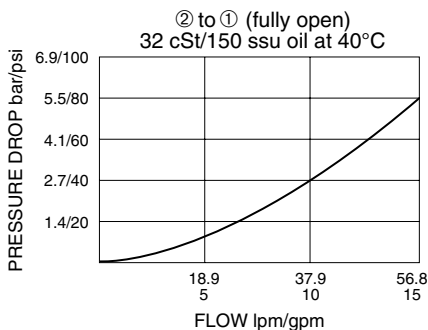
Installation: No restrictions; See page 9.020.1

Cavity: VC10-2; See page 9.110.1

Cavity Tool: CT10-2XX; See page 8.600.1

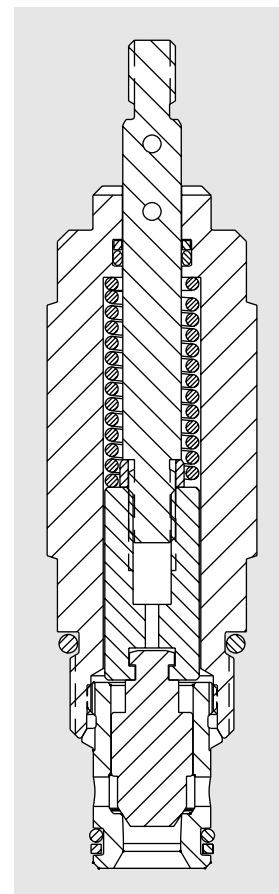
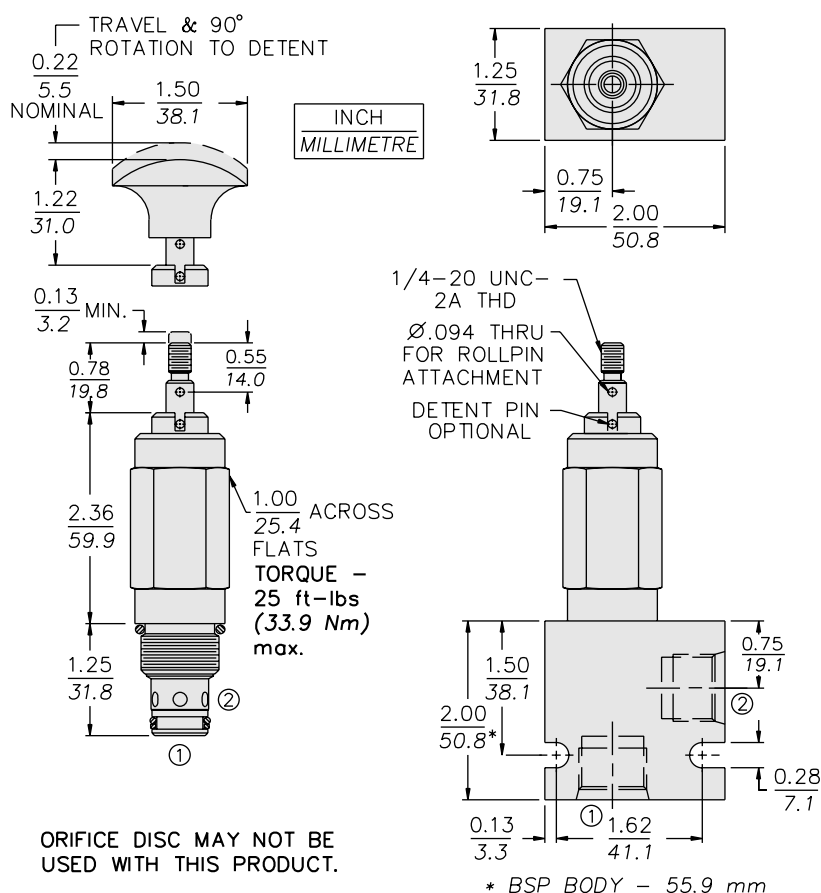
Seal Kit: SK10-2X-T; See page 8.650.1

PERFORMANCE (Cartridge Only)



MP10-22

DIMENSIONS



MATERIALS

Cartridge: Weight: 0.23 kg. (0.50 lbs.); Steel with hardened work surfaces; Zinc-plated exposed surfaces; Buna N O-rings and polyester elastomer back-up standard; Plastic knob optional.

Standard Ported Body: Weight: 0.16 kg. (0.35 lbs.); Anodized high-strength 6061 T6 aluminum alloy, rated to 240 bar (3500 psi); see page 8.010.1. Ductile iron and steel bodies available; dimensions may differ; consult factory.

TO ORDER

MP10-22

Option

Threaded Shaft/
Spring Return **T**

Threaded Shaft/
Lock Position Pin **R**

Black Plastic Knob/
Spring Return **K**

Black Plastic Knob/
Lock Position Pin **D**

Red Plastic Knob/
Spring Return **J**

Red Plastic Knob/
Lock Position Pin **L**

Seals

N Buna N (Std.)

V Fluorocarbon

Porting

0 Cartridge Only

6T SAE 6

8T SAE 8

2B 1/4 in. BSP*

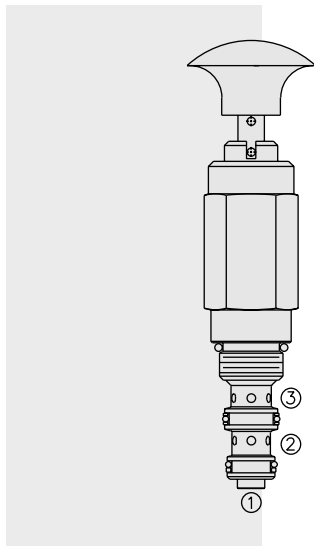
3B 3/8 in. BSP*

4B 1/2 in. BSP*

*BSP Body;
U.K. Mfr. Only

DIRECTIONAL VALVES

MP08-30 Manual, Spring Return, Pull-to-Shift



DESCRIPTION

A 3-way, manual, pull-to-shift, spring-return, directional hydraulic cartridge valve.

Series operation is prohibited due to the tank port (①) pressure rating.

OPERATION

In its steady-state, spring-offset position, the **MP08-30** directs flow from ② to ①, while blocking at ③.

In the actuated (pulled) position, the cartridge directs flow from ③ to ②, blocking ①. The spring chamber is vented at ①.

Note: Pressure at port ① will directly act on the spool and spring. Port ① is intended to be a tank port only.

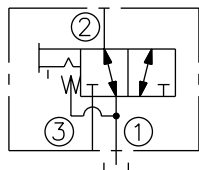
A unique pull-and-rotate feature for holding the positive actuated position is optional. A 90° rotation is required to position at the hold slot. The valve resets to spring-return de-actuated with a slight pull and a 90° turn from the locked actuated position.

FEATURES

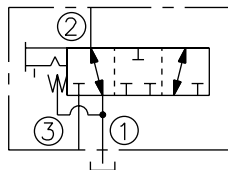
- Hardened spool and cage for long life.
- Pressure to 14 bar (200 psi) on ①.
- Optional rotational lock position.
- Compact size.

SYMBOLS

USASI/ISO:



TRANSITION:



RATINGS

Operating Pressure:

On ③ to ②: 240 bar (3500 psi)

On ① (Max.): 14 bar (200 psi)

Proof Pressure: 350 bar (5075 psi)

Flow: See Performance Chart

Internal Leakage: 82 cc/minute (5 cu. in./minute) max.

Mechanical Pull Effort Required: 7.7 kg. (17 lbs.) installed; 8.6 kg. (19 lbs.) to travel 3.2 mm (0.125 in.); 9.1 kg. (20 lbs.) to detent

Temperature: -40 to 120°C

Filtration: See page 9.010.1

Fluids: Mineral-based or synthetics with lubricating properties at viscosities of 7.4 to 420 cSt (50 to 2000 ssu)

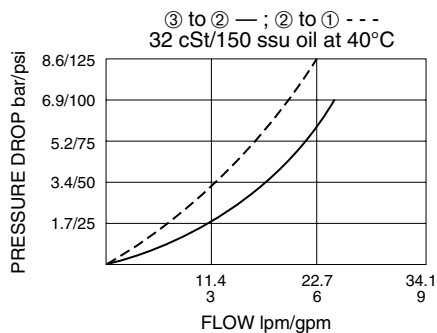
Installation: No restrictions; See page 9.020.1

Cavity: VC08-3; See page 9.108.1

Cavity Tool: CT08-3XX; See page 8.600.1

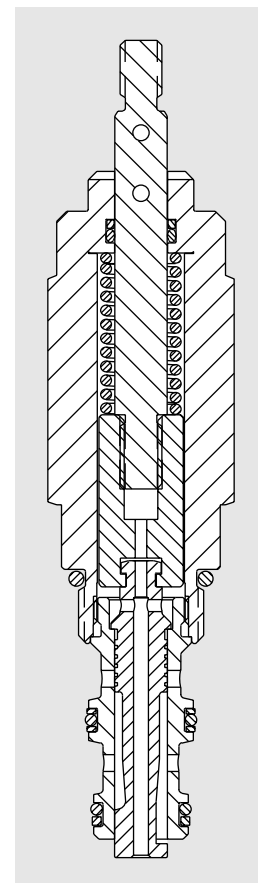
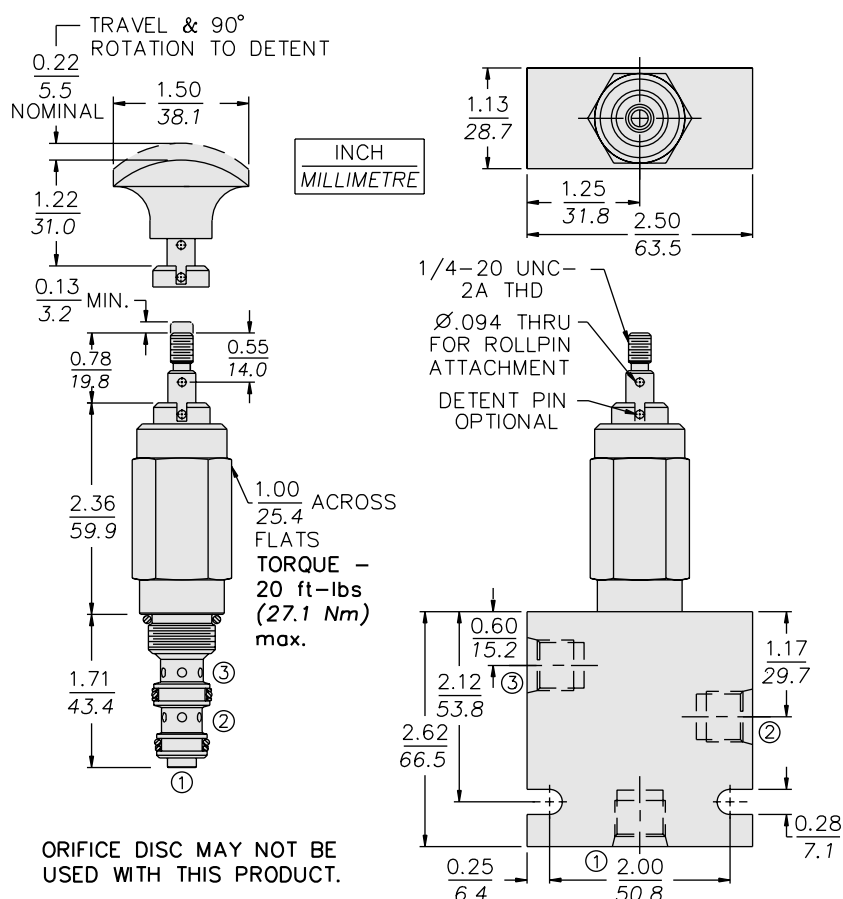
Seal Kit: SK08-3X-MT; See page 8.650.1

PERFORMANCE (Cartridge Only)



MP08-30

DIMENSIONS



MATERIALS

Cartridge: Weight: 0.23 kg. (0.50 lbs.); Steel with hardened work surfaces. Zinc-plated exposed surfaces. Buna N O-rings and polyester elastomer back-ups standard. Plastic knob optional.

Standard Ported Body: Weight: 0.27 kg. (0.60 lbs.); Anodized high-strength 6061 T6 aluminum alloy, rated to 240 bar (3500 psi); see page 8.008.1. Ductile iron and steel bodies available; dimensions may differ; consult factory.

TO ORDER

MP08-30

Option

Threaded Shaft/
Spring Return T

Threaded Shaft/
Lock Position Pin R

Black Plastic Knob/
Spring Return K

Black Plastic Knob/
Lock Position Pin D

Red Plastic Knob/
Spring Return J

Red Plastic Knob/
Lock Position Pin L

Seals

N Buna N (Std.)

V Fluorocarbon

Porting

0 Cartridge Only

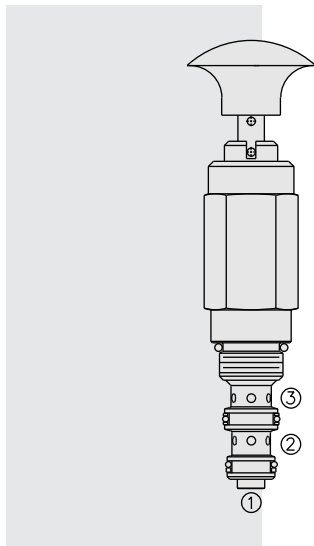
6T SAE 6

2B 1/4 in. BSP*

3B 3/8 in. BSP*

*BSP Body;
U.K. Mfr. Only

MP58-30 Manual, Spring Return, Pull-to-Shift



DESCRIPTION

A 3-way, manual, pull-to-shift, spring-return, directional hydraulic cartridge valve. Series operation is prohibited due to the tank port (1) pressure rating.

OPERATION

In its steady-state, spring-offset position, the **MP58-30** directs flow from 2 to 1, while blocking at 3.

In the actuated (pulled) position, the cartridge directs flow from 3 to 2, blocking 1. The spring chamber is vented at 1.

Note: Pressure at port 1 will directly act on the spool and spring. Port 1 is intended to be a tank port only.

A unique pull-and-rotate feature for holding the positive actuated position is optional. A 90° rotation is required to position at the hold slot. The valve resets to spring-return de-actuated with a slight pull and a 90° turn from the locked actuated position.

FEATURES

- Hardened spool and cage for long life.
- Pressure to 14 bar (200 psi) on 1.
- Optional rotational lock position.
- Compact size.

RATINGS

Operating Pressure:

On 3 to 2: 345 bar (5000 psi)

On 1 (Max.): 14 bar (200 psi)

Flow: See Performance Chart

Internal Leakage: 147 cc/minute (9 cu. in./minute) max. at 345 bar (5000 psi)

Mechanical Pull Effort Required: 7.7 kg. (17 lbs.) installed; 8.6 kg. (19 lbs.) to travel 3.2 mm (0.125 in.); 9.1 kg. (20 lbs.) to detent

Temperature: -40 to 120°C

Filtration: See page 9.010.1

Fluids: Mineral-based or synthetics with lubricating properties at viscosities of 7.4 to 420 cSt (50 to 2000 sus); See Temperature and Oil Viscosity, page 9.060.1

Installation: No restrictions; See page 9.020.1

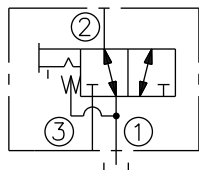
Cavity: VC08-3; See page 9.108.1

Cavity Tool: CT08-3XX; See page 8.600.1

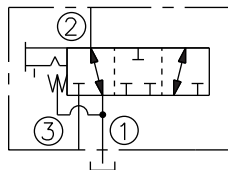
Seal Kit: SK08-3P-MT; See page 8.650.1

SYMBOLS

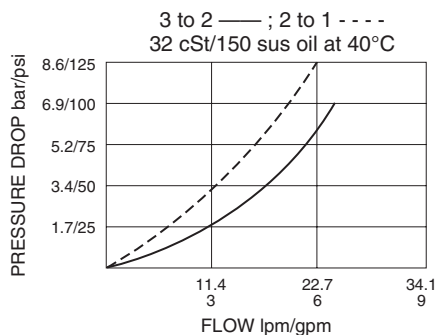
USAS/ISO:



TRANSITION:

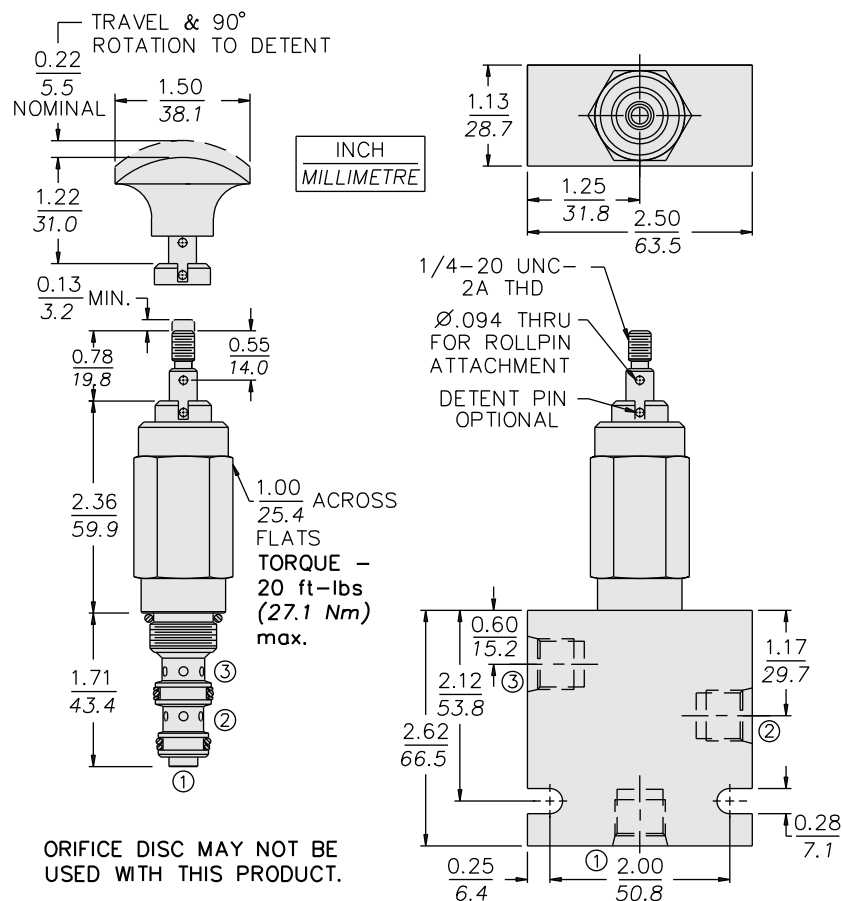


PERFORMANCE (Cartridge Only)



MP58-30

DIMENSIONS



MATERIALS

Cartridge: Weight: 0.23 kg. (0.50 lbs.)
Steel with hardened work surfaces.
Zinc-plated exposed surfaces.
Polyurethane cast O-rings and
Fluorocarbon back-up standard.
Plastic knob optional.

Standard Ported Body: Weight:
0.27 kg. (0.60 lbs.) Anodized
high-strength 6061 T6 aluminum
alloy, rated to 207 bar (3000 psi).
Ductile iron (code D) bodies are
required for operation over 207 bar
(3000 psi), dimensions may differ.
See page 8.008.1

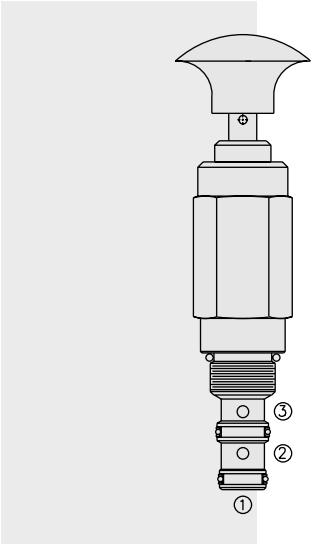
TO ORDER

MP58-30		-	-	P
Option				Seals
Threaded Shaft/ Spring Return	T			P Polyurethane
Threaded Shaft/ Lock Position Pin	R			
Black Plastic Knob/ Spring Return	K			
Black Plastic Knob/ Lock Position Pin	D			
Red Plastic Knob/ Spring Return	J			
Red Plastic Knob/ Lock Position Pin	L			
				Porting
			0	Cartridge Only
			6T	SAE 6
			6TD	SAE 6
			2B	1/4 in. BSP*
			2BD	1/4 in. BSP*
			3B	3/8 in. BSP*
			3BD	3/8 in. BSP*

*BSP Body;
U.K. Mfr. Only

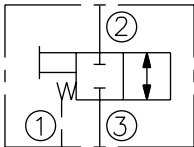
DIRECTIONAL VALVES

MP08-34 Manual, Spring Return, Pull-to-Shift

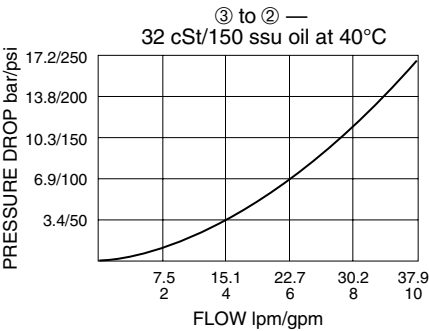


SYMBOLS

USASI/ISO:



PERFORMANCE (Cartridge Only)



DESCRIPTION

A 3-way, manual, pull-to-shift, spring-return, directional hydraulic cartridge valve.

OPERATION

In its steady-state, spring-offset position, the **MP08-34** blocks flow from ② to ③.

In the actuated (pulled) position, the cartridge directs flow from ③ to ②. The spring chamber is vented at ①. When released, the valve returns to its steady state.

Note: Pressure at port ① will directly act on the spool and spring. Port ① is intended to be a tank port only.

FEATURES

- Hardened spool and cage for long life.
- Pressure to 14 bar (200 psi) on ①.
- Optional rotational lock position.
- Compact size.

RATINGS

Operating Pressure:

On ③ to ②: 240 bar (3500 psi)

Proof Pressure: 350 bar (5075 psi)

Flow: See Performance Chart

Internal Leakage: 82 cc/minute (5 cu. in./minute) max.

Mechanical Pull Effort Required: 7.3 kg. (17 lbs.) installed; 8.6 kg. (19 lbs.) to travel 3.2 mm (0.125 in.); 9.1 kg. (20 lbs.) to detent

Temperature: -40 to 120°C

Filtration: See page 9.010.1

Fluids: Mineral-based or synthetics with lubricating properties at viscosities of 7.4 to 420 cSt (50 to 2000 ssu)

Installation: No restrictions; See page 9.020.1

Cavity: VC08-3; See page 9.108.1

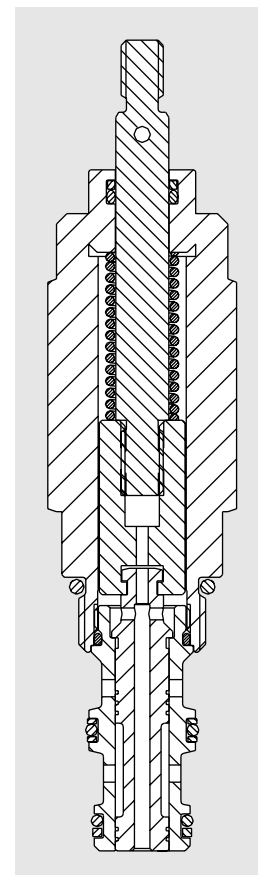
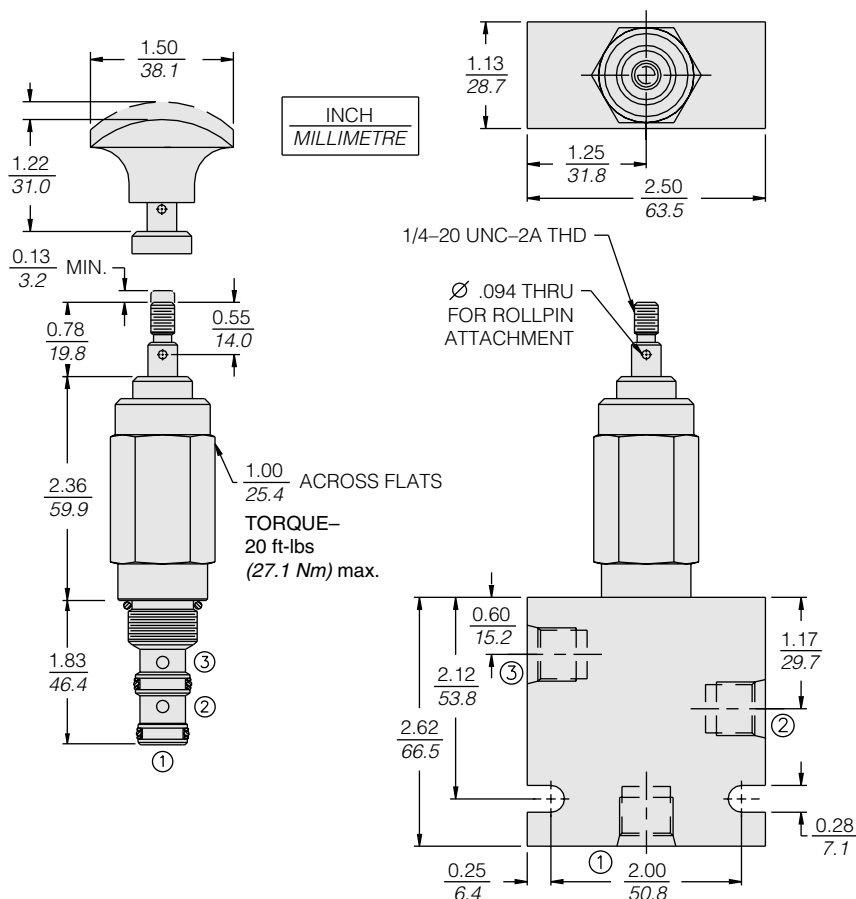
Cavity Tool: CT08-3XX; See page 8.600.1

Seal Kit: SK08-3X-MT; See page 8.650.1

Note: This product replaces MP08-36

MP08-34

DIMENSIONS



MATERIALS

Cartridge: Weight: 0.23 kg. (0.50 lbs.); Steel with hardened work surfaces. Zinc-plated exposed surfaces. Buna N O-rings and polyester elastomer back-ups standard. Plastic knob optional.

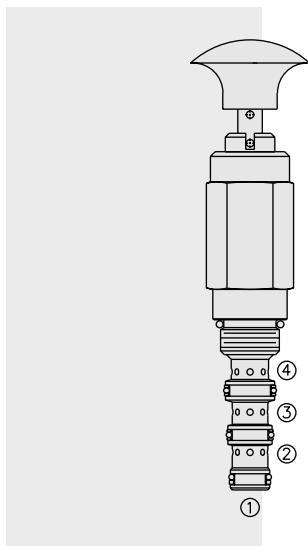
Standard Ported Body: Weight: 0.27 kg. (0.60 lbs.); Anodized high-strength 6061 T6 aluminum alloy, rated to 240 bar (3500 psi); see page 8.008.1. Ductile iron and steel bodies available; dimensions may differ; consult factory.

TO ORDER

MP08-34		-	-	-
Option				Seals
Threaded Shaft/ Spring Return	T			N Buna N (Std.)
Black Plastic Knob/ Spring Return	K			V Fluorocarbon
Red Plastic Knob/ Spring Return	J			
			Porting	
			0 Cartridge Only	
			6T SAE 6	
			2B 1/4 in. BSP*	
			3B 3/8 in. BSP*	
			*BSP Body; U.K. Mfr. Only	

DIRECTIONAL VALVES

MP08-40 Manual, Spring Return, Pull-to-Shift



DESCRIPTION

A 4-way, manual, pull-to-shift, spring-return, directional hydraulic cartridge valve. Series operation is prohibited due to the tank port (①) pressure rating.

OPERATION

In its steady-state, spring-offset position, the **MP08-40** directs flow from ③ to ②, and from ④ to ①.

In the actuated (pulled) position, the cartridge directs flow from ③ to ④, and from ② to ①. The spring chamber is vented at ①.

Note: Pressure at port ① will directly act on the spool and spring. Port ① is intended to be a tank port only.

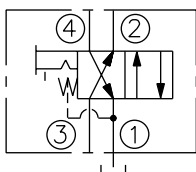
A unique pull-and-rotate feature for holding the positive actuated position is optional. A 90° rotation is required to position at the hold slot. The valve resets to spring-return de-actuated with a slight pull and a 90° turn from the locked actuated position.

FEATURES

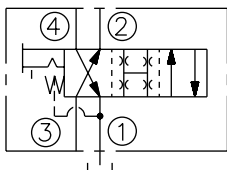
- Hardened spool and cage for long life.
- Pressure to 14 bar (200 psi) on ①.
- Optional rotational lock position.
- Compact size.

SYMBOLS

USASI/ISO:



TRANSITION:



RATINGS

Operating Pressure:

- On ②, ③ and ④: 240 bar (3500 psi)
- On ① (Max.): 14 bar (200 psi)

Proof Pressure: 350 bar (5075 psi)

Flow: See Performance Chart

Internal Leakage: 82 cc/minute (5 cu. in./minute) max.

Mechanical Pull Effort Required: 7.7 kg. (17 lbs.) installed; 8.6 kg. (19 lbs.) to travel 3.2 mm (0.125 in.); 9.1 kg. (20 lbs.) to detent

Temperature: -40 to 120°C

Filtration: See page 9.010.1

Fluids: Mineral-based or synthetics with lubricating properties at viscosities of 7.4 to 420 cSt (50 to 2000 ssu)

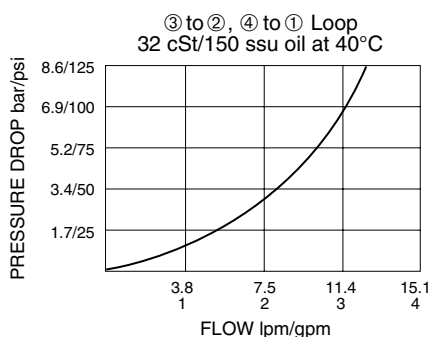
Installation: No restrictions; See page 9.020.1

Cavity: VC08-4; See page 9.108.1

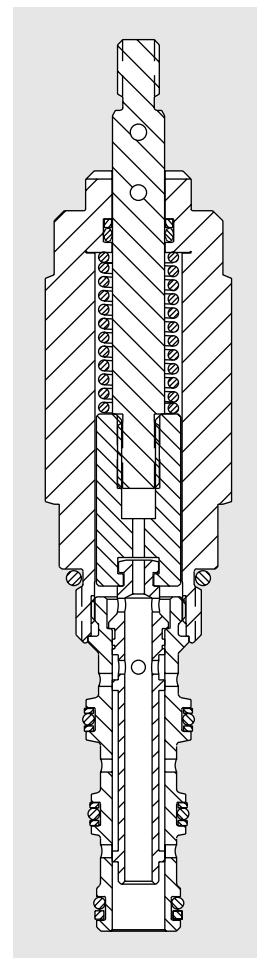
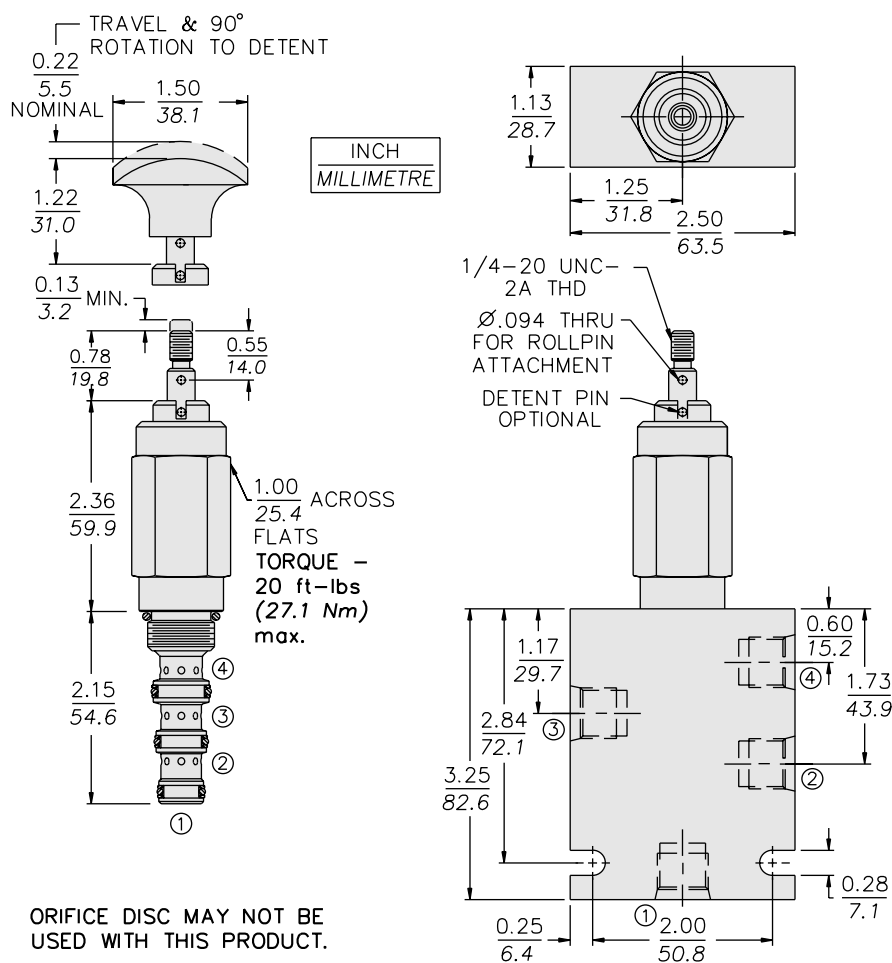
Cavity Tool: CT08-4XX; See page 8.600.1

Seal Kit: SK08-4X-MMT; See page 8.650.1

PERFORMANCE (Cartridge Only)



DIMENSIONS



MATERIALS

Cartridge: Weight: 0.25 kg. (0.55 lbs.); Steel with hardened work surfaces. Zinc-plated exposed surfaces. Buna N O-rings and back-ups standard. Plastic knob optional.

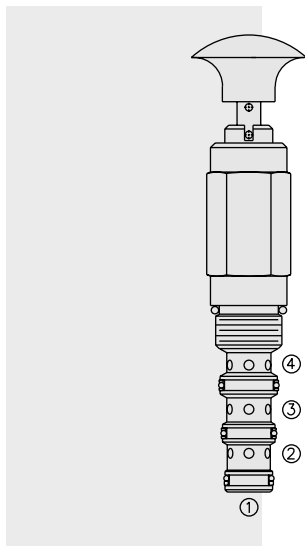
Standard Ported Body: Weight: 0.18 kg. (0.40 lbs.); Anodized high-strength 6061 T6 aluminum alloy, rated to 240 bar (3500 psi); see page 8.008.1. Ductile iron and steel bodies available; dimensions may differ; consult factory.

TO ORDER

MP08-40		-	-	-
<u>Option</u>				<u>Seals</u>
Threaded Shaft/ Spring Return	T			N Buna N (Std.)
Threaded Shaft/ Lock Position Pin	R			V Fluorocarbon
Black Plastic Knob/ Spring Return	K			<u>Porting</u>
Black Plastic Knob/ Lock Position Pin	D			0 Cartridge Only
<u>Red</u> Plastic Knob/ Spring Return	J			6T SAE 6
<u>Red</u> Plastic Knob/ Lock Position Pin	L			2B 1/4 in. BSP*
				3B 3/8 in. BSP*
				*BSP Body; U.K. Mfr. Only

DIRECTIONAL VALVES

MP10-40 Manual, Spring Return, Pull-to-Shift



DESCRIPTION

A 4-way, manual, pull-to-shift, spring-return, directional hydraulic cartridge valve. Series operation is prohibited due to the tank port (①) pressure rating.

OPERATION

In its steady-state spring-offset position, the **MP10-40** directs flow from ③ to ②, and from ④ to ① (tank).

In the actuated (pulled) position, the cartridge directs flow from ③ to ④, and from ② to ①. Note that all ports are open in transition.

Note: Pressure at port ① will directly act on the spool and spring. Port ① is intended to be a tank port only.

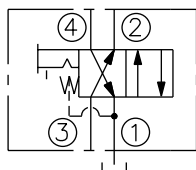
A unique pull-and-rotate feature for holding the positive actuated position is optional. A 90° rotation is required to position at the hold slot. The valve resets to spring-return de-actuated with a slight pull and a 90° turn from the locked actuated position.

FEATURES

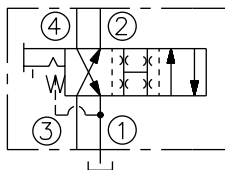
- Hardened spool and cage for long life.
- Remains closed to 14 bar (200 psi) back-pressure.
- Optional rotational lock position.
- Industry common cavity.

SYMBOLS

USASI/ISO:



TRANSITION:



RATINGS

Operating Pressure:

On ③, ② and ④: 207 bar (3000 psi)

On ① (Max.): 14 bar (200 psi)

Proof Pressure: 350 bar (5075 psi)

Flow: See Performance Chart

Internal Leakage: 82 cc/minute (5 cu. in./minute) max.

Mechanical Pull Effort Required: 7.3 kg. (16 lbs.) installed; 8.2 kg. (18 lbs.) to travel 3.2 mm (0.125 inch); 8.6 kg. (19 lbs.) to detent

Temperature: -40 to 120°C

Filtration: See page 9.010.1

Fluids: Mineral-based or synthetics with lubricating properties at viscosities of 7.4 to 420 cSt (50 to 2000 ssu)

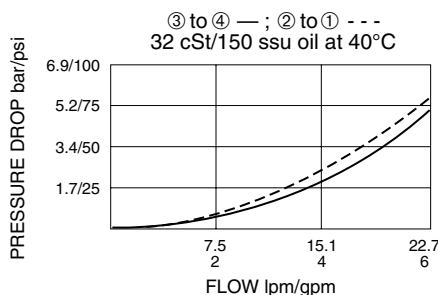
Installation: No restrictions; See page 9.020.1

Cavity: VC10-4; See page 9.110.1

Cavity Tool: CT10-4XX; See page 8.600.1

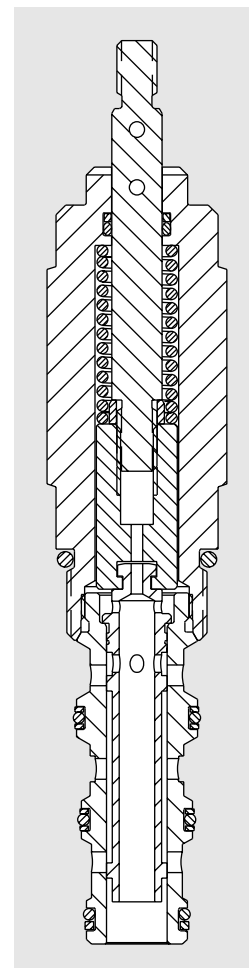
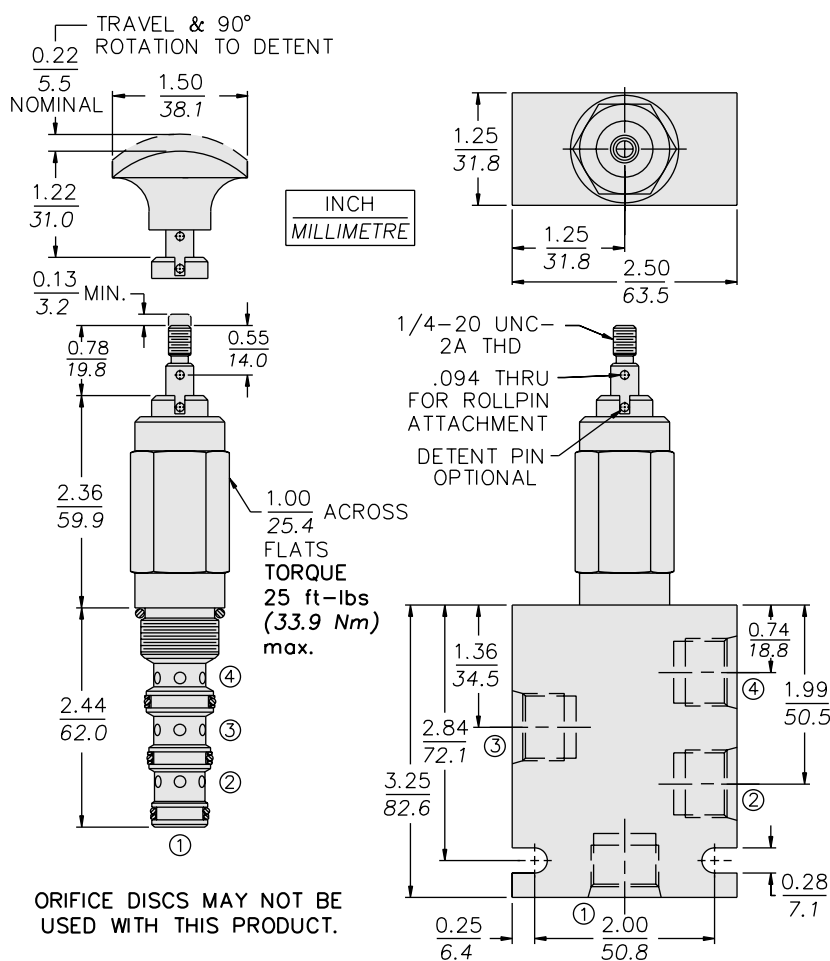
Seal Kit: SK10-4X-MMT; See page 8.650.1

PERFORMANCE (Cartridge Only)



MP10-40

DIMENSIONS



MATERIALS

Cartridge: Weight: 0.32 kg. (0.70 lbs.); Steel with hardened work surfaces. Zinc-plated exposed surfaces. Buna N O-rings and polyester elastomer back-ups standard. Plastic knob optional.

Standard Ported Body: Weight: 0.34 kg. (0.75 lbs.); Anodized high-strength 6061 T6 aluminum alloy, rated to 240 bar (3500 psi); see page 8.010.1. Ductile iron and steel bodies available; dimensions may differ; consult factory.

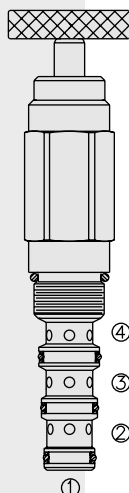
TO ORDER

MP10-40		-		-	
Option				Seals	
Threaded Shaft/ Spring Return	T			N	Buna N (Std.)
Threaded Shaft/ Lock Position Pin	R			V	Fluorocarbon
Black Plastic Knob/ Spring Return	K			Porting	
Black Plastic Knob/ Lock Position Pin	D			0	Cartridge Only
Red Plastic Knob/ Spring Return	J			6T	SAE 6
Red Plastic Knob/ Lock Position Pin	L			8T	SAE 8
				2B	1/4 in. BSP*
				3B	3/8 in. BSP*
				*BSP Body; U.K. Mfr. Only	

DIRECTIONAL VALVES

MD10-40 Manual, Spring Return, Push-to-Shift

Patent
Pending



DESCRIPTION

A 4-way, manual, push-to-shift, spring-return, directional hydraulic cartridge valve. Series operation is prohibited due to the tank port (①) pressure rating.

OPERATION

In its steady-state spring-offset position, the **MD10-40** directs flow from ④ to ③, and from ② to ① (tank).

In the actuated (pushed) position, the cartridge directs flow from ② to ③, and from ④ to ①. Note that all ports are open in transition.

Note: Pressure at port ① will directly act on the spool and spring. Port ① is intended to be a tank port only.

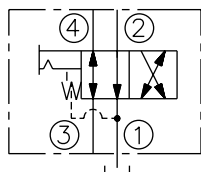
When the valve is actuated (pushed in) it can be detented by holding in and turning the knob clockwise 90°. When released, the valve will remain in the actuated position. To return the valve to its steady state, push in the knob and turn the handle counterclockwise.

FEATURES

- Hardened spool and cage for long life.
- Remains closed to 14 bar (200 psi) back-pressure.
- Optional rotational lock position.
- Industry common cavity.

SYMBOLS

USASI/ISO:



RATINGS

Operating Pressure:

- On ③, ② and ④: 207 bar (3000 psi)
- On ① (Max.): 14 bar (200 psi)

Cycle Life: 100,000

Flow: See Performance Chart

Internal Leakage: 82 cc/minute (5 cu. in./minute) max.

Temperature: -40 to 120°C

Filtration: See page 9.010.1

Fluids: Mineral-based or synthetics with lubricating properties at viscosities of 7.4 to 420 cSt (50 to 2000 ssu)

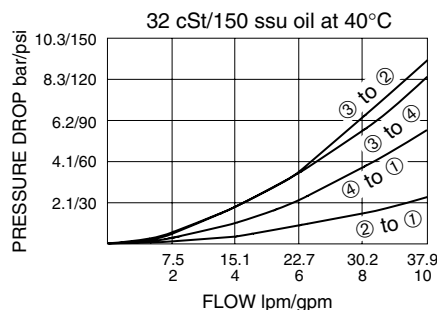
Installation: No restrictions; See page 9.020.1

Cavity: VC10-4; See page 9.110.1

Cavity Tool: CT10-4XX; See page 8.600.1

Seal Kit: SK10-4X-MMT; See page 8.650.1

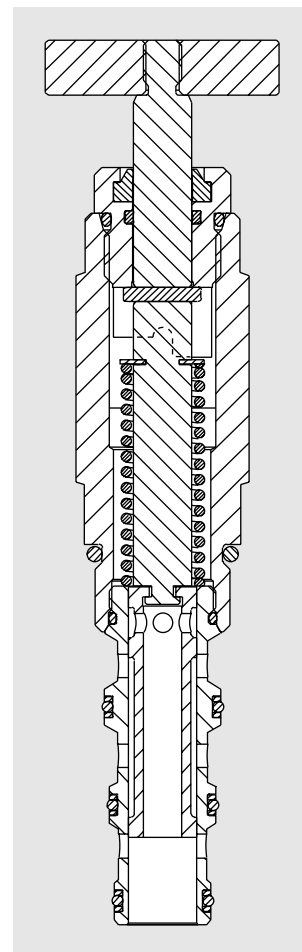
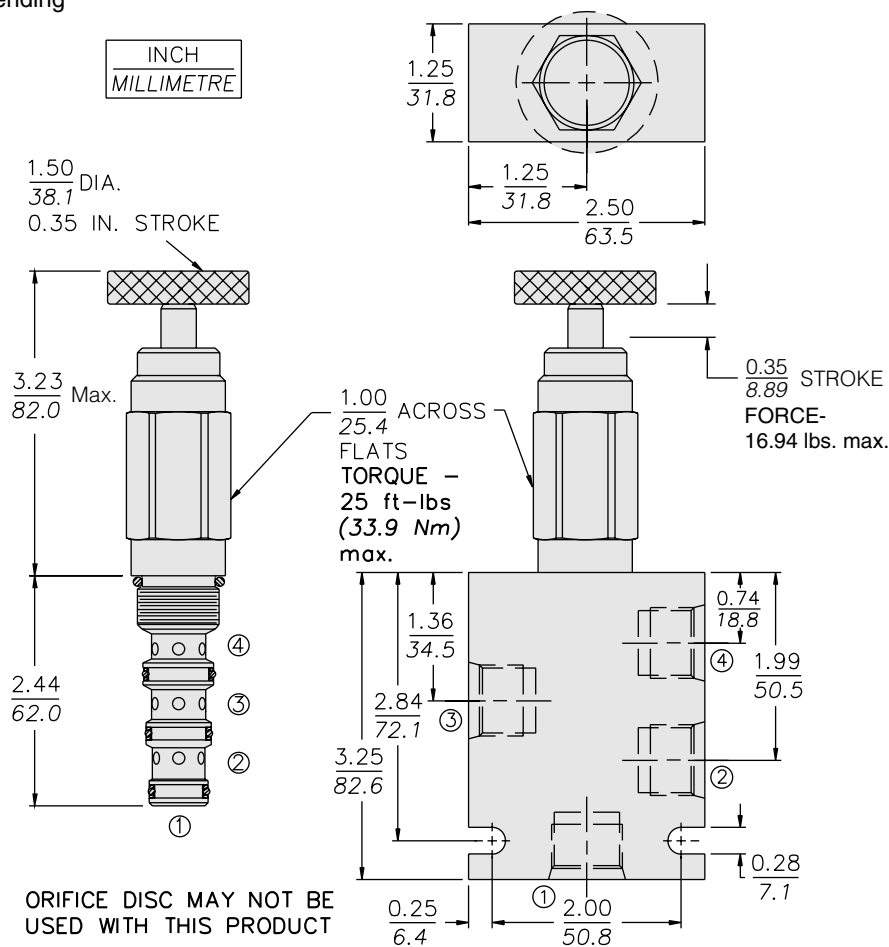
PERFORMANCE (Cartridge Only)



MD10-40

DIMENSIONS

Patent Pending



MATERIALS

Cartridge: Weight: 0.32 kg. (0.70 lbs.); Steel with hardened work surfaces. Zinc-plated exposed surfaces. Buna N O-rings and polyester elastomer back-ups standard. Aluminum knob.

Standard Ported Body: Weight: 0.34 kg. (0.75 lbs.); Anodized high-strength 6061 T6 aluminum alloy, rated to 240 bar (3500 psi); see page 8.010.1. Ductile iron and steel bodies available; dimensions may differ; consult factory.

TO ORDER

MD10-40

Option

Threaded Shaft w/o Detent **T**
Threaded Shaft with Detent **R**
Aluminum Knob w/o Detent **K**
Aluminum Knob with Detent **D**

Seals

N Buna N (Std.)
V Fluorocarbon

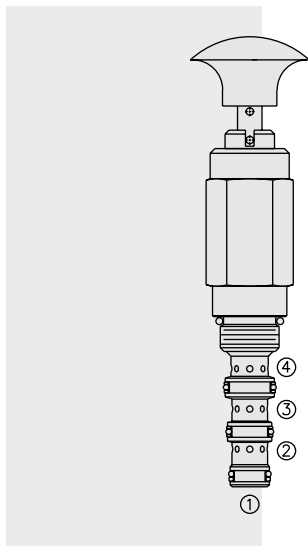
Porting

Cartridge Only **0**
SAE 6 **6T**
SAE 8 **8T**
1/4 in. BSP* **2B**
3/8 in. BSP* **3B**

*BSP Body;
U.K. Mfr. Only

DIRECTIONAL VALVES

MP08-41 Manual, Spring Return, Pull-to-Shift



DESCRIPTION

A 4-way, manual, pull-to-shift, spring-return, directional hydraulic cartridge valve. Series operation is prohibited due to the tank port (①) pressure rating.

OPERATION

In its steady-state, spring-offset position, the **MP08-41** blocks flow in all directions.

In the actuated (pulled) position, the cartridge directs flow from ③ to ④, and from ② to ①. The spring chamber is vented at ①.

Note: Pressure at port ① will directly act on the spool and spring. Port ① is intended to be a tank port only.

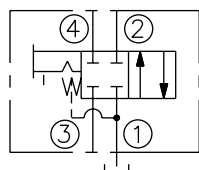
A unique pull-and-rotate feature for holding the positive actuated position is optional. A 90° rotation is required to position at the hold slot. The valve resets to spring-return de-actuated with a slight pull and a 90° turn from the locked actuated position.

FEATURES

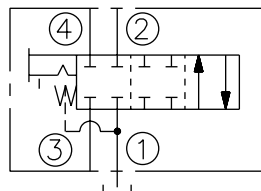
- Hardened spool and cage for long life.
- Pressure to 14 bar (200 psi) on ①.
- Optional rotational lock position.
- Compact size.

SYMBOLS

USASI/ISO:



TRANSITION:



RATINGS

Operating Pressure:

On ②, ③ and ④: 240 bar (3500 psi)

On ① (Max.): 14 bar (200 psi)

Proof Pressure: 350 bar (5075 psi)

Flow: See Performance Chart

Internal Leakage: 82 cc/minute (5 cu. in./minute) max.

Mechanical Pull Effort Required: 7.7 kg. (17 lbs.) installed; 8.6 kg. (19 lbs.) to travel 3.2 mm (0.125 in.); 7.1 kg. (20 lbs.) to detent

Temperature: -40 to 120°C

Filtration: See page 9.010.1

Fluids: Mineral-based or synthetics with lubricating properties at viscosities of 7.4 to 420 cSt (50 to 2000 ssu)

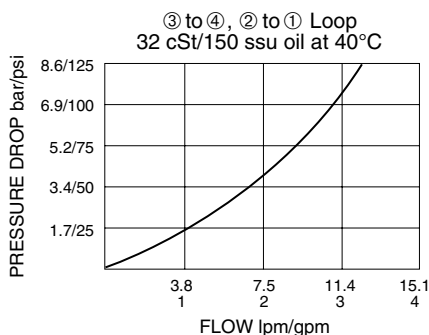
Installation: No restrictions; See page 9.020.1

Cavity: VC08-4; See page 9.108.1

Cavity Tool: CT08-4XX; See page 8.600.1

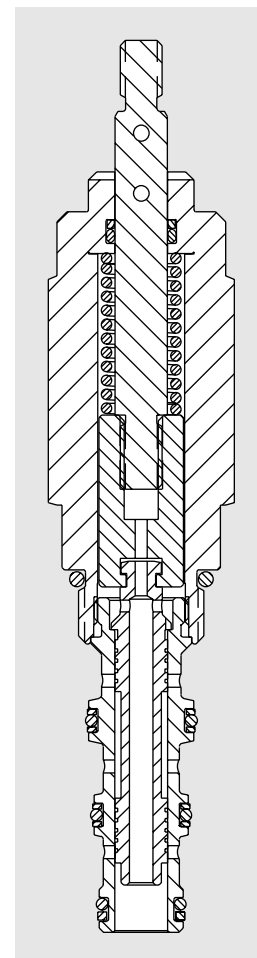
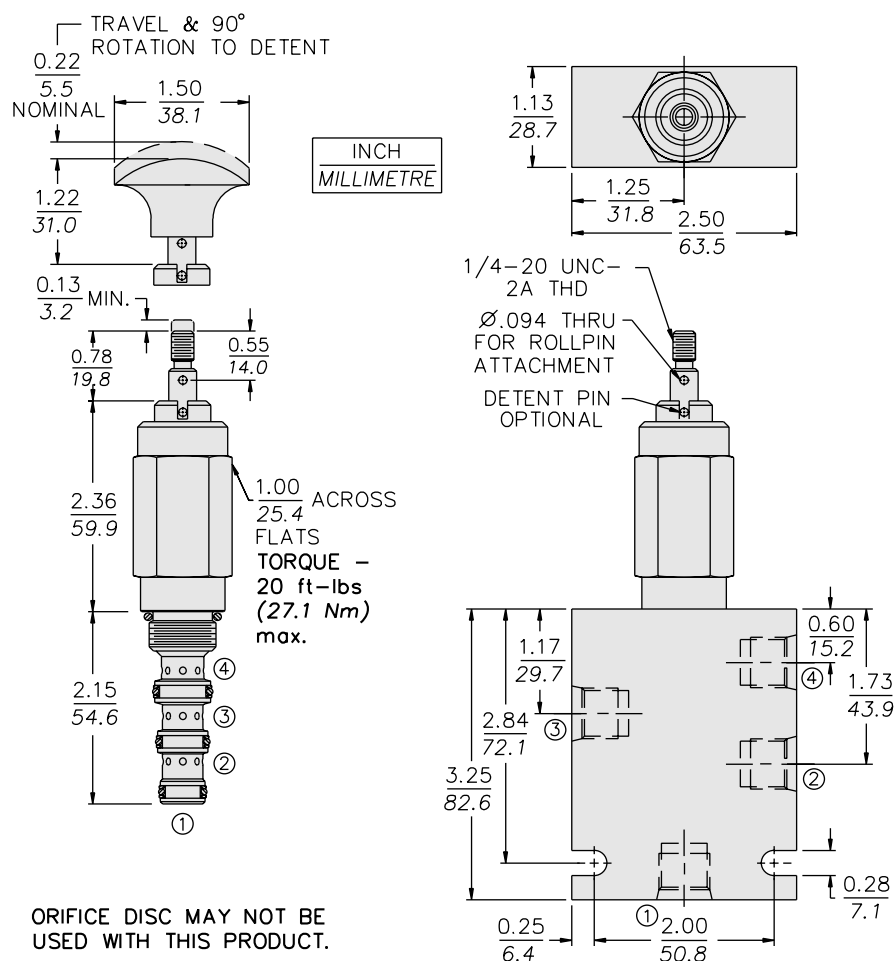
Seal Kit: SK08-4-MMT; See page 8.650.1

PERFORMANCE (Cartridge Only)



MP08-41

DIMENSIONS



MATERIALS

Cartridge: Weight: 0.25 kg. (0.55 lbs.); Steel with hardened work surfaces. Zinc-plated exposed surfaces. Buna N O-rings and back-ups standard. Plastic knob optional.

Standard Ported Body: Weight: 0.18 kg. (0.40 lbs.); Anodized high-strength 6061 T6 aluminum alloy, rated to 240 bar (3500 psi); see page 8.008.1. Ductile iron and steel bodies available; dimensions may differ; consult factory.

TO ORDER

MP08-41

Option

Threaded Shaft/
Spring Return **T**

Threaded Shaft/
Lock Position Pin **R**

Black Plastic Knob/
Spring Return **K**

Black Plastic Knob/
Lock Position Pin **D**

Red Plastic Knob/
Spring Return **J**

Red Plastic Knob/
Lock Position Pin **L**

Seals

N Buna N (Std.)

V Fluorocarbon

Porting

0 Cartridge Only

6T SAE 6

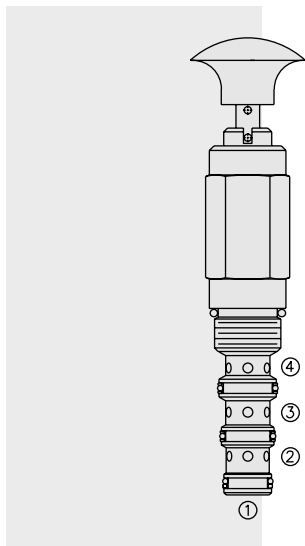
2B 1/4 in. BSP*

3B 3/8 in. BSP*

*BSP Body;
U.K. Mfr. Only

DIRECTIONAL VALVES

MP10-41 Manual, Spring Return, Pull-to-Shift



DESCRIPTION

A 4-way, manual, pull-to-shift, spring-return, screw-in, directional hydraulic cartridge valve.

Series operation is prohibited due to the tank port (①) pressure rating.

OPERATION

In its steady-state spring-offset position, the **MP10-41** blocks flow in all directions.

In the actuated (pulled) position, the cartridge directs flow from ③ to ④, and from ② to ①.

Note: Pressure at port ① will directly act on the spool and spring. Port ① is intended to be a tank port only.

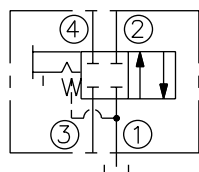
A unique pull-and-rotate feature for holding the positive actuated position is optional. A 90° rotation is required to position at the hold slot. The valve resets to spring-return de-actuated with a slight pull and a 90° turn from the locked actuated position.

FEATURES

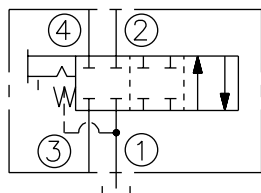
- Hardened spool and cage for long life.
- Remains closed to 12.4 bar (180 psi) back-pressure.
- Optional rotational lock position.
- Industry common cavity.

SYMBOLS

USASI/ISO:



TRANSITION:



RATINGS

Operating Pressure:

On ③, ② and ④: 207 bar (3000 psi)

On ① (Max.): 12.4 bar (180 psi)

Proof Pressure: 350 bar (5075 psi)

Flow: See Performance Chart

Internal Leakage: 82 cc/minute (5 cu. in./minute) max.

Mechanical Pull Effort Required: 7.3 kg. (16 lbs.) installed; 8.2 kg. (18 lbs.) to travel 3.2 mm (0.125 inch); 8.6 kg. (19 lbs.) to detent

Temperature: -40 to 120°C

Filtration: See page 9.010.1

Fluids: Mineral-based or synthetics with lubricating properties at viscosities of 7.4 to 420 cSt (50 to 2000 ssu)

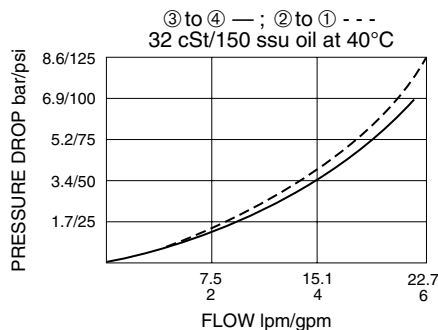
Installation: No restrictions; See page 9.020.1

Cavity: VC10-4; See page 9.110.1

Cavity Tool: CT10-4XX; See page 8.600.1

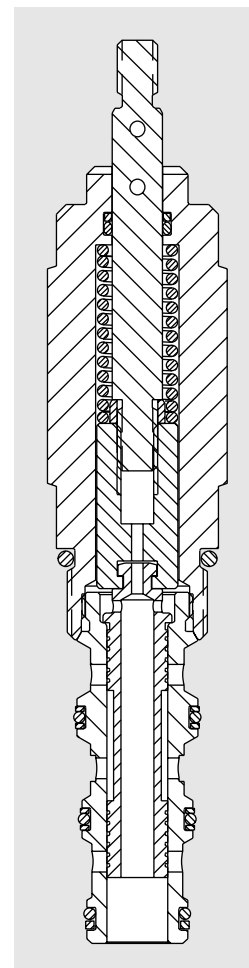
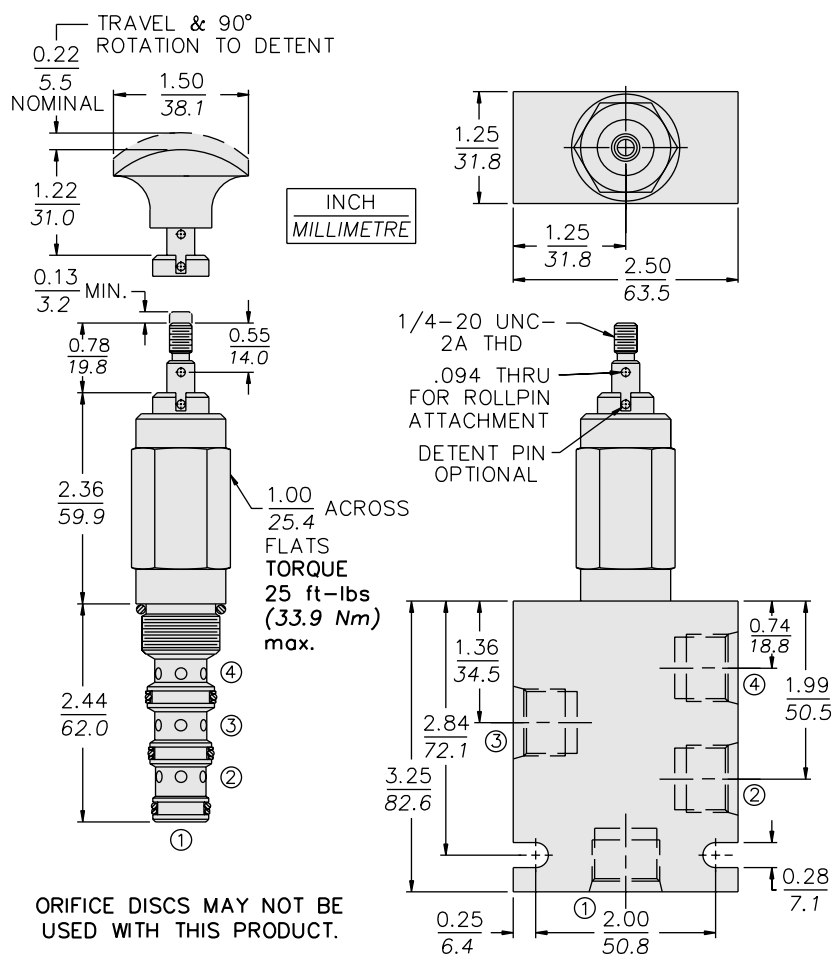
Seal Kit: SK10-4X-MMT; See page 8.650.1

PERFORMANCE (Cartridge Only)



MP10-41

DIMENSIONS



MATERIALS

Cartridge: Weight: 0.32 kg. (0.70 lbs.); Steel with hardened work surfaces. Zinc-plated exposed surfaces. Buna N O-rings and polyester elastomer back-ups standard. Plastic knob optional.

Standard Ported Body: Weight: 0.34 kg. (0.75 lbs.); Anodized high-strength 6061 T6 aluminum alloy, rated to 240 bar (3500 psi); see page 8.010.1. Ductile iron and steel bodies available; dimensions may differ; consult factory.

TO ORDER

MP10-41

Option

Threaded Shaft/
Spring Return **T**

Threaded Shaft/
Lock Position Pin **R**

Black Plastic Knob/
Spring Return **K**

Black Plastic Knob/
Lock Position Pin **D**

Red Plastic Knob/
Spring Return **J**

Red Plastic Knob/
Lock Position Pin **L**

Seals

N Buna N (Std.)

V Fluorocarbon

Porting

0 Cartridge Only

6T SAE 6

8T SAE 8

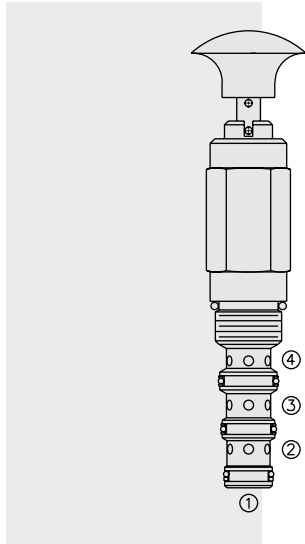
2B 1/4 in. BSP*

3B 3/8 in. BSP*

*BSP Body;
U.K. Mfr. Only

DIRECTIONAL VALVES

MP10-42 Manual, Spring Return, Pull-to-Shift



DESCRIPTION

A 4-way, manual, pull-to-shift, spring-return, screw-in, directional hydraulic cartridge valve.

Series operation is prohibited due to the tank port (①) pressure rating.

OPERATION

In its steady-state spring-offset position, the **MP10-42** directs flow between ports ③ and ②.

In the actuated (pulled) position, the cartridge directs flow from ③ to ④.

Note: Pressure at port ① will directly act on the spool and spring. Port ① is intended to be a tank port only.

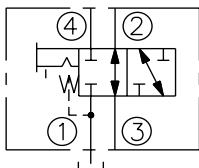
A unique pull-and-rotate feature for holding the positive actuated position is optional. A 90° rotation is required to position at the hold slot. The valve resets to spring-return de-actuated with a slight pull and a 90° turn from the locked actuated position.

FEATURES

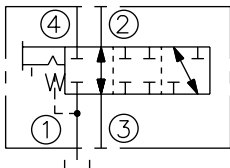
- Hardened spool and cage for long life.
- Remains closed to 12.4 bar (180 psi) back-pressure.
- Optional rotational lock position.
- Industry common cavity.

SYMBOLS

USAS/ISO:



TRANSITION:



RATINGS

Operating Pressure:

On ③, ② and ④: 240 bar (3500 psi)

On ① (Max.): 12.4 bar (180 psi)

Proof Pressure: 420 bar (6090 psi)

Flow: See Performance Chart

Internal Leakage: 82 cc/minute (5 cu. in./minute) max.

Mechanical Pull Effort Required: 7.3 kg. (16 lbs.) installed; 8.2 kg. (18 lbs.) to travel 3.2 mm (0.125 inch); 8.6 kg. (19 lbs.) to detent

Temperature: -40 to 120°C

Filtration: See page 9.010.1

Fluids: Mineral-based or synthetics with lubricating properties at viscosities of 7.4 to 420 cSt (50 to 2000 ssu)

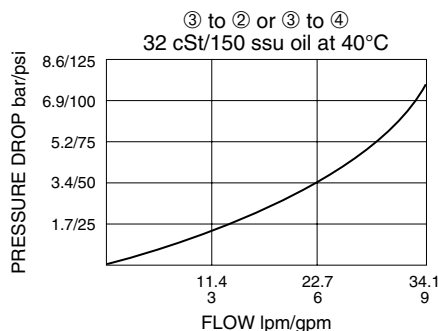
Installation: No restrictions; See page 9.020.1

Cavity: VC10-4; See page 9.110.1

Cavity Tool: CT10-4XX; See page 8.600.1

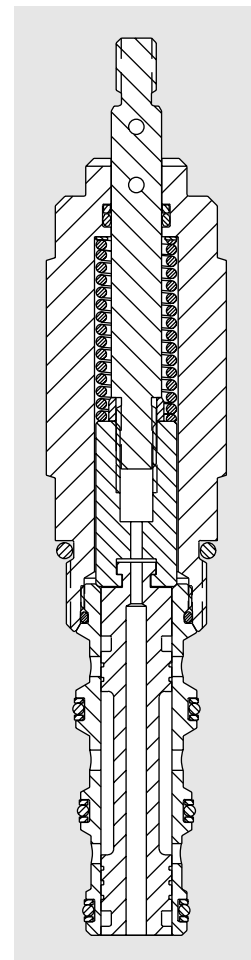
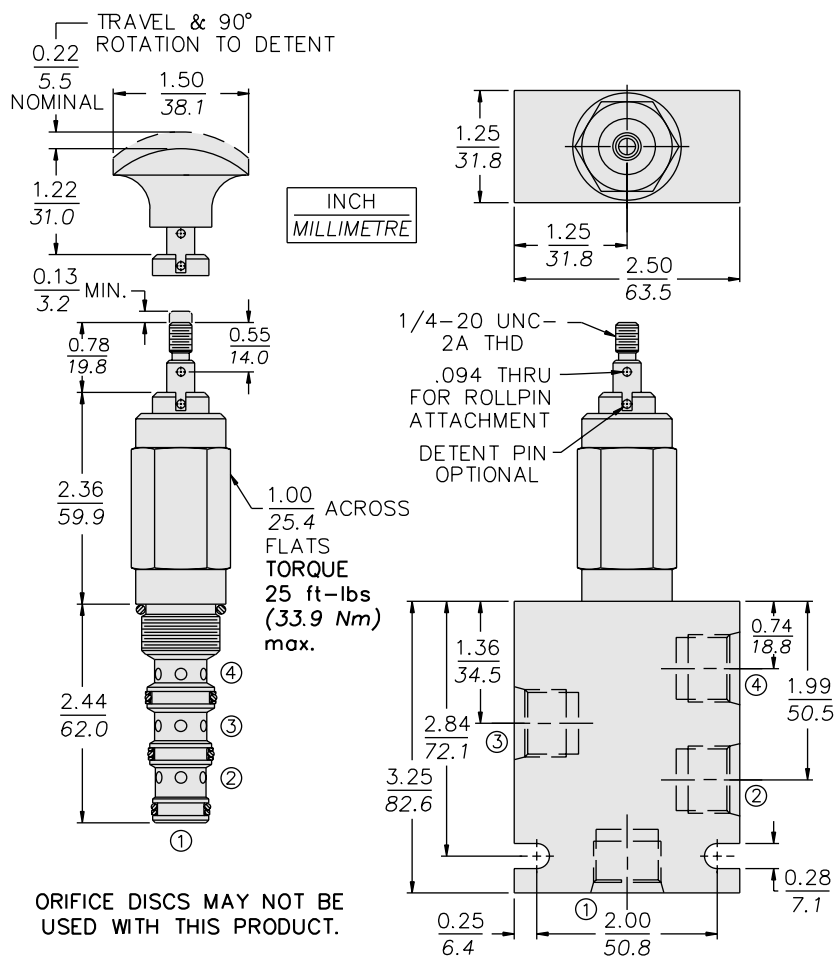
Seal Kit: SK10-4X-MMT; See page 8.650.1

PERFORMANCE (Cartridge Only)



MP10-42

DIMENSIONS



MATERIALS

Cartridge: Weight: 0.32 kg. (0.70 lbs.); Steel with hardened work surfaces. Zinc-plated exposed surfaces. Buna N O-rings and polyester elastomer back-ups standard. Plastic knob optional.

Standard Ported Body: Weight: 0.34 kg. (0.75 lbs.); Anodized high-strength 6061 T6 aluminum alloy, rated to 240 bar (3500 psi); see page 8.010.1. Ductile iron and steel bodies available; dimensions may differ; consult factory.

TO ORDER

MP10-42

Option

Threaded Shaft/
Spring Return **T**

Threaded Shaft/
Lock Position Pin **R**

Black Plastic Knob/
Spring Return **K**

Black Plastic Knob/
Lock Position Pin **D**

Red Plastic Knob/
Spring Return **J**

Red Plastic Knob/
Lock Position Pin **L**

Seals

N Buna N (Std.)

V Fluorocarbon

NS Buna N with
Sealed Spool

VS Fluorocarbon
with Sealed Spool

Porting

0 Cartridge Only

6T SAE 6

8T SAE 8

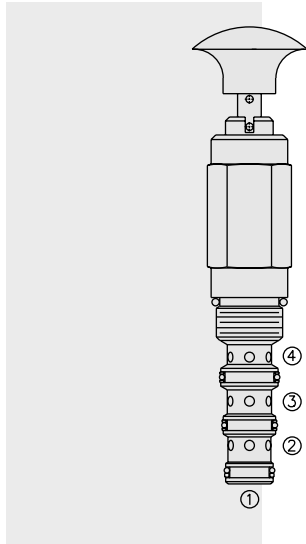
2B 1/4 in. BSP*

3B 3/8 in. BSP*

*BSP Body; U.K. Mfr. Only

DIRECTIONAL VALVES

MP10-43 Manual, Spring Return, Pull-to-Shift



DESCRIPTION

A 4-way, manual, pull-to-shift, spring-return, screw-in, directional hydraulic cartridge valve.

Series operation is prohibited due to the tank port (①) pressure rating.

OPERATION

In its steady-state spring-offset position, the **MP10-43** blocks flow at ③ and at ②, while ④ is open to ①. In the actuated (pulled) position, the cartridge directs flow from ③ to ④ and from ② to ①. Note that all ports are restricted/open in transition.

Note: Pressure at port ① will directly act on the spool and spring. Port ① is intended to be a tank port only.

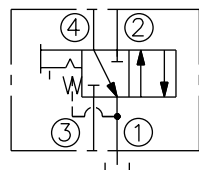
A unique pull-and-rotate feature for a positive actuated position hold is optional. A 90° rotation is required to position at the hold slot. The valve resets to spring-return de-actuated with a slight pull and 90° turn from the locked actuated position.

FEATURES

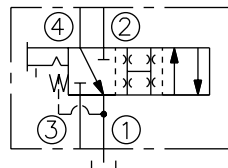
- Hardened spool and cage for long life.
- Remains closed to 10.3 bar (150 psi) back-pressure.
- Optional rotational lock position.
- Industry common cavity.

SYMBOLS

USASI/ISO:



TRANSITION:



RATINGS

Operating Pressure:

On ③, ② and ④: 207 bar (3500 psi)

On ① (Max.): 12.4 bar (180 psi)

Proof Pressure: 350 bar (5075 psi)

Flow: See Performance Chart

Internal Leakage: 82 cc/minute (5 cu. in./minute) max.

Mechanical Pull Effort Required: 7.3 kg. (16 lbs.) installed; 8.2 kg. (18 lbs.) to travel 3.2 mm (0.125 inch); 8.6 kg. (19 lbs.) to detent

Temperature: -40 to 120°C

Filtration: See page 9.010.1

Fluids: Mineral-based or synthetics with lubricating properties at viscosities of 7.4 to 420 cSt (50 to 2000 ssu)

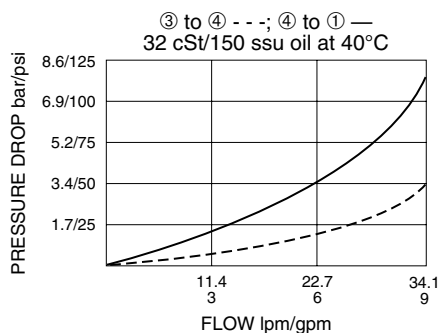
Installation: No restrictions; See page 9.020.1

Cavity: VC10-4; See page 9.110.1

Cavity Tool: CT10-4XX; See page 8.600.1

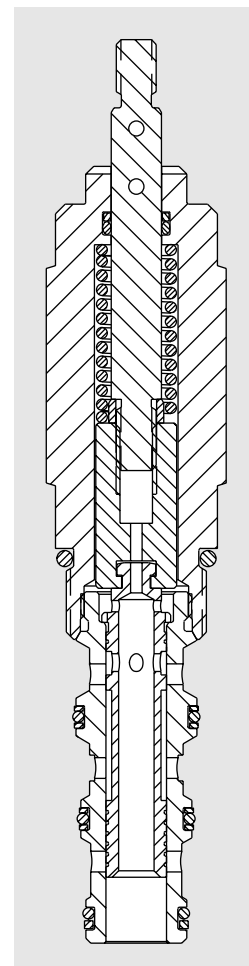
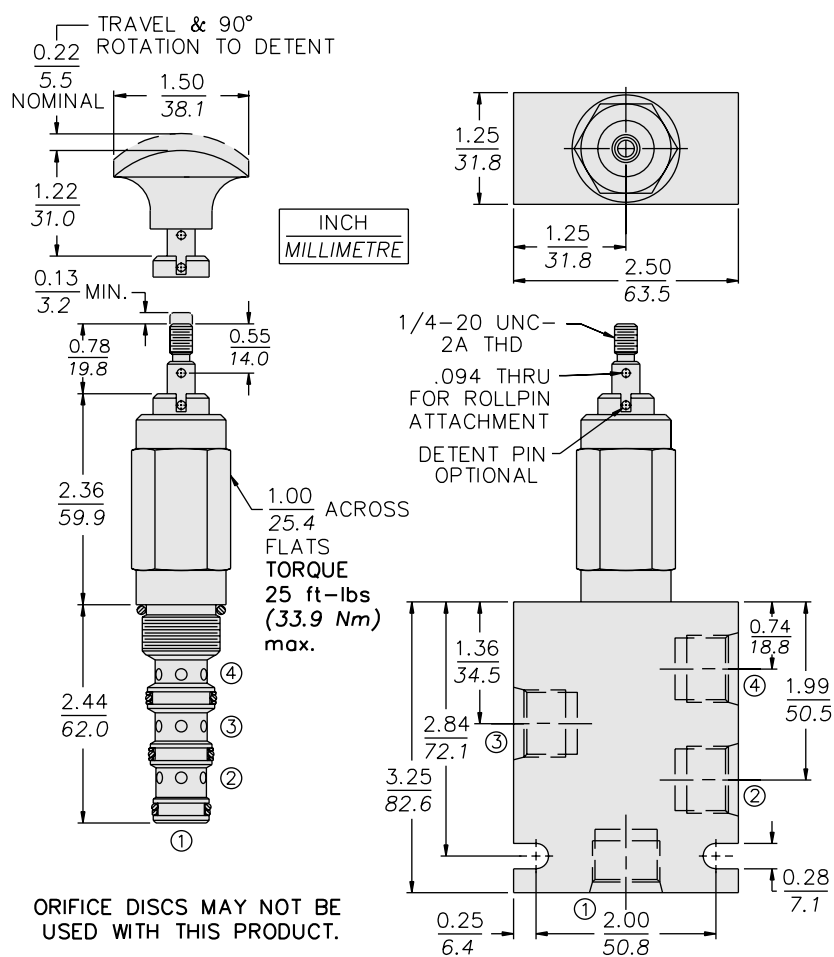
Seal Kit: SK10-4X-MMT; See page 8.650.1

PERFORMANCE (Cartridge Only)



MP10-43

DIMENSIONS



MATERIALS

Cartridge: Weight: 0.32 kg. (0.70 lbs.); Steel with hardened work surfaces. Zinc-plated exposed surfaces. Buna N O-rings and polyester elastomer back-ups standard. Plastic knob optional.

Standard Ported Body: Weight: 0.34 kg. (0.75 lbs.); Anodized high-strength 6061 T6 aluminum alloy, rated to 240 bar (3500 psi); see page 8.010.1. Ductile iron and steel bodies available; dimensions may differ; consult factory.

TO ORDER

MP10-43

Option

Threaded Shaft/
Spring Return **T**

Threaded Shaft/
Lock Position Pin **R**

Black Plastic Knob/
Spring Return **K**

Black Plastic Knob/
Lock Position Pin **D**

Red Plastic Knob/
Spring Return **J**

Red Plastic Knob/
Lock Position Pin **L**

Seals

N Buna N (Std.)

V Fluorocarbon

Porting

0 Cartridge Only

6T SAE 6

8T SAE 8

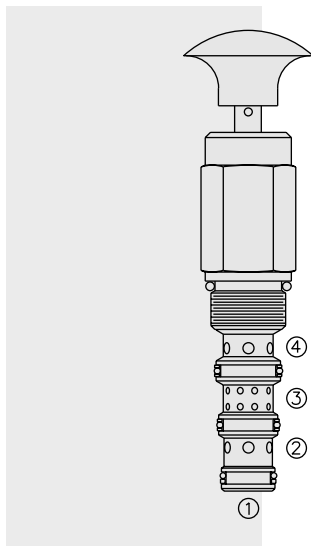
2B 1/4 in. BSP*

3B 3/8 in. BSP*

*BSP Body; U.K. Mfr. Only

DIRECTIONAL VALVES

MP10-47A Manual Pull/Push-to-Shift, 3-Position,



DESCRIPTION

A 4-way, 3-position, spool-type, tandem center, manual pull/push-to-shift, spring-return, directional hydraulic cartridge valve.

OPERATION

In its neutral position, the **MP10-47A** blocks ports ② and ④, while allowing flow from ③ to ①. In the pulled position, flow is allowed bi-directionally between ports ③ and ② and from ④ to ①. In the pushed position, flow is allowed between ports ③ and ④ and from ② to ①.

FEATURES

- Hardened spool and cage for long life.
- Industry common cavity.

RATINGS

Operating Pressure:

Ports ②, ③ and ④: 207 bar (3000 psi)

Port ① (Max.): 14 bar (200 psi)

Flow: See Performance Chart

Internal Leakage: 41 cc/minute (2.5 cu. in./minute) at 207 bar (3000 psi) max.

Mechanical Pull/Push Effort Required: 9.0 kg. (20 lbs.) initial;
11.3 kg. (25 lbs.) full stroke

Temperature: -40 to 120°C

Filtration: See page 9.010.1

Fluids: Mineral-based or synthetics with lubricating properties at viscosities of
7.4 to 420 cSt (50 to 2000 ssu)

Installation: No restrictions; See page 9.020.1

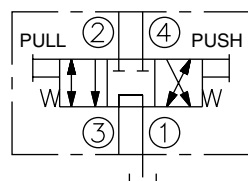
Cavity: VC10-4; See page 9.110.1

Cavity Tool: CT10-4XX; See page 8.600.1

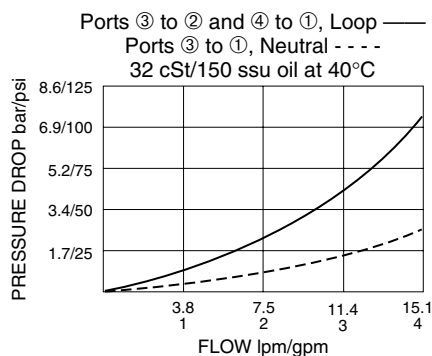
Seal Kit: SK10-4X-MMT; See page 8.650.1

SYMBOLS

USASI/ISO:



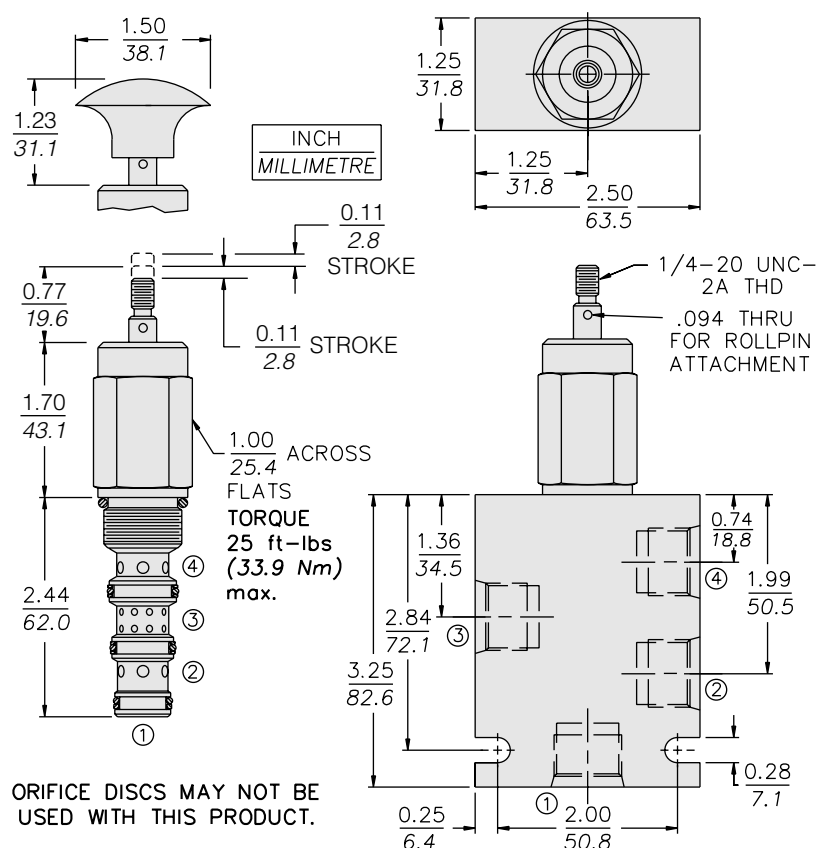
PERFORMANCE (Cartridge Only)



4-Way, Tandem Center

MP10-47A

DIMENSIONS



MATERIALS

Cartridge: Weight: 0.32 kg. (0.70 lbs.); Steel with hardened work surfaces. Zinc-plated exposed surfaces. Buna N O-rings and polyester elastomer back-ups standard. Plastic knob optional.

Standard Ported Body: Weight: 0.34 kg. (0.75 lbs.); Anodized high-strength 6061 T6 aluminum alloy, rated to 240 bar (3500 psi); see page 8.010.1. Ductile iron and steel bodies available; dimensions may differ; consult factory.

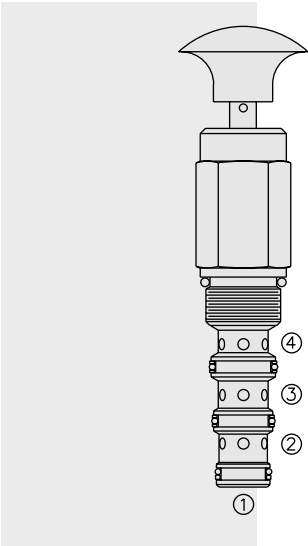
TO ORDER

MP10-47A		-		-	
Option				Seals	
Threaded Shaft/ Spring Return	T			N	Buna N (Std.)
Black Plastic Knob/ Spring Return	K			V	Fluorocarbon
Red Plastic Knob/ Spring Return	J			Porting	
				0	Cartridge Only
				6T	SAE 6
				8T	SAE 8
				2B	1/4 in. BSP*
				3B	3/8 in. BSP*

*BSP Body; U.K. Mfr. Only

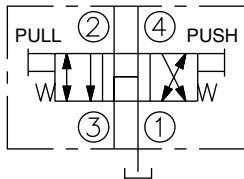
DIRECTIONAL VALVES

MP10-47B Manual Pull/Push-to-Shift, 3-Position,



SYMBOLS

USASI/ISO:



DESCRIPTION

A 4-way, 3-position, spool-type, open center, manual pull/push-to-shift, spring-return, directional hydraulic cartridge valve.

OPERATION

In its neutral position, the **MP10-47B** has all ports open. In the pulled position, flow is allowed bi-directionally between ports ③ and ④ and from ② to ①. In the pushed position, flow is allowed between ports ③ and ② and from ④ to ①.

FEATURES

- Hardened spool and cage for long life.
- Industry common cavity.

RATINGS

Operating Pressure:

Ports ②, ③ and ④: 207 bar (3000 psi)

Port ① (Max.): 14 bar (200 psi)

Flow: See Performance Chart

Internal Leakage: 164 cc/minute (10 cu. in./minute) at 207 bar (3000 psi) max.

Mechanical Pull/Push Effort Required: 9.0 kg. (20 lbs.) initial;
11.3 kg. (25 lbs.) full stroke

Temperature: -40 to 120°C

Filtration: See page 9.010.1

Fluids: Mineral-based or synthetics with lubricating properties at viscosities of
7.4 to 420 cSt (50 to 2000 ssu)

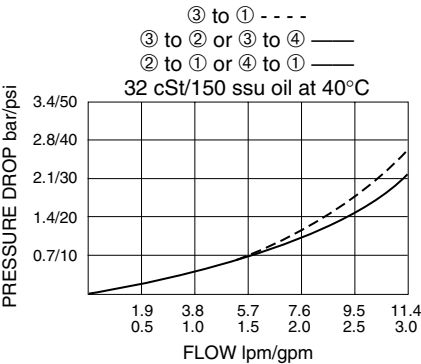
Installation: No restrictions; See page 9.020.1

Cavity: VC10-4; See page 9.110.1

Cavity Tool: CT10-4XX; See page 8.600.1

Seal Kit: SK10-4X-MMT; See page 8.650.1

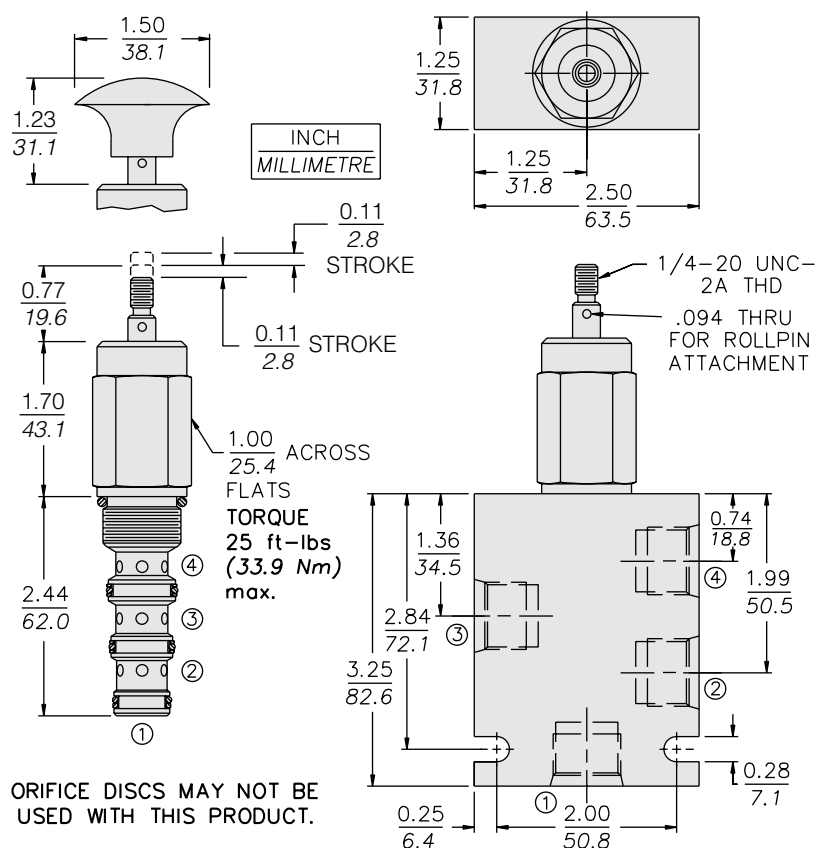
PERFORMANCE (Cartridge Only)



4-Way, Open Center

MP10-47B

DIMENSIONS



MATERIALS

Cartridge: Weight: 0.32 kg. (0.70 lbs.); Steel with hardened work surfaces. Zinc-plated exposed surfaces. Buna N O-rings and polyester elastomer back-ups standard. Plastic knob optional.

Standard Ported Body: Weight: 0.34 kg. (0.75 lbs.); Anodized high-strength 6061 T6 aluminum alloy, rated to 240 bar (3500 psi); see page 8.010.1. Ductile iron and steel bodies available; dimensions may differ; consult factory.

TO ORDER

MP10-47B

Option

- Threaded Shaft/ Spring Return **T**
- Black Plastic Knob/ Spring Return **K**
- Red Plastic Knob/ Spring Return **J**

Seals

N Buna N (Std.)
V Fluorocarbon

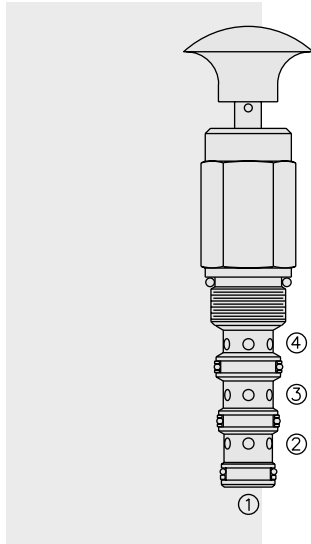
Porting

0 Cartridge Only
6T SAE 6
8T SAE 8
2B 1/4 in. BSP*
3B 3/8 in. BSP*

*BSP Body; U.K. Mfr. Only

DIRECTIONAL VALVES

MP10-47C Manual Pull/Push-to-Shift, 3-Position,



DESCRIPTION

A 4-way, 3-position, spool-type, closed center, manual pull/push-to-shift, spring-return, directional hydraulic cartridge valve.

OPERATION

In its neutral position, the **MP10-47C** blocks all ports. In the pulled position, flow is allowed bi-directionally between ports ③ and ④ and from ② to ①. In the pushed position, flow is allowed between ports ③ and ② and from ④ to ①.

FEATURES

- Hardened spool and cage for long life.
- Industry common cavity.

RATINGS

Operating Pressure:

Ports ②, ③ and ④: 207 bar (3000 psi)

Port ① (Max.): 14 bar (200 psi)

Flow: See Performance Chart

Internal Leakage: 41 cc/minute (2.5 cu. in./minute) at 207 bar (3000 psi) max.

Mechanical Pull/Push Effort Required: 9.0 kg. (20 lbs.) initial;
11.3 kg. (25 lbs.) full stroke

Temperature: -40 to 120°C

Filtration: See page 9.010.1

Fluids: Mineral-based or synthetics with lubricating properties at viscosities of
7.4 to 420 cSt (50 to 2000 ssu)

Installation: No restrictions; See page 9.020.1

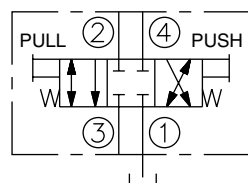
Cavity: VC10-4; See page 9.110.1

Cavity Tool: CT10-4XX; See page 8.600.1

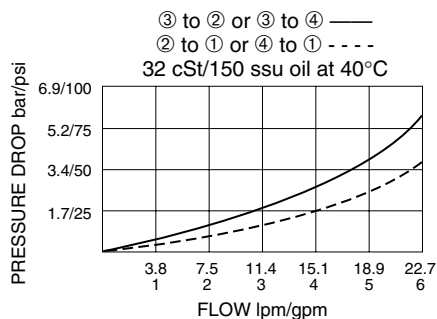
Seal Kit: SK10-4X-MMT; See page 8.650.1

SYMBOLS

USASI/ISO:



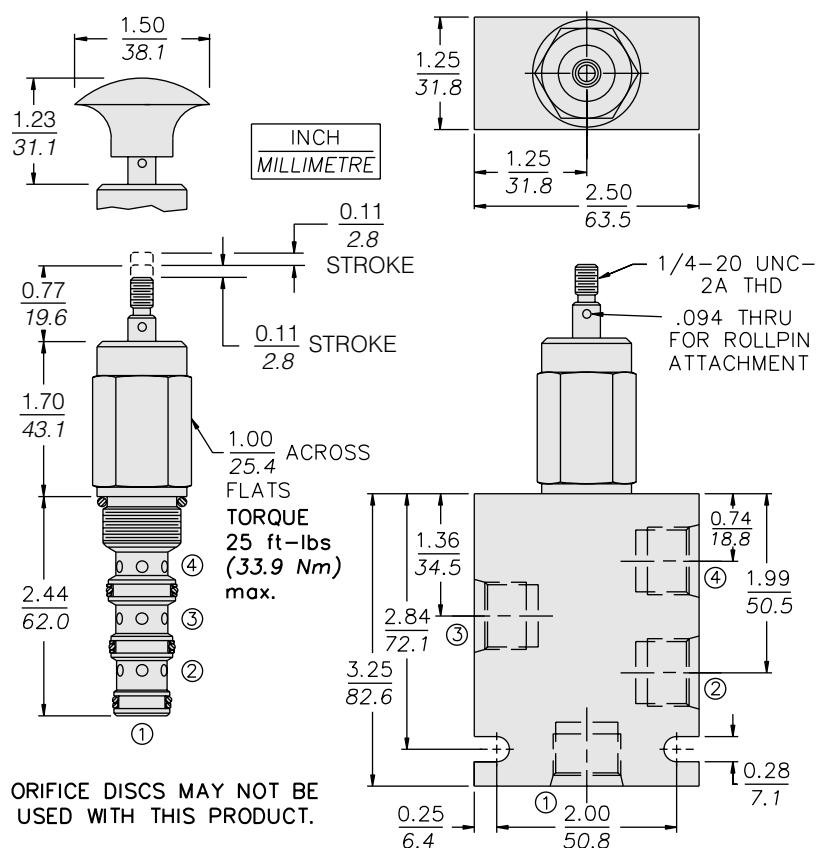
PERFORMANCE (Cartridge Only)



4-Way, Closed Center

MP10-47C

DIMENSIONS



MATERIALS

Cartridge: Weight: 0.32 kg. (0.70 lbs.); Steel with hardened work surfaces. Zinc-plated exposed surfaces. Buna N O-rings and polyester elastomer back-ups standard. Plastic knob optional.

Standard Ported Body: Weight: 0.34 kg. (0.75 lbs.); Anodized high-strength 6061 T6 aluminum alloy, rated to 240 bar (3500 psi); see page 8.010.1. Ductile iron and steel bodies available; dimensions may differ; consult factory.

TO ORDER

MP10-47C

Option
Threaded Shaft/
Spring Return **T**
Black Plastic Knob/
Spring Return **K**
Red Plastic Knob/
Spring Return **J**

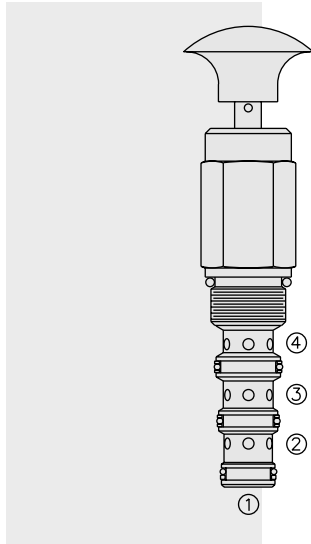
Seals
N Buna N (Std.)
V Fluorocarbon

Porting
0 Cartridge Only
6T SAE 6
8T SAE 8
2B 1/4 in. BSP*
3B 3/8 in. BSP*

*BSP Body; U.K. Mfr. Only

DIRECTIONAL VALVES

MP10-47D Manual Pull/Push-to-Shift, 3-Position,



DESCRIPTION

A 4-way, 3-position, spool-type, motor spool, manual pull/push-to-shift, spring-return, directional hydraulic cartridge valve.

OPERATION

In its neutral position, the **MP10-47D** blocks port ③, while allowing flow from ② to ①. In the pulled position, flow is allowed bi-directionally between ports ③ and ④ and from ② to ①. In the pushed position, flow is allowed between ports ③ and ② and from ④ to ①.

FEATURES

- Hardened spool and cage for long life.
- Industry common cavity.

RATINGS

Operating Pressure:

Ports ②, ③ and ④: 207 bar (3000 psi)

Port ① (Max.): 14 bar (200 psi)

Flow: See Performance Chart

Internal Leakage: 164 cc/minute (10 cu. in./minute) at 207 bar (3000 psi) max.

Mechanical Pull/Push Effort Required: 9.0 kg. (20 lbs.) initial;
11.3 kg. (25 lbs.) full stroke

Temperature: -40 to 120°C

Filtration: See page 9.010.1

Fluids: Mineral-based or synthetics with lubricating properties at viscosities of
7.4 to 420 cSt (50 to 2000 ssu)

Installation: No restrictions; See page 9.020.1

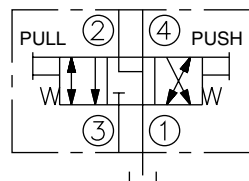
Cavity: VC10-4; See page 9.110.1

Cavity Tool: CT10-4XX; See page 8.600.1

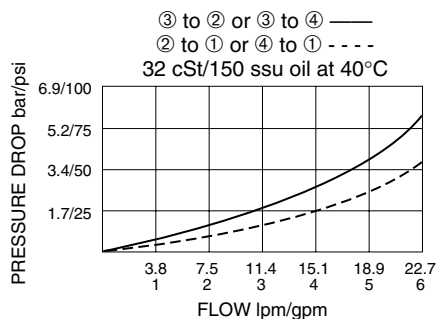
Seal Kit: SK10-4X-MMT; See page 8.650.1

SYMBOLS

USASI/ISO:



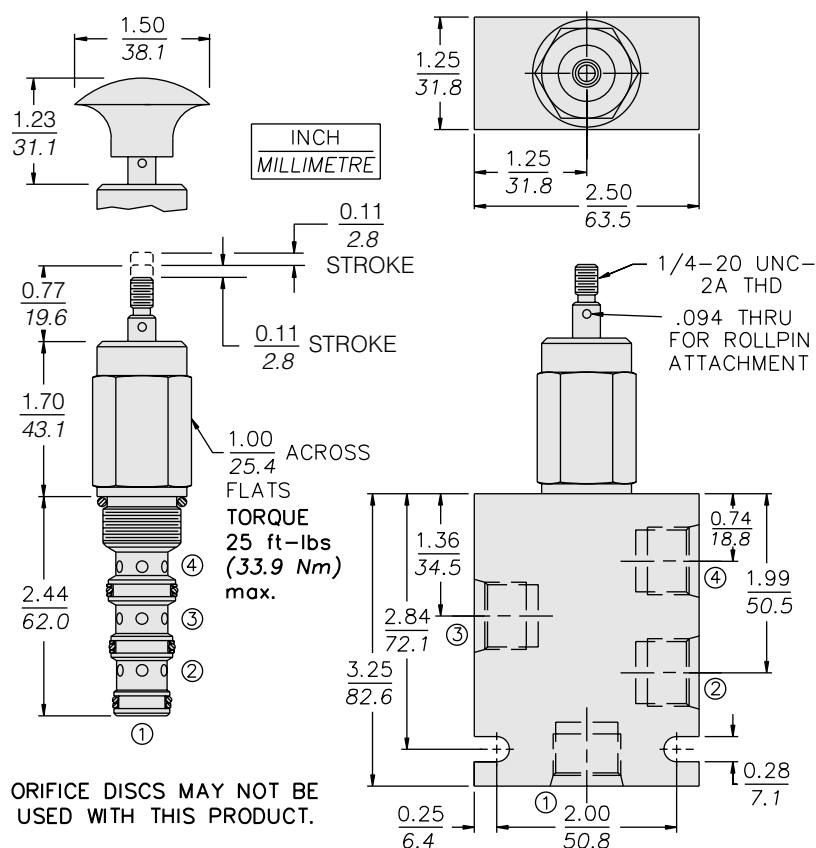
PERFORMANCE (Cartridge Only)



4-Way, Motor Spool

MP10-47D

DIMENSIONS



MATERIALS

Cartridge: Weight: 0.32 kg. (0.70 lbs.); Steel with hardened work surfaces. Zinc-plated exposed surfaces. Buna N O-rings and polyester elastomer back-ups standard. Plastic knob optional.

Standard Ported Body: Weight: 0.34 kg. (0.75 lbs.); Anodized high-strength 6061 T6 aluminum alloy, rated to 240 bar (3500 psi); see page 8.010.1. Ductile iron and steel bodies available; dimensions may differ; consult factory.

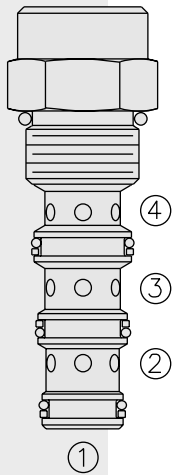
TO ORDER

MP10-47D		-		-	
Option				Seals	
Threaded Shaft/ Spring Return	T			N	Buna N (Std.)
Black Plastic Knob/ Spring Return	K			V	Fluorocarbon
Red Plastic Knob/ Spring Return	J			Porting	
				0	Cartridge Only
				6T	SAE 6
				8T	SAE 8
				2B	1/4 in. BSP*
				3B	3/8 in. BSP*

*BSP Body; U.K. Mfr. Only

DIRECTIONAL VALVES

BV10-40 Brake Release Valve



DESCRIPTION

A screw-in, cartridge-style, spool-type, hydraulic directional valve which operates by pressure-to-shift spring return. It is normally used to release a spring-applied brake whenever hydraulic power is directed to move a load.

OPERATION

In neutral, the **BV10-40** allows flow from ② to ③. When the pressure differential between the ① and ④ ports exceeds approximately 5.5 bar (80 psi), the spool has moved far enough to close ② to ③ flow, while opening the higher pressure of ① or ④ to ②.

FEATURES

- Hardened spool and cage for long life.
- Industry common cavity.

RATINGS

Operating Pressure: 240 bar (3500 psi)

Proof Pressure: 390 bar (5700 psi)

Flow: See Performance Chart

Internal Leakage: 164 cc/minute (10 cu. in./minute) max. at 207 bar (3000 psi)
② to ③ (shifted)

Differential Pressure Required (① > ④, ④ > ①) to Shift to Close ② to ③/Open ① or ④ to ②: 5.5 bar (80 psi)

Temperature: -40 to 120°C with standard Buna seals

Filtration: See page 9.010.1

Fluids: Mineral-based or synthetics with lubricating properties at viscosities of 7.4 to 420 cSt (50 to 2000 ssu)

Installation: No restrictions; See page 9.020.1

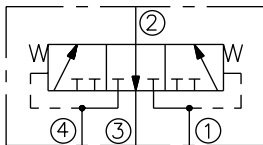
Cavity: VC10-4; See page 9.110.1

Cavity Tool: CT10-4XX; See page 8.600.1

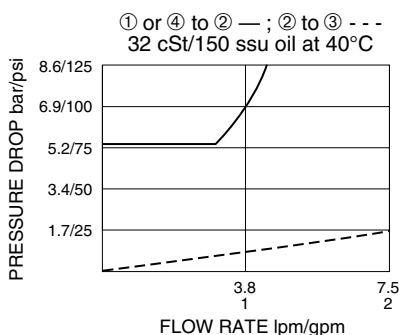
Seal Kit: SK10-4X-TBT; See page 8.650.1

SYMBOLS

USAS/ISO:

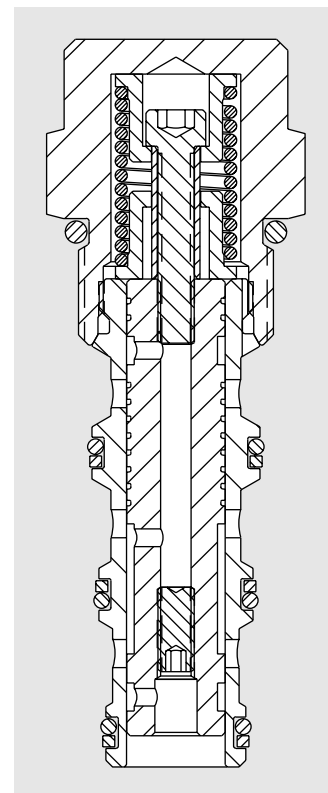
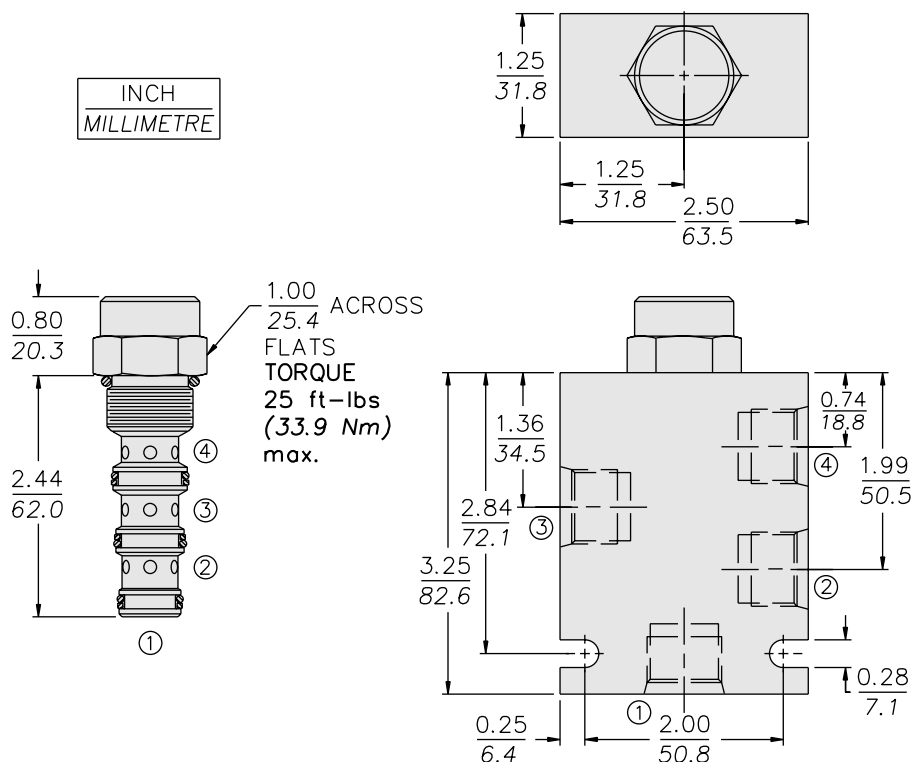


PERFORMANCE (Cartridge Only)



BV10-40

DIMENSIONS



MATERIALS

Cartridge: Weight: 0.16 kg. (0.35 lbs.); Steel with hardened work surfaces. Zinc-plated exposed surfaces. Buna N O-rings and polyester elastomer back-ups standard.

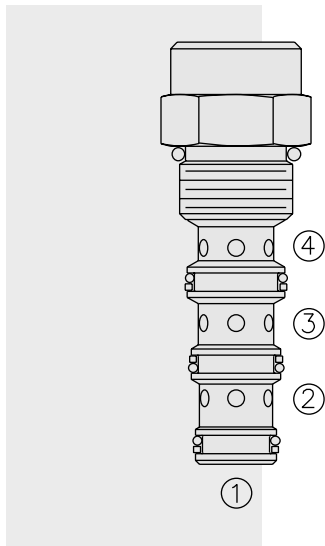
Standard Ported Body: Weight: 0.34 kg. (0.75 lbs.); Anodized high-strength 6061 T6 aluminum alloy, rated to 240 bar (3500 psi); see page 8.010.1. Ductile iron and steel bodies available; dimensions may differ; consult factory.

TO ORDER

BV10-40 -		
Porting		Seals
Cartridge Only	0	N Buna N (Std.)
SAE 6	6T	V Fluorocarbon
SAE 8	8T	
1/4 in. BSP*	2B	
3/8 in. BSP*	3B	
*BSP Body U.K. Mfr. Only		

DIRECTIONAL VALVES

BV10-42 Brake Release Valve, 2-Position



DESCRIPTION

A screw-in, cartridge-style, spool-type, hydraulic directional valve which operates by pressure-to-shift spring return. It is normally used to release a spring-applied brake whenever hydraulic power is directed to move a load.

OPERATION

In neutral, the **BV10-42** allows flow from ② to ③. When the pressure differential between the ① and ④ ports exceeds approximately 5.5 bar (80 psi), the spool has moved far enough to close ② to ③ flow, while opening the higher pressure of ④ to ②.

FEATURES

- Hardened spool and cage for long life.
- Industry common cavity.

RATINGS

Operating Pressure: 240 bar (3500 psi)

Flow: See Performance Chart

Internal Leakage: 82 cc/minute (5 cu. in./minute) max. at 207 bar (3000 psi) ② to ③ (shifted)

Differential Pressure Required (④ > ①) to Shift to Close ② to ③/Open ④ to ②: 5.5 bar (80 psi)

Temperature: -40 to 120°C with standard Buna seals

Filtration: See page 9.010.1

Fluids: Mineral-based or synthetics with lubricating properties at viscosities of 7.4 to 420 cSt (50 to 2000 ssu)

Installation: No restrictions; See page 9.020.1

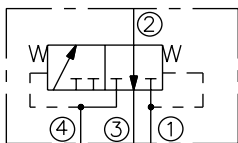
Cavity: VC10-4; See page 9.110.1

Cavity Tool: CT10-4XX; See page 8.600.1

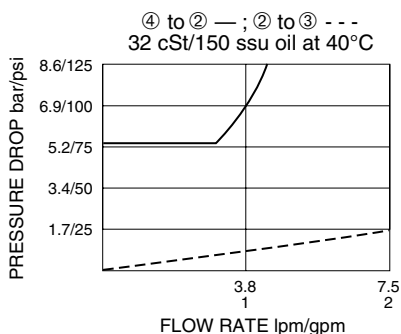
Seal Kit: SK10-4X-TBT; See page 8.650.1

SYMBOLS

USAS/ISO:

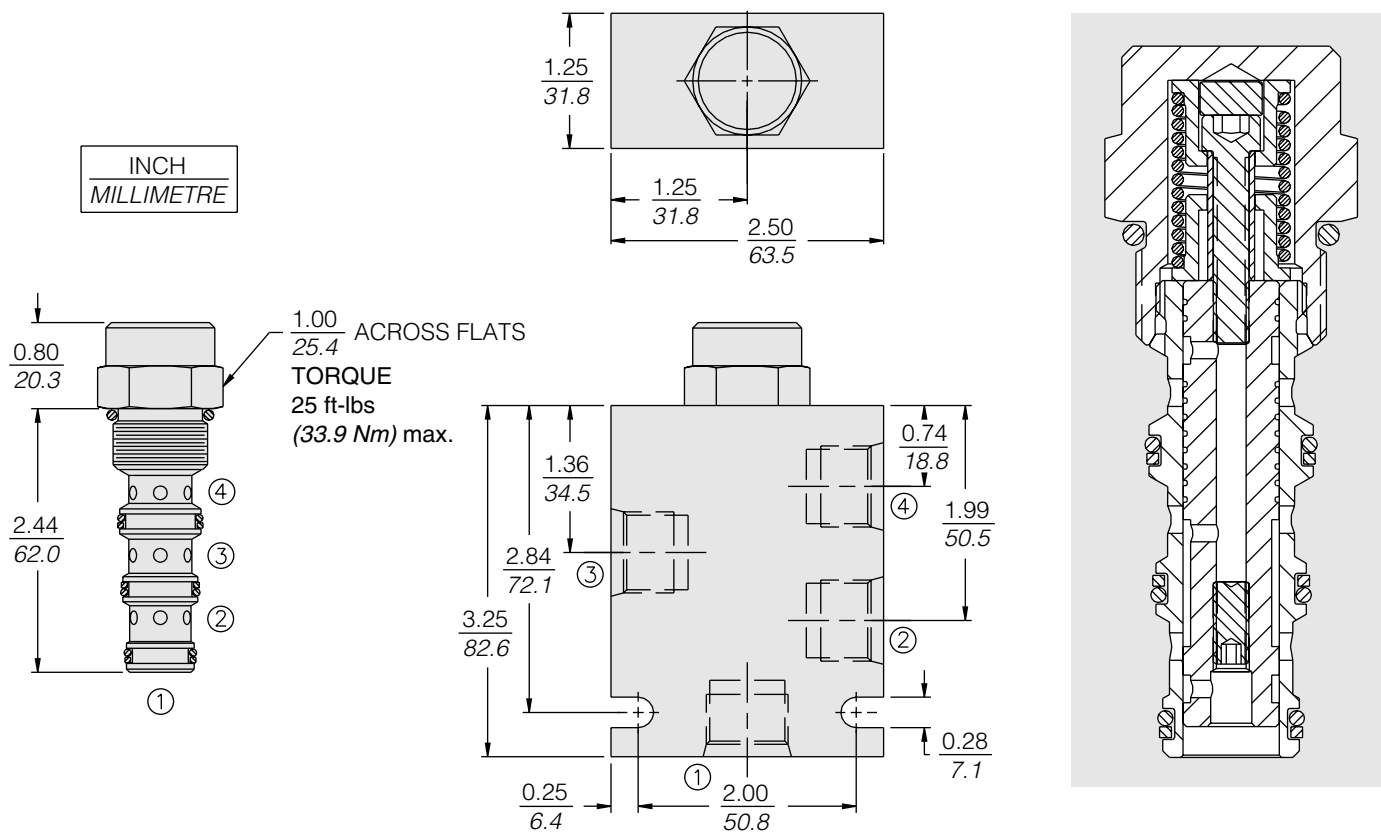


PERFORMANCE (Cartridge Only)



BV10-42

DIMENSIONS



MATERIALS

Cartridge: Weight: 0.16 kg. (0.35 lbs.); Steel with hardened work surfaces. Zinc-plated exposed surfaces. Buna N O-rings and polyester elastomer back-ups standard.

Standard Ported Body: Weight: 0.34 kg. (0.75 lbs.); Anodized high-strength 6061 T6 aluminum alloy, rated to 240 bar (3500 psi); see page 8.010.1. Ductile iron and steel bodies available; dimensions may differ; consult factory.

TO ORDER

BV10-42 -

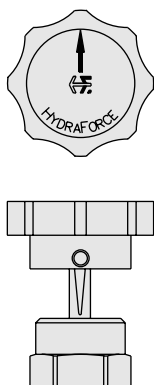
Porting		Seals	
Cartridge Only	0	N	Buna N (Std.)
SAE 6	6T	V	Fluorocarbon
SAE 8	8T		
1/4 in. BSP*	2B		
3/8 in. BSP*	3B		

*BSP Body
U.K. Mfr. Only

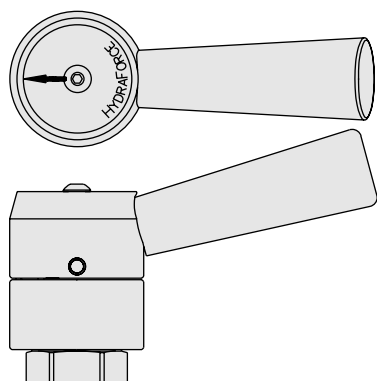
Operator Options – MR Series

2-POSITION, 90° ROTATION, POINTER IN-LAY

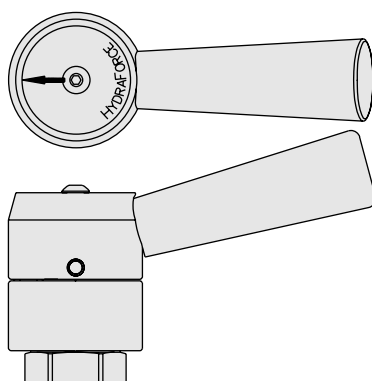
Plastic Knob
Pointer In-Lay
Kit P/N 5341010



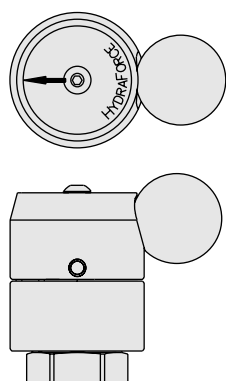
Lever Handle
Friction Lock
Kit P/N 5342020



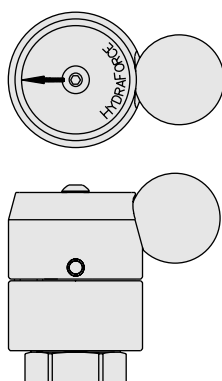
Lever Handle
2-Position Detent
Kit P/N 5342030



Ball Handle
Friction Lock
Kit P/N 5342050



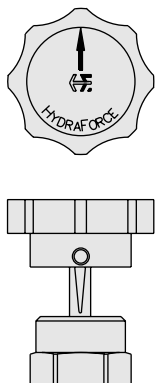
Ball Handle
2-Position Detent
Kit P/N 5342060



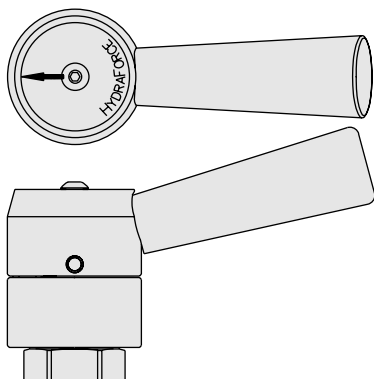
Operator Options – MR Series

3-POSITION, 45°–0–45° ROTATION, POINTER IN-LAY

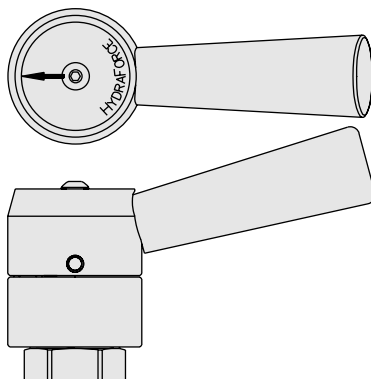
**Plastic Knob
Pointer In-Lay
Kit P/N 5341010**



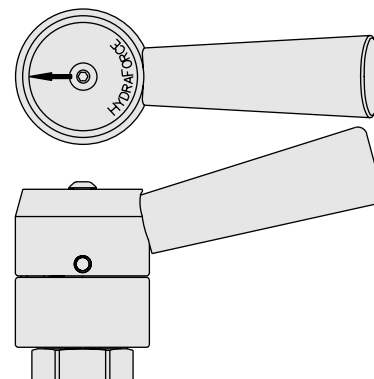
**Lever Handle
Friction Lock**
Kit P/N 5343020**



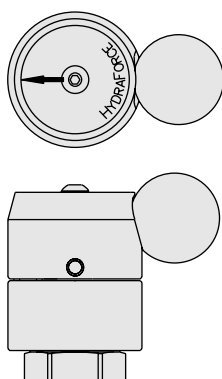
**Lever Handle
3-Position Detent
Kit P/N 5343030**



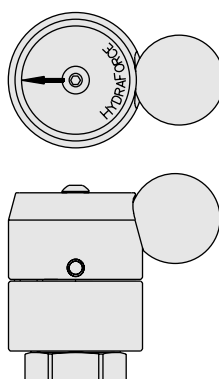
**Lever Handle
Spring Return
Kit P/N 5343040**



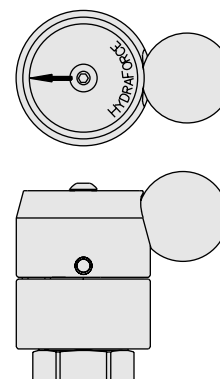
**Ball Handle
Friction Lock**
Kit P/N 5343050**



**Ball Handle
3-Position Detent
Kit P/N 5343060**



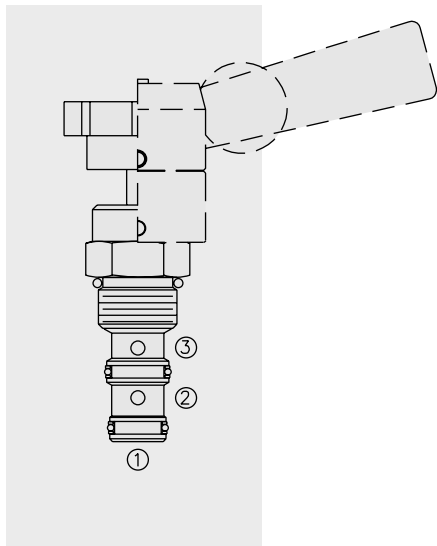
**Ball Handle
Spring Return
Kit P/N 5343070**



**Detented on neutral.

DIRECTIONAL VALVES

MR10-31 Manual Rotary 3-Way, 2-Pos. Directional Valve



DESCRIPTION

A manually-operated three-way, two-position directional valve with adaptability to a variety of adjustment operators (ordered separately).

OPERATION

Rotation of 90°, 2-position. In extreme counterclockwise position, ports ① and ② are open while port ③ is closed. In extreme clockwise position, ports ① and ③ are open while port ② is closed. All ports are closed in transition.

FEATURES

- Two-position detent, infinite friction lock, or spring return operators ordered separately.
- May be fully pressurized at all ports.
- Optional lock-down bracket.
- Heavy-duty construction.
- Industry common cavity.

RATINGS

Operating Pressure: 240 bar (3500 psi)

Max. Flow: See Performance Chart

Internal Leakage: 164 cc/min. (10 cu. in./min.) at 240 bar (3500 psi)

Temperature: -40 to 120°C with standard Buna N seals

Spring Return Option: Returns clockwise

Fluids: Mineral-based or synthetics with lubricating properties at viscosities of 7.4 to 420 cSt (50 to 2000 ssu)

Installation: No position restrictions; See page 9.020.1

See page 4.990.2 for operator handles/knobs installation;

See page 4.990.1 for lock-down bracket installation.

Cavity: VC10-3; See page 9.110.1

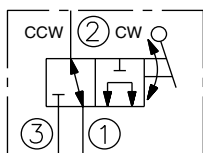
Cavity Tool: CT10-3XX; See page 8.600.1

Seal Kit: SK10-3X-MM; See page 8.650.1

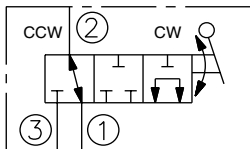
Lock-Down Bracket Kit: Part Number 5399000

SYMBOLS

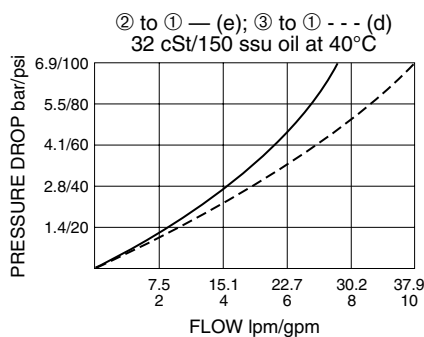
USASI/ISO:



TRANSITION:

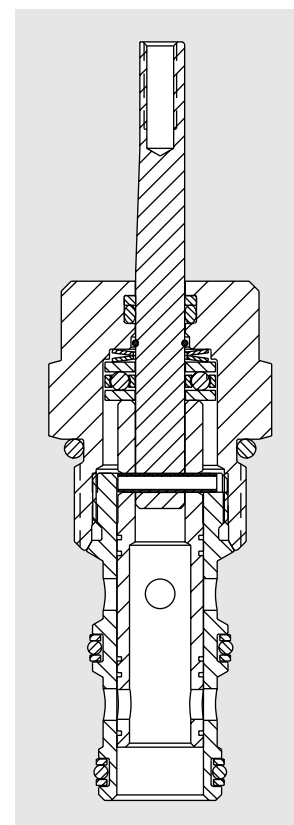
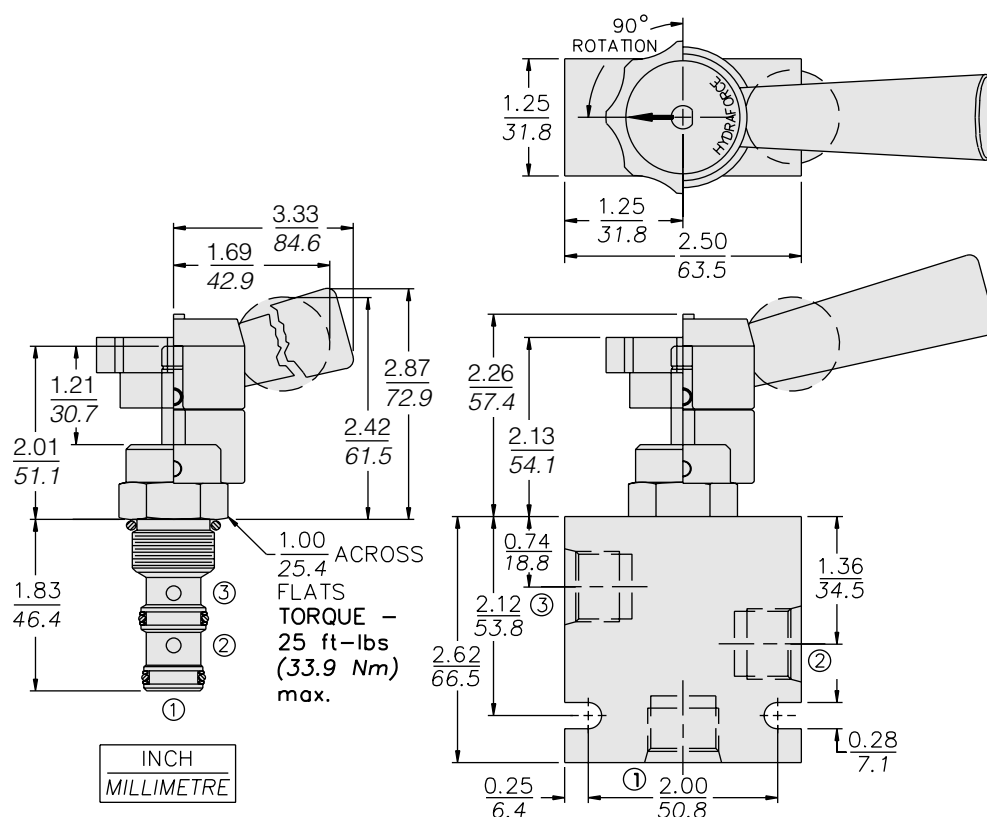


PERFORMANCE (Cartridge Only)



MR10-31

DIMENSIONS



MATERIALS

Cartridge: Weight: 0.12 kg. (0.27 lbs.); Steel with hardened work surfaces. Zinc-plated exposed surfaces. Buna N O-rings and Fluorocarbon back-ups standard.

Standard Ported Body: Weight: 0.27 kg. (0.60 lbs.); Anodized high-strength 6061 T6 aluminum alloy, rated to 240 bar (3500 psi); see page 8.010.1. Ductile iron and steel bodies available; dimensions may differ; consult factory.

Lever-Type Handle: (Sold Separately) Weight: 0.18 kg. (0.38 lbs.); Steel with hardened work surfaces. Zinc-plated exposed surfaces. Plastic lever arm.

TO ORDER

MR10-31

Option

None (Blank)

Seals

N Buna N (Std.)
V Fluorocarbon

Porting

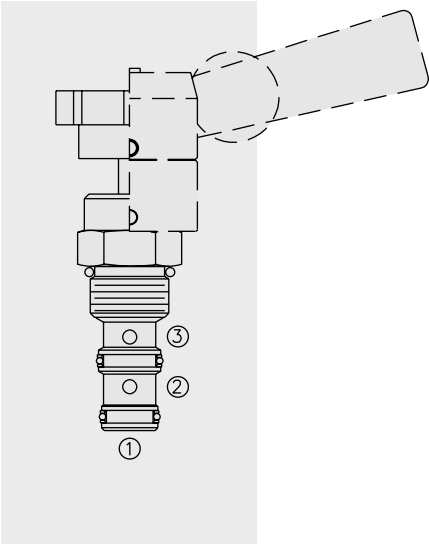
Cartridge Only 0
SAE 6 6T
SAE 8 8T
SAE 8 with Lock-Down Bracket 8TL
1/4 in. BSP* 2B
3/8 in. BSP* 3B

*BSP Body;
U.K. Mfr. Only

NOTE: To order standard operator kits, refer to pages 4.770.1 and 4.770.2

DIRECTIONAL VALVES

MR10-37A Manual Rotary, 3-Way, 3-Position



DESCRIPTION

Manually-operated three-way, three-position directional valve, with adaptability to a variety of adjustment operators (ordered separately), in a variety of spool configurations.

OPERATION

Three positions: centered, 45° counterclockwise, and 45° clockwise. In the center position all ports are closed. In the 45° counterclockwise from center position, ports ② and ③ are open while port ① is closed. In the 45° clockwise from center position, ports ① and ② are open while port ③ is closed. All ports are closed in transition.

FEATURES

- Three-position detent, friction lock (with detented neutral), or spring return operators may be ordered separately.
- May be fully pressurized at all ports.
- Optional lock-down bracket.
- Heavy-duty construction.
- Industry common cavity.

RATINGS

Operating Pressure: 240 bar (3500 psi)

Max. Flow: See Performance Chart

Internal Leakage: 164 cc/minute (10 cu. in./minute) at 240 bar (3500 psi)

Temperature: -40 to 120°C with standard Buna N seals

Fluids: Mineral-based or synthetics with lubricating properties at viscosities of 7.4 to 420 cSt (50 to 2000 ssu)

Installation: No position restrictions; See page 9.020.1
See page 4.990.2 for operator handles/knobs installation;
See page 4.990.1 for lock-down bracket installation.

Cavity: VC10-3; See page 9.110.1

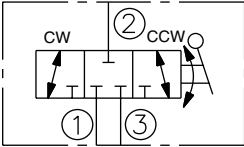
Cavity Tool: CT10-3XX; See page 8.600.1

Seal Kit: SK10-3X-MM; See page 8.650.1

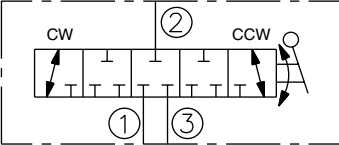
Lock-Down Bracket Kit: Part Number 5399000

SYMBOLS

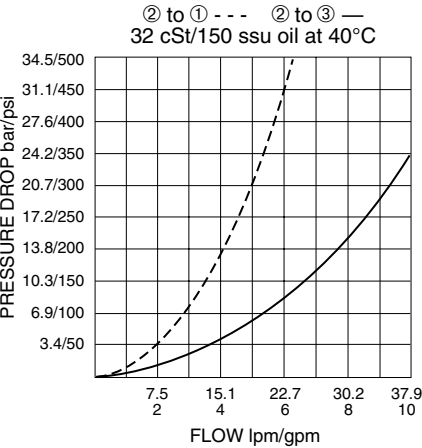
USAS/ISO:



TRANSITION:

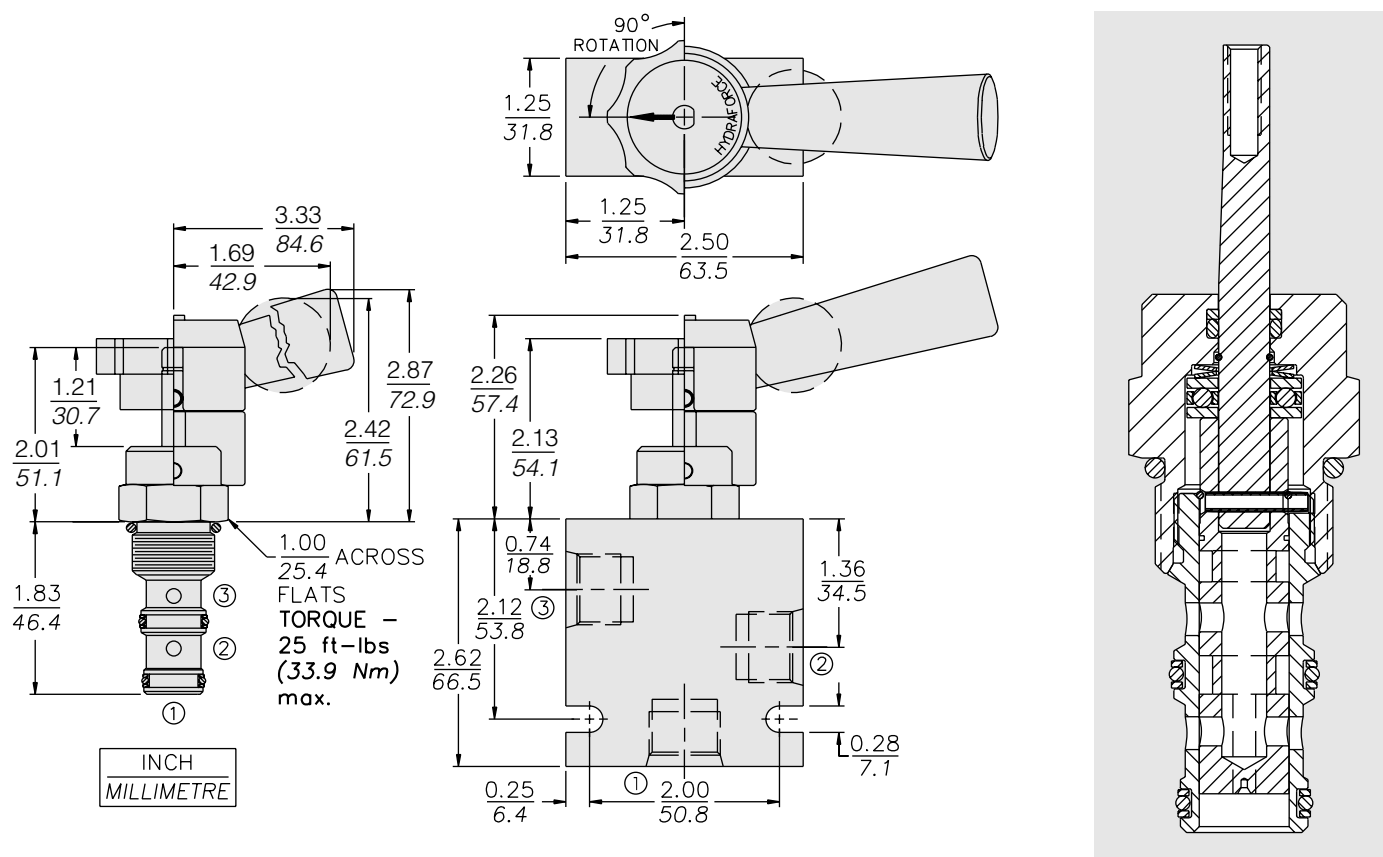


PERFORMANCE (Cartridge Only)



MR10-37A

DIMENSIONS



MATERIALS

Cartridge: Weight: 0.11 kg. (0.25 lbs.); Steel with hardened work surfaces. Zinc-plated exposed surfaces. Buna N O-rings and Fluorocarbon back-ups standard.

Standard Ported Body: Weight: 0.32 kg. (0.70 lbs.); Anodized high-strength 6061 T6 aluminum alloy, rated to 240 bar (3500 psi); see page 8.010.1. Ductile iron and steel bodies available; dimensions may differ; consult factory.

Lever-Type Handle: (Sold Separately) Weight: 0.18 kg. (0.38 lbs.); Steel with hardened work surfaces. Zinc-plated exposed surfaces. Plastic lever arm.

TO ORDER

MR10-37A

Option

None (Blank)

Seals

N Buna N (Std.)
V Fluorocarbon

Porting

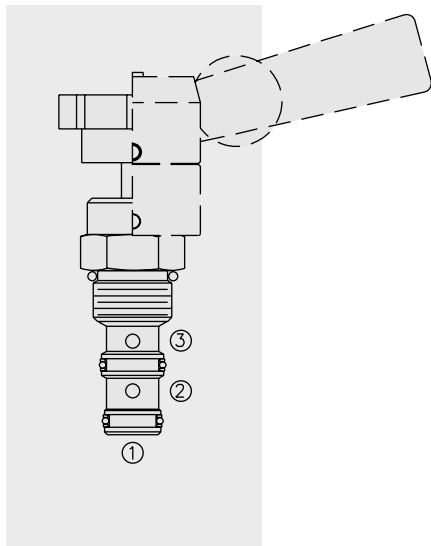
Cartridge Only **0**
SAE 6 **6T**
SAE 8 **8T**
SAE 8 with
Lock-Down Bracket **8TL**
1/4 in. BSP* **2B**
3/8 in. BSP* **3B**

*BSP Body;
U.K. Mfr. Only

NOTE: To order standard operator kits, refer to pages 4.770.1 and 4.770.2

DIRECTIONAL VALVES

MR10-37B Manual Rotary, 3-Way, 3-Position



DESCRIPTION

Manually-operated three-way, three-position directional valve, with adaptability to a variety of adjustment operators (ordered separately), in a variety of spool configurations.

OPERATION

Three positions: centered, 45° counterclockwise, and 45° clockwise. In the center position all ports are open. In the 45° counterclockwise from center position, ports ② and ③ are open while port ① is closed. In the 45° clockwise from center position, ports ① and ② are open while port ③ is closed. All ports are partially open in transition.

FEATURES

- Three-position detent, friction lock (with detented neutral), or spring return operators may be ordered separately.
- May be fully pressurized at all ports.
- Optional lock-down bracket.
- Heavy-duty construction.
- Industry common cavity.

RATINGS

Operating Pressure: 240 bar (3500 psi)

Max. Flow: See Performance Chart

Internal Leakage: 164 cc/minute (10 cu. in./minute) at 240 bar (3500 psi)

Temperature: -40 to 120°C with standard Buna N seals

Fluids: Mineral-based or synthetics with lubricating properties at viscosities of 7.4 to 420 cSt (50 to 2000 ssu)

Installation: No position restrictions; See page 9.020.1

See page 4.990.2 for operator handles/knobs installation;

See page 4.990.1 for lock-down bracket installation.

Cavity: VC10-3; See page 9.110.1

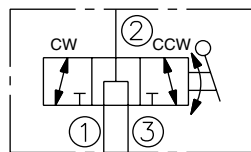
Cavity Tool: CT10-3XX; See page 8.600.1

Seal Kit: SK10-3X-MM; See page 8.650.1

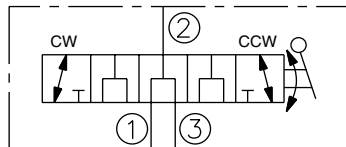
Lock-Down Bracket Kit: Part Number 5399000

SYMBOLS

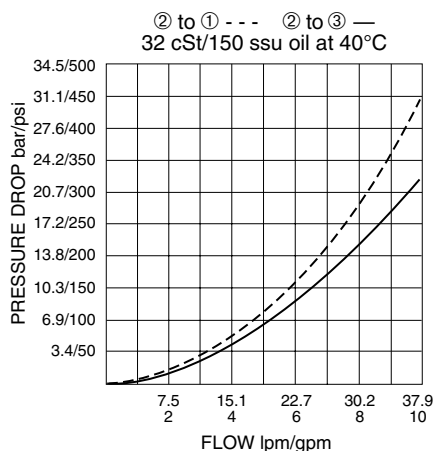
USAS/ISO:



TRANSITION:

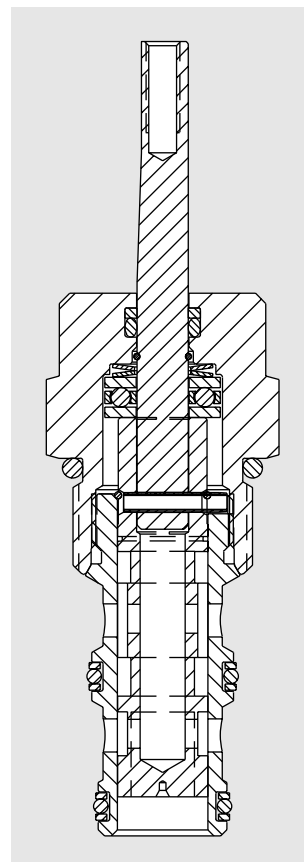
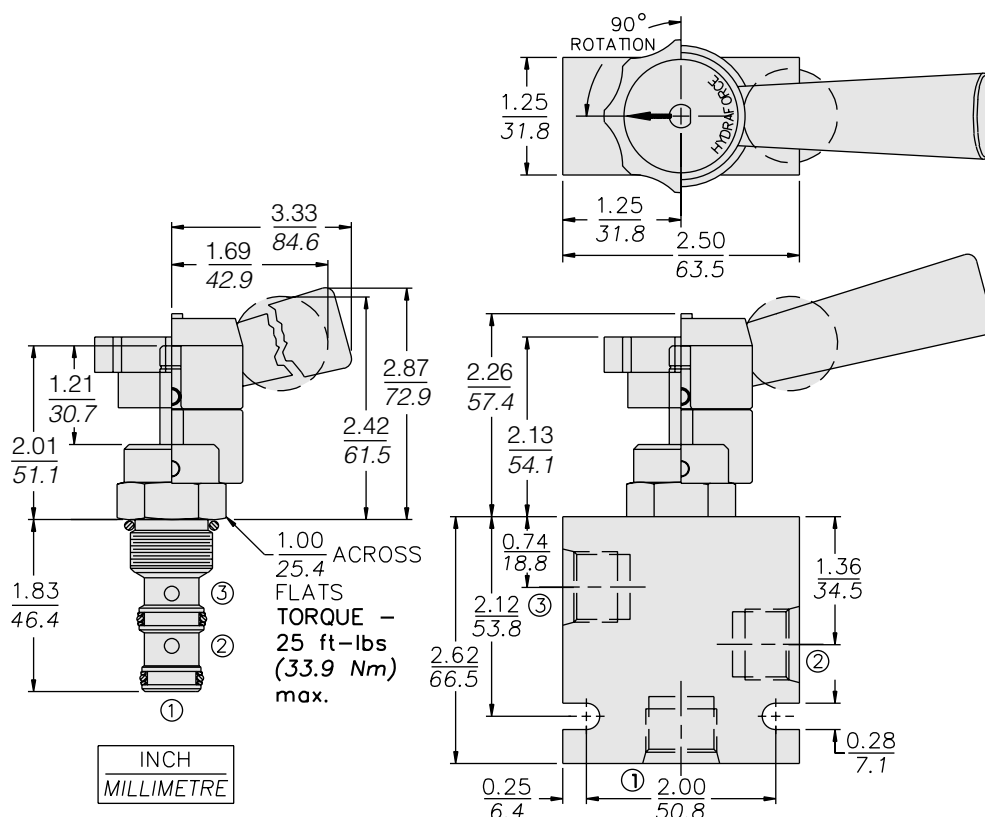


PERFORMANCE (Cartridge Only)



MR10-37B

DIMENSIONS



MATERIALS

Cartridge: Weight: 0.11 kg. (0.25 lbs.); Steel with hardened work surfaces. Zinc-plated exposed surfaces. Buna N O-rings and Fluorocarbon back-ups standard.

Standard Ported Body: Weight: 0.32 kg. (0.70 lbs.); Anodized high-strength 6061 T6 aluminum alloy, rated to 240 bar (3500 psi); see page 8.010.1. Ductile iron and steel bodies available; dimensions may differ; consult factory.

Lever-Type Handle: (Sold Separately) Weight: 0.18 kg. (0.38 lbs.); Steel with hardened work surfaces. Zinc-plated exposed surfaces. Plastic lever arm.

TO ORDER

MR10-37B

Option

None (Blank)

Seals

N Buna N (Std.)
V Fluorocarbon

Porting

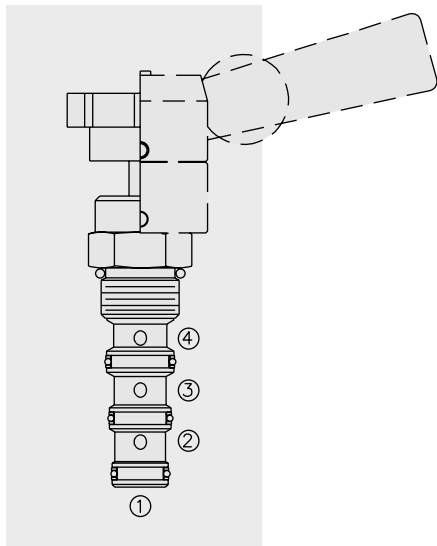
Cartridge Only **0**
SAE 6 **6T**
SAE 8 **8T**
SAE 8 with Lock-Down Bracket **8TL**
1/4 in. BSP* **2B**
3/8 in. BSP* **3B**

*BSP Body;
U.K. Mfr. Only

NOTE: To order standard operator kits, refer to pages 4.770.1 and 4.770.2

DIRECTIONAL VALVES

MR10-40 Manual Rotary 4-Way, 2-Pos. Directional Valve



DESCRIPTION

A manually-operated four-way, two-position directional valve, with adaptability to a variety of adjustment operators (ordered separately).

OPERATION

Two positions, 90° rotation. In extreme counterclockwise position, ports ① and ④ are open while ports ② and ③ are open. In extreme clockwise position, ports ① and ② are open while ports ③ and ④ are open. All ports are closed in transition.

FEATURES

- Two-position detent, infinite friction lock, or spring return operators may be ordered separately.
- May be fully pressurized at all ports.
- Optional lock-down bracket.
- Heavy-duty construction.
- Industry common cavity.

RATINGS

Operating Pressure: 240 bar (3500 psi)

Max. Flow: See Performance Chart

Internal Leakage: 164 cc/minute (10 cu. in./minute) at 240 bar (3500 psi)

Temperature: -40 to 120°C with standard Buna N seals

Fluids: Mineral-based or synthetics with lubricating properties at viscosities of 7.4 to 420 cSt (50 to 2000 ssu)

Installation: No position restrictions; See page 9.020.1

See page 4.990.2 for operator handles/knobs installation;

See page 4.990.1 for lock-down bracket installation.

Cavity: VC10-4; See page 9.110.1

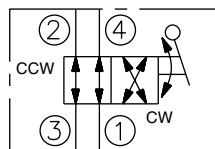
Cavity Tool: CT10-4XX; See page 8.600.1

Seal Kit: SK10-4X-MMM; See page 8.650.1

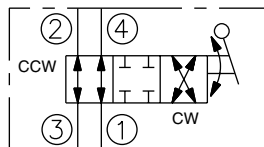
Lock-Down Bracket Kit: Part Number 5399000

SYMBOLS

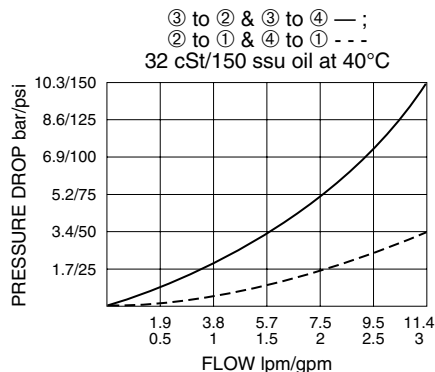
USAS/ISO:



TRANSITION:

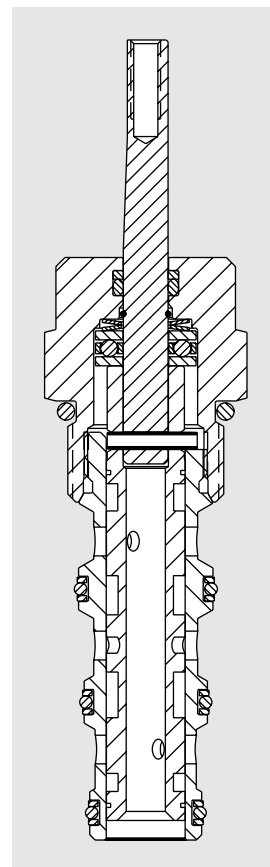
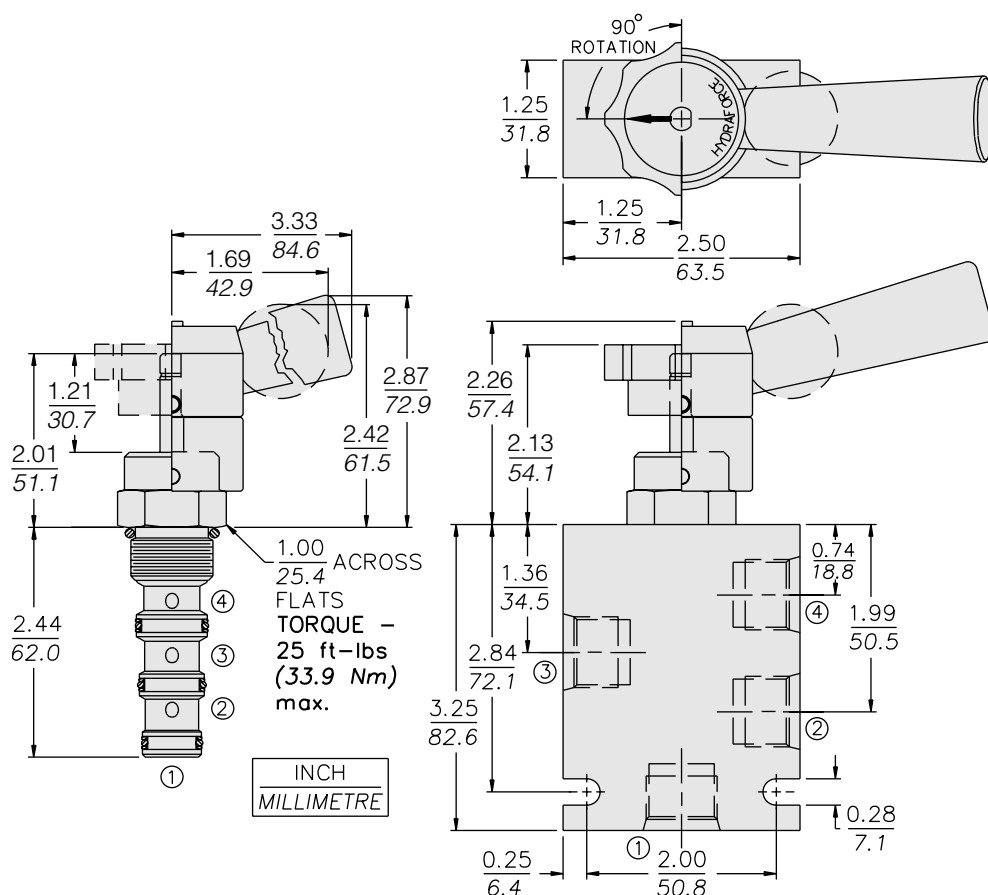


PERFORMANCE (Cartridge Only)



MR10-40

DIMENSIONS



MATERIALS

Cartridge: Weight: 0.13 kg. (0.29 lbs.); Steel with hardened work surfaces. Zinc-plated exposed surfaces. Buna N O-rings and Fluorocarbon back-ups standard.

Standard Ported Body: Weight: 0.34 kg. (0.75 lbs.); Anodized high-strength 6061 T6 aluminum alloy, rated to 240 bar (3500 psi); see page 8.010.1. Ductile iron and steel bodies available; dimensions may differ; consult factory.

Lever-Type Handle: (Sold Separately) Weight: 0.18 kg. (0.38 lbs.); Steel with hardened work surfaces. Zinc-plated exposed surfaces. Plastic lever arm.

TO ORDER

MR10-40

Option

None (Blank)

Porting

Cartridge Only 0
SAE 6 6T
SAE 8 8T
SAE 8 with Lock-Down Bracket 8TL
1/4 in. BSP* 2B
3/8 in. BSP* 3B

*BSP Body;
U.K. Mfr. Only

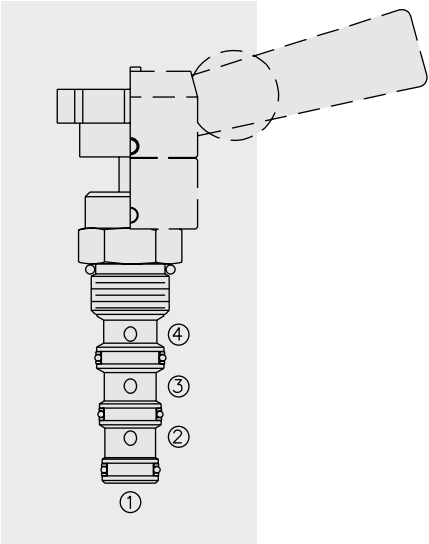
Seals

N Buna N (Std.)
V Fluorocarbon

NOTE: To order standard operator kits, refer to pages 4.770.1 and 4.770.2

DIRECTIONAL VALVES

MR10-41 Manual Rotary 4-Way, 2-Pos. Directional Valve



DESCRIPTION

A manually-operated four-way, two-position directional valve, with adaptability to a variety of adjustment operators (ordered separately).

OPERATION

Two positions, 90° rotation. In extreme counterclockwise position all ports are closed. In extreme clockwise position, ports 1 and 4 are open while ports 2 and 3 are open. All ports are closed in transition.

FEATURES

- Two-position detent, infinite friction lock, or spring return operators may be ordered separately.
- May be fully pressurized at all ports.
- Optional lock-down bracket.
- Heavy-duty construction.
- Industry common cavity.

RATINGS

Operating Pressure: 240 bar (3500 psi)

Max. Flow: See Performance Chart

Internal Leakage: 164 cc/minute (10 cu. in./minute) at 240 bar (3500 psi)

Temperature: -40 to 120°C with standard Buna N seals

Fluids: Mineral-based or synthetics with lubricating properties at viscosities of 7.4 to 420 cSt (50 to 2000 ssu)

Installation: No position restrictions; See page 9.020.1
See page 4.990.2 for operator handles/knobs installation;
See page 4.990.1 for lock-down bracket installation.

Cavity: VC10-4; See page 9.110.2

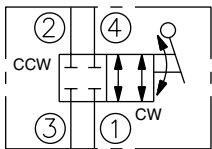
Cavity Tool: CT10-4XX; See page 8.600.1

Seal Kit: SK10-4X-MMM; See page 8.650.1

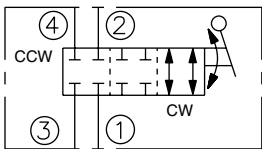
Lock-Down Bracket Kit: Part Number 5399000

SYMBOLS

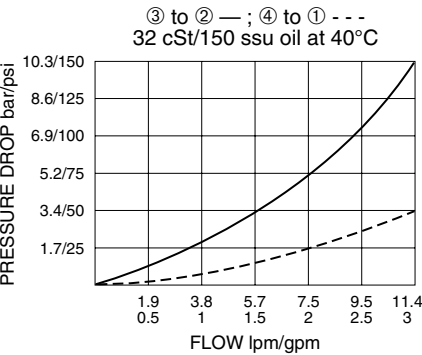
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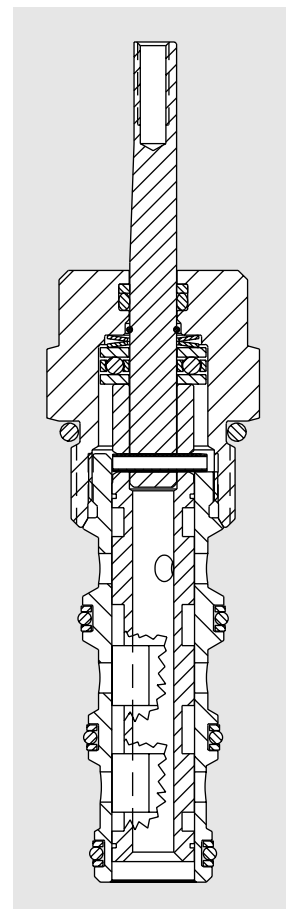
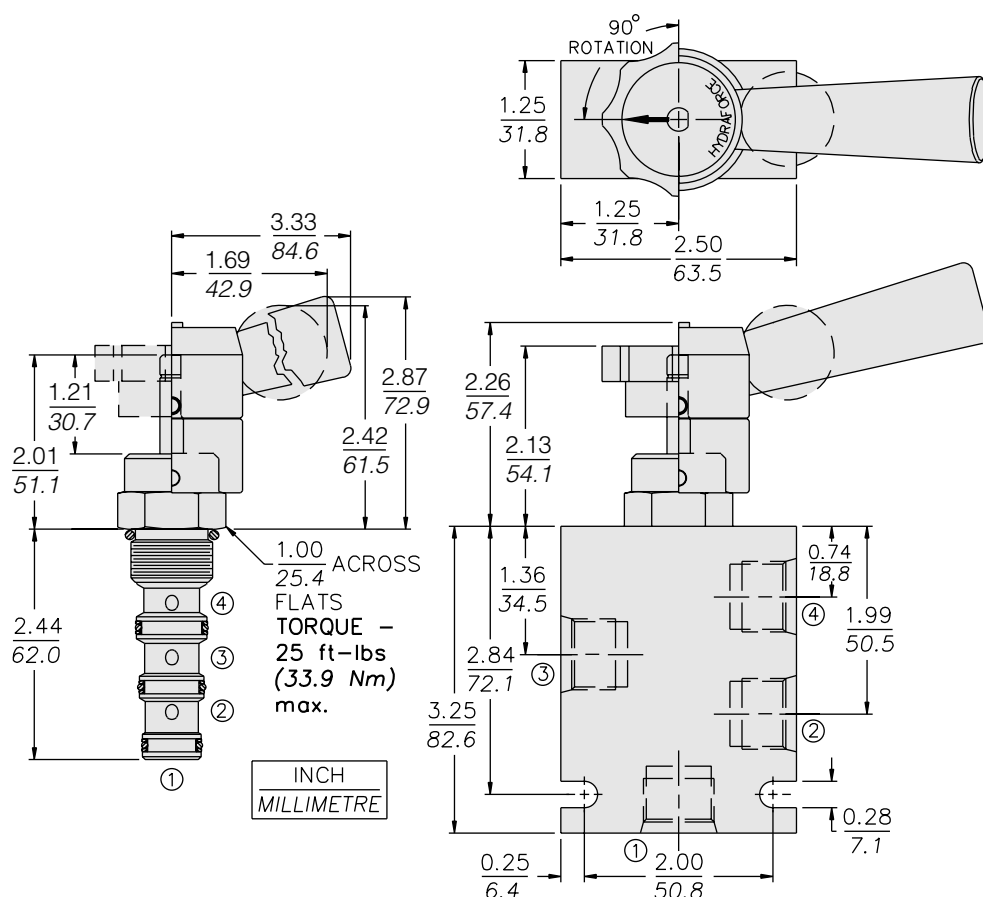


TRANSITION:



PERFORMANCE (Cartridge Only)

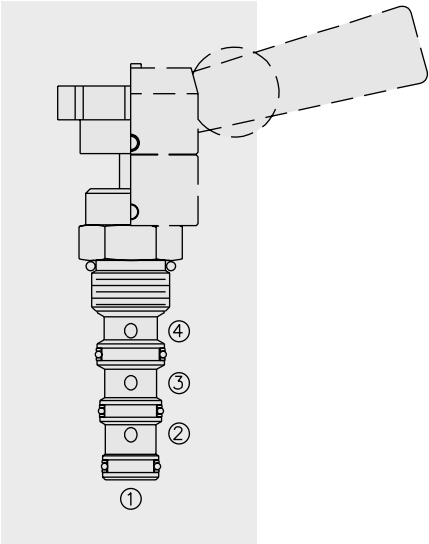




MR10-41	-	-	-
<u>Option</u>			
None (Blank)			
<u>Porting</u>			
Cartridge Only		0	
SAE 6		6T	
SAE 8		8T	
SAE 8 with			
Lock-Down Bracket		8TL	
1/4 in. BSP*		2B	
3/8 in. BSP*		3B	
*BSP Body; U.K. Mfr. Only			

DIRECTIONAL VALVES

MR10-43 Manual Rotary 4-Way, 2-Pos. Directional Valve



DESCRIPTION

A manually-operated four-way, two-position directional valve, with adaptability to a variety of adjustment operators (ordered separately).

OPERATION

Two positions, 90° rotation. In extreme counterclockwise position ports ① and ② are open while ports ③ and ④ are closed. In extreme clockwise position, ports ① and ④ are open while ports ② and ③ are open. In transition, ports ①, ② and ③ are partially open while port ④ is closed.

FEATURES

- Two-position detent, infinite friction lock, or spring return operators may be ordered separately.
- May be fully pressurized at all ports.
- Optional lock-down bracket.
- Heavy-duty construction.
- Industry common cavity.

RATINGS

Operating Pressure: 240 bar (3500 psi)

Max. Flow: See Performance Chart

Internal Leakage: 164 cc/minute (10 cu. in./minute) at 240 bar (3500 psi)

Temperature: -40 to 120°C with standard Buna N seals

Fluids: Mineral-based or synthetics with lubricating properties at viscosities of 7.4 to 420 cSt (50 to 2000 ssu)

Installation: No position restrictions; See page 9.020.1
See page 4.990.2 for operator handles/knobs installation;
See page 4.990.1 for lock-down bracket installation.

Cavity: VC10-4; See page 9.110.2

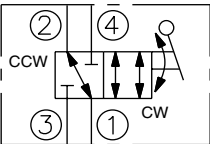
Cavity Tool: CT10-4XX; See page 8.600.1

Seal Kit: SK10-4X-MMM; See page 8.650.1

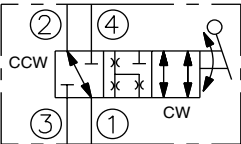
Lock-Down Bracket Kit: Part Number 5399000

SYMBOLS

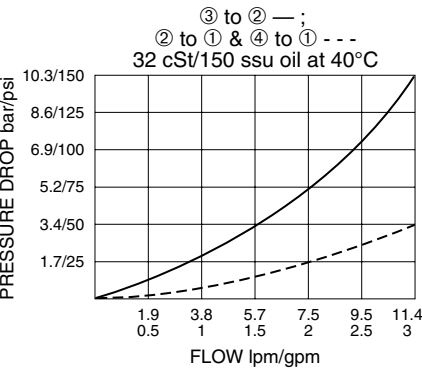
USASI/ISO:



TRANSITION:

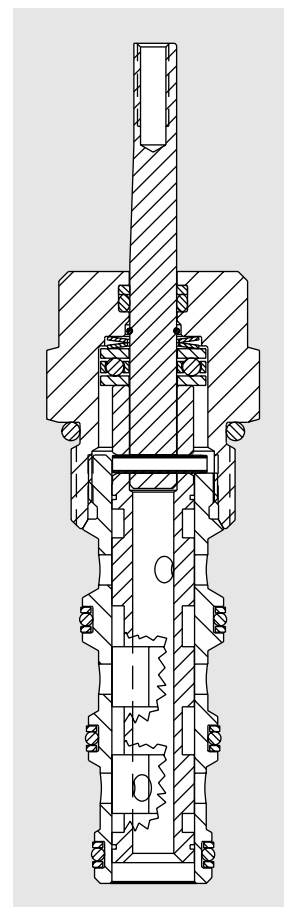
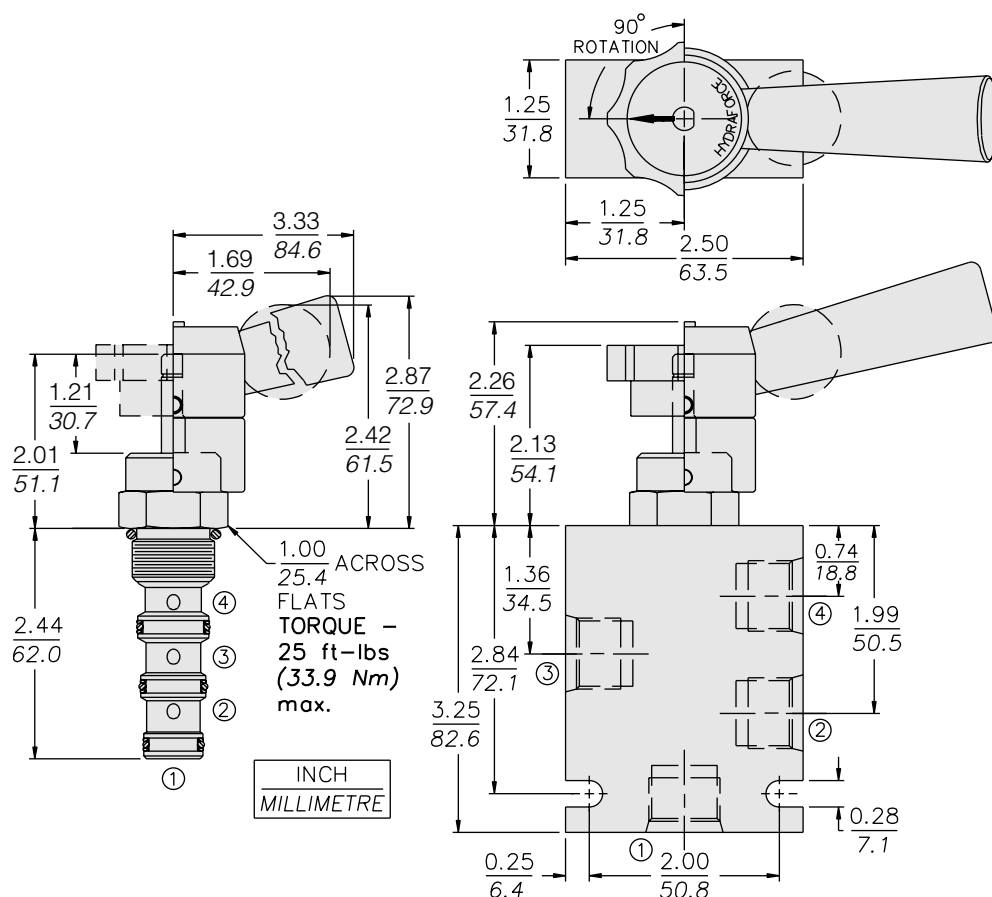


PERFORMANCE (Cartridge Only)



MR10-43

DIMENSIONS



MATERIALS

Cartridge: Weight: 0.13 kg. (0.29 lbs.); Steel with hardened work surfaces. Zinc-plated exposed surfaces. Buna N O-rings and Fluorocarbon back-ups standard.

Standard Ported Body: Weight: 0.34 kg. (0.75 lbs.); Anodized high-strength 6061 T6 aluminum alloy, rated to 240 bar (3500 psi); see page 8.010.1. Ductile iron and steel bodies available; dimensions may differ; consult factory.

Lever-Type Handle: (Sold Separately) Weight: 0.18 kg. (0.38 lbs.); Steel with hardened work surfaces. Zinc-plated exposed surfaces. Plastic lever arm.

TO ORDER

MR10-43

Option

None (Blank)

Seals

N Buna N (Std.)
V Fluorocarbon

Porting

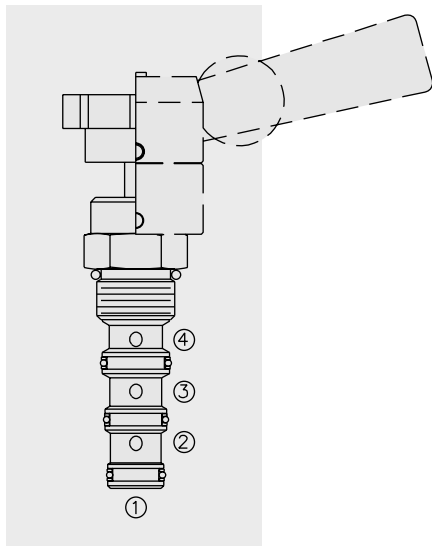
Cartridge Only **0**
SAE 6 **6T**
SAE 8 **8T**
SAE 8 with Lock-Down Bracket **8TL**
1/4 in. BSP* **2B**
3/8 in. BSP* **3B**

*BSP Body;
U.K. Mfr. Only

NOTE: To order standard operator kits, refer to pages 4.770.1 and 4.770.2

DIRECTIONAL VALVES

MR10-47A Manual Rotary, 4-Way, 3-Pos. Tandem Center



DESCRIPTION

Manually-operated four-way, three-position directional valve, with adaptability to a variety of adjustment operators (ordered separately), in a variety of spool configurations.

OPERATION

Three positions: centered, 45° counterclockwise, and 45° clockwise. In the center position ports ① and ③ are open while ports ② and ④ are closed. In the 45° counterclockwise from center position, ports ① and ④ are open while ports ② and ③ are open. In the 45° clockwise from center position, ports ① and ② are open while ports ③ and ④ are open. All ports are partially open in transition.

FEATURES

- Three-position detent, friction lock (with detented neutral), or spring return operators may be ordered separately.
- May be fully pressurized at all ports.
- Optional lock-down bracket.
- Heavy-duty construction.
- Industry common cavity.

RATINGS

Operating Pressure: 240 bar (3500 psi)

Max. Flow: See Performance Chart

Internal Leakage: 164 cc/minute (10 cu. in./minute) at 240 bar (3500 psi)

Temperature: -40 to 120°C with standard Buna N seals

Fluids: Mineral-based or synthetics with lubricating properties at viscosities of 7.4 to 420 cSt (50 to 2000 ssu)

Installation: No position restrictions; See page 9.020.1

See page 4.990.2 for operator handles/knobs installation;

See page 4.990.1 for lock-down bracket installation.

Cavity: VC10-4; See page 9.110.1

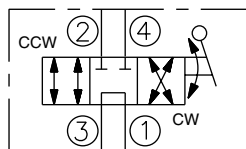
Cavity Tool: CT10-4XX; See page 8.600.1

Seal Kit: SK10-4X-MMM; See page 8.650.1

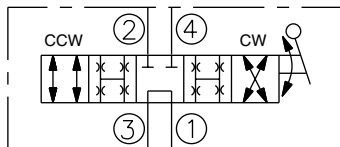
Lock-Down Bracket Kit: Part Number 5399000

SYMBOLS

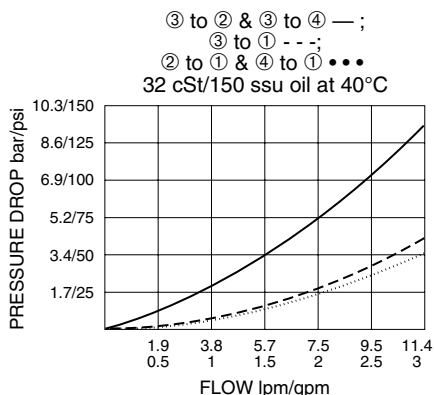
USAS/ISO:



TRANSITION:

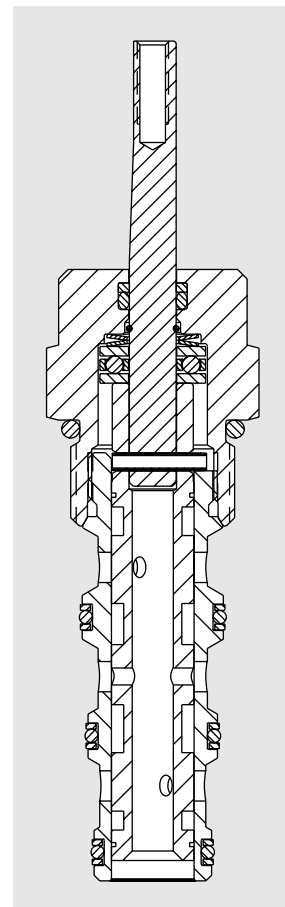
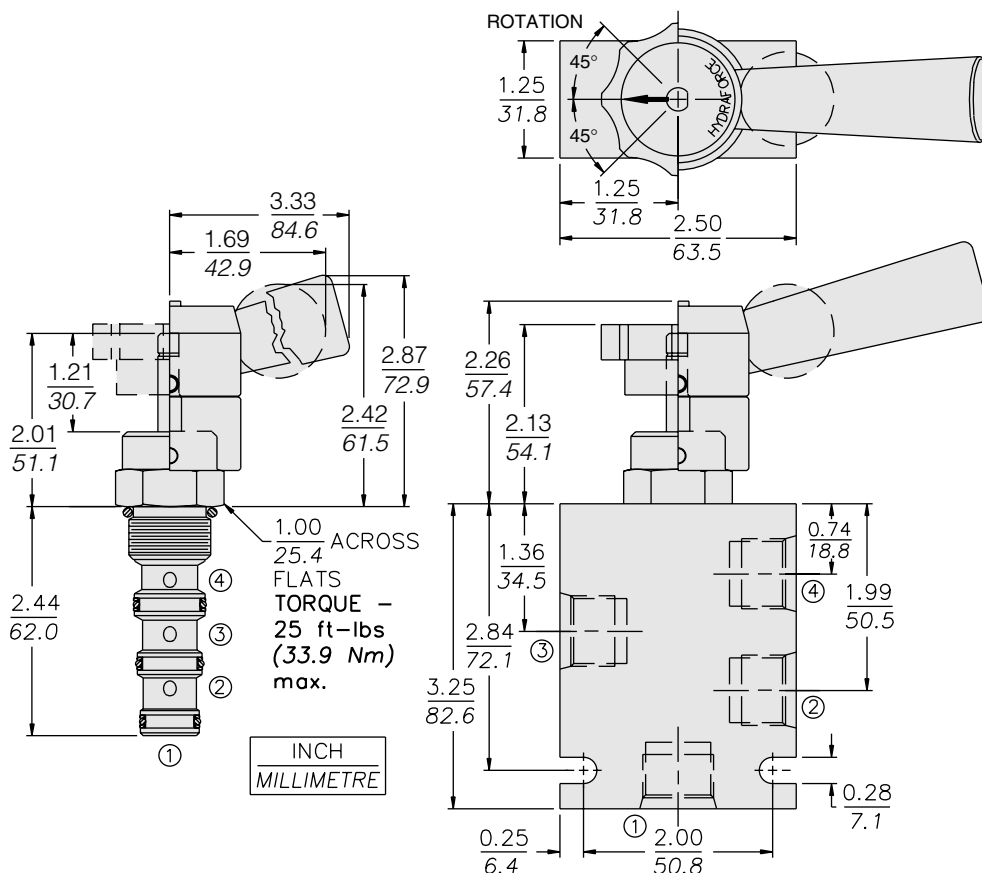


PERFORMANCE (Cartridge Only)



MR10-47A

DIMENSIONS



MATERIALS

Cartridge: Weight: 0.13 kg. (0.29 lbs.); Steel with hardened work surfaces. Zinc-plated exposed surfaces. Buna N O-rings and Fluorocarbon back-ups standard.

Standard Ported Body: Weight: 0.34 kg. (0.75 lbs.); Anodized high-strength 6061 T6 aluminum alloy, rated to 240 bar (3500 psi); see page 8.010.1. Ductile iron and steel bodies available; dimensions may differ; consult factory.

Lever-Type Handle: (Sold Separately) Weight: 0.18 kg. (0.38 lbs.); Steel with hardened work surfaces. Zinc-plated exposed surfaces. Plastic lever arm.

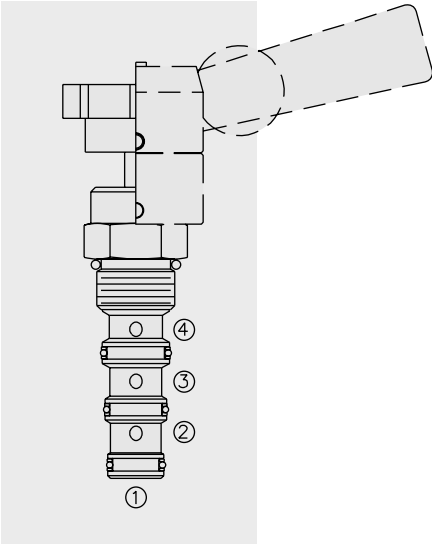
TO ORDER

MR10-47A		-		-	
Option		Porting		Seals	
None (Blank)		Cartridge Only		N Buna N (Std.)	
		SAE 6		V Fluorocarbon	
		SAE 8			
		SAE 8 with			
		Lock-Down Bracket			
		1/4 in. BSP*			
		3/8 in. BSP*			
		*BSP Body;			
		U.K. Mfr. Only			

NOTE: To order standard operator kits, refer to pages 4.770.1 and 4.770.2

DIRECTIONAL VALVES

MR10-47B Manual Rotary, 4-Way, 3-Pos., Open Center



DESCRIPTION

Manually-operated four-way, three-position directional valve, with adaptability to a variety of adjustment operators (ordered separately), in a variety of spool configurations.

OPERATION

Three positions: centered, 45° counterclockwise, and 45° clockwise. In the center position all ports are open. In the 45° counterclockwise from center position, ports ① and ④ are open while ports ② and ③ are open. In the 45° clockwise from center position, ports ① and ② are open while ports ③ and ④ are open. All ports are partially open in transition.

FEATURES

- Three-position detent, friction lock (with detented neutral), or spring return operators may be ordered separately.
- May be fully pressurized at all ports.
- Optional lock-down bracket.
- Heavy-duty construction.
- Industry common cavity.

RATINGS

Operating Pressure: 240 bar (3500 psi)

Max. Flow: See Performance Chart

Internal Leakage: 164 cc/minute (10 cu. in./minute) at 240 bar (3500 psi)

Temperature: -40 to 120°C with standard Buna N seals

Fluids: Mineral-based or synthetics with lubricating properties at viscosities of 7.4 to 420 cSt (50 to 2000 ssu)

Installation: No position restrictions; See page 9.020.1
See page 4.990.2 for operator handles/knobs installation;
See page 4.990.1 for lock-down bracket installation.

Cavity: VC10-4; See page 9.110.1

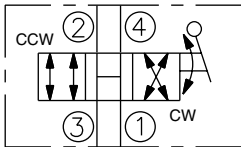
Cavity Tool: CT10-4XX; See page 8.600.1

Seal Kit: SK10-4X-MMM; See page 8.650.1

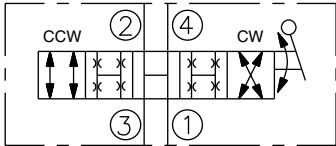
Lock-Down Bracket Kit: Part Number 5399000

SYMBOLS

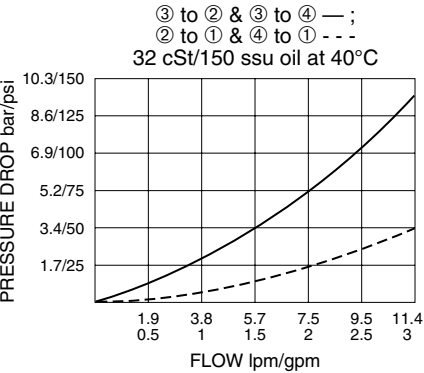
USAS/ISO:



TRANSITION:

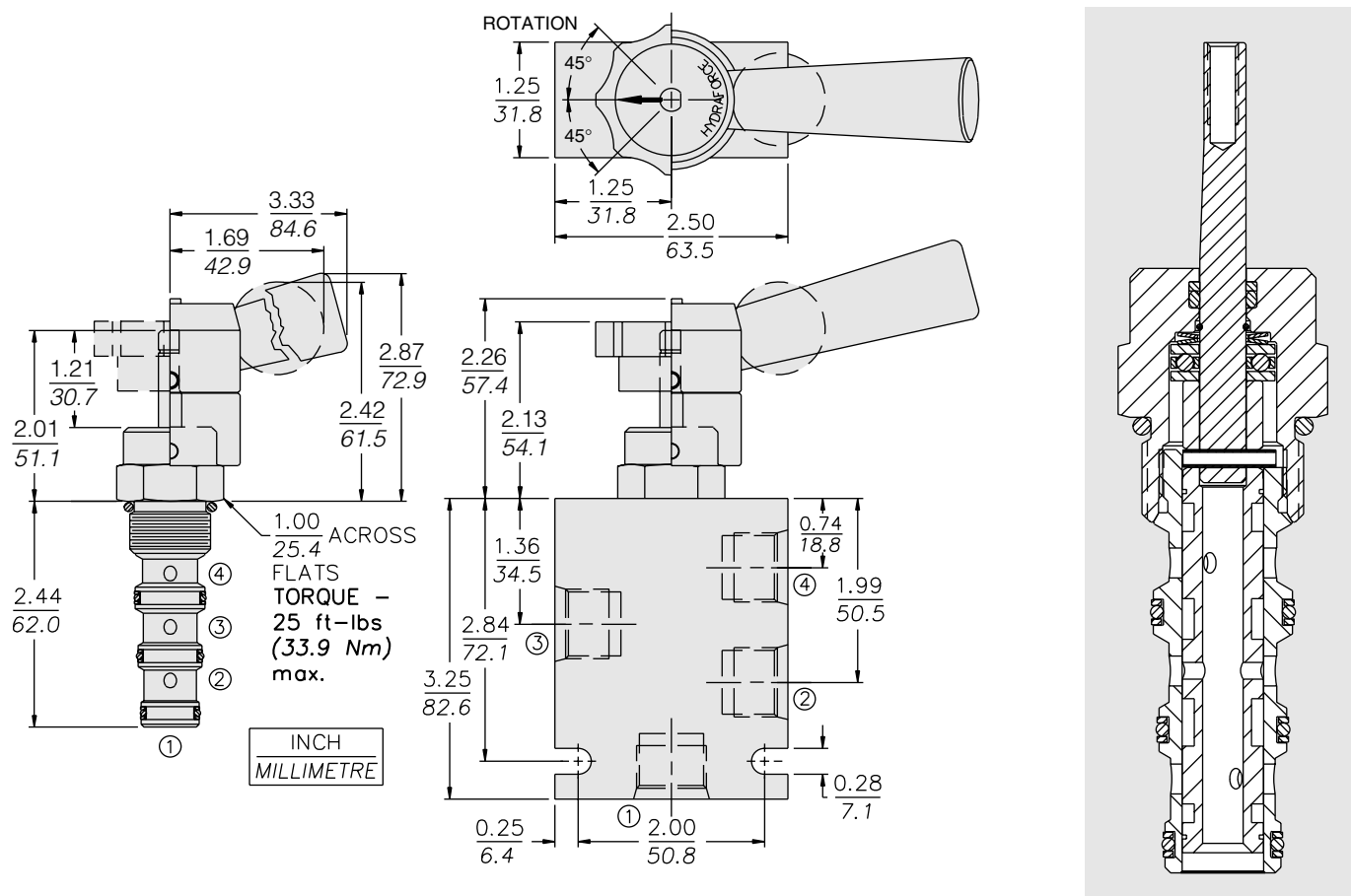


PERFORMANCE (Cartridge Only)



MR10-47B

DIMENSIONS



MATERIALS

Cartridge: Weight: 0.13 kg. (0.29 lbs.); Steel with hardened work surfaces. Zinc-plated exposed surfaces. Buna N O-rings and Fluorocarbon back-ups standard.

Standard Ported Body: Weight: 0.34 kg. (0.75 lbs.); Anodized high-strength 6061 T6 aluminum alloy, rated to 240 bar (3500 psi); see page 8.010.1. Ductile iron and steel bodies available; dimensions may differ; consult factory.

Lever-Type Handle: (Sold Separately) Weight: 0.18 kg. (0.38 lbs.). Steel with hardened work surfaces. Zinc-plated exposed surfaces. Plastic lever arm.

TO ORDER

MR10-47B

Option

None (Blank)

Porting

Cartridge Only
SAE 6
SAE 8
SAE 8 with
Lock-Down Bracket
1/4 in. BSP*
3/8 in. BSP*

0
6T
8T
8TL
2B
3B

Seals

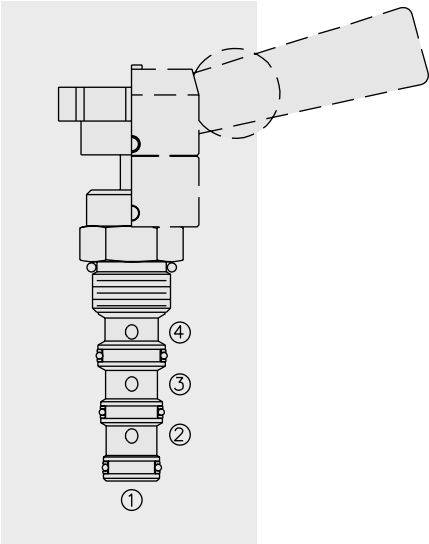
N Buna N (Std.)
V Fluorocarbon

NOTE: To order standard operator kits, refer to pages 4.770.1 and 4.770.2

*BSP Body;
U.K. Mfr. Only

DIRECTIONAL VALVES

MR10-47C Manual Rotary, 4-Way, 3-Pos., Closed Center



DESCRIPTION

Manually-operated four-way, three-position directional valve, with adaptability to a variety of adjustment operators (ordered separately), in a variety of spool configurations.

OPERATION

Three positions: centered, 45° counterclockwise, and 45° clockwise. In the center position all ports are closed. In the 45° counterclockwise from center position, ports ① and ④ are open while ports ② and ③ are open. In the 45° clockwise from center position, ports ① and ② are open while ports ③ and ④ are open. All ports are closed in transition.

FEATURES

- Three-position detent, friction lock (with detented neutral), or spring return operators may be ordered separately.
- May be fully pressurized at all ports.
- Optional lock-down bracket.
- Heavy-duty construction.
- Industry common cavity.

RATINGS

Operating Pressure: 240 bar (3500 psi)

Max. Flow: See Performance Chart

Internal Leakage: 164 cc/minute (10 cu. in./minute) at 240 bar (3500 psi)

Temperature: -40 to 120°C with standard Buna N seals

Fluids: Mineral-based or synthetics with lubricating properties at viscosities of 7.4 to 420 cSt (50 to 2000 ssu)

Installation: No position restrictions; See page 9.020.1
See page 4.990.2 for operator handles/knobs installation;
See page 4.990.1 for lock-down bracket installation.

Cavity: VC10-4; See page 9.110.1

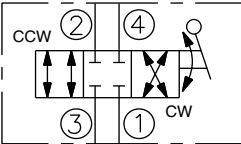
Cavity Tool: CT10-4XX; See page 8.600.1

Seal Kit: SK10-4X-MMM; See page 8.650.1

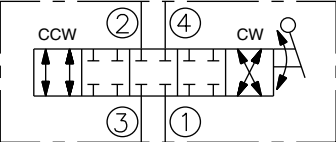
Lock-Down Bracket Kit: Part Number 5399000

SYMBOLS

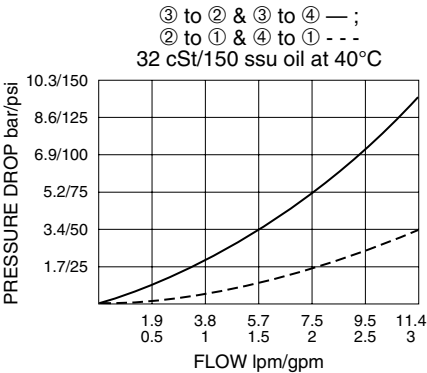
USAS/ISO:



TRANSITION:

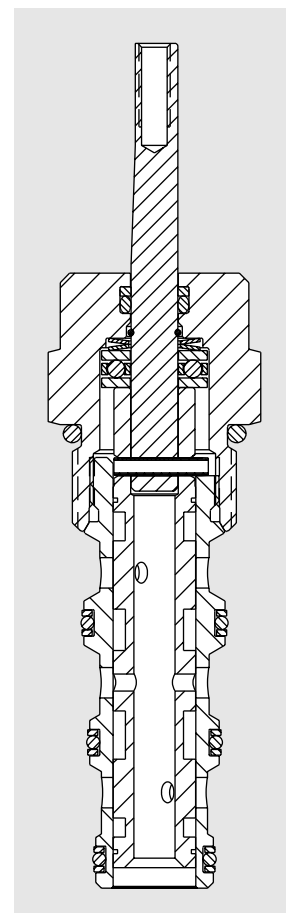
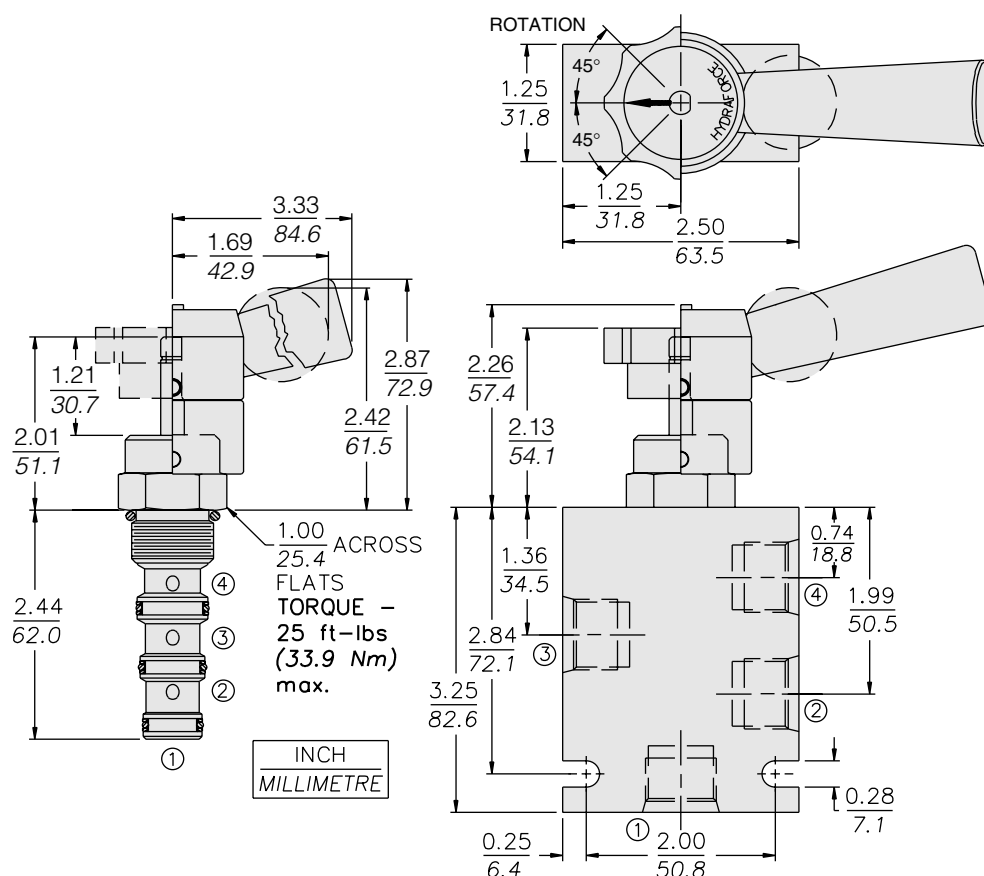


PERFORMANCE (Cartridge Only)



MR10-47C

DIMENSIONS



MATERIALS

Cartridge: Weight: 0.13 kg. (0.29 lbs.); Steel with hardened work surfaces. Zinc-plated exposed surfaces. Buna N O-rings and Fluorocarbon back-ups standard.

Standard Ported Body: Weight: 0.34 kg. (0.75 lbs.); Anodized high-strength 6061 T6 aluminum alloy, rated to 240 bar (3500 psi); see page 8.010.1. Ductile iron and steel bodies available; dimensions may differ; consult factory.

Lever-Type Handle: (Sold Separately) Weight: 0.18 kg. (0.38 lbs.). Steel with hardened work surfaces. Zinc-plated exposed surfaces. Plastic lever arm.

TO ORDER

MR10-47C

Option

None (Blank)

Porting

Cartridge Only **0**
SAE 6 **6T**
SAE 8 **8T**
SAE 8 with Lock-Down Bracket **8TL**
1/4 in. BSP* **2B**
3/8 in. BSP* **3B**

*BSP Body;
U.K. Mfr. Only

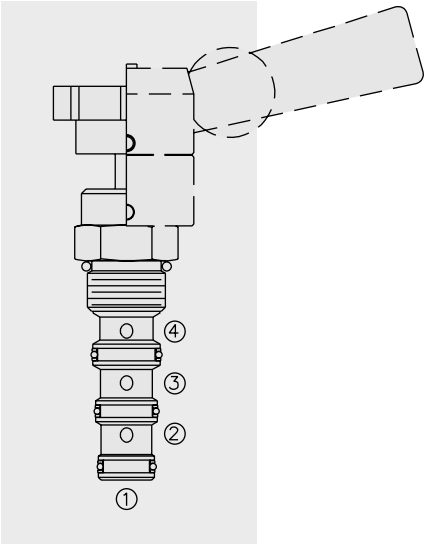
Seals

N Buna N (Std.)
V Fluorocarbon

NOTE: To order standard operator kits, refer to pages 4.770.1 and 4.770.2

DIRECTIONAL VALVES

MR10-47D Manual Rotary, 4-Way, 3-Pos., Motor Spool



DESCRIPTION

Manually-operated four-way, three-position directional valve, with adaptability to a variety of adjustment operators (ordered separately), in a variety of spool configurations.

OPERATION

Three positions: centered, 45° counterclockwise, and 45° clockwise. In the center position ports ①, ② and ④ are open while port ③ is closed. In the 45° counterclockwise from center position, ports ① and ④ are open while ports ② and ③ are open. In the 45° clockwise from center position, ports ① and ② are open while ports ③ and ④ are open. All ports are partially open in transition.

FEATURES

- Three-position detent, friction lock (with detented neutral), or spring return operators may be ordered separately.
- May be fully pressurized at all ports.
- Optional lock-down bracket.
- Heavy-duty construction.
- Industry common cavity.

RATINGS

Operating Pressure: 240 bar (3500 psi)

Max. Flow: See Performance Chart

Internal Leakage: 164 cc/minute (10 cu. in./minute) at 240 bar (3500 psi)

Temperature: -40 to 120°C with standard Buna N seals

Fluids: Mineral-based or synthetics with lubricating properties at viscosities of 7.4 to 420 cSt (50 to 2000 ssu)

Installation: No position restrictions; See page 9.020.1
See page 4.990.2 for operator handles/knobs installation;
See page 4.990.1 for lock-down bracket installation.

Cavity: VC10-4; See page 9.110.1

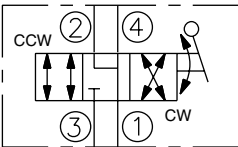
Cavity Tool: CT10-4XX; See page 8.600.1

Seal Kit: SK10-4X-MMM; See page 8.650.1

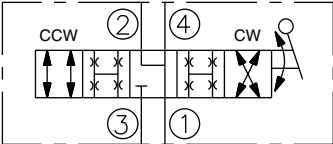
Lock-Down Bracket Kit: Part Number 5399000

SYMBOLS

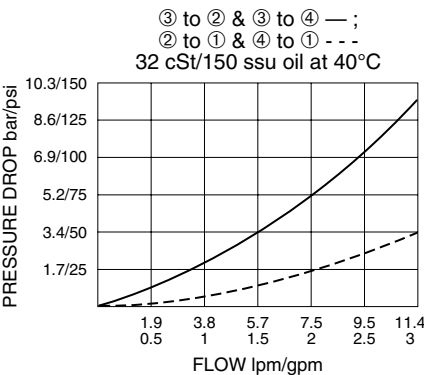
USAS/ISO:



TRANSITION:

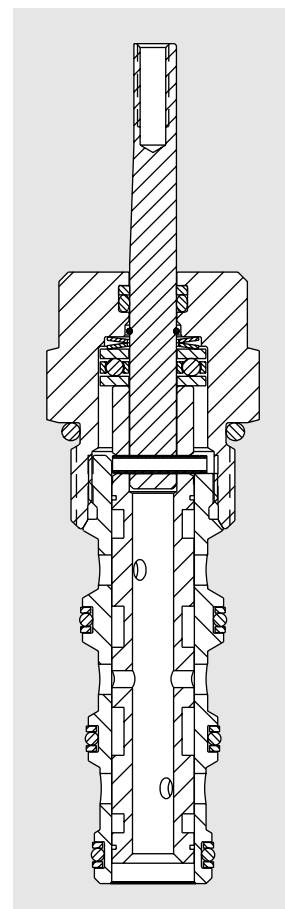
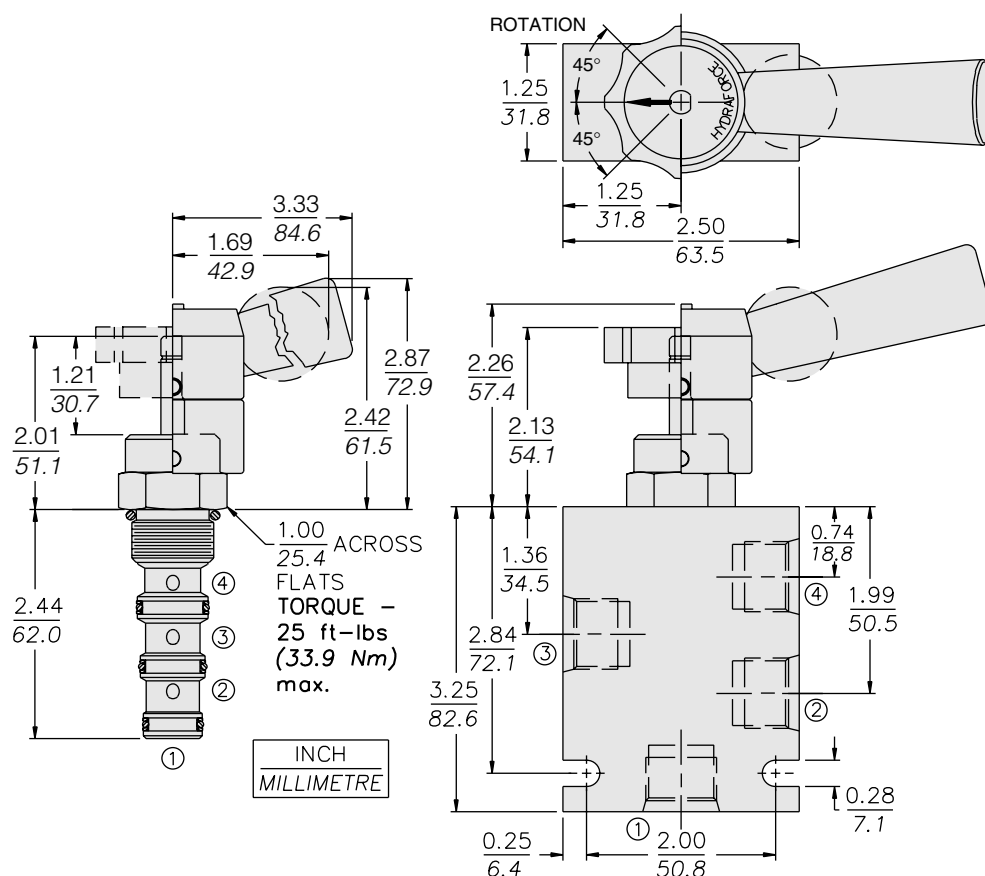


PERFORMANCE (Cartridge Only)



MR10-47D

DIMENSIONS



MATERIALS

Cartridge: Weight: 0.13 kg. (0.29 lbs.); Steel with hardened work surfaces. Zinc-plated exposed surfaces. Buna N O-rings and Fluorocarbon back-ups standard.

Standard Ported Body: Weight: 0.34 kg. (0.75 lbs.); Anodized high-strength 6061 T6 aluminum alloy, rated to 240 bar (3500 psi); see page 8.010.1. Ductile and steel bodies available; dimensions may differ; consult factory.

Lever-Type Handle: (Sold Separately) Weight: 0.18 kg. (0.38 lbs.). Steel with hardened work surfaces. Zinc-plated exposed surfaces. Plastic lever arm.

TO ORDER

MR10-47D

Option

None (Blank)

Porting

Cartridge Only **0**
SAE 6 **6T**
SAE 8 **8T**
SAE 8 with
Lock-Down Bracket **8TL**
1/4 in. BSP* **2B**
3/8 in. BSP* **3B**

*BSP Body;
U.K. Mfr. Only

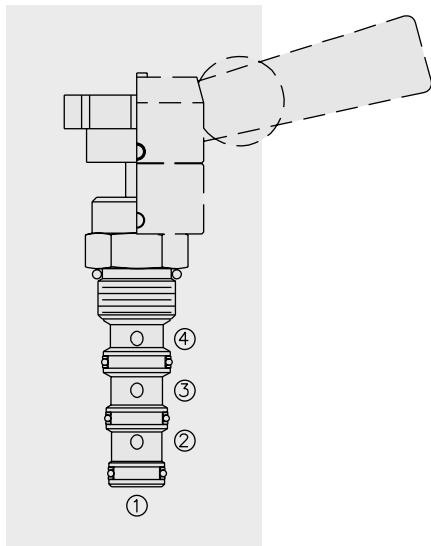
Seals

N Buna N (Std.)
V Fluorocarbon

NOTE: To order standard operator kits, refer to pages 4.770.1 and 4.770.2

DIRECTIONAL VALVES

MR10-47F Manual Rotary, 4-Way, 3-Position



DESCRIPTION

Manually-operated four-way, three-position directional valve, with adaptability to a variety of adjustment operators (ordered separately), in a variety of spool configurations.

OPERATION

Three positions: centered, 45° counterclockwise, and 45° clockwise. In the center position ports ① and ③ are open while ports ② and ④ are closed. In the 45° counterclockwise from center position, ports ③ and ④ are open while ports ① and ② are open. In the 45° clockwise from center position, ports ② and ③ are open while ports ① and ④ are closed. All ports are partially open in transition, except for clockwise from center rotation when port ④ remains closed in transition.

FEATURES

- Three-position detent, friction lock (with detented neutral), or spring return operators may be ordered separately.
- May be fully pressurized at all ports.
- Optional lock-down bracket.
- Heavy-duty construction.
- Industry common cavity.

RATINGS

Operating Pressure: 240 bar (3500 psi)

Max. Flow: See Performance Chart

Internal Leakage: 164 cc/minute (10 cu. in./minute) at 240 bar (3500 psi)

Temperature: -40 to 120°C with standard Buna N seals

Fluids: Mineral-based or synthetics with lubricating properties at viscosities of 7.4 to 420 cSt (50 to 2000 ssu)

Installation: No position restrictions; See page 9.020.1

See page 4.990.2 for operator handles/knobs installation;

See page 4.990.1 for lock-down bracket installation.

Cavity: VC10-4; See page 9.110.1

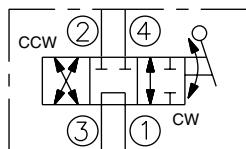
Cavity Tool: CT10-4XX; See page 8.600.1

Seal Kit: SK10-4X-MMM; See page 8.650.1

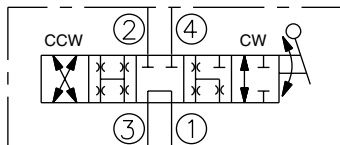
Lock-Down Bracket Kit: Part Number 5399000

SYMBOLS

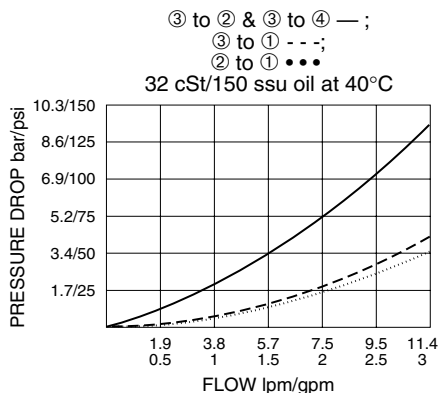
USAS/ISO:



TRANSITION:

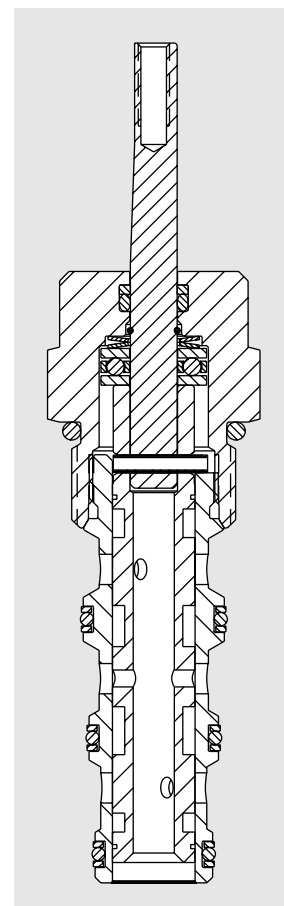
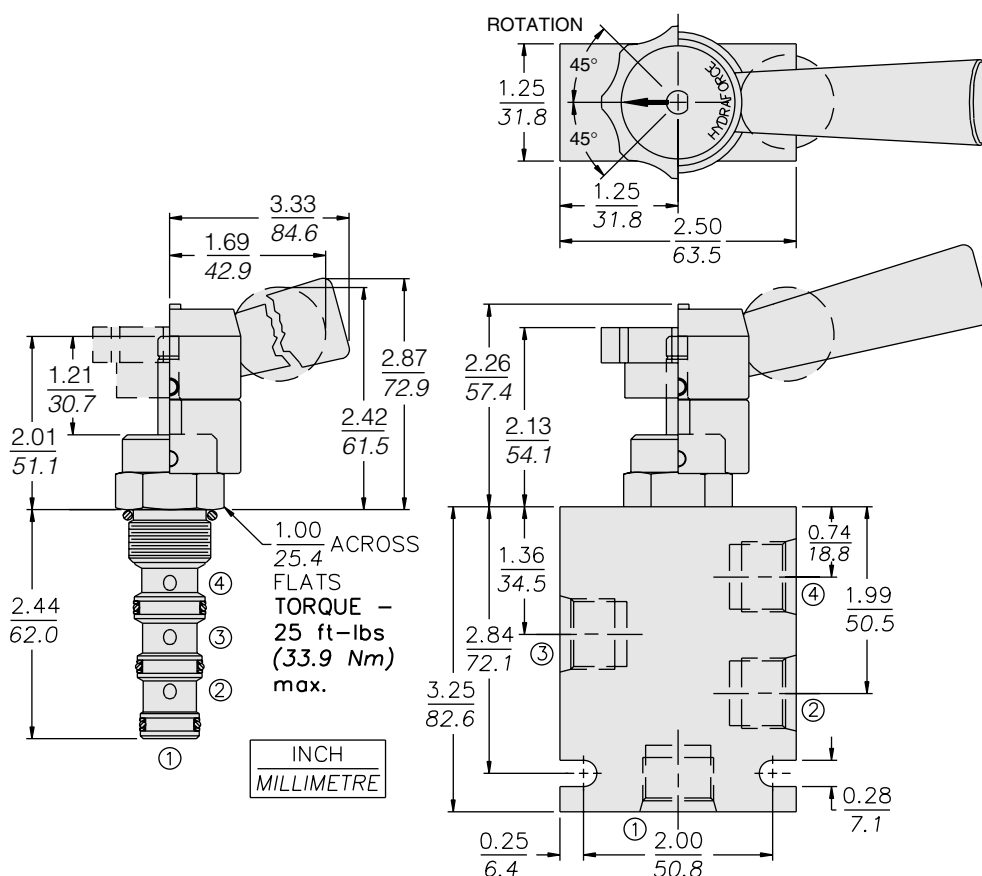


PERFORMANCE (Cartridge Only)



MR10-47F

DIMENSIONS



MATERIALS

Cartridge: Weight: 0.13 kg. (0.29 lbs.); Steel with hardened work surfaces. Zinc-plated exposed surfaces. Buna N O-rings and Fluorocarbon back-ups standard.

Standard Ported Body: Weight: 0.34 kg. (0.75 lbs.); Anodized high-strength 6061 T6 aluminum alloy, rated to 240 bar (3500 psi); see page 8.010.1. Ductile iron and steel bodies available; dimensions may differ; consult factory.

Lever-Type Handle: (Sold Separately) Weight: 0.18 kg. (0.38 lbs.); Steel with hardened work surfaces. Zinc-plated exposed surfaces. Plastic lever arm.

TO ORDER

MR10-47F

Option

None (Blank)

Porting

Cartridge Only **0**
SAE 6 **6T**
SAE 8 **8T**
SAE 8 with
Lock-Down Bracket **8TL**
1/4 in. BSP* **2B**
3/8 in. BSP* **3B**

*BSP Body;
U.K. Mfr. Only

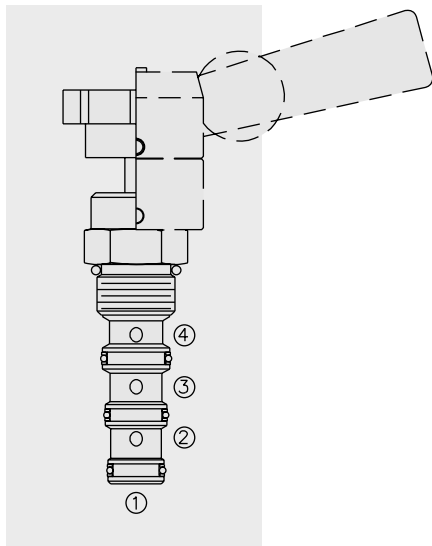
Seals

N Buna N (Std.)
V Fluorocarbon

NOTE: To order standard operator kits, refer to pages 4.770.1 and 4.770.2

DIRECTIONAL VALVES

MR10-47G Manual Rotary, 4-Way, 3-Position



DESCRIPTION

Manually-operated four-way, three-position directional valve, with adaptability to a variety of adjustment operators (ordered separately), in a variety of spool configurations.

OPERATION

Three positions: centered, 45° counterclockwise, and 45° clockwise. In the center position ports ①, ③ and ④ are open while port ② is closed. In the 45° counterclockwise from center position, ports ① and ④ are open while ports ② and ③ are open. In the 45° clockwise from center position, ports ① and ② are open while ports ③ and ④ are open. All ports are partially open in transition.

FEATURES

- Three-position detent, friction lock (with detented neutral), or spring return operators may be ordered separately.
- May be fully pressurized at all ports.
- Optional lock-down bracket.
- Heavy-duty construction.
- Industry common cavity.

RATINGS

Operating Pressure: 240 bar (3500 psi)

Max. Flow: See Performance Chart

Internal Leakage: 164 cc/minute (10 cu. in./minute) at 240 bar (3500 psi)

Temperature: -40 to 120°C with standard Buna N seals

Fluids: Mineral-based or synthetics with lubricating properties at viscosities of 7.4 to 420 cSt (50 to 2000 ssu)

Installation: No position restrictions; See page 9.020.1

See page 4.990.2 for operator handles/knobs installation;

See page 4.990.1 for lock-down bracket installation.

Cavity: VC10-4; See page 9.110.1

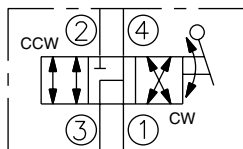
Cavity Tool: CT10-4XX; See page 8.600.1

Seal Kit: SK10-4X-MMM; See page 8.650.1

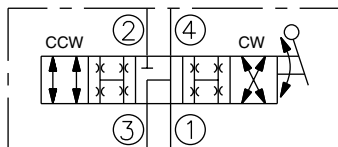
Lock-Down Bracket Kit: Part Number 5399000

SYMBOLS

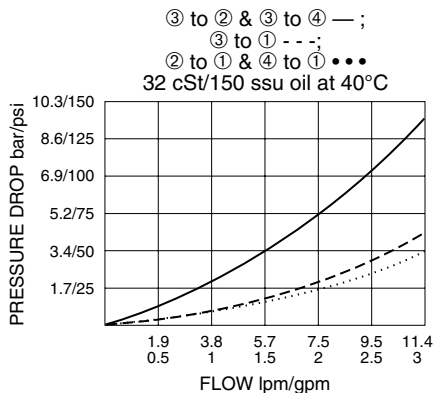
USAS/ISO:



TRANSITION:

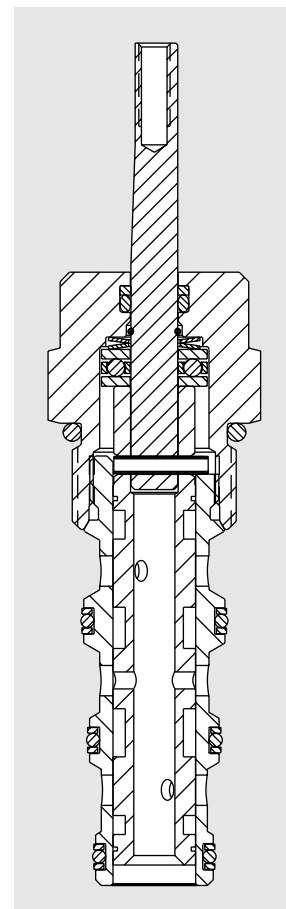
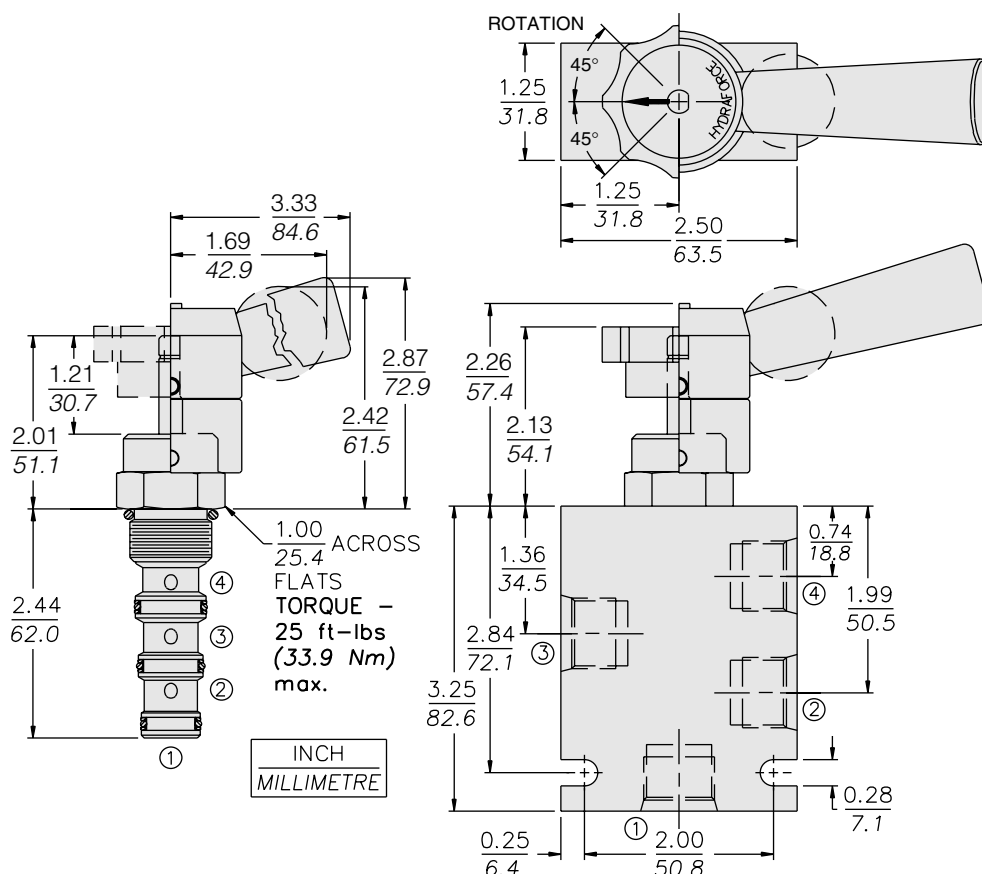


PERFORMANCE (Cartridge Only)



MR10-47G

DIMENSIONS



MATERIALS

Cartridge: Weight: 0.13 kg. (0.29 lbs.); Steel with hardened work surfaces. Zinc-plated exposed surfaces. Buna N O-rings and Fluorocarbon back-ups standard.

Standard Ported Body: Weight: 0.34 kg. (0.75 lbs.); Anodized high-strength 6061 T6 aluminum alloy, rated to 240 bar (3500 psi); see page 8.010.1. Ductile iron and steel bodies available; dimensions may differ; consult factory.

Lever-Type Handle: (Sold Separately) Weight: 0.18 kg. (0.38 lbs.). Steel with hardened work surfaces. Zinc-plated exposed surfaces. Plastic lever arm.

TO ORDER

MR10-47G

Option

None (Blank)

Porting

Cartridge Only **0**
SAE 6 **6T**
SAE 8 **8T**
SAE 8 with
Lock-Down Bracket **8TL**
1/4 in. BSP* **2B**
3/8 in. BSP* **3B**

*BSP Body;
U.K. Mfr. Only

Seals

N Buna N (Std.)
V Fluorocarbon

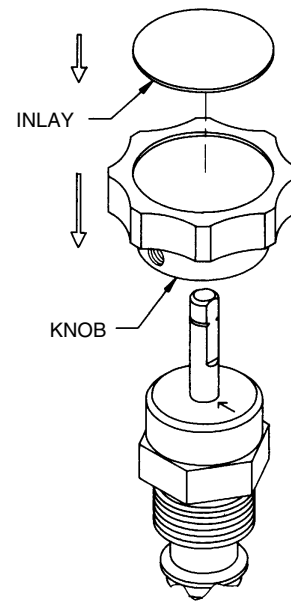
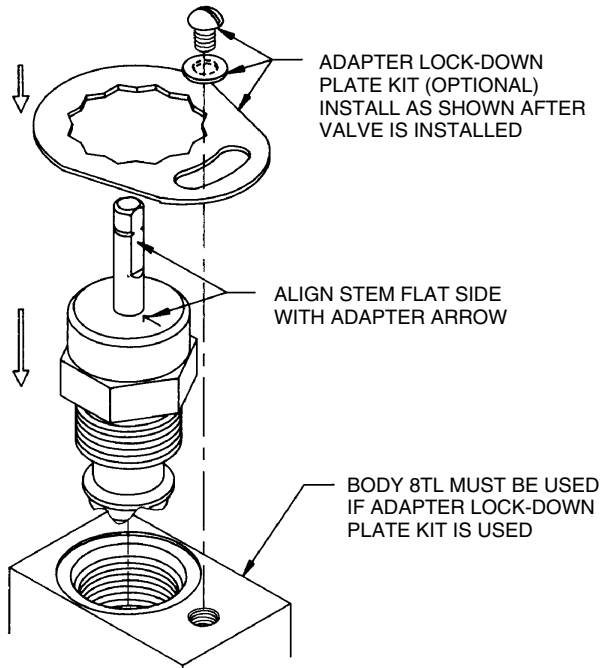
NOTE: To order standard operator kits, refer to pages 4.770.1 and 4.770.2

DIRECTIONAL CONTROLS

Plastic Knob Installation Instructions

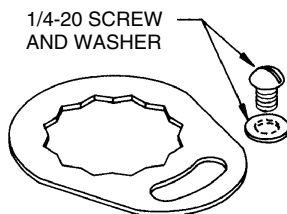
Standard plastic knob kits feature very low effort adjustments and infinite positioning.

- 1 Install the cartridge and optional lock-down plate as indicated. See cartridge torque specifications in the Technical Data section, page 9.020.1.
- 2 Rotate the knob to the Start position by turning the shaft to alignment with the stamped screw.
- 3 Install the knob on the stem and align the Allen head set screw with the flat surface on the stem and tighten the set screw.
- 4 Peel the adhesive from the inlay and install it as desired. (Note that the inlay will be very difficult to re-position, so be careful.)



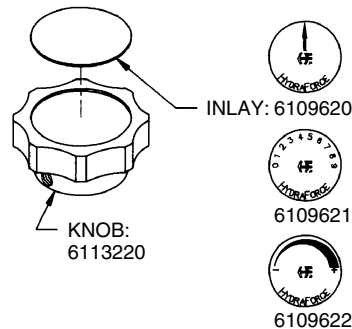
LOCK-DOWN PLATE KIT

Optional, Order Separately: 5399000



KNOB KIT PARTS

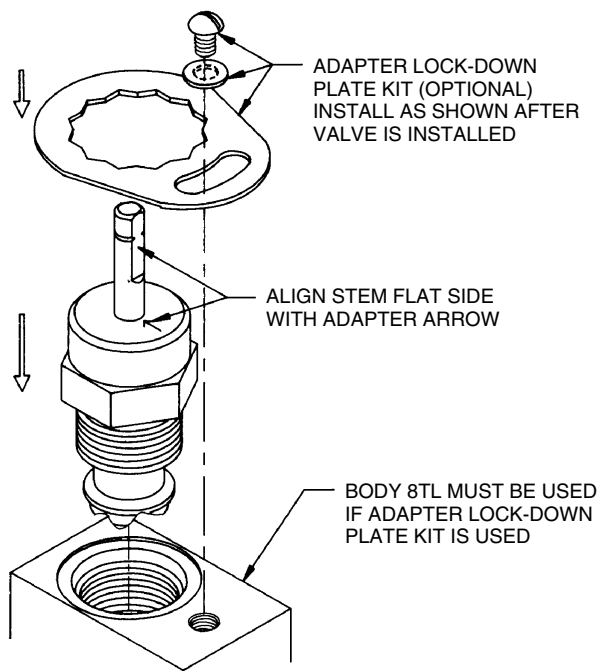
5341010 - Includes Knob & Inlay "A"
5341020 - Includes Knob & Inlay "B"
5341030 - Includes Knob & Inlay "C"



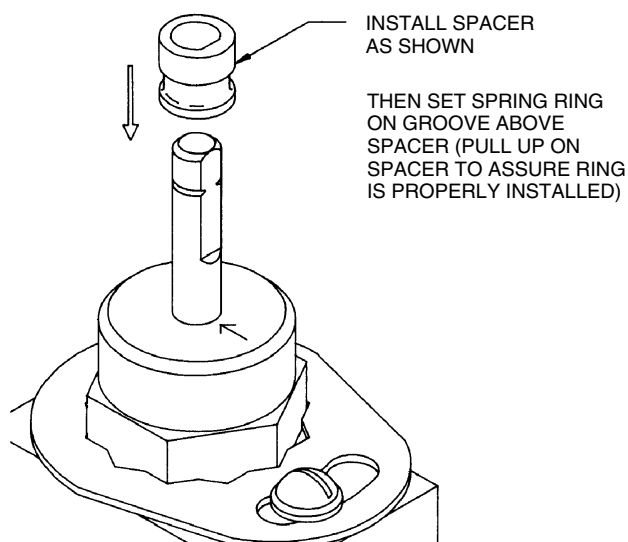
Ball & Lever Handle Installation Instructions

Preliminary Cartridge Installation:

- 1 Install the cartridge and optional lock-down plate as indicated. See cartridge torque specifications in the Technical Data section, page 9.020.1.

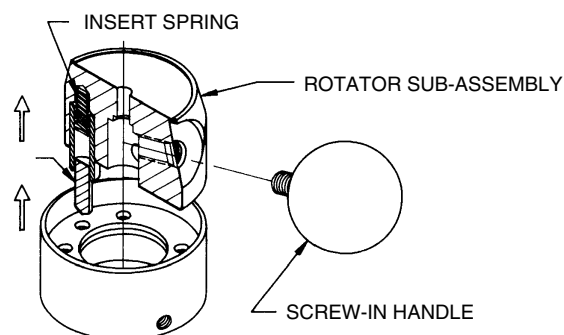


- 2 Install the spacer as shown. Note that an extra spring ring is provided should one get damaged or lost.



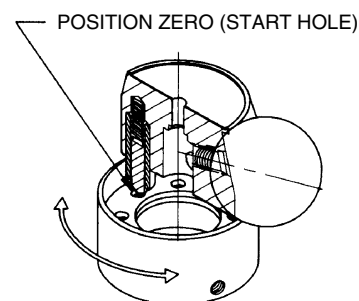
Handle Sub-Assembly:

- 3 Install the ball or lever, the spring, and the position pin into the top rotator. Note that the rotator inlay is fastened, but may be repositioned later.



FIRST INSTALL SPRING, THEN PIN AS SHOWN

- 4 Turn the rotator to position the pin in the correct start hole position. Refer to the **Start Hole Position illustrations** on the following page for proper position. HydraForce has pre-assembled the position ring in the adapter plate per the kit ordered. Use the drive stud to find the appropriate start position. Hold this sub-assembly together manually or with tape until ready to proceed.

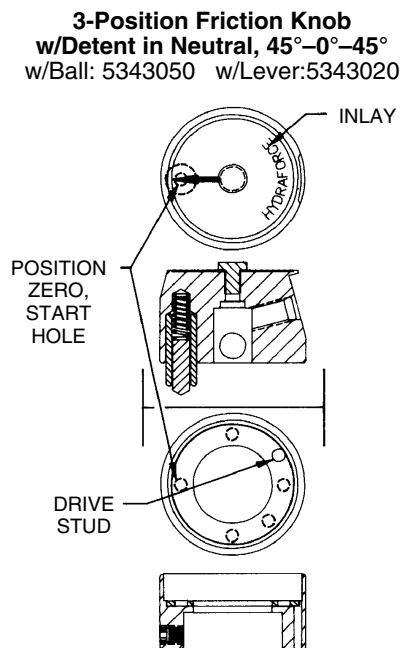
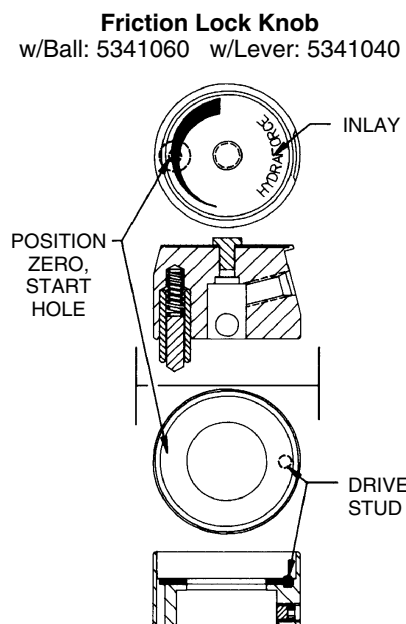
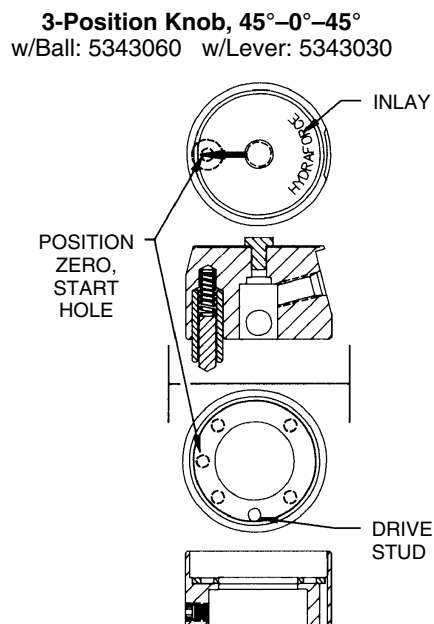
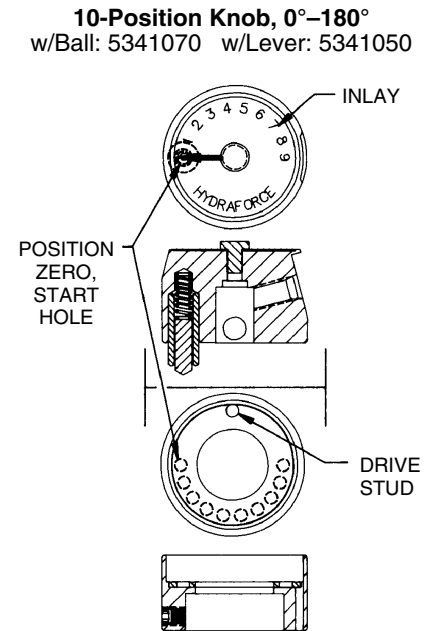
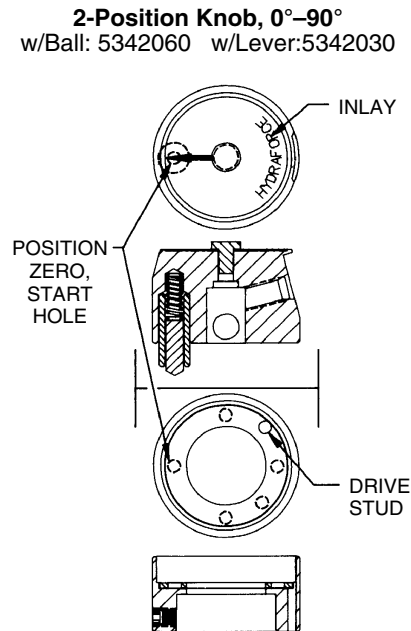
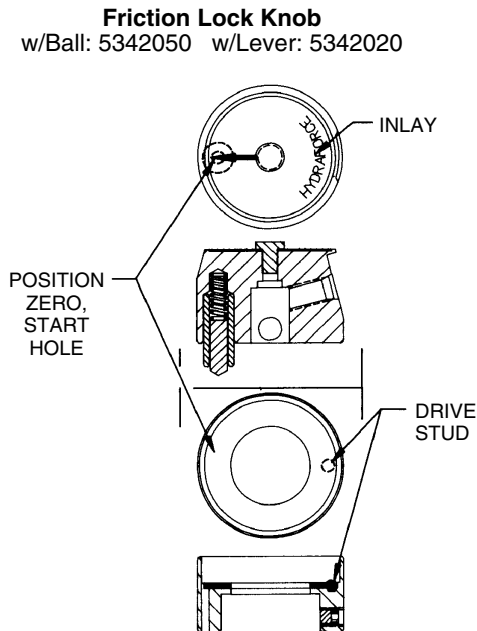


DIRECTIONAL CONTROLS

Ball & Lever Handle Installation Instructions (cont'd)

Start Hole Position Illustrations (refer to step 4 on previous page)

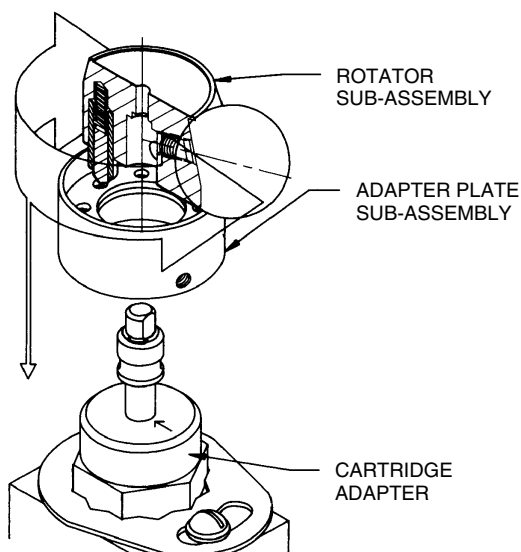
- Identify your handle kit part number from these illustrations.
- Align position zero on the inlay and adapter plate subassembly as illustrated.
- All set screws are tightened to 0.03–0.04 Nm (3–4 ft.-lbs.).



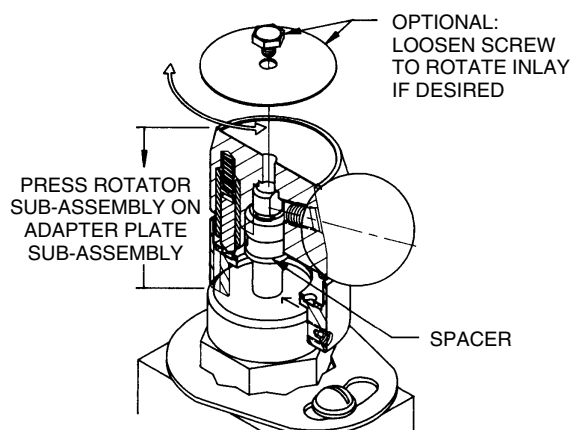
Ball & Lever Handle Installation Instructions (cont'd)

Handle Sub-Assembly to Cartridge Valve:

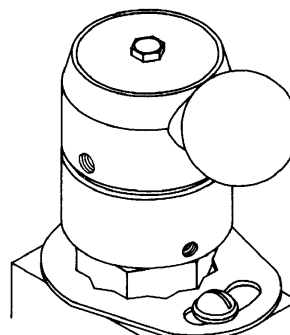
- 5** Turn handle sub-assembly to the desired position on the cartridge shaft. Push the adapter plate to a flush position with the cartridge adapter and tighten the three set screws to 0.03–0.04 Nm (3–4 ft.-lbs.) in the adapter plate sub-assembly to the cartridge adapter.



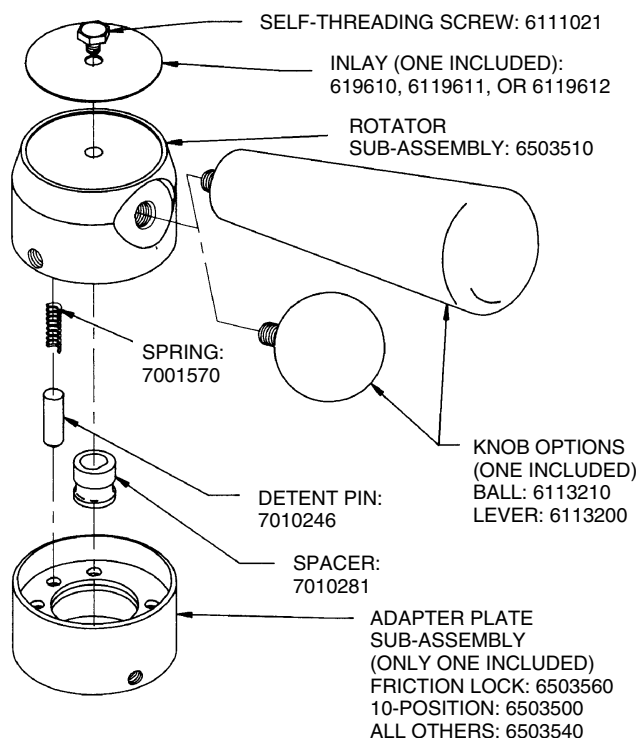
- 6** Push the rotator subassembly to a flush position with the cartridge shaft spacer. Tighten the two set screws on the rotator into the spacer at 0.03–0.04 Nm (3–4 ft.-lbs.). If necessary, loosen the inlay screw to reposition.



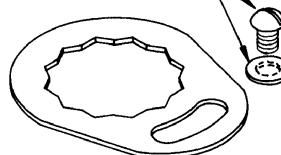
- 7** After all the set screws are tightened, the knob should move slightly upward. This allows the assembly to rotate from one position to the next.



HANDLE KIT PARTS



1/4-20 SCREW
AND WASHER



LOCK-DOWN PLATE KIT

Optional, Order
Separately:
5399000

Spring Centered Knob Installation

Spring Centered Knob Kit Piece Part List

Description (part no.) qty.

Handle (see Figure 1) qty: 1
Knob Screw (6111021) qty: 1
Inlay (6109610) qty: 1
Knob Subassembly (6503420) qty: 1
Subassembly includes:
Set Screws (6111011) qty: 2
Spacer (7010281) qty: 1
Plunger Subassembly (6503410) qty: 1
Retainer (7011881) qty: 1
Spring (7010416) qty: 1
Spring (7010426) qty: 1
Knob (7011271) qty: 1

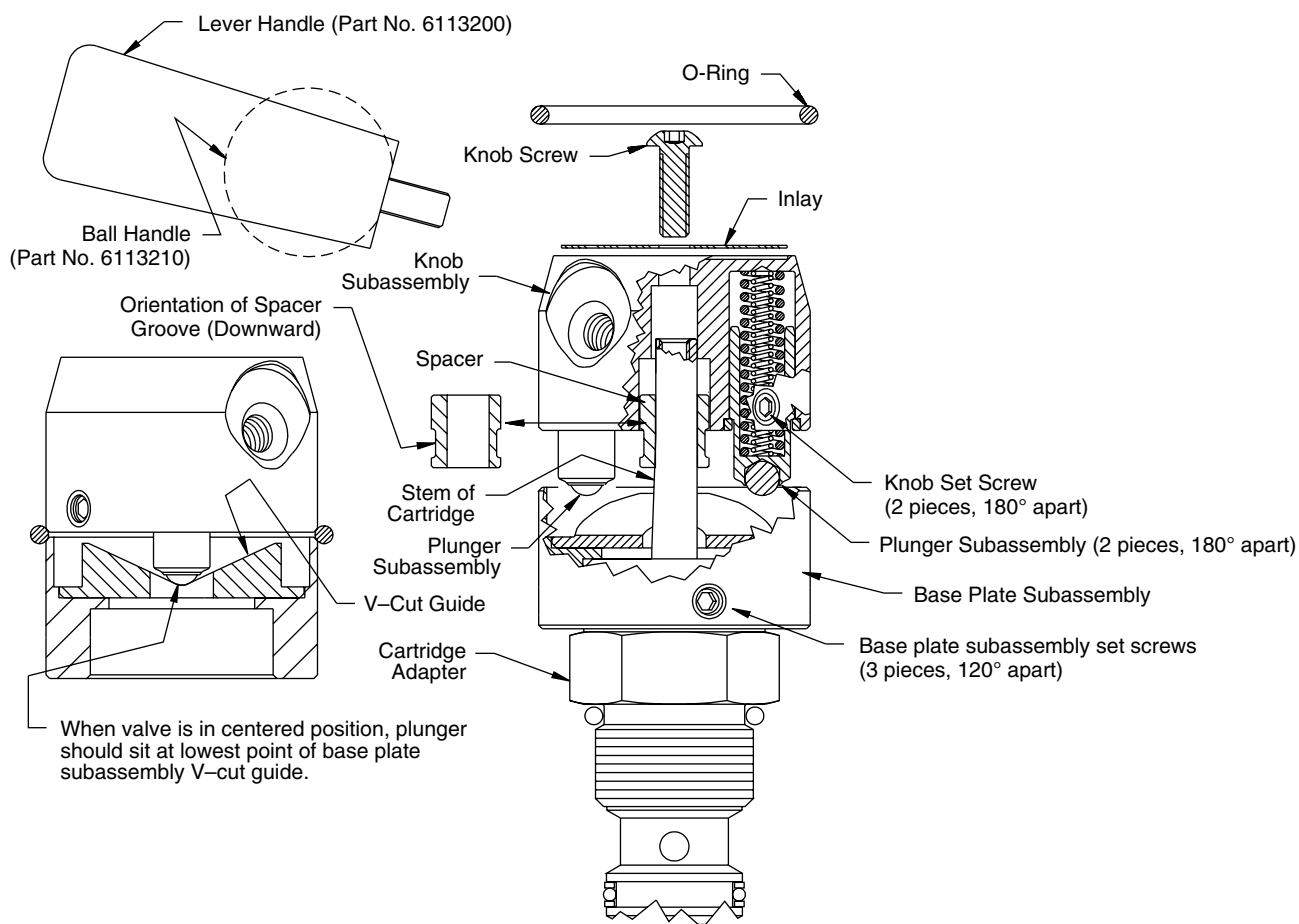
Description (part no.) qty.

Base Plate Subassembly (6503620) qty: 1
Subassembly includes:
Set Screws (6111012) qty: 3
V-Cut Guide (7010376) qty: 1
Stud (6107500) qty: 1
Base Plate (7010271) qty: 1
O-Ring (6023001) qty: 1
3/32 Hex Key Wrench, not shown (6107490) qty: 1

Tools Required

3/32 Hex Key Wrench (included in kit)
1" Hex Torque Wrench
1/4" Flat Head Screwdriver (for adapter lock-down kit only)

Figure 1: Exploded Assembly



Spring Centered Knob Installation (cont'd)

Figure 2: Centering the Valve

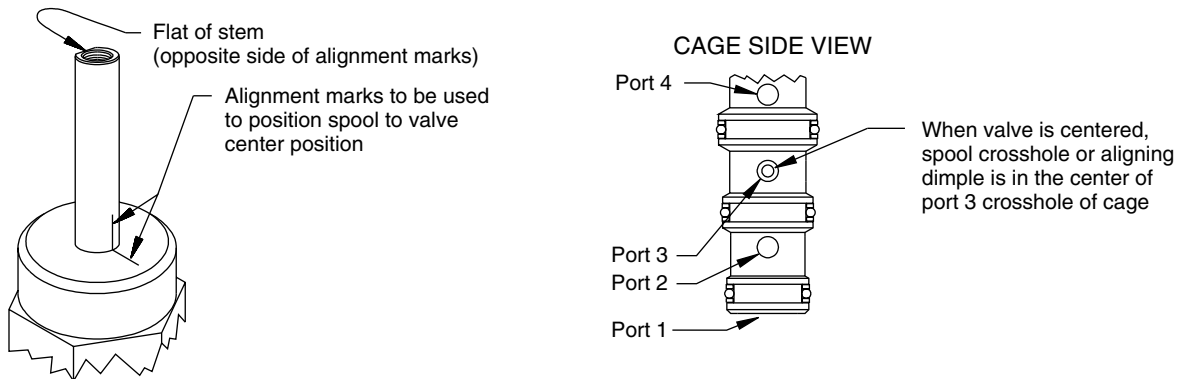
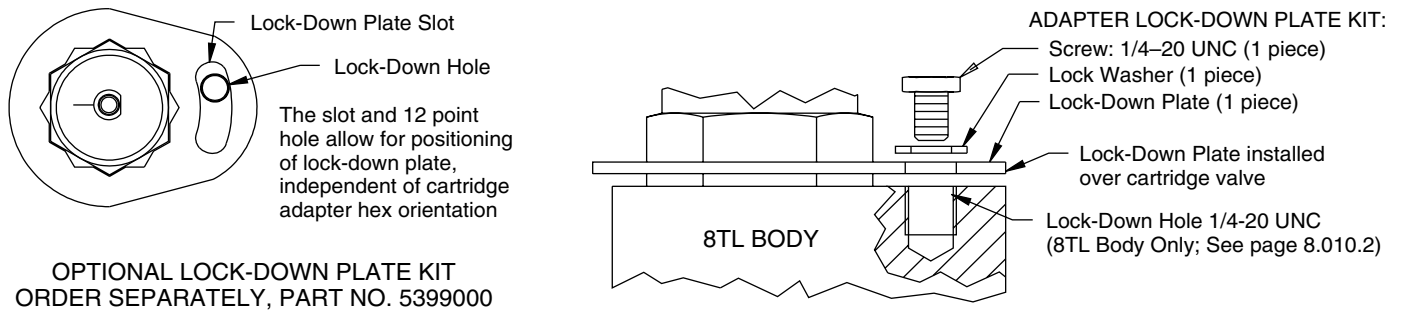


Figure 3: Lock-Down Plate Kit (Optional) for use with 8TL Body Only



Spring Centered Knob Installation Instructions

Please read these instructions and review Figures 1, 2 & 3 before assembling

- 1) With cartridge valve in hand, line up the alignment marks of the stem and adapter as shown in Figure 3. (This will locate valve center position which is critical to valve operation.)
- 2) Install cartridge valve.
- 3) Verify that alignment marks are aligned after installing valve.
- 4) If lock-down plate kit is being used, see Figure 3.
 - A) Body or manifold must have 1/4-20 UNC threaded hole.
 - B) Place lock-down plate over cartridge hex and position slot over body or manifold lock-down hole (1/4-20 UNC threaded hole) Install 1/4-20 UNC screw and washer; tighten to 7-8 ft-lbs.
- 5) Place base plate subassembly (V-cut up) over stem and adapter of cartridge (see Figure 1). Do not tighten base plate subassembly set screws at this time.
- 6) Place spacer onto adjusting stem positioning the outer groove of spacer downward (toward cartridge adapter) as shown in Figure 1.
- 7) If handle is not attached to knob, screw handle into knob.
- 8) Make sure knob subassembly set screws are flush with outside diameter of knob. Carefully place knob subassembly (with plungers facing downward) over stem, aligning plungers with the lowest point of the V-cut in the base plate subassembly, as shown in Figure 1. (Optional: Lightly grease V-cut Guide.)
- 9) Gently rotate knob subassembly and base plate subassembly together, keeping plunger aligned in lowest point of V-cut, and orienting handle to the desired position when valve is centered. It is important that stem does not rotate while rotating knob subassembly and base plate subassembly. If stem does rotate, repeat steps beginning from step 1.
- 10) Once handle is in desired centered position, hold base plate subassembly down on adapter and tighten the three base plate set screws, alternating tightening sequence to center base plate on adapter as best as possible. Tighten to 1-1/2 to 2 ft-lbs.
- 11) After base plate is secure, screw in knob subassembly set screws until they contact the spacer. Then press down firmly on knob and tighten two knob set screws to 1-1/2 to 2 ft-lbs, alternating tightening sequence, as done in step 10. Knob may lift when released.
- 12) Position inlay on top of knob as desired and insert knob screw into top hole of knob. Tighten knob screw, drawing knob toward adjusting stem until knob bottoms out on stem.
- 13) To verify proper assembly, rotate handle both CW and CCW and make sure rotation in both directions is equal (45°).
- 14) Optional: Install O-ring in the gap between the knob subassembly and base plate subassembly, as shown in Figure 1. This step is recommended when operating in an environment where dust and moisture may be present.
- 15) If rotation is unequal in both directions or desired handle position is incorrect, remove knob screw, loosen base plate subassembly set screws, and loosen knob set screws, making sure there is no contact between knob set screws and spacer. Repeat steps 3-12.