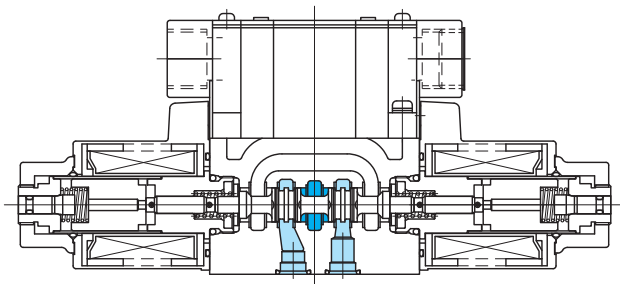
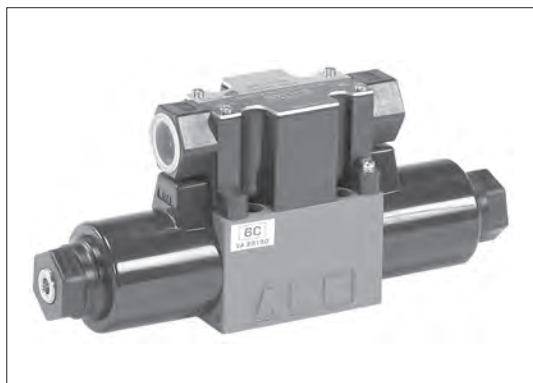


Shockless solenoid operated directional control valves DG4VS-3

E
10-1

Directional Control Valves



- This solenoid directional valves provides reduced shock during switching (compared to standard DG4V-3).

Model Code

(F3)-DG4VS-3-2A(L)-M-P7-H-7-(P08)-54

1 2 3 4 5 6 7 8 9 10 11 12

- 1 Hydraulic fluid
Omit: mineral oil based fluid, water-glycol based fluid
F3: Phosphate ester
- 2 Shockless solenoid operated directional control valve (gasket mounting)
Wet armature type
- 3 Mounting dimensions
3: ISO 4401-03
- 4 Spool type
See page E10-2
- 5 Spool/spring arrangement
A: Spring offset, A type (2 position, single solenoid)
B: Spring offset, B type (2 position, single solenoid)
C: Spring centered type (3 position, double solenoid)
- 6 Solenoid assembly configuration (for spring sets, type A and B)
Omit: standard (energized: P to B, A to T)
L: Left hand build (energized: P to A, B to T)
- 7 Electrical wiring (configuration, wiring connection port side)
P: Plug-in solenoids, conduit box, G 1/2
U: DIN43650 connectors, Pg. 11
KU: Flying leads (standard lead wire length 350 mm, DC 12 V, 24 V only)
- 8 Electrical accessories
Omit: no accessories (electrical wiring P, KU) and for no connectors (electrical wiring U)
1: Connectors without accessories (electrical wiring U)
4: With surge suppressor (electrical wiring KU, slow solenoid deenergize)
7: With indicator lamp and surge suppressor (DC standard)

- 9: ADC solenoid rectifier (fast solenoid deenergization), indicator lamp and surge suppressor
- 12: ADC solenoid rectifier (slow solenoid deenergization), indicator lamp and surge suppressor

Table of electrical accessories which can be selected

Electrical Wiring System	Solenoid Power Supply	Electrical Accessories					
		Omitted	1	2	7	9	12
P	DC	○	×	×	○	×	×
	AC/DC conversion	×	×	×	×	○	○
U	DC	○	○	×	○	×	×
	AC/DC conversion	×	×	×	×	×	○
KU	DC	○	×	○	×	×	×

- : Electrical accessory which can be selected
- ×: Electrical accessory which cannot be selected

- 9 Solenoid voltage
(See page E10-2)
- 10 Allowable T port back pressure
7: 20.6 MPa
- 11 Port orifice (option)
Omit: no port orifices (standard)
Port orifices
<Example 1> P08 (0.8 mm orifice in P port)
┌└ Orifice diameter
Port (A, B, P and T)
<Example 2> B12 (1.2 mm orifice in B port)
<Example 3> 2 port combinations
Combination sequence, PTAB
P10T12, P08B10

- 12 Design no.

Specifications

Model Code	Max. Working Pressure MPa	Max. Flow L/min	Allowable Tank Port Back Pressure MPa	Max. Switching Frequency (cycles/min)		Weight kg	
				DC	AC/DC Conversion	Single Solenoids	Double Solenoids
DG4VS-3	35	See "Pressure-Flow Characteristics"	20.6	200	120	1.6	2.0

Solenoid Specifications

Power Supply	Voltage Code	Voltage V	Frequency Hz	Holding Current A	Power Consumption W	Allowable Voltage Fluctuation %	Insulation Class (Allowable Temperature)
DC	G	12	—	2.36	29	±10	H (180°C)
	H	24		1.16	28		
	R	100		0.29	29		
AC ↓ DC (AC/DC conversion) (ADC)	TR	AC 100 V ↓ DC 90 V (coil)	50/60 Hz	0.33	30	±10	H (180°C)
	BR	AC 110 V ↓ DC 100 V (coil)	50/60 Hz	0.29	29		
	VR	AC 200 V ↓ DC 180 V (coil)	50/60 Hz	0.17	31		

- Note:
- Current values and power consumption varies with temperature conditions. Values shown in table are based on 30°C.
 - In the AC/DC conversion type, AC power is used to activate the DC solenoid by the built-in rectifier, and it comes with the characteristics featured by DC solenoids. This means that the items given for the DC solenoids apply for the maximum flow.
 - Consult Tokyo Keiki for details on solenoids for the supply voltages which are not listed above.

Spool Types and Pressure-Flow Characteristics

DC, AC-DC Rectifier Solenoid (applied voltage 90% of rated)

Spool Center Position	Model Code, Functional Symbol			Max. Flow L/min														
	3 Position	2 Position		P → A → B → T					P → A (B port block)					P → B (A port block)				
	Spring Centered - C -	Spring Offset, B Type - B - - BL -																
				7MPa	14MPa	21MPa	28MPa	35MPa	7MPa	14MPa	21MPa	28MPa	35MPa	7MPa	14MPa	21MPa	28MPa	35MPa
0	 DG4VS-3-0C 	DG4VS-3-0B 	DG4VS-3-0BL 	80	80	80	60	50	80	80	80	60	50	80	80	80	60	50
2	 DG4VS-3-2C 	DG4VS-3-2B 	DG4VS-3-2BL 	80	80	80	80	80	80	45	30	23	19	80	45	30	23	19
3	 DG4VS-3-3C 	DG4VS-3-3B 	DG4VS-3-3BL 	80	80	65	35	30	80	30	23	18	14	80	65	35	28	24
6	 DG4VS-3-6C 	DG4VS-3-6B 	DG4VS-3-6BL 	80	80	80	52	42	80	60	38	27	23	80	60	38	27	23
8	 DG4VS-3-8C 	DG4VS-3-8B 	DG4VS-3-8BL 	45	45	45	30	25	45 (45)	45 (45)	45 (38)	30 (33)	25 (30)	45	45	45	30	25
31	 DG4VS-3-31C 	DG4VS-3-31B 	DG4VS-3-31BL 	80	80	65	35	30	80	65	35	28	24	80	30	23	18	14

Spool Transient Condition	Model Code, Functional Symbol		Max. Flow L/min														
	2 Position		N, A, A L					N, A					A L				
	Spring Offset, A Type - A - - AL -																
			7MPa	14MPa	21MPa	28MPa	35MPa	7MPa	14MPa	21MPa	28MPa	35MPa	7MPa	14MPa	21MPa	28MPa	35MPa
2	 DG4VS-3-2A 	DG4VS-3-2AL 	80	80	80	63	60	50	15	10	10	10	80	40	26	22	20

- Note:
- Values in () for spool type 8 are max. flows with A, B ports blocked.
 - Max. flow refers to limit flow without valve malfunction for valve switching.
 - For KU4 coil, it may differ from this table.

Characteristics Curve

Pressure Drop Characteristics

Pressure drop characteristics are the same as DG4V-3 (see page E2-8).

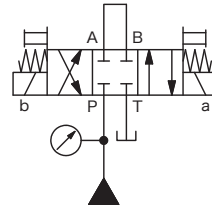
Switching Times

Unit: ms				
Power Supply	Operation	De-energize Time	Spring Offset Spring Centered C, B, BL	Spring Offset A, AL
DC	Energize		80	
	Spring Return		30	
AC/DC conversion (with Rectifier)	Energize		80	
	Spring Return		Fast	40
		Slow	120	

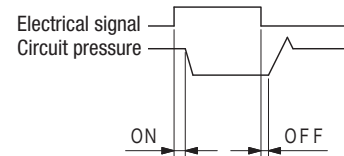
Note: • Values shown may vary according to spool type and circuit conditions.

Conditions: No. 2 spool, open loop circuit, flow 40 L/min, supply pressure 17.5 MPa, fluid viscosity 20 mm²/s

[Circuit Example]

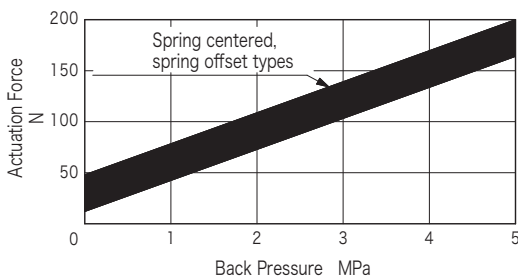


[Switching Time Definition]



Notes on Operation

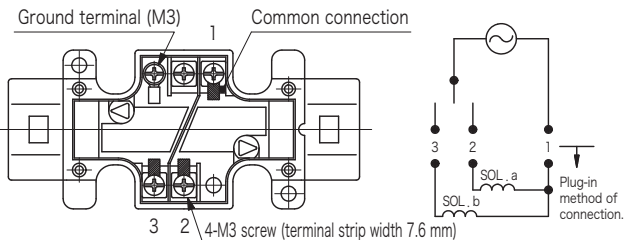
- Mounting orientation
No restrictions on valve mounting attitude.
- Solenoid energization
Always ensure that one side of solenoid is deenergized before energizing the opposite side. For spring centered and spring offset valves, solenoid should be continuously energized during circuit switching. Deenergization of solenoid will cause spool to return to prescribed position by spring force.
- T (tank) port piping
Prevent abnormal pressure surges above the allowable back pressure rating from being generated in T port. Valve is wet armature type so ensure that valve is always filled with oil.
- Using valves as two-way and three-way
Valve is designed as four-way and max. flow is limited when using as two or three-way valves. Consult Tokyo Keiki for details.
- Long periods of solenoid energization
Care should be paid as long periods of solenoid energization at high pressure may cause spool sticking and switching malfunction.
- Malfunctions due to surge pressure
Avoid combining flows of tank lines prone to surge pressures. Surge pressures in T port may lead to spool malfunctions.
- Manual operation
For manual switching, push the manual override pin. Be aware that actuation force increases with higher back pressure. (See graph)
- Solenoid indicator lamp



For valves with indicator lamps, the lamps will light when current flows to the solenoid.

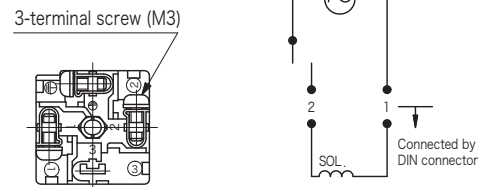
- Electrical wiring
Solenoid and conduit box are pre-wired. Refer to below diagrams for wiring from power source to conduit box and DIN connectors.

P type



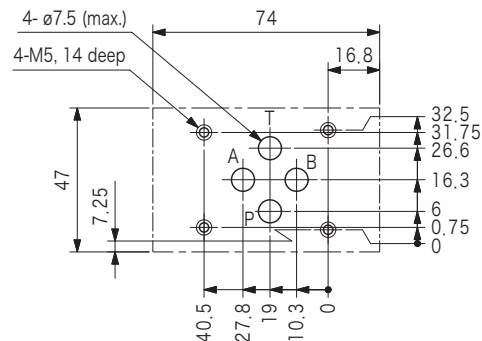
The electrical wiring has no polarities.

U type (DIN connector)



Terminals 1 and 2 have no polarities.

● Mounting dimensions



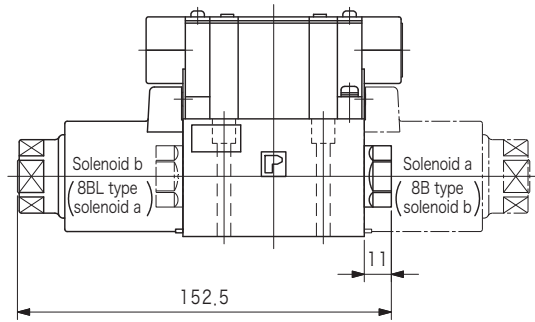
● Mounting surface machining accuracy

Surface Roughness	1.6 μm Ra	
Flatness	Less than 0.01 (□ per 100 mm)	0.01 / 100
Permissible Tolerance	Mounting bolt hole: ±0.1 Ports: ±0.2	

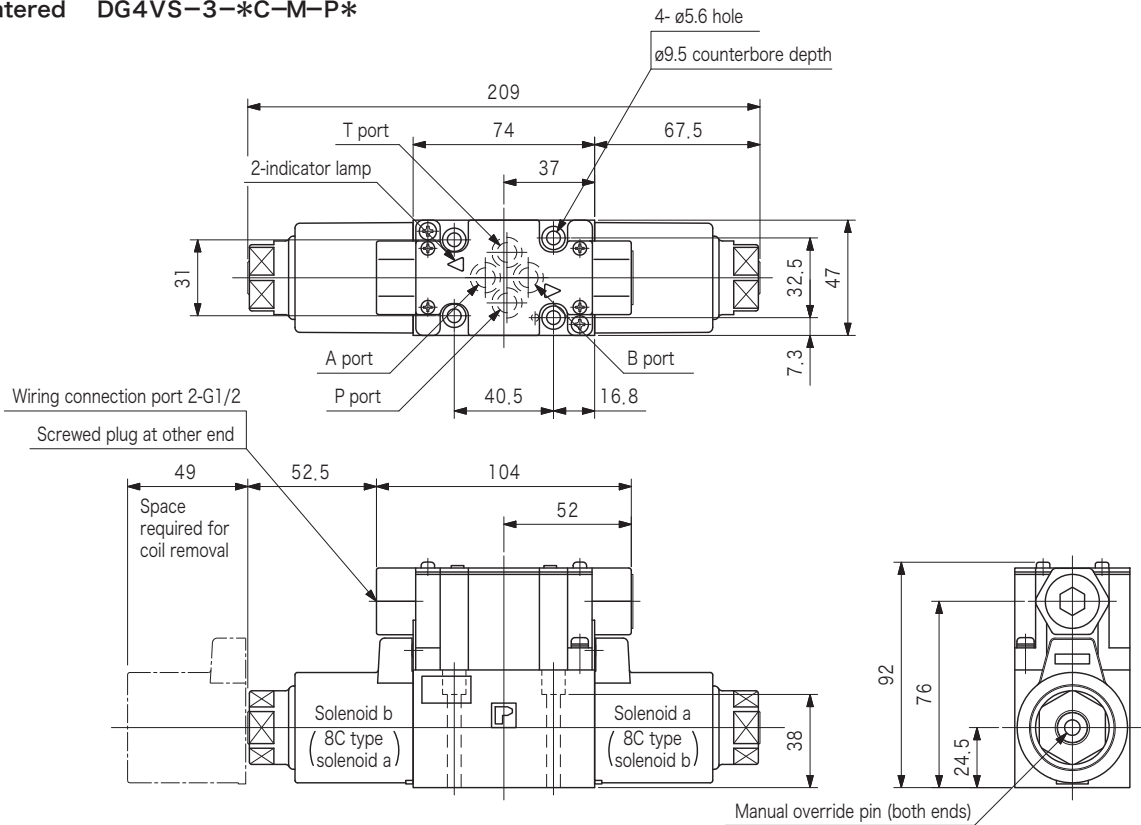
Dimensions

Spring Offset DG4VS-3-*A/B-M-P* (solid line)

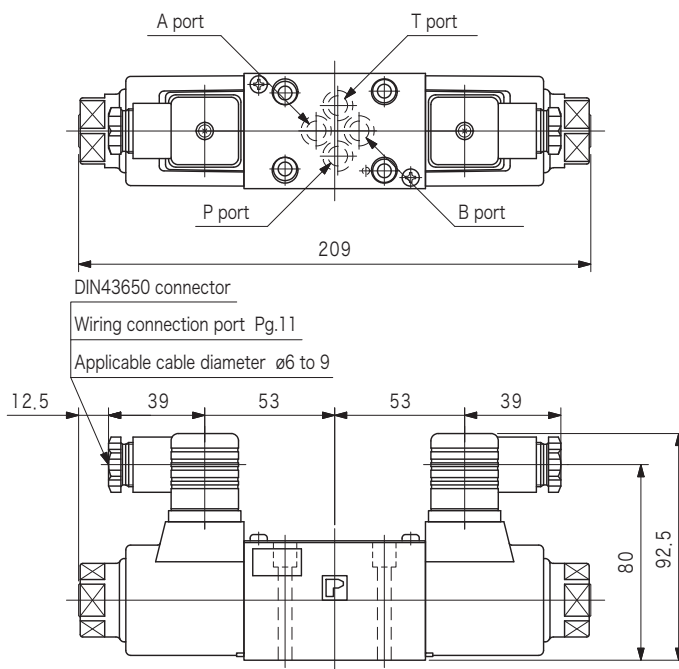
Spring Offset DG4VS-3-*AL/BL-M-P* (dashed line)



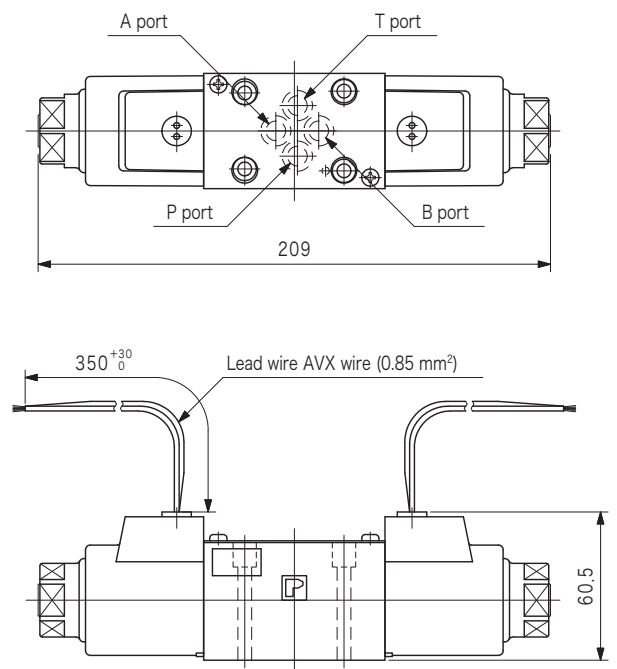
Spring Centered DG4VS-3-*C-M-P*



DG4VS-3-*C-M-U*



DG4VS-3-*C-M-KU*



Mounting Bolts (JIS B 1176, Strength Class 12.9)

Hex Socket Bolts	Qty
M5 × 50	4

- Mounting bolts must be ordered separately.
- Tightening torque of mounting bolts: 7 to 8 N•m

Subplate

Subplate		Connection Port Dia. Rc
Side Piping	DGMS-3-1E-10-T-JA-J	3/8
Bottom Piping	DGVM-3-10-T-JA-J	

- Subplate and bolts must be ordered separately.
- See page R6-6 for dimensions.
- See page R6-6 for plural mount subplates.
- Max. working pressure is 21 MPa. For higher pressures, valve should be mounted on manifold block.

Construction

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Directional Control Valves

O-ring

No.	Part No.	Standard	Qty	
			A/B	C
2	008001817	JIS B 2401 1A-P20	1	2
4	008000217	JIS B 2401 1A-P4	2	4
5	007902617	AS568-026 (NBR, Hs70)	1	2
7	007911429	AS568-114 (FKM, Hs90)	1	2
12	007901219	AS568-012 (NBR, Hs90)	4	4
14	007911419	AS568-114 (NBR, Hs90)	1	—
23	007900817	AS568-008 (NBR, Hs70)	1	1

Solenoid coil (P type)

No.	Voltage Code	Part No.
3	G	40078304
	H	40078305
	R	40078307
	TR	40078308
	BR	40078307
	VR	40078309

