

Vickers®

Directional Controls



Mechanical Actuators Directional Control Valves Directional Control Valves

310 bar (4500 psi)

Flows to 114 l/min (30 USgpm)

NFPA D05, ISO-4401-05

DG1V4-01**-10 Knob Operated

DG17V4-01**-10 Lever Operated

Introduction

General Description

The mechanical directional control valves described in this brochure are:

- Knob & Lever operated valves
DG1/17V4-01**-10

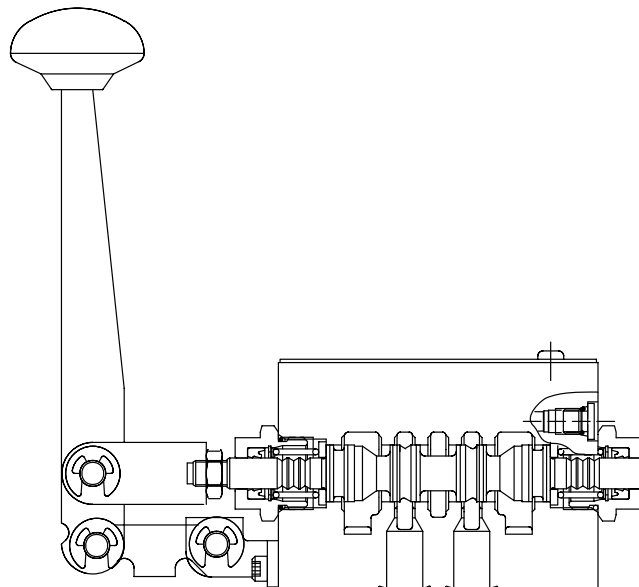
Mechanical operation used by these valves is achieved by hand actuation.

DG1 and DG17 are manual knob and lever operated valves used for applications requiring four-way directional operation. These valves are offered in spring offset, spring centered and no-spring detented versions.

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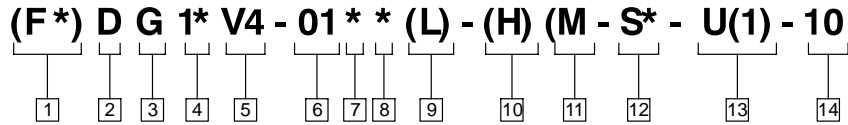
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Typical Sectional View



Model Code

Two & Four-way Directional Valves



1 Interface seals

Blank - Buna N (std.)
 F3 - Viton (fire resistant seals)
 F6 - Nitrile seals (water glycol)

2 Directional control

3 Mounting type

G - Manifold or subplate

4 Control type

17 - Manual lever operated
 1 - Knob operated

5 Flow direction

V4 - Four-way, 310 bar (4500 psi)

6 Valve size

01 - ISO-4401-05, NFPA-D05 interface

7 Spool type (crossover condition)

0 - Open center
 1 - Open center, B blocked
 2 - Closed center
 3 - Closed center, P and B blocked
 6 - Closed center, P only
 7 - Closed center, T blocked
 8 - Open center, A and B blocked
 11 - Open center, A blocked
 22 - Closed center, 2-way
 31 - Closed center, A and P blocked
 33 - Closed center, bleed A & B

8 Spool/Spring arrangement

A - Spring offset (handle out)
 A2 - Spring offset (handle in)
 C - Spring centered
 N - No spring detented

9 Left hand build

Omit for standard right hand assembly

10 Handle

H - Booted handle for harsh environment
 Omit if not required

11 Flag symbol

M - Electrical features (applies only to switch models)
 Omit if not required

12 Spool indicator switch

S3 - Switch wired normally open
 S4 - Switch wired normally closed
 Omit if not required

13 Switch connection

U - DIN 43650 connection for switch
 U1 - DIN 43650 connector provided for switch
 Omit if not required

14 Design number

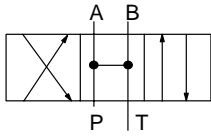
Subject to change. Installation dimensions remain as shown for design numbers 10 through 19.

Viton is a registered trademark E.I. DuPont Co.

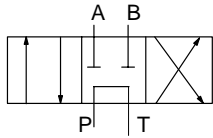
General Information

Spool Variations

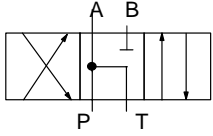
DG**V4-010*-10



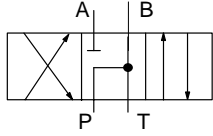
DG**V4-018*-10



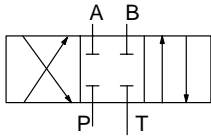
DG**V4-011*-10



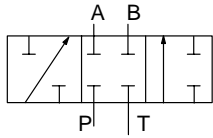
DG**V4-0111*-10



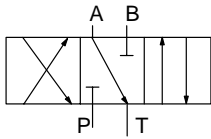
DG**V4-012*-10



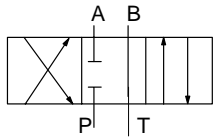
DG**V4-0122*-10



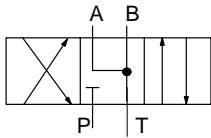
DG**V4-013*-10



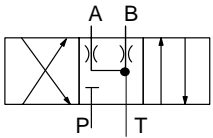
DG**V4-031*-10



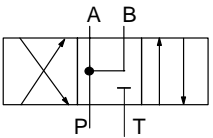
DG**V4-016*-10



DG**V4-033*-10

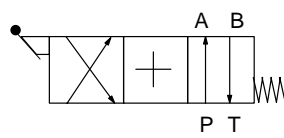


DG**V4-017*-10

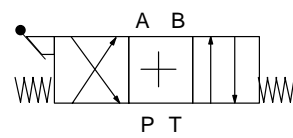


Build Variations

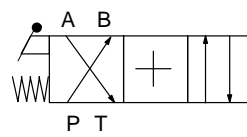
DG17V4-01*A-10



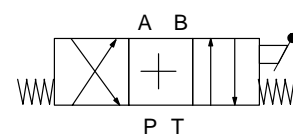
DG17V4-01*C-10



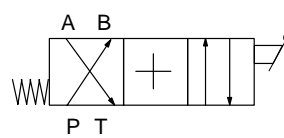
DG17V4-01*A2-10



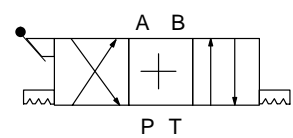
DG17V4-01*CL-10



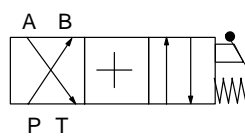
DG17V4-01*AL-10



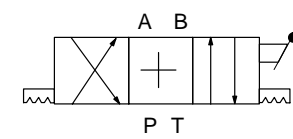
DG17V4-01*N-10



DG17V4-01*A2L-10

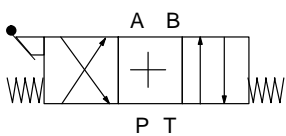


DG17V4-01*NL-10

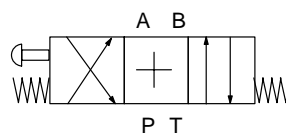


Operator Variations

DG17V4-01**-10 Lever operator



DG1V4-01**-10 Knob operator



Performance Data

Max. pressure P, A & B ports:

For all spools except type "8" 315 bar (4500 psi)

For type "8" spools only 175 bar (2500 psi)

Max. pressure T port : 70 bar (1000 psi)

Max. flow:

- All DG17V4 models except type "1" and "11" spools - 114 l/min (30 USgpm)
- All DG17V4 models with type "1" and "11" spools - 45 l/min (12 USgpm)
- All DG1V4-01*N models except type "1" and "11" spools - 76 l/min (20 USgpm)
- All DG1V4-01*N models with type "1" and "11" spools - 45 l/min (12 USgpm)
- All DG1V4-01*A/C models - 30 l/min (8 USgpm)

Handle shift force:

DG17V4 "A" – 38 N. (8.5 lbs.)

DG17V4 "C" – 36 N. (8.0 lbs.)

DG17V4 "N" – 20 N. (4.5 lbs.)

Operating temperature:

20° to 50° C (70° to 120° F)

Weights (approx):

DG1V4: 3,1 kg (6.9 lbs.)

DG17V4: 3,4 kg (7.4 lbs.)

Bolt kits:

(metric) - BK855993M

(inch) - BDKG01-633

SAE grade 8 (metric grade 12,9) or better required

Max. bolt torque: 12,6 Nm (112 lb. in.)

Subplate: 2 kg (4.5 lbs.)

Fluid viscosity: 75-250 SUS (15-51 cSt)

Fluid Cleanliness - See page 11.

Fluids & Seals

BUNA-N seals are standard and are compatible with water-in-oil emulsions, high water based fluids, and petroleum oil. "F3" (Viton) seals are compatible with phosphate esters, and "F6" seals are for water glycol. Maximum operating pressure for high water based fluids is 69 bar (1000 psi).

Mounting Interface

ISO 4401-05

CETOP 5

NFPA D05

Shifting Action

Spring offset valves are spring positioned unless lever is actuated.

Spring centered valves return the spool to center position when the lever or knob control is released.

No-spring detented valves will remain in the last position attained provided there is no severe shock, vibration or unusual pressure transients.

CAUTION

Surges of oil in a common tank line serving these and other valves can be of sufficient magnitude to cause inadvertent shifting of these valves. This is particularly critical in the no-spring detented type valves. Separate tank lines or a vented manifold with a continuous downward path to tank is necessary.

Mounting Position

No-spring detented valves must be installed with the longitudinal axis horizontal for good machine reliability. The mounting position of spring-offset, and spring centered models is unrestricted.

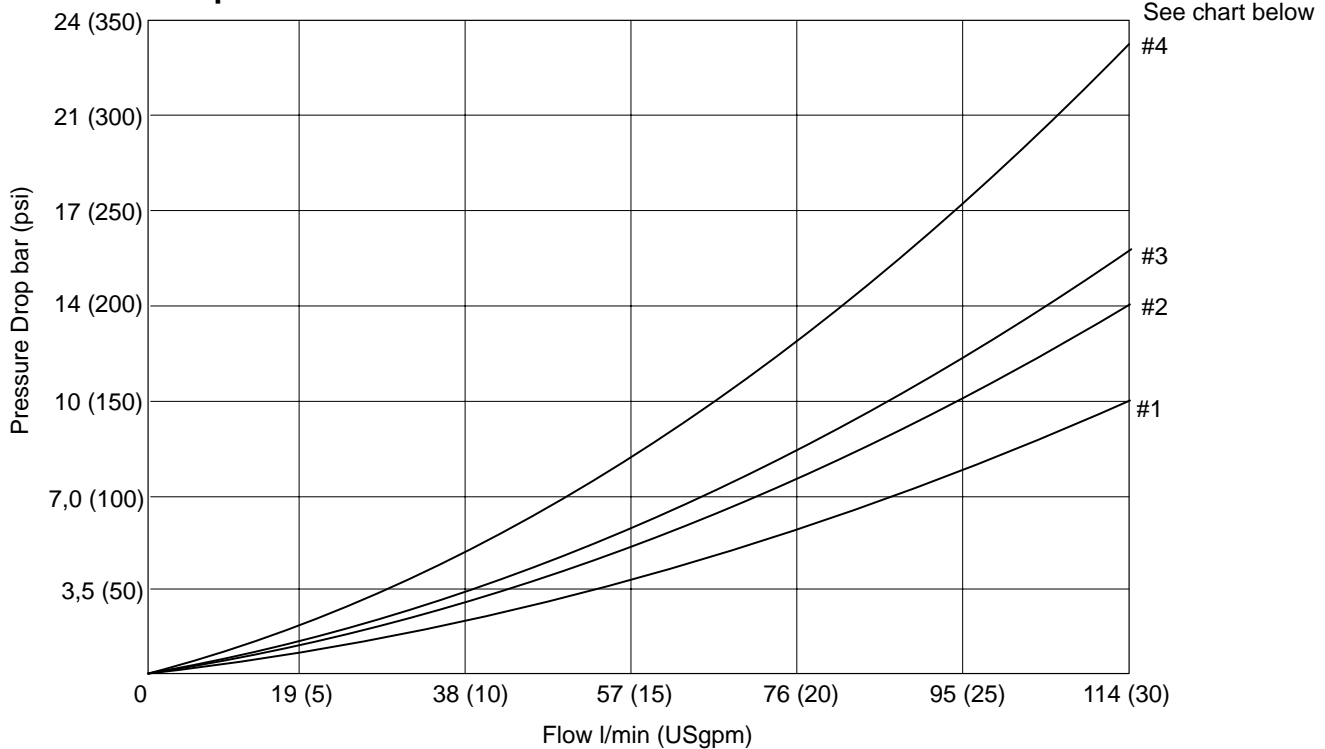
Installation Data

On two-way valves "T" is the drain connection and must be piped directly to tank through a surge-free line so there will be no back pressure at this port.

NOTE

Any sliding spool valve, if held for long periods of time, may stick and not spring return due to fluid residue formation and therefore, should be cycled periodically to prevent this from happening.

Pressure Drop



| Pressure Drop Reference Curve | | | | | |
|-------------------------------|-------|-------|-------|-------|-------|
| Model Code | P - A | P - B | A - T | B - T | P - T |
| DG17V4-010*-10 | 1 | 1 | 1 | 2 | 2 |
| DG17V4-011*-10 | 1 | 1 | 1 | 2 | 2 |
| DG17V4-012*-10 | 2 | 2 | 1 | 2 | - |
| DG17V4-013*-10 | 2 | 2 | 1 | 2 | - |
| DG17V4-016*-10 | 2 | 2 | 1 | 2 | - |
| DG17V4-017*-10 | 1 | 1 | 3 | 3 | - |
| DG17V4-018*-10 | 4 | 4 | 3 | 4 | 2 |
| DG17V4-0111*-10 | 1 | 1 | 2 | 2 | 2 |
| DG17V4-0122*-10 | 2 | 2 | - | - | - |
| DG17V4-0131*-10 | 2 | 2 | 1 | 2 | - |
| DG17V4-0133*-10 | 2 | 2 | 1 | 3 | - |

1. Figures in the pressure drop chart give approximate pressure drops (ΔP) when passing 20,5 cSt (100 SUS) fluid having .865 specific gravity.

2. For any other flow rate (Q_1), the pressure drop (ΔP_1) will be approximately:

$$\Delta P_1 = \Delta P(Q_1/Q_2)^2$$

3. For any other viscosity(s), the pressure drop (ΔP) will change as follows:

| Viscosity | 14 | 20 | 43 | 54 | 65 | 76 | 85 |
|---------------------------|--------|--------|-------|-------|-------|-------|-------|
| cSt | 14 | 20 | 43 | 54 | 65 | 76 | 85 |
| (SUS) | (17,5) | (97,8) | (200) | (250) | (300) | (350) | (400) |
| % of ΔP (Approx.) | 81 | 88 | 104 | 111 | 116 | 120 | 124 |

4. For any other specific gravity (G_1)*, the pressure drop (ΔP_1), will be approximately:

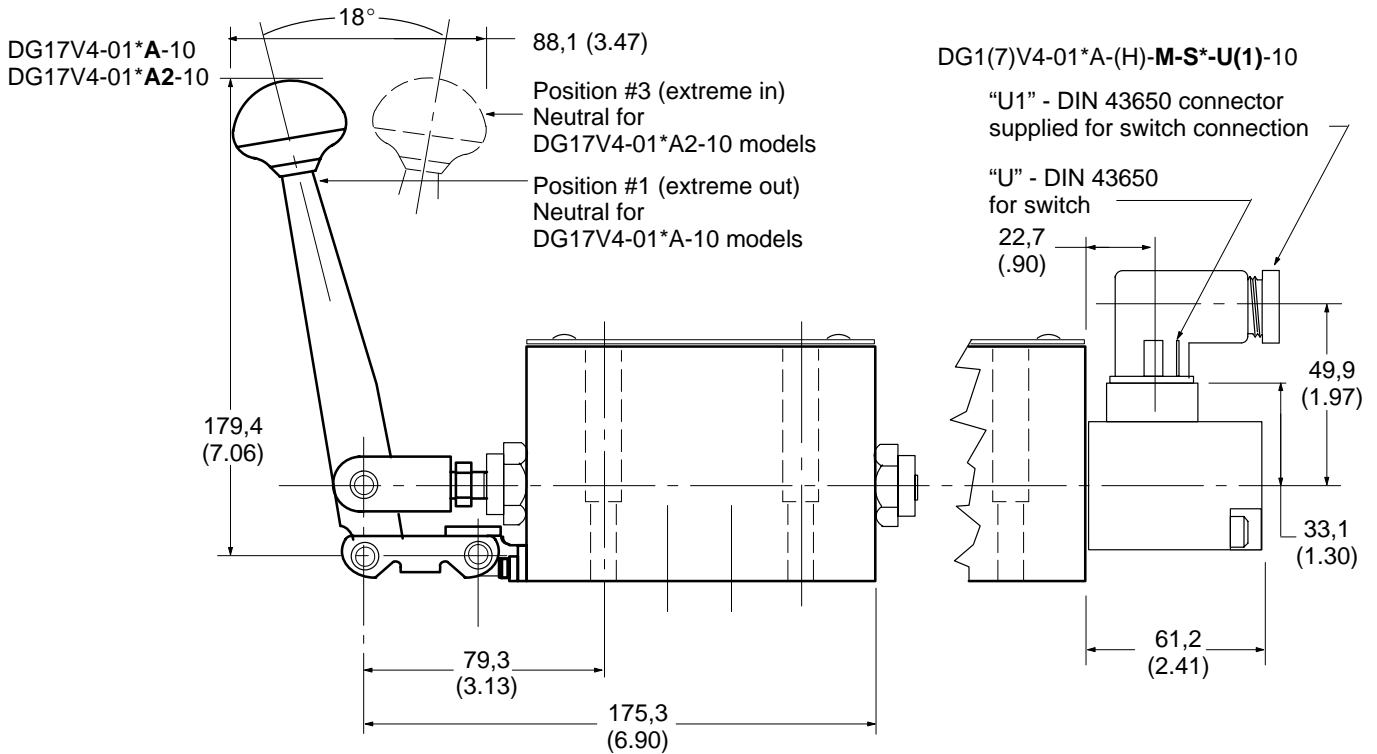
$$\Delta P_1 = \Delta P(G_1/G)$$

* Specific gravity of fluid may be obtained from its producer. The value is higher for fire-resistant fluids than for oil.

Installation Dimensions

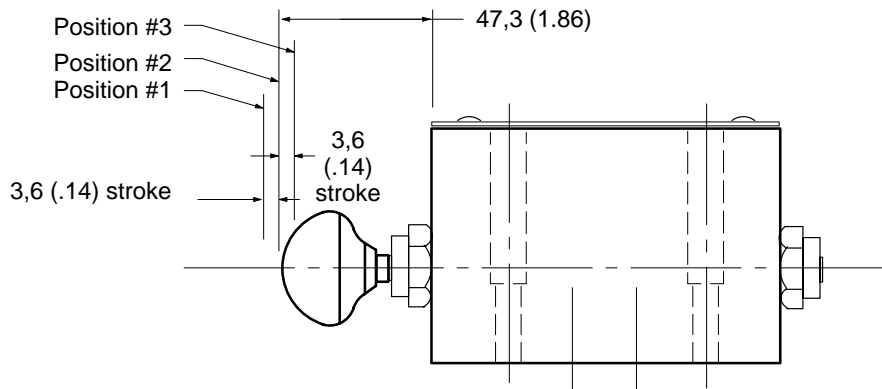
Manual Lever Operated Valves

Millimeters (inches)



Manual Knob Operated Valve

DG1V4-01**-10

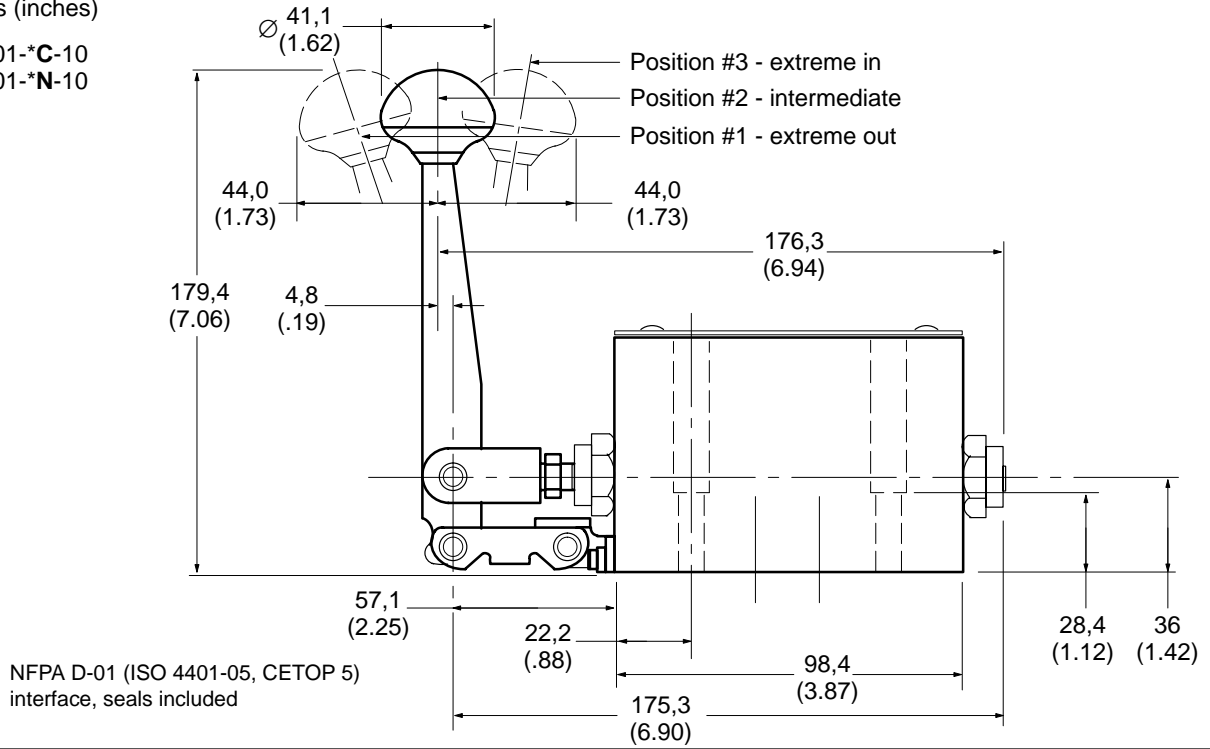


Spring Centered & No-Spring Detented Manual Lever Operated Valves

Millimeters (inches)

DG17V4-01-*C-10

DG17V4-01-*N-10



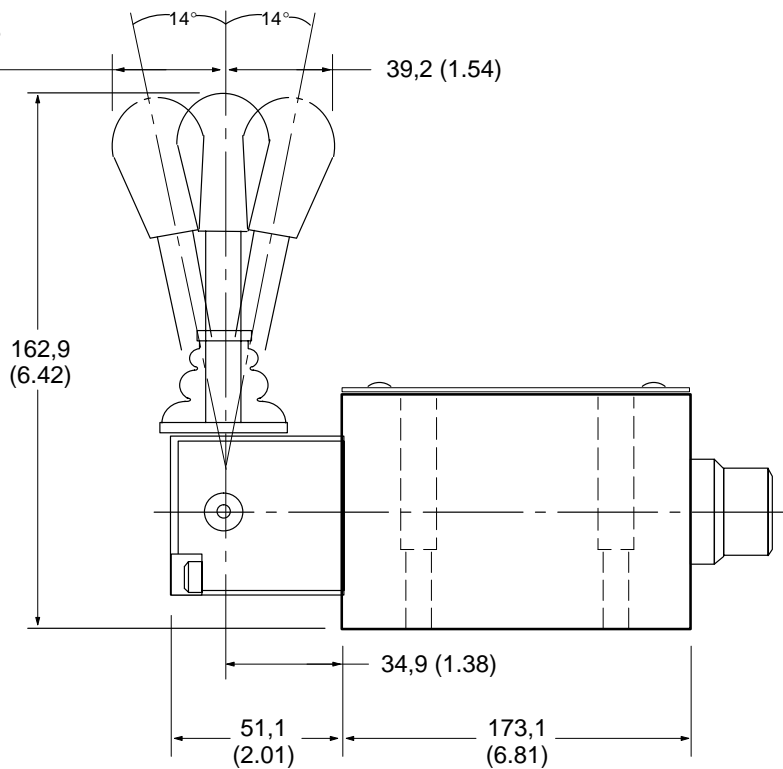
Mechanically Operated for Harsh Environments

millimeters (inches)

39,2 (1.54)

39,2 (1.54)

DG17V4-01**-H-10



Subplates & Bolt Kits

Valves, subplates and mounting bolts must be ordered separately.

Example:

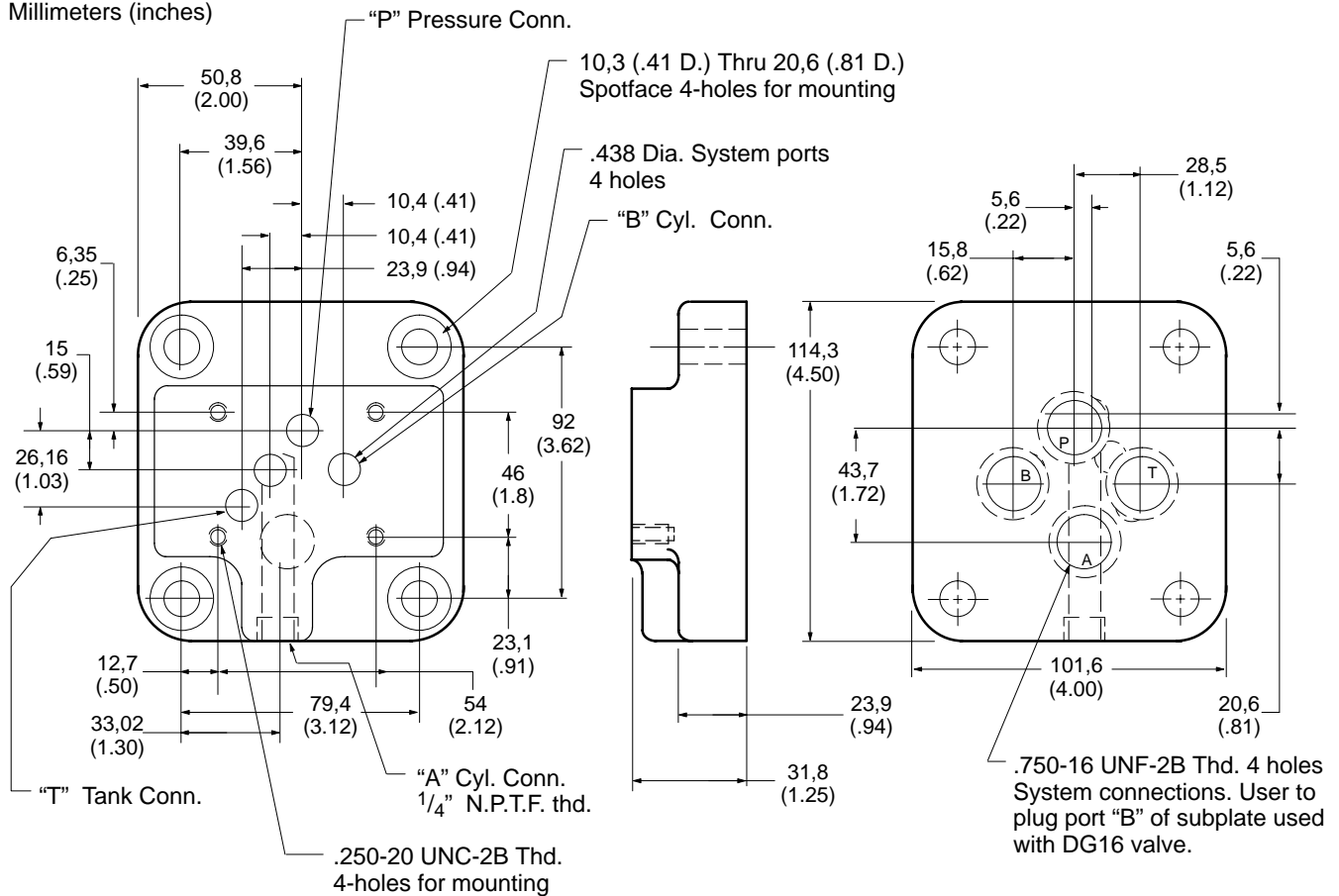
- One (1) DG17V4-012A-10 Valve
- One (1) DGSM(E)-01-20-T8 Subplate
- One (1) BKDG01-633 Bolt Kit

When subplate is not used, a machined pad must be provided for mounting. Pad must be flat within 0,0127 mm (.0005 inch) and smooth within 63 microinch. Mounting bolts, when provided by customer, should be SAE grade 7 or better.

Torque mounting bolts to:
13 Nm (115 lb. in.)

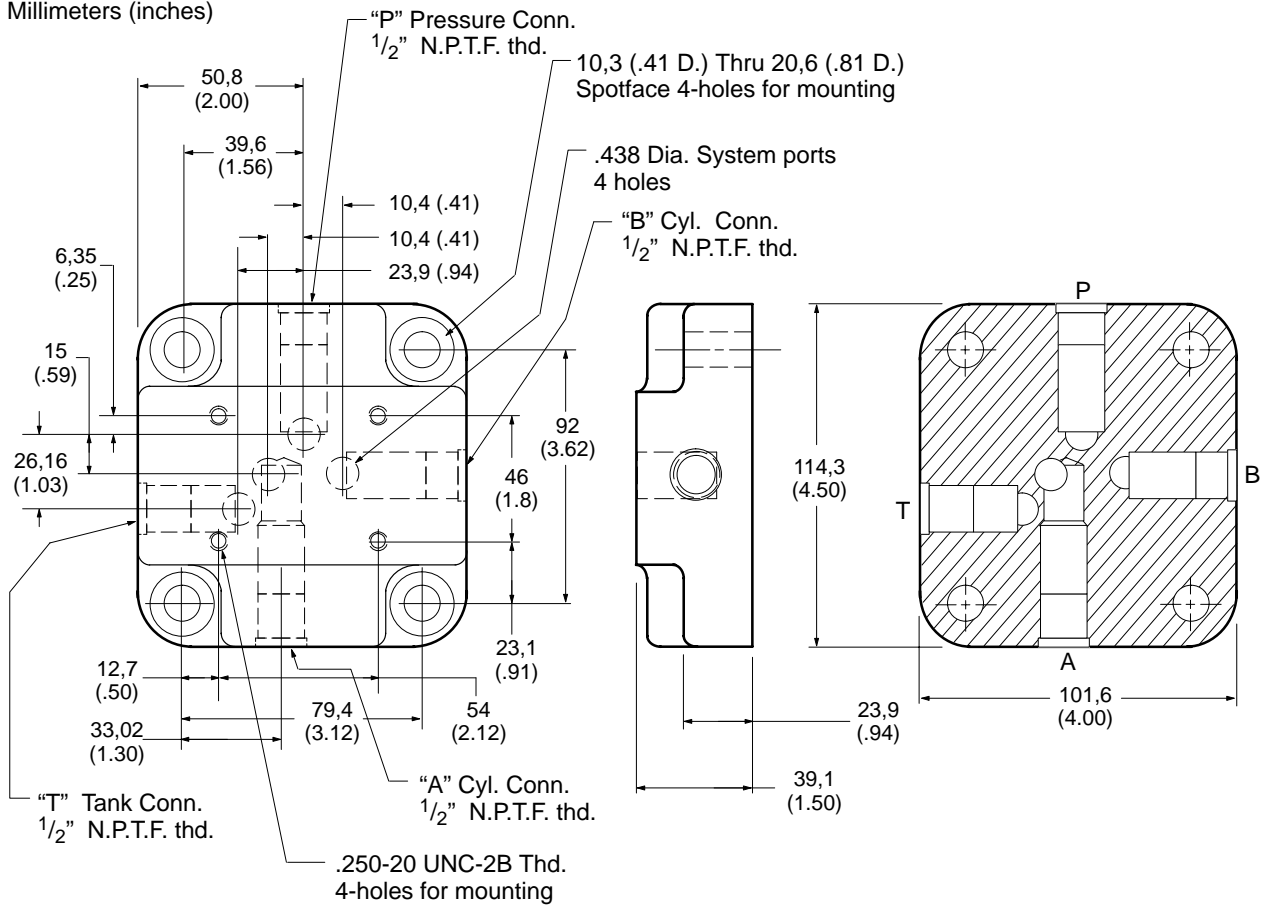
Mounting Subplate DGSM-01-20-T8

Millimeters (inches)



Mounting Subplate DGSME-01-20-T8

Millimeters (inches)



Application Data

Fluid Cleanliness

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

Essential information on the correct methods for treating hydraulic fluid is included in Vickers publication 561 "Vickers Guide to Systemic Contamination Control" available from your local Vickers distributor or by contacting Vickers, Incorporated.

Recommendations on filtration and the selection of products to control fluid condition are included in 561.

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

Vickers products, as any components, will operate with apparent satisfaction in fluids with higher cleanliness codes than those described. Other manufacturers will often recommend levels above those specified. Experience has shown, however, that life of any hydraulic component is shortened in fluids with higher cleanliness codes than those listed below. These codes have been proven to provide a long, trouble-free service life for the products shown, regardless of the manufacturer.

| Product | System Pressure Level bar (psi) | | |
|------------------------------|------------------------------------|--------------------|-----------------|
| | <70 (<1000) | 70-210 (1000-3000) | 210+ (3000+) |
| Vane Pumps – Fixed | 20/18/15 | 19/17/14 | 18/16/13 |
| Vane Pumps – Variable | 18/16/14 | 17/15/13 | |
| Piston Pumps – Fixed | 19/17/15 | 18/16/14 | 17/15/13 |
| Piston Pumps – Variable | 18/16/14 | 17/15/13 | 16/14/12 |
| Directional Valves | 20/18/15 | 20/18/15 | 19/17/14 |
| Pressure/Flow Control Valves | 19/17/14 | 19/17/14 | 19/17/14 |
| CMX Valves | 18/16/14 | 18/16/14 | 17/15/13 |
| Servo Valves | 16/14/11 | 16/14/11 | 15/13/10 |
| Proportional Valves | 17/15/12 | 17/15/12 | 15/13/11 |
| Cylinders | 20/18/15 | 20/18/15 | 20/18/15 |
| Vane Motors | 20/18/15 | 19/17/14 | 18/16/13 |
| Axial Piston Motors | 19/17/14 | 18/16/13 | 17/15/12 |
| Radial Piston Motors | 20/18/14 | 19/17/13 | 18/16/13 |

Fluids and Seals

Flouorocarbon seals are standard and are suitable for use with phosphate ester type fluids or their blends, water glycol, water-in-oil emulsion fluids and petroleum oil. Refer to 694 for hydraulic fluid and temperature recommendations.

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