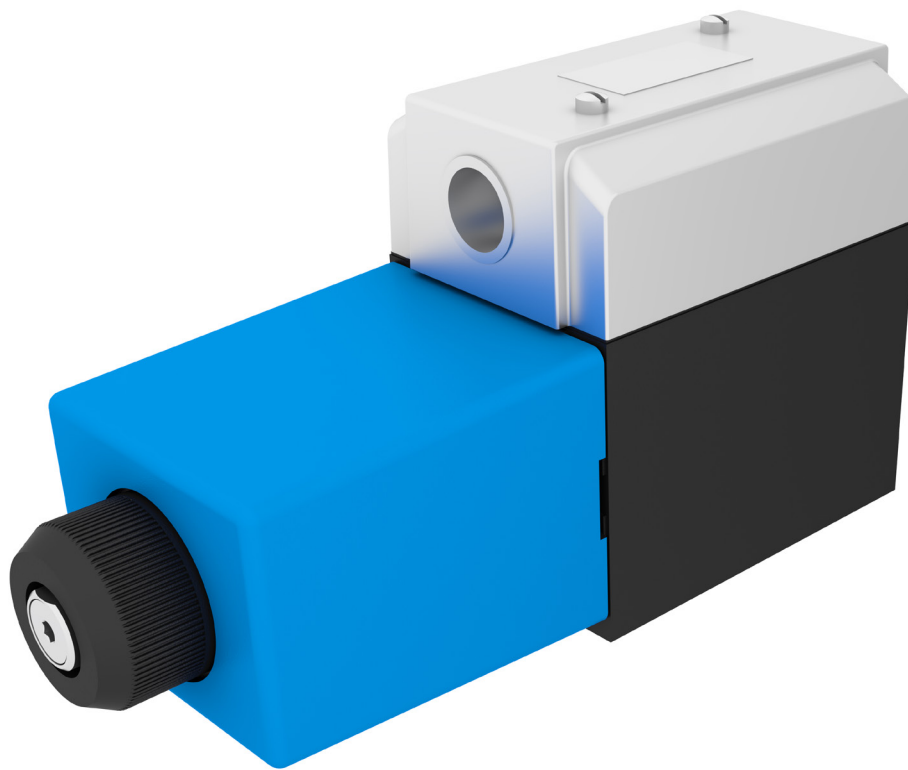


ISSO4401 Size 05; ANSI/B93.7M-D05
DG4V4-01

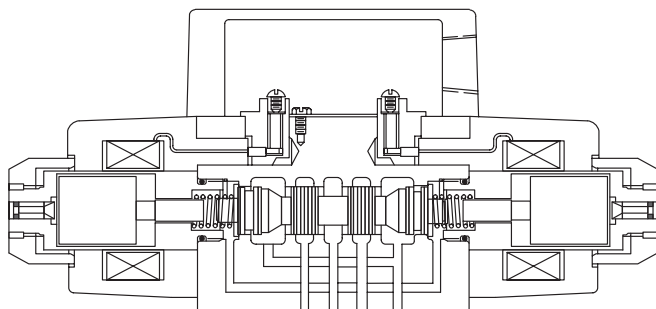


III-C

This wet armature solenoid operated directional control valve is for directing and stopping flow at any point in a hydraulic system. Its primary function is to determine the direction of the fluid flow in a work cylinder or determine the direction of rotation of a fluid motor.

These valves are designed to meet the requirements of high performance, precision industrial hydraulic systems operating at pressures up to 315 bar (4570 psi) and flows to 115 L/min (30 USgpm). They mount on the ISO size 05 mounting surface.

The performance of the most conventional solenoid operated directional valves is limited by the flow forces acting on the spool in opposition to the solenoids and return springs. Special attention is given to compensating for, or minimizing, these undesirable forces in the design of the series 5 valve.



Features and benefits

High performance

High pressure and flow capability with performance comparable to competitors, due to 315 bar (4570 psi) and 115 L/min (30 USgpm) ratings.

Reliability

A high margin of shifting force is available to overcome spool friction due to dirt and other contaminants. Also, a balance spool with cushioned shift means less wear and long life.

- Wet armature solenoids for quieter operation and long life with no dynamic seal leakage.
- Molded coil construction is impervious to moisture and dirt.
- Larger diameter spool combined with constant area and tangential flow passages result in low pressure drop.
- Stainless steel solenoid pin is processed hardened for long life.
- Patented detent mechanism for greater reliability and long life.

Service ability

- Plug-in coils and electrical connections simplify maintenance.
- Cartridge style manual actuators; easily replaced or exchanged for an SAE plug.
- Plug-in solenoid coil for ease of servicing can be replaced without disturbing the hydraulic system or wiring cavity.
- Two solenoid sizes to choose from for optimum performance and cost selection.
- Optional pin-type or top-side plug-in electrical connectors for easy valve replacement. Reversible to fit any installation need.
- Dual frequency (50/60 Hz) 2-wire coils for lower inventory at the OEM (optional).

* - DG4V4-01 - ** - * (L) - (Z) - (V) M - (S*) - ** - *** - * - (L) - ** - *(L) - * - 1* - S***

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18

1	Special seals F3 Viton F6 Buna nitrile/high can
2	Model series DG4V4-01 Subplate mounting; solenoid operated. Pressure rating 315 bar (4570 psi) for ports P, A & B.
3	Spool type Please refer functional symbols on Page 4 for spool types.
4 5	Spool/spring arrangement A Spring offset, end-to-end AL Same as "A" but left hand build B Spring offset, end to center BL Same as "B" but left hand build C Spring centered N No spring detented
6	Manual override options Omit if serviceable. Z No manual override H Water-resistant override(s) on solenoid end(s)
7	Solenoid energization identity V Solenoid "A" is at port "A" end/ or solenoid "B" is at port "B" end, independent of spool type. Omit for U.S. ANSI B93.9 standard requiring solenoid "A" energization to connect P to A and/ or solenoid "B" to connect P to B, independent of solenoid location.
8	Flag symbol M Electrical options and features
9	Spool indicator switch Blank Without switch S3 Switch, wired normally open S4 Switch, wired normally closed

10	Coil type U Omit for plug-in. Coils with junction box U1 ISO 4400 (DIN 43650) mounting+ KU Connector fitted KUP6 Top exit flying lead (150mm) KUPM4 Flying lead external to coil with Deutsch connector ♦ Refer to pages 102 - 103 for more information. Female connector to be supplied by customer.
11 12	Junction box with electrical connectors PA3W Three pin connector PA5W Five pin connector PM4W M12 connector
13	Solenoid indicator lights Omit if not required. L Lights fitted
14 15	Surge suppressor Omit for low power B 110V AC 50 Hz/120V AC 60 Hz D 220V AC 50 Hz/240V AC 60 Hz G 12V DC H 24V DC Omit for standard power. BL 110V AC 50 Hz/120V AC 60 Hz (low watt) HL 24V DC (low watt) *F6 seals not available with DC low power voltages.
16	Port T code 4 70 bar (1000 psi) (low power) 5 120 bar (1750 psi) (standard power)
17	Design number Subject to change, installation dimensions remain as shown for design numbers 10 through 19.
18	Special features S Special suffix S324 CSA approved

Maximum pressure

Ports P, A & B 315 bar (4570psi)*
 Port T 120 bar (1750 psi)
 (See model code)
 * 70 bar (1000 psi) with high water base fluids (95% maximum water content) or low watt coils

Standard

Voltage rating	Inrush Amps (rms)	Holding Amps (rms)	Holding- Watts
120V AC 60 Hz	3.95	0.98	37
110V AC 50 Hz	4.10	0.98	37
240V AC 60 Hz	1.97	0.49	37
220V AC 50 Hz	1.77	0.49	36
110V AC 50 Hz	3.25	0.77	30
220V AC 50 Hz	1.55	0.42	28
240V AC 50 Hz	1.55	0.42	28
12V DC		3.64	45
24V DC		1.83	45

Response time

The following response times were measured from the point of energization/ de-energization to the point of first indication of inlet pressure change. Response up to full system pressure is dependent on the system's compressed volume and can vary with each application.

Series	Valve type	AC Solenoid		DC Solenoid	
		Solenoid energized	Spring return	Solenoid energized	Spring return
Standard	Spring centered	20 ms	50 ms	50 ms	80 ms
Low power	Spring centered	20 ms	35 ms	40 ms	35 ms
Standard	Spring offset	18 ms	25 ms	50 ms	50 ms
Low power	Spring offset	15 ms	35 ms	50 ms	15 ms
Standard	Detented	22 ms		120 ms	
Low power	Detented	15 ms			

Solenoid energizing

Spring centered and spring offset valves will be spring positioned unless the solenoid is energized continuously. No-spring detented valves may be energized momentarily, approximately 0.15 second; when the solenoid is de-energized the spool will remain in the last position attained, provided there is no shock, vibration or unusual pressure transients.

Low power

Voltage Rating	Inrush Amps (rms)	Holding Amps (rms)	Holding- Watts
120V AC 60 Hz	2.40	0.69	27.5
110V AC 50 Hz	2.40	0.78	28.5
240V AC 60 Hz	1.15	0.25	27.5
220V AC 50 Hz	1.10	0.35	28.5
110V AC 50 Hz	2.40	0.61	23
220V AC 50 Hz	1.00	0.24	23
240V AC 50 Hz	1.20	0.26	23
12V DC		2.33	33
24V DC		1.25	30



CAUTION

Any sliding spool valve, if held shifted under pressure for long periods, may stick and not return, due to silting. Therefore, it is recommended that the valve be cycled periodically to prevent this from occurring.

Maximum flow data

Maximum recommended flow data is for AC or DC solenoids at 90% nominal voltage in a 4-way circuit with cylinder ports either looped or blocked and containing 2,5 liter (0.66 USgpm) compressed volume. Reduced performance may result when certain spools are used in 3-way circuits.

Valve function, symbol and recommended maximum flow

(See page 97 for maximum flow curves).



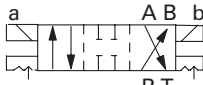
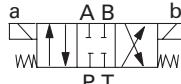
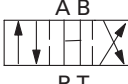
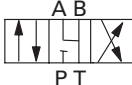
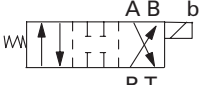
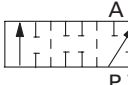
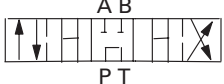

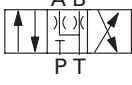
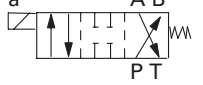
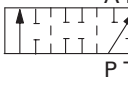
Fluids and seals

Buna N seals are standard and are compatible with water-in oil emulsions, high water base fluids and petroleum oils. For phosphate ester fire resistant fluids, Viton seals must be specified. Seals for water glycol have an F6 designation. Maximum operating pressure for high water base fluids is 1000 psi.

III-C

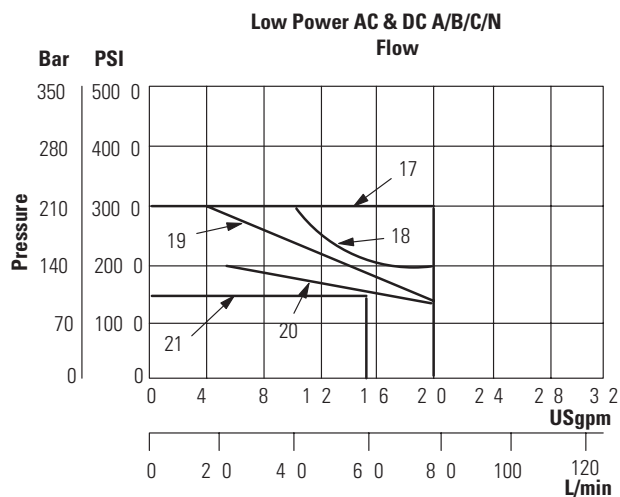
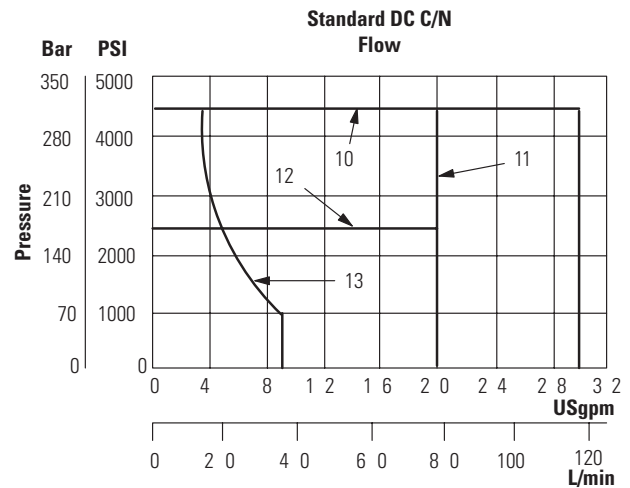
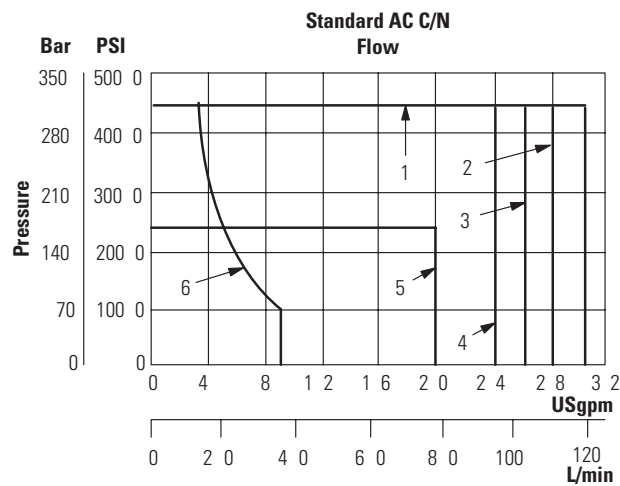
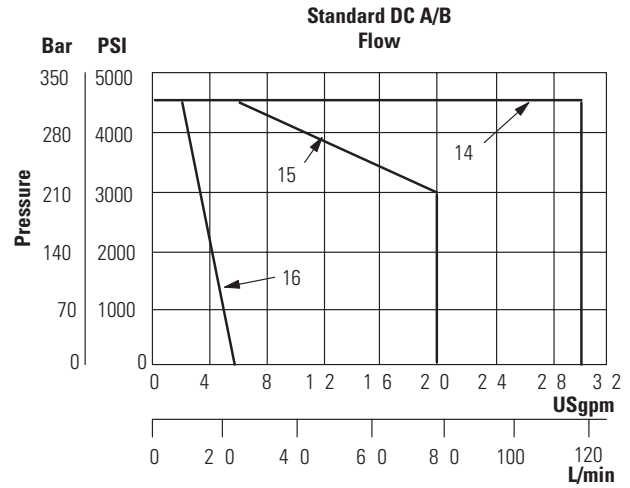
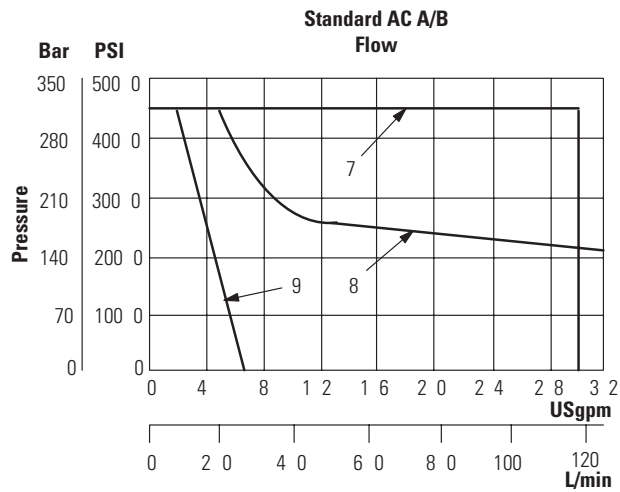
Application recommendations

Filtration: ISO 4406 Code 20/18/15 Operating temperature: 20 to 50 C (70 to 120 F) Fluid Viscosity: 16 - 51 cSt (75 - 250 SUS)

Spool type	3 Position spring centered (C)	Max. Flow curve				Spool type	2 Position detented (N)	Max. Flow curve			
		Standard		Low power				Standard		Low power	
		AC	DC	AC	DC			AC	DC	AC	DC
0		1	10	17	21	0		1	11	17	N/A
-		6	13	18	N/A	2		1	11	18	N/A
2		1	10	17	21	-	2 Position spring offset to Port A (A)				
-		4	11	18	21	0		7	14	17	21
6		3	11	18	21	2 6		7	14	17	21
-		1	10	17	21	22		9	16	N/A	N/A
8		5	12	20	21	-	2 Position spring offset to Port B (B)				
-		1	10	17	21	0		7	14	17	21
33		2	11	18	21	2 6		8	15	19	21
-	-	-	-	-	-	22		9	16	N/A	N/A

Maximum flow curves

III-C



Pressure drops in offset positions except where otherwise indicated

Spool code	P to A	P to B	A to T	B to T	P to T
0	1	1	1	2	1
1	3	4	1	6	4
2	4	4	2	3	—
3	4	4	1	3	—
6	4	4	1	2	—
7	1	1	4	6	—
8	7	7	4	4	3
11	4	3	6	1	—
22	4	4	—	—	—
31	4	4	3	1	—
33	4	4	3	3	—

For other viscosities, pressure drops approximate to:

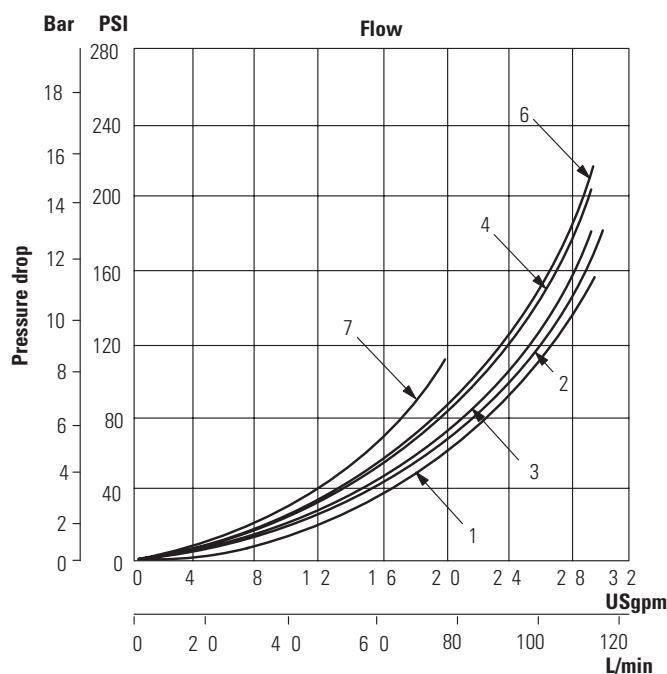
Viscosity cSt (SUS)						
14	20	43	54	65	76	85
(17.5)	(97.8)	(200)	(251)	(302)	(352)	(399)
% of ΔP						
81	88	104	111	116	120	124

A change to another specific gravity will yield an approximately proportional change in pressure drop.

The specific gravity of a fluid may be obtained from its producer. Fire resistant fluids usually have higher specific gravities than oil.

Drain

On 2-way valves, "T" is the drain and must be connected to the tank through a surge-free line, so there will be no back pressure at this port.



III-C

CAUTION

Surges of oil in a common 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 are necessary. Consult your Vickers representative for instructions.

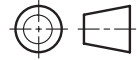
Standard conduit box & 'PB' Insta-plug

III-C

Electrical current
Signal light ("Lights" & "PB")
2 places Sol. A Light

46,8 (1.84) AC
87,4 (3.44) DC

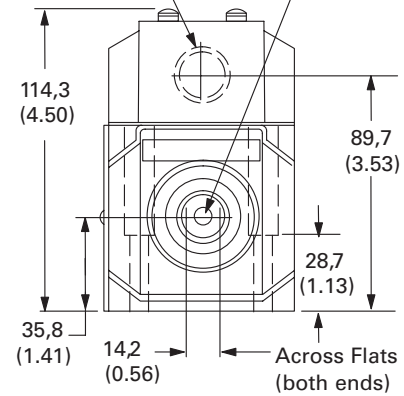
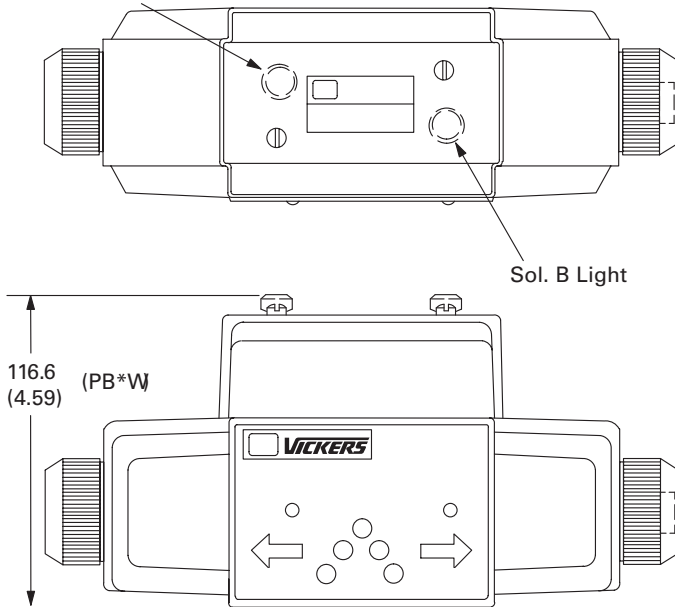
3rd angel projection



Clearance required for Coil removal (both ends)

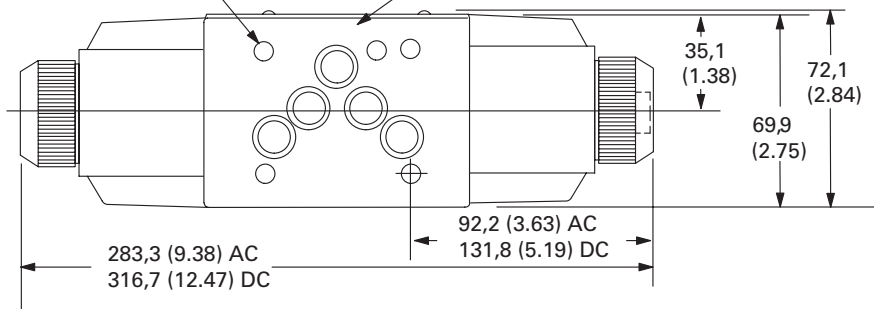
"G" - BSP
"J" - 20mm thread
"W" - 1/2" NPT
Connection box
may be rotated 180

Manual operating
Pin (both ends)

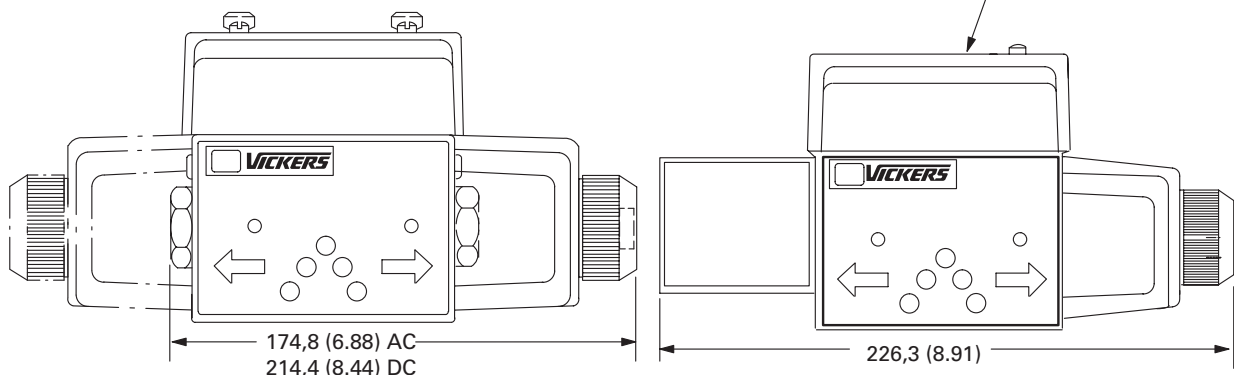


4-Valve mounting holes
for socket head cap screws
1/4-20x1-1/2 or M6x40 metric
SAE Grade 8 or better, metric grade 10.9
Torque 12-15 N.m (110-130 lb. in.)

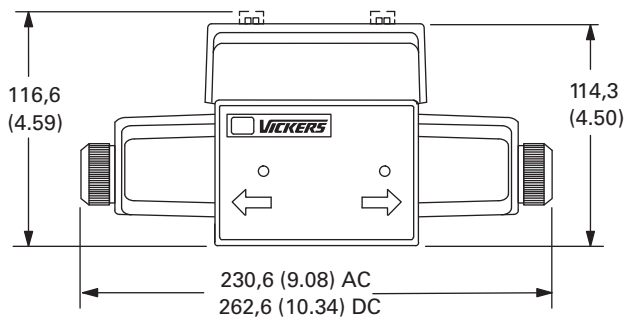
NFPA D02 mounting surface
(ISO 4401-AC-05-4-A)



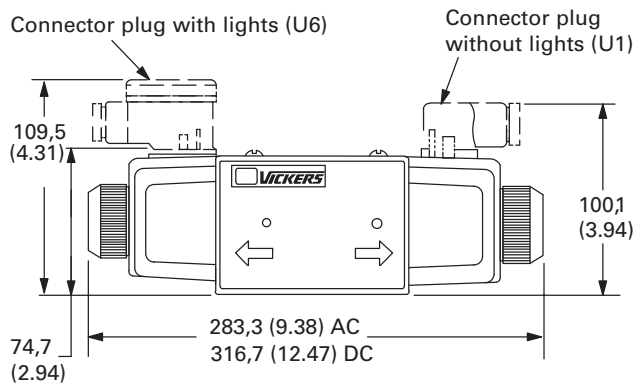
S3, S4 Switch



'L' Low power option

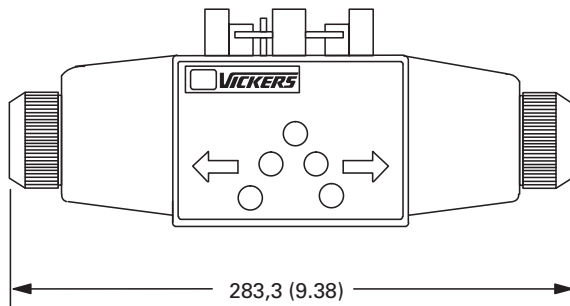


'U' DIN 43650 Connector* option

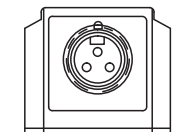


*Connector plug not included with valve

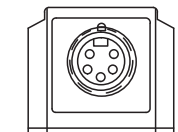
'PA'



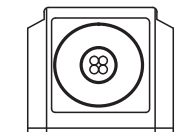
Connector option, Pin type 'PA3'/'PA5' (NFPA T 3.5.29) PM4 (SAE H1738-2)



Single Solenoid Valve (PA3)



Double Solenoid Valve or Optional Single Solenoid Valve (PA5)

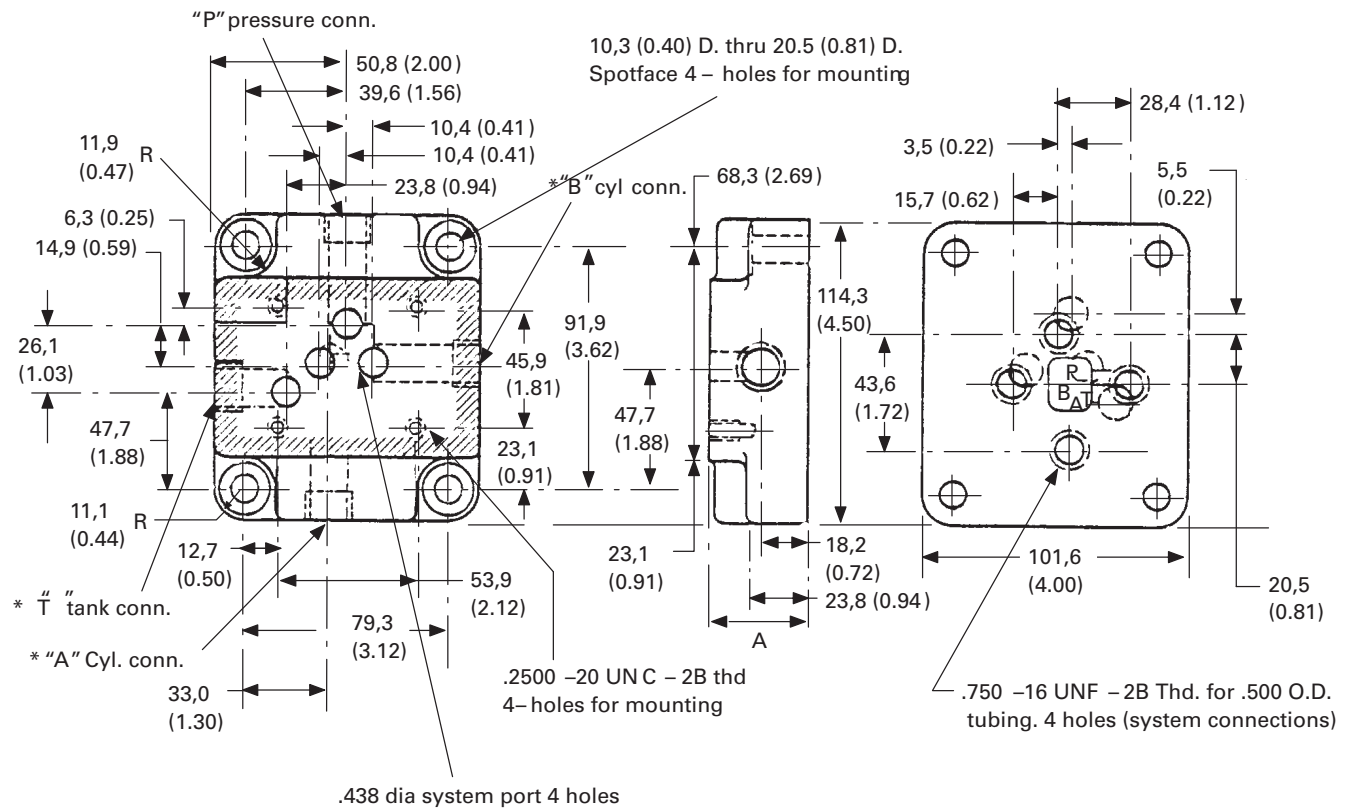


Double Solenoid Valve or Optional Single Solenoid Valve (PM4)

Number of Solenoids	Number of pins	Option code
Single	3	PA3
Single or Double	5	PA5
Single or Double	4	PM4

Subplate and mounting surface

III-C



*Ports on model DGSME-01-20-T8 only

Model	Dimension "A"
DGSM-01-20-T8	31,75 (1.25)
DGSME-01-20-T8	38,10 (1.50)

Note: Metric grade 10.9 (SAE Grade 8) mounting bolts required.

Bolt kits

Bolt kits include 4 directional valve mounting bolts and are ordered separately.

*Ports on model DGSME-01-20-T8 only

Model Codes	Sizes	Thread
BKDG01-633	¼-20-1½	Inch
BK855993M	M6x1x40	Metric

Note: Metric grade 10.9 (SAE Grade 8) mounting bolts required.

When subplate is not used, a machined pad (as indicated by subplate shaded area) must be provided for mounting; pad must be flat within 0.0127 mm (.0005 inch) and smooth within 1.6 flm (63 microinch).

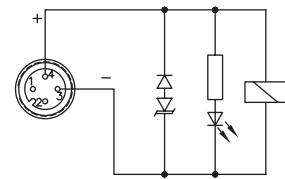
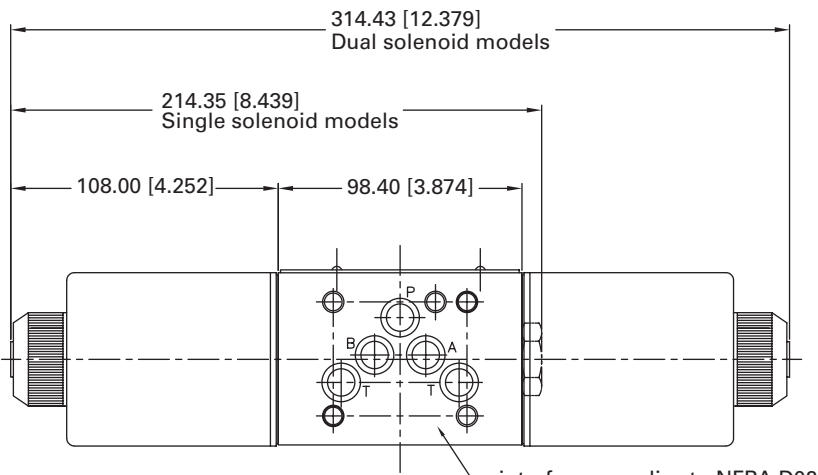
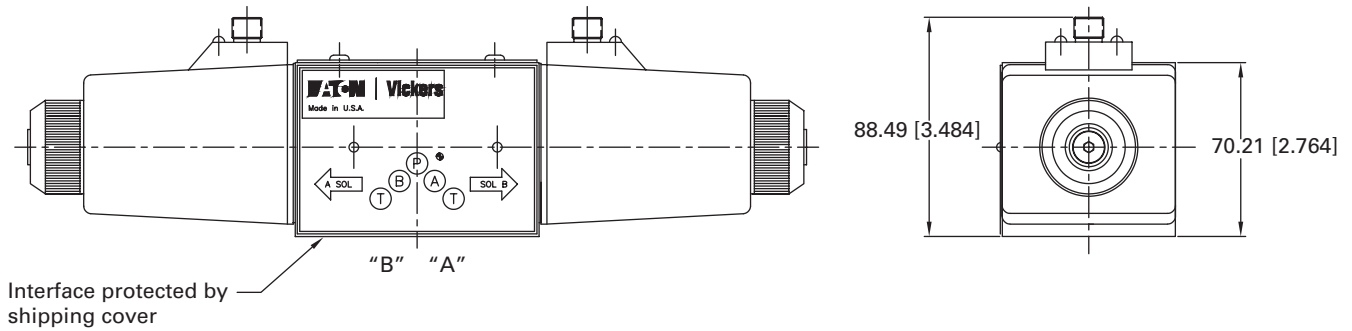
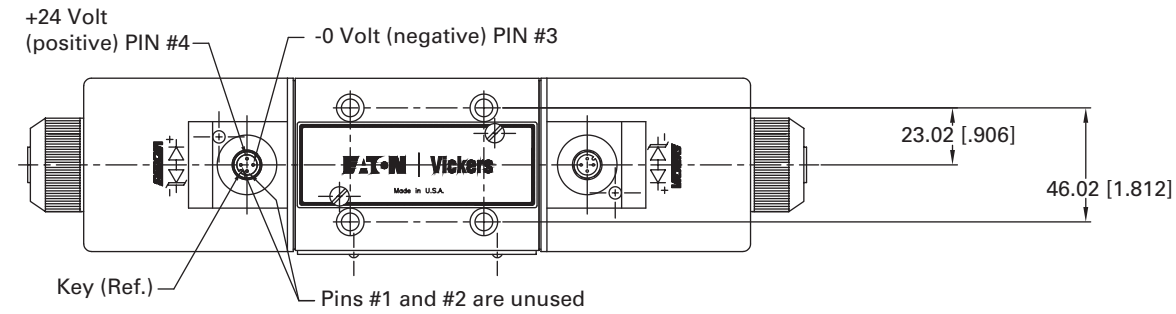
Fluid cleanliness

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. 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.

Filtration requirements

20/18/15



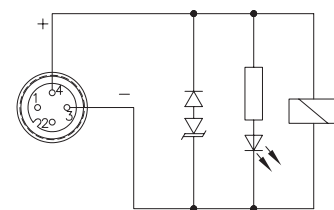
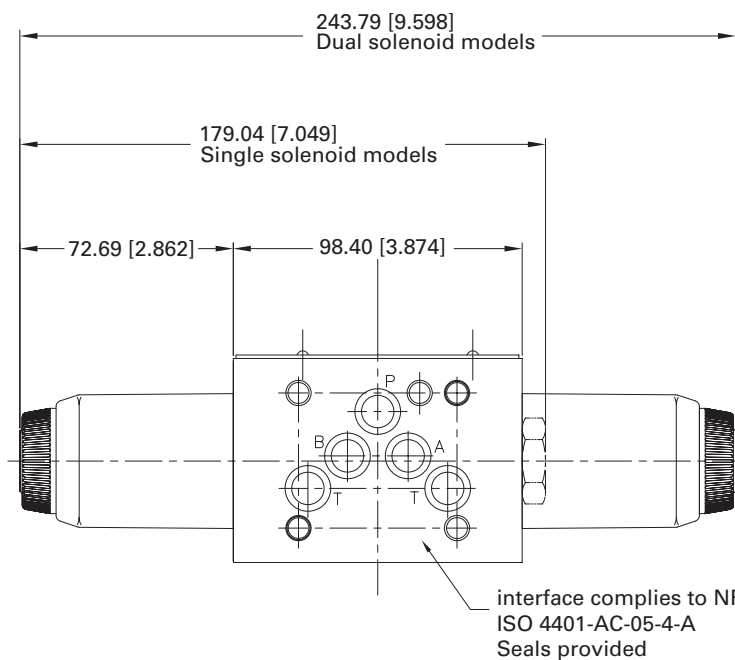
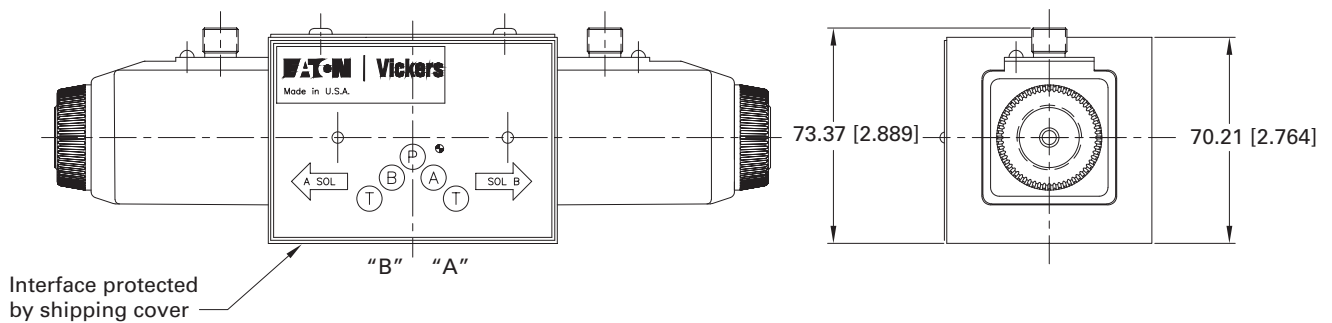
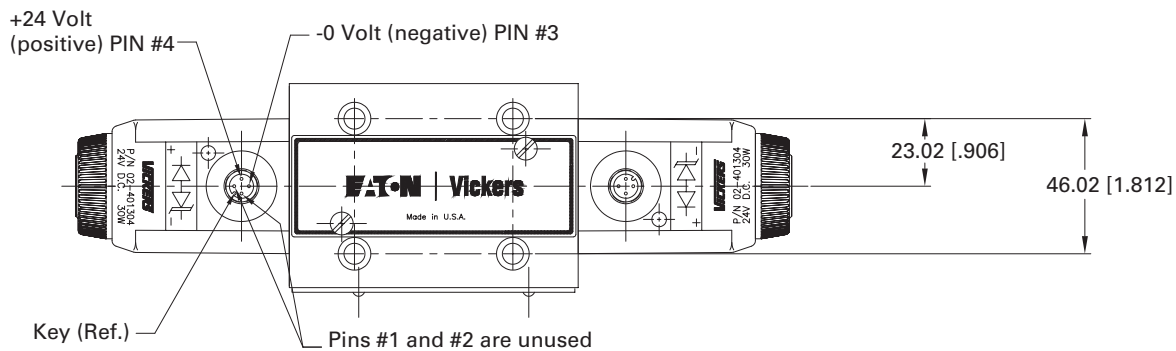
Electrical schematic

interface complies to NFPA D02
ISO 4401-AC-05-4-A
Seals provided

(F*) - DG4V4 - 0 1***(L) - (Z) - (V)M - KUPM4L - D7 - * - 5 10 Series
└─ Standard power

M12 Connectors feature

III-C



Electrical schematic

(F*) - DG4V4 - 01*** (L) - (Z) - (V)M - KUPM4L - D7 - *L - 4 10 Series
 Low watt