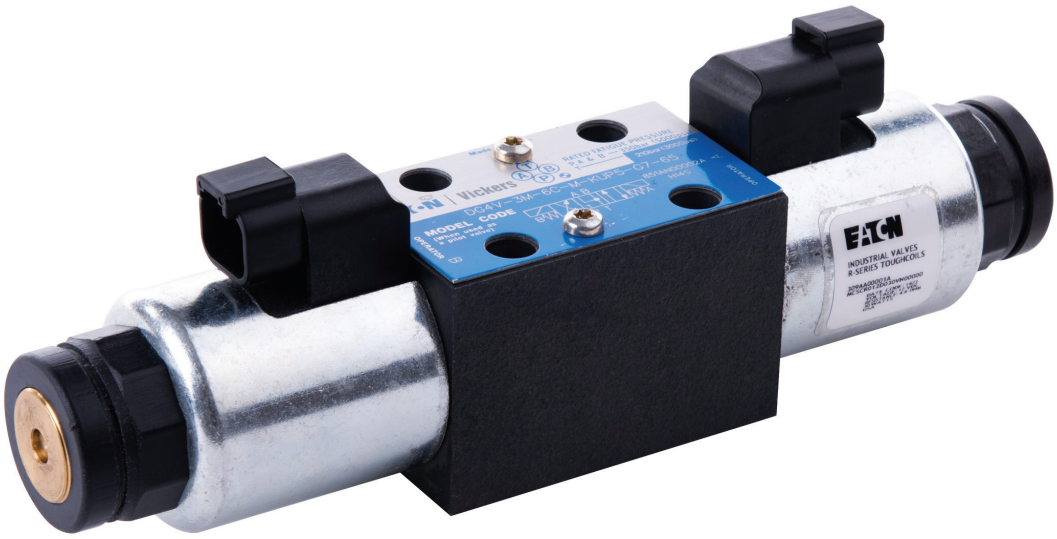
ISO4401 Size 03; ANSI/B93.7M-D03
Solenoid operated directional valve
DG4V-3M-65



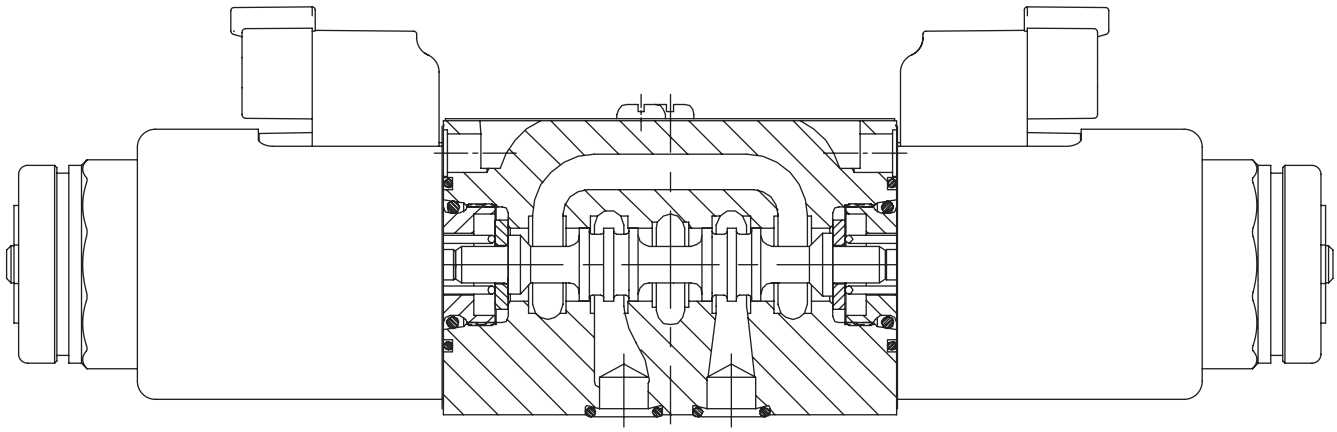
General description

Solenoid operated directional control valves are for directing and stopping flow at any point in a hydraulic system.

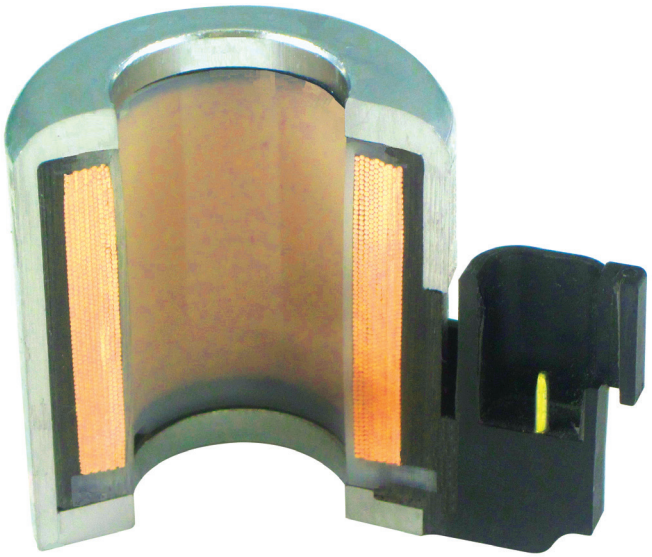
- Efficient control of greater hydraulic powers without increasing solenoid power consumption.
- Installed cost and space savings from higher power/ weight-and-size ratios.
- Installation flexibility resulting from choice of numerous combinations of solenoid connectors and locations.
- Viton seals as standard for multi-fluid capability. Nitrile seals available as a model code option.
- Higher sustained Machine productivity and higher uptime because of proven fatigue life and endurance, tested over 20 million cycles.
- Solenoid coils can be changed quickly and easily without leakage from hydraulic system.
- Compact, cost effective system design when used with Eaton SystemStak™ valves and subplates.

DG4V-3M High performance valves

- Minimum pressure drop 2.5 bar at 30 l/min.
- Range of coil connectors including DIN and Deutsch.
- Range of coil voltages and power options.
- Up to 80 l/min (21 USgpm) and up to 40 l/min (10.5 USgpm) respectively at 350 bar (5000 psi).
- Offers designers the opportunity to select the optimum value package for each application.
- International standard interface. The valve mounting face conforms to ISO 4401, size 03 and is compatible with related international standards.
- Rigorous coil tests for added protection against physical and environmental damage. Details on page R-3.
- Rated to IP69 best in the class



Eaton tough coils



You can rely on Eaton ToughCoils

OEM's strive to build dependable machines that get the job done without interruption – no matter the conditions. Our solenoid operated directional control valves matched with our new ToughCoils provides industry leading environmental protection and performance in a compact and rugged package.

Electro-hydraulic components are being utilized in an array of off-highway and industrial applications. Electrical winding integrity is critical. ToughCoils are encapsulated in a plastic surrounding by a one- piece deep drawn metal frame. With an IP69K rating (Deutsch type only), it has the highest ingression protection from dust and water. Most valve coils in the market only meet an ingression protection (IP) rating of 65.

ToughCoils have also passed Eaton's own rigorous tests for added protection against physical and environmental damage:

- Extreme heat
- Thermal shock dunk
- Extended vibration test
- Salt fog
- Ice
- Bench handling
- Combined environment test
- Particle impact

Flexible Mounting - ToughCoils can be reversed mounted and rotated to any degree allowing more wiring flexibility in difficult locations

*	DG4V—3	M	—	**	*(L)	—	(**)	(V)	M	—	****	—	D*	**	*	—	6*	—	***
1	2	3		4	5		6	7	8		9		10	11	12		13		15

1 Seal type

Blank	Viton
F6	Buna Nitrile/High CAN

2 Model series

4	Solenoid operated
V	Pressure rating 350 bar (5000 psi) on P, A & B ports
3	ISO4401 Size 03

3 Performance

M	Mobile high performance

4 Spool type

Please refer functional symbols on Page 76 for spool types.

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 option

Blank	Plain override(s) in solenoid end(s) only ▲
H	Water-resistant override(s) on solenoid end(s) ▲
Z	No overrides at either end

▲ No override in non-solenoid end of single solenoid valves

7 Solenoid energization identity

Blank	None
V	Solenoid "A" is at port "A" end and/ or solenoid "B" is at port "B" end, independent of spool type

Note: Used to select the identification of the solenoid. Refer to table on page 4.

8 Flag symbol

M	Electrical options and features

9 Coil type

U	ISO4400, DIN43650 connector
U1	ISO4400 fitted with PG11 plug
KUP5	Integral Deutsch connector

10 Surge suppressor/ damper

D	Zener Diode

11 Coil Rating

G	12V DC
GL	12V DC
H	24V DC
HL	– 24V DC

12 Tank pressure rating

Refer to "Operating Data" for port T pressure ratings.

7	207 bar (3000 psi)

13 Design number

65	Basic design

15 Reverse coil option

RC	Both Coils reversed
RCA	A Coil Reversed
RCB	B coil reversed

Note: See page 10.

Functional symbols

Spool options

The valve function schematics apply to both U.S. and European valves.

II-B

DG4V-3(S)-*NV

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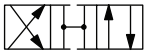

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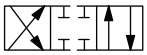

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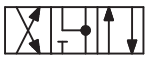

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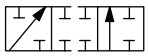

DG4V-3(S)-*BV

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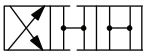

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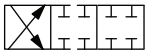

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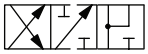

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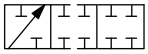

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521

561

DG4V-3(S)-*AV

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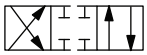
2



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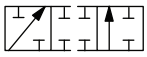

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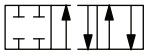

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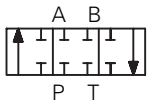

DG4V-3(S)-*BLV

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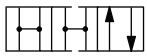

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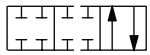

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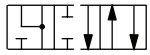

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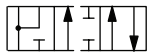

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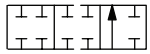

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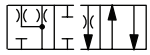

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DG4V-3(S)-*ALV

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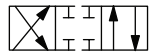

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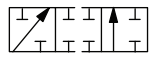

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DG4V-3(S)-8CV

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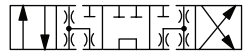

DG4V-3(S)-8BLV

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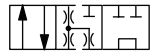

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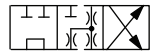

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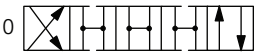

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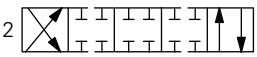

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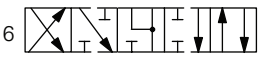

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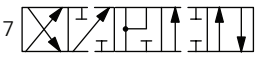

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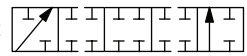

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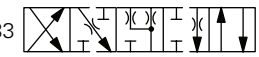

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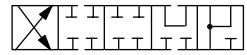

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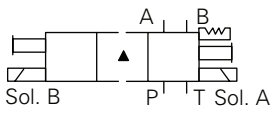
Solenoid identified to US and European standards

	U.S. Solenoid Standard	European solenoid standard (specify "V" in the model code at position 7 on page 75)
Double solenoid valves, two position, detented		
Double solenoid valves, spring centered		
Single solenoid valves, solenoid at port A end		
Single solenoid valves, solenoid at port B end		

▲ Transient conditions only

Feature	DG4V-3M
Pressure Limits P, A and B ports	350 bar (5075 psi)
T port:	210 bar (3045 psi)
Flow rating	See performance data
Relative duty factor	Continuous; ED = 100%
Type of protection: ISO 4400 coils with plug fitted correctly	IP69K for Deutsch type IP65 for DIN type
Coil winding	Class H
Coil encapsulation	Class F
Permissable voltage fluctuation: Maximum Minimum	 Refer to temperature limits. 90% rated
Typical response times at 100% rated volts measured from application/removal of voltage to full spool displacement of "2C" spool at:	
Flow rate P-A, B-T	20 l/min (5.3 USgpm)
Pressure	175 bar (2537 psi)
AC (~) energizing	18 ms
AC (~) de–energizing	32 ms
DC (=) energizing	60 ms
DC (=) de–energizing	40 ms

Power consumption, DC solenoids at rated voltage and 20 C (68 F). Full power coils:	
12V, model type "G"	30W
24V, model type "H"	30W
Low power coils:	
12V, model type "GL"	18W
24V, model type "HL"	18W

▲ 1st half cycle; armature fully retracted.

Performance data

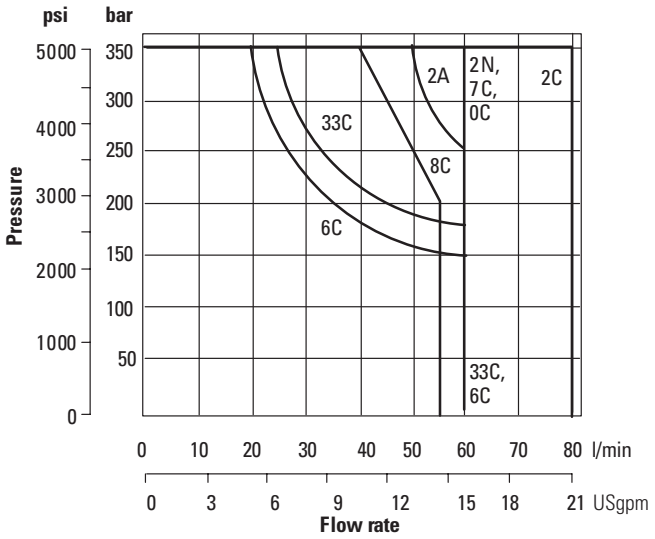
Typical with mineral oil at 36 cSt (168.6 SUS) and a specific gravity of 0.87.

II-B

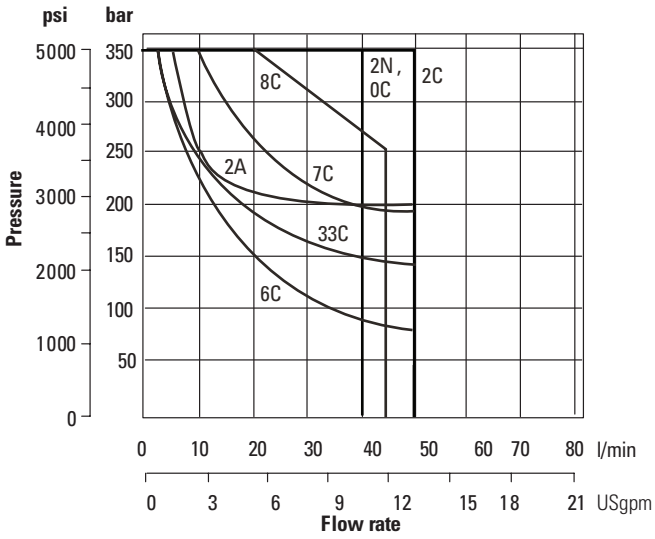
Maximum flow rates

Performance based on full power solenoid coils warm and operating at 90% rated voltage.

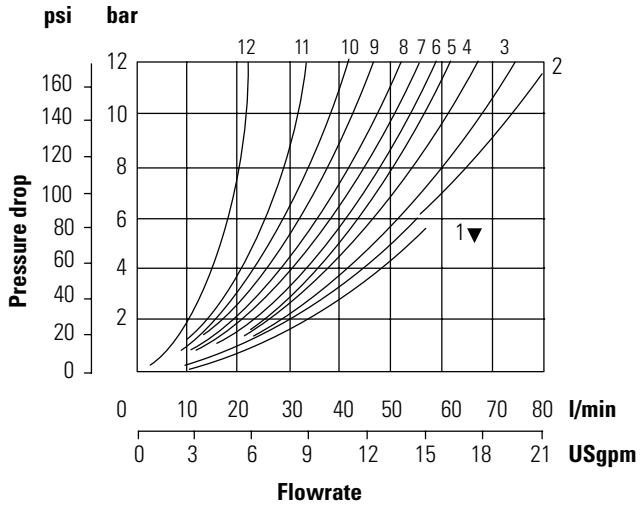
H type solenoid- 30W



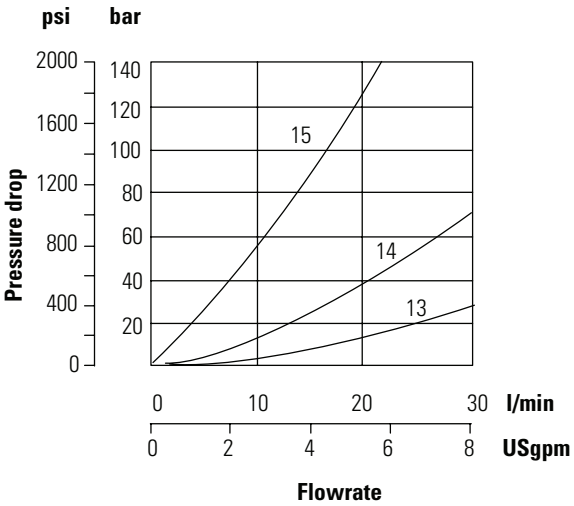
HL type solenoid- 18W- (Optional)



Pressure drops



DG4V-3



DG4V-3

▼ Curve for spool type 6: not recommended for flows in excess of 60 l/min (15.8 USgpm).

Pressure drops in offset positions except where otherwise indicated	Spool positions covered	P to A	P to B	A to T	B to T	P to T	B to A or A to B
0A(L)	Both	5	5	2	2	-	-
0B(& 0C	De-energized	-	-	-	-	4▲Δ	-
	Energized	4	4	2	2	-	-
2A(L)	Both	6	6	5	5	-	-
2B(L) & 2C	Energized	5	5	2	2	-	-
2N	Both	6	6	3	3	-	-
6B(L) & 6C	De-energized	-	-	3▲	3Δ	3	3
	Energized	6	6	1	1	-	-
7B(L) & 7C	De-energized	6▲	6Δ	-	-	-	7
	Energized	4	4	3	3	-	-
8B(L) & 8C	All	9	9	5	5	3	-
22A(L), 22B(L) & 22C	All	6	6	-	-	-	
24A(L)	De-energized	6	6	2	2	-	-
33B(L) & 33C	De-energized	-	-	15▲	15Δ	-	-
	Energized	5	5	2	2	-	-
52VL &52C	Energized	6▲	6Δ	2	-	-	10❍
56BL	Both	6▲	6Δ	11▲	10Δ	-	10❍
56C	De-energized	-	-	11▲	10Δ	-	10❍
	Energized	6▲	6Δ	2	-	-	10❍
521B	All	6▲	6Δ	-	-	-	10❍
561B	De-energized	-	-	10▲	11Δ	-	10❍
	Energized	6	6Δ	-	-	-	10❍

▲"B"plugged Δ "A"plugged ❍"P"plugged

For other viscosities, pressure drops approximate to:

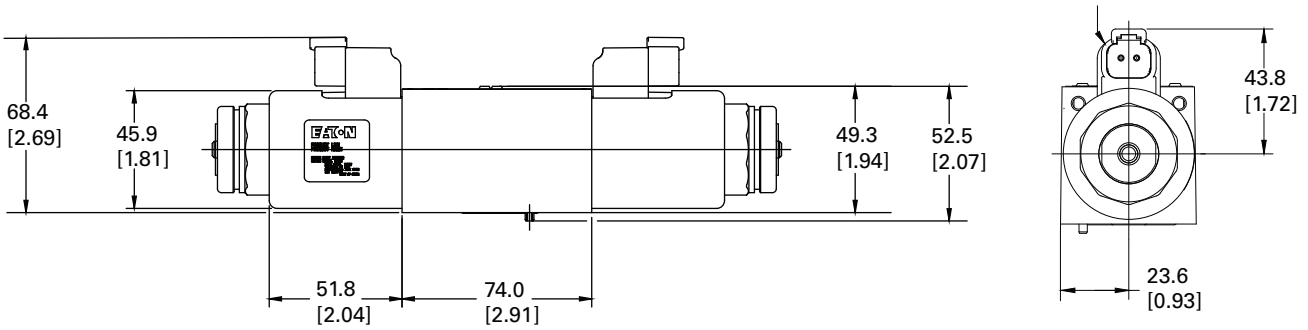
Viscosity cSt (SUS)

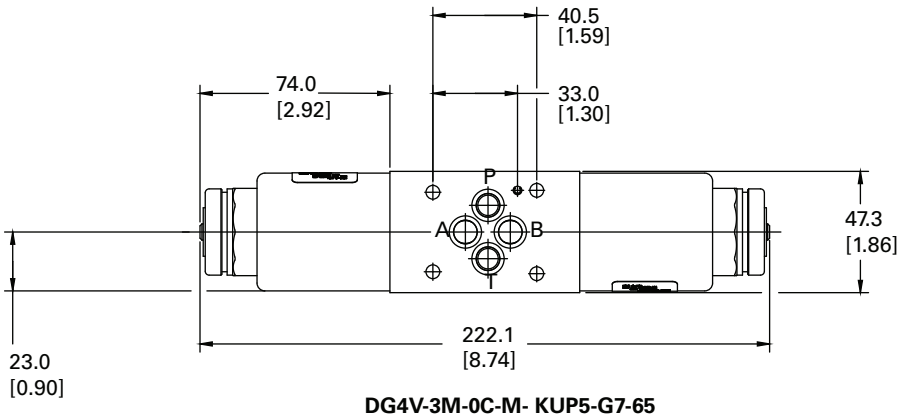
14 (17.5)	20 (97.8)	43 (200)	54 (251)	65 (302)	76 (352)	85 (399)
% of ΔP (Approx.)						
81	88	104	111	116	120	124

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.

Installation dimension

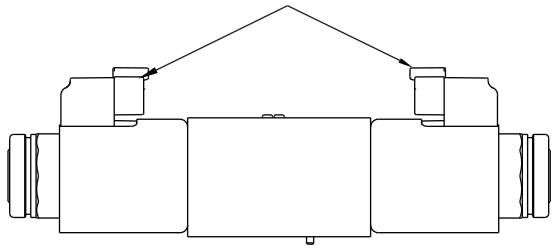
Integral deutsch connector
Deutsch male DT04-2P mating connector DT06-2S.





DG4V-3M-0C-M- KUP5-G7-65

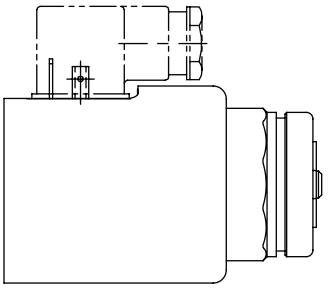
Reversed coil at both sides



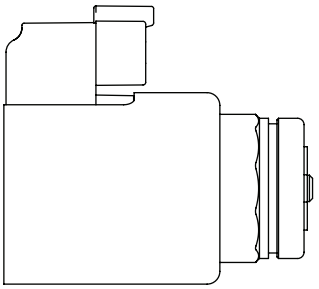
DG4V-3M-0C-M-KUP5-G7-65-RC

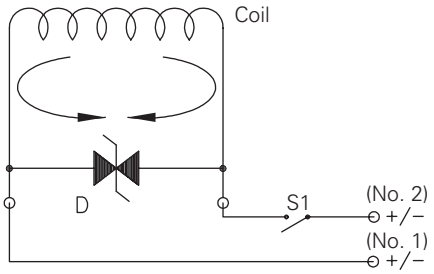
Note: Option RCA will have coil at A port reversed and option RCB will have coil at B port reversed.

U/U1



KUP5





Surge suppression device Bi - directional Zener Diode (D)

Zener diode in parallel with coil. When switch (S1) is opened, the energy stored in the coil is trapped and dissipated by the diode (D) and the coil resistance.

- The Zener makes exact limitation of inductive spikes.
- Polarity insensitive.