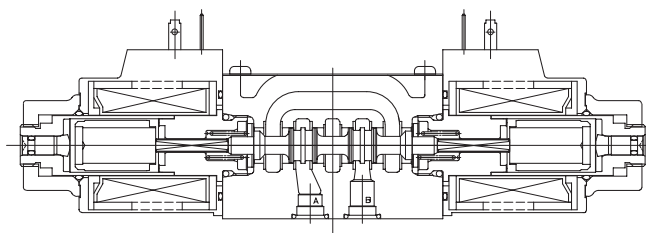
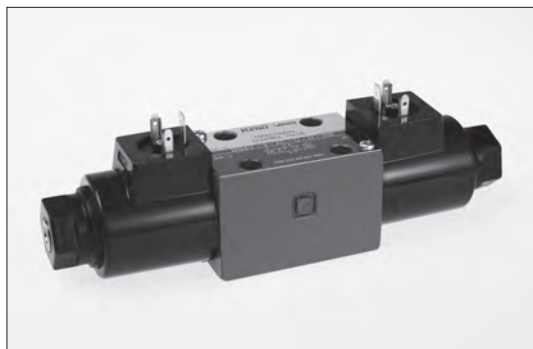


# Solenoid operated directional control valves DG4V-3, 100



- Cost reductions achieved while maintaining the performance of the previous '54' design series.
- Dimensions and mounting dimensions are interchangeable with the current '54' design series.

E  
15-1

Directional Control Valves

## Model Code

**DG4V-3-2A(L)-U-H-100(-S1)**

1	2	3	4	5	6	7	8	9
---	---	---	---	---	---	---	---	---

1 Solenoid operated directional control valve (gasket mounting)

Wet armature type

2 Mounting dimensions

3: ISO 4401-03

3 Spool type

See "Spool Types"

4 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)

N: No spring detented type (2 position, double solenoid)

5 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)

6 Electrical wiring system

U: DIN43650 connectors

7 Solenoid voltage

H: DC24V

8 Design no.

9 Special feature

S1: Neutral condition low leak type (for 2C only)

## 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	Single Solenoids	Double Solenoids
DG4V-3	35	100	16	300	1.6	2.0

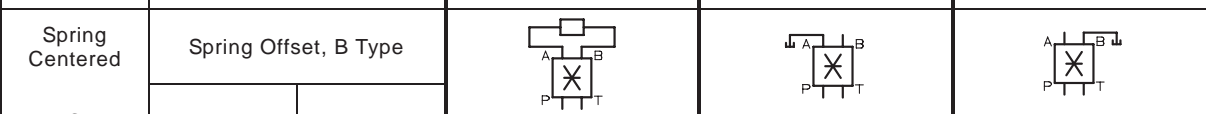
## Solenoid Specifications

Power Supply	Voltage Code	Voltage V	Frequency Hz	Initial Current A	Holding Current A	Power Consumption W	Allowable Voltage Fluctuation %	Insulation Class (Allowable Temperature)
DC	H	24	-	-	1.16	28	±10	H (180°C)

Note: • Current values and power consumption varies with temperature conditions. Values shown in table are based on 30°C.  
• Consult Tokyo Keiki for details on solenoids for the supply voltages which are not listed above.

# Spool Types and Pressure-Flow Characteristics

## DC 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→B→A→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	DG4V-3-0C	DG4V-3-0B	DG4V-3-0BL	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80
2	DG4V-3-2C	DG4V-3-2B	DG4V-3-2BL	100	100	100	100	100	80	45	30	23	19	80	45	30	23	19
3	DG4V-3-3C	DG4V-3-3B	DG4V-3-3BL	80	80	65	35	30	80	30	23	18	14	80	65	35	28	24
6	DG4V-3-6C	DG4V-3-6B	DG4V-3-6BL	80	80	80	52	42	80	60	38	27	23	80	60	38	27	23
7	DG4V-3-7C	DG4V-3-7B	DG4V-3-7BL	100	100	100	100	100	70	21	14	12	10	70	21	14	12	10
8	DG4V-3-8C	DG4V-3-8B	DG4V-3-8BL	45	45	45	30	25	45 (45)	45 (45)	45 (38)	30 (33)	25 (30)	45 (45)	45 (45)	45 (38)	30 (33)	25 (30)
31	DG4V-3-31C	DG4V-3-31B	DG4V-3-31BL	80	80	65	35	30	80	65	35	28	24	80	30	23	18	14
33	DG4V-3-33C	DG4V-3-33B	DG4V-3-33BL	80	80	80	80	80	80	45	30	23	19	80	45	30	23	19

E  
15-2

Directional Control Valves

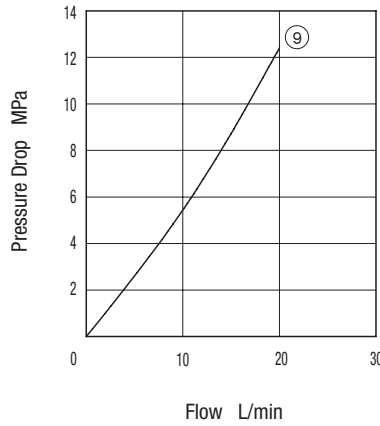
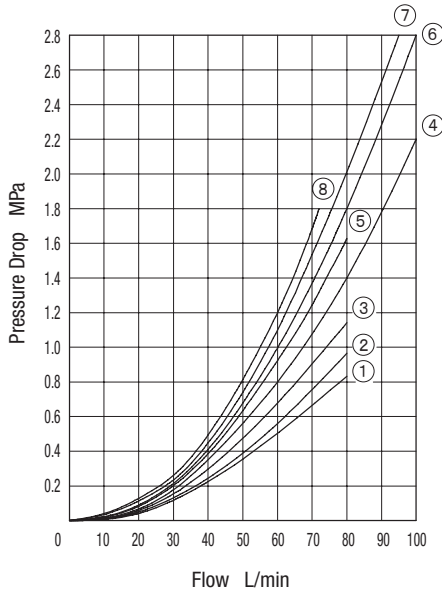
## DC Solenoid (applied voltage 90% of rated)

Spool Transient Condition	Model Code, Functional Symbol			Max. Flow L/min														
	No Spring Detented	2 Position		N, A, AL					N, A		AL		N, A		AL			
		Spring Offset, A Type	- N -	- A -	- AL -	P→A→B→T P→B→A→T					P→A (B port block)		P→B (A port block)		P→B (A port block)		P→A (B port block)	
						7MPa	14MPa	21MPa	28MPa	35MPa	7MPa	14MPa	21MPa	28MPa	35MPa	7MPa	14MPa	21MPa
0	DG4V-3-0A	DG4V-3-0AL	80	80	80	80	80	60	60	60	60	60	80	80	80	80	80	
2	DG4V-3-2A	DG4V-3-2AL	80	80	80	63	60	50	15	10	10	10	80	40	26	22	20	
	DG4V-3-23A	DG4V-3-23AL	80	80	80	80	80	40	20	15	10	10	-	-	-	-	-	
	DG4V-3-2N		70	70	70	70	70	60	60	60	50	30	60	60	60	50	30	

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.

# Characteristics Curve (viscosity 20 mm<sup>2</sup>/s, specific gravity 0.87) (typical examples)

## Pressure Drop Characteristics



- For pressure drops ( $\Delta P_1$ ) of viscosities other than 20 mm<sup>2</sup>/s, calculate using multiplier coefficients shown in below table.
- The formula to calculate pressure drops ( $\Delta P_1$ ) for specific gravities other than 0.87 is as follows.  
 $\Delta P_1 = \Delta P \times G_1 / G$   
 $\Delta P$ .....Values according to characteristics curve  
 $G$ .....0.87  
 $G_1$ .....Desired specific gravity value

Viscosity mm <sup>2</sup> /s	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150
Coefficient	0.85	1.00	1.09	1.17	1.24	1.29	1.34	1.38	1.42	1.46	1.49	1.52	1.56	1.59	1.62

## Pressure Drop Curve Number

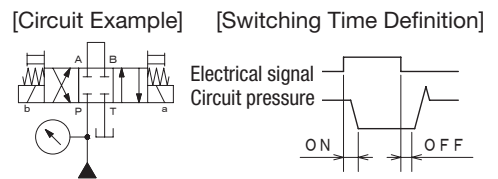
C, B, BL										A, AL				N					
Spool Type	Switched Condition				Neutral Condition					Spool Type	Switched Condition				Spool Type	Switched Condition			
	P ↓ A	B ↓ T	P ↓ B	A ↓ T	P ↓ T	A ↓ T	B ↓ T	P ↓ A	P ↓ B		P ↓ A	B ↓ T	P ↓ B	A ↓ T		P ↓ A	B ↓ T	P ↓ B	A ↓ T
0	④	③	④	③	④	①	①	④	④	0	⑤	④	⑤	④	2	⑦	④	⑦	④
2	⑥	④	⑥	④	—	—	—	—	—	2	⑦	⑥	⑦	⑧					
3	⑥	④	⑧	②	—	④	—	—	—	23	⑦	⑤	—	⑦					
6	⑧	②	⑧	②	—	④	④	—	—										
7	④	⑥	④	⑥	—	—	—	⑦	⑦										
8	⑦	⑤	⑦	⑤	⑧	—	—	—	—										
31	⑧	②	⑥	④	—	—	④	—	—										
33	⑥	④	⑥	④	—	⑨	⑨	—	—										

## Switching Times

Power Supply	Operation	Deenergize Time	Unit: ms		
			Spring Offset Spring Centered C, B, BL	Spring Offset A, AL	No Spring Detented N
DC	Energize		30	30	30
	Spring Return	Fast	15		-
		Slow	90		-

- Note:
- Values shown may vary according to spool type and circuit conditions.
  - De-energize time depends on a surge suppressor used.  
 Deenergize time "Fast": no surge suppressor, or surge suppressor using varistor  
 Deenergize time "Slow": surge suppressor using diode

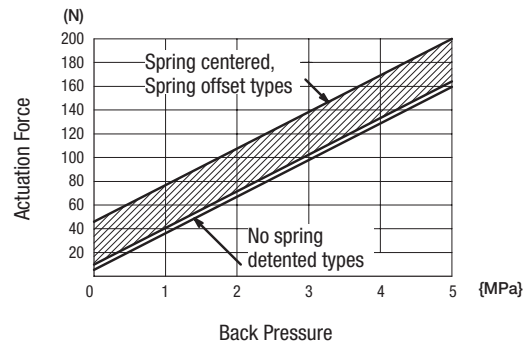
- Conditions: No. 2 spool, open loop circuit, flow 40 L/min., supply pressure 17.5 MPa, fluid viscosity 20 mm<sup>2</sup>/s



## Notes on Operation

- **Mounting orientation**  
To ensure sure switching of no spring detented type valves, mount valves so spool axis is horizontal. There are no mounting attitude restrictions for other spool/spring arrangements.
- **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. For no spring detented type valves, spool will be maintained in switched position by the detent but to ensure sure circuit switching, solenoid should be energized for more than 0.1 second.
- **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. No spring detented type valves are susceptible to such malfunctions during deenergization.
- **Manual operation**  
For manual switching, push the manual override pin. Be aware that actuation force increases with higher back pressure. (See graph)

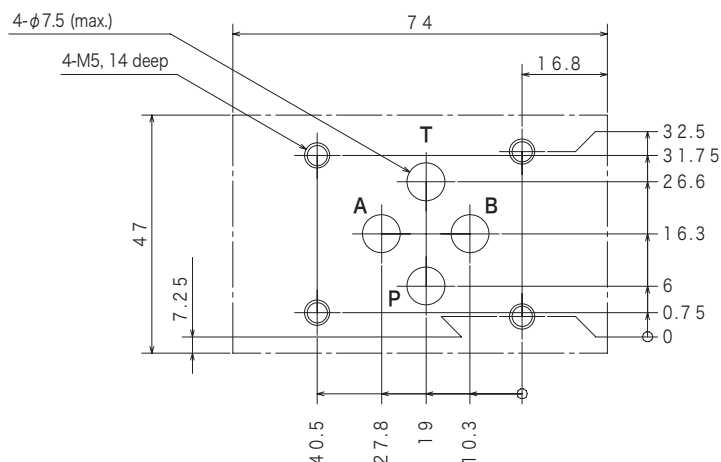


**Back pressure and pin actuation force for manual operation**

## Mounting Bolts (JIS B 1176, Strength Class 12.9)

Hex Socket Bolts	Qty
M5 × 50	4

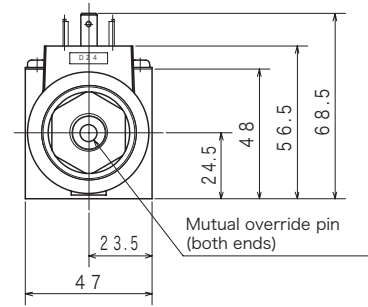
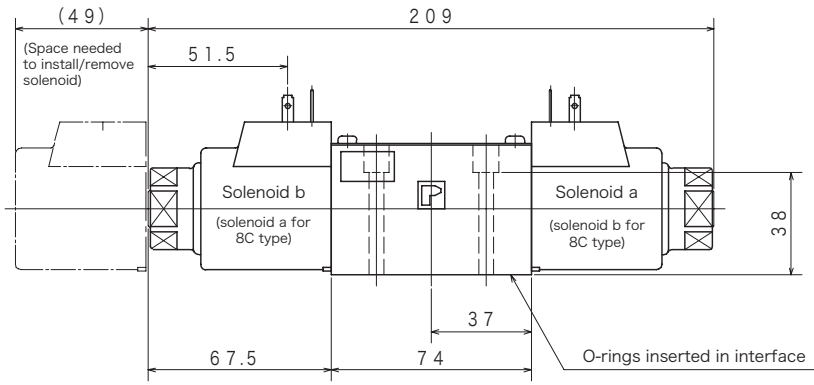
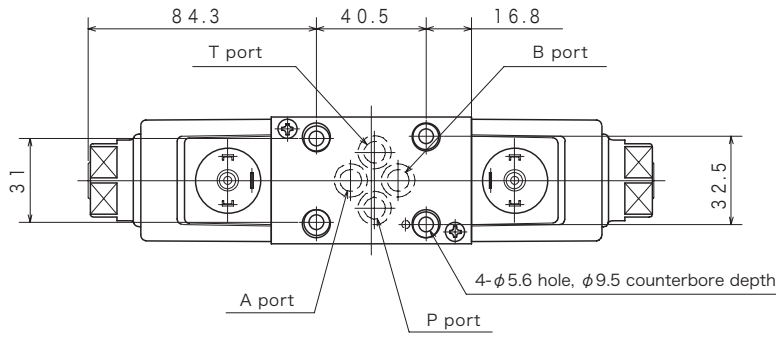
- Mounting bolts must be ordered separately.
- Tightening torque of mounting bolts: 7 to 8 N•m
- Mounting dimensions



- **Mounting surface machining accuracy**

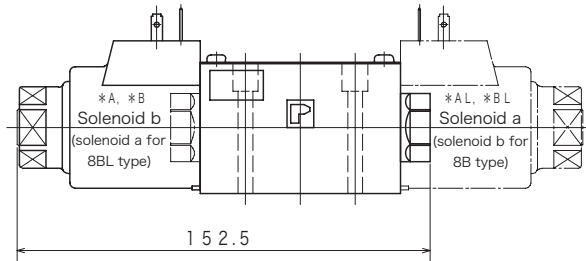
Surface Roughness	1.6 μm Ra
Flatness	Less than 0.01 (□ per 100 mm)
Permissible Tolerance	Mounting bolt hole: ±0.1 Ports: ±0.2

# Dimensions



## Double Solenoid

( DG4V-3-\*C )  
( DG4V-3-\*N )



## Single Solenoid

( DG4V-3-\*A )  
( DG4V-3-\*AL )  
( DG4V-3-\*B )  
( DG4V-3-\*BL )