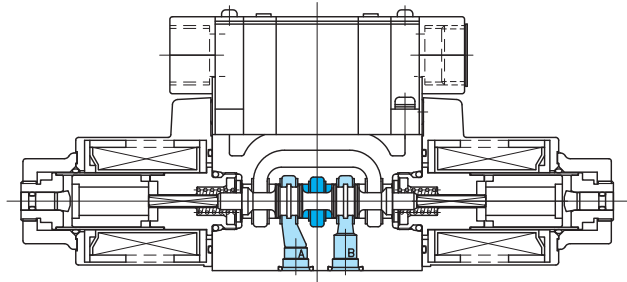
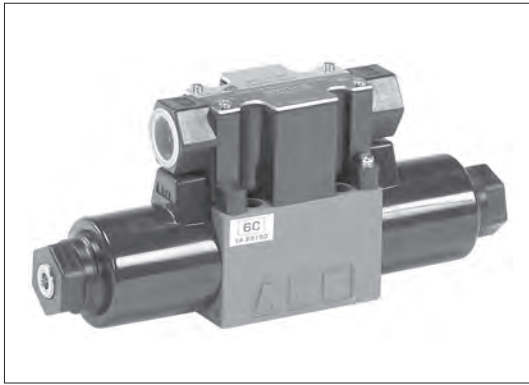


Low-holding current solenoid operated directional control valves DG4VL-3



- Energy-saving solenoid valve features reduced power consumption after switching (energized condition).
- Integrated solid state relay. Valve can be directly driven by connecting signal terminal to PLC, etc.

Model Code

(F3)-DG4VL-3-2A(L)-M-PK2-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 Low-holding current solenoid operated directional control valve (gasket mounting)
Wet armature type
 - 3 Mounting dimensions
3: ISO 4401-03
 - 4 Spool type
See page E8-2 and E8-3
 - 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)
N: No spring detented type (2 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
 - 8 Contact point input type
K2: Sink connection
E2: Source connection
 - 9 Solenoid voltage
H: DC24 V
 - 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	
					Single Solenoids	Double Solenoids
DG4VL-3	35	See "Pressure-Flow Characteristics"	20.6	* 300	1.6	2.0

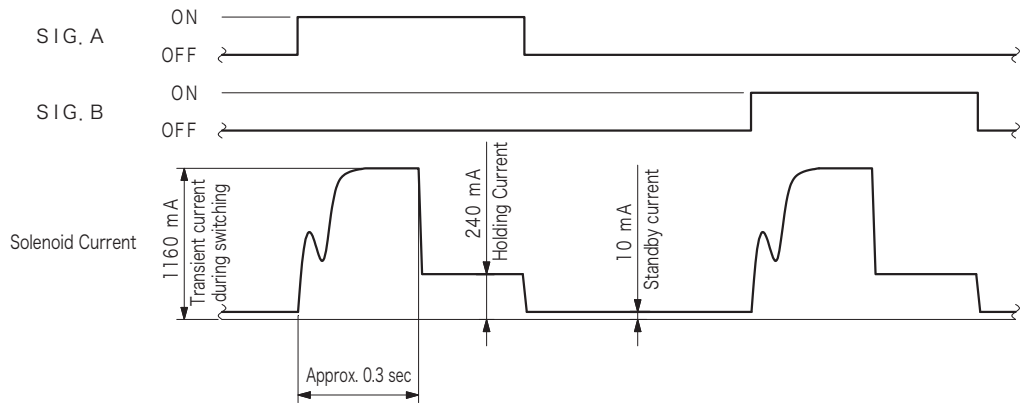
Note: * Switching frequency of less than 200 (cycles/min) needed for low power benefits.

Electrical Specifications

Electrical Wiring System	Voltage Code	Supply Voltage	Supply Current at Switching (0.3 sec. from ON)	Supply Current During Holding	Power Consumption During Holding	Solenoid		Allowable Contact Voltage		Contact Current	
						Insulation Class	Allowable Temperature	Solenoid OFF	Solenoid ON	Solenoid OFF	Solenoid ON
PK2	H	DC24V ± 10%	1.16A	0.24A	6W	H	180 °C	DC24V or open	0V ± 0.1V	Less than 100µA	4mA
PE2								0V ± 0.1V or open	DC24V ± 10%		

Note: Current values and power consumption varies with temperature conditions. Values shown in table are based on 30°C.

Switching Current



Spool Types and Pressure-Flow Characteristics

DC Solenoids (applied voltage 90% of rated)

Spool Center Position	Model Code, Functional Symbol			Max. Flow L/min																
	3 Position	2 Position		P → A (B port block)					P → B (A port block)											
	Spring Centered - C -	Spring Offset, B Type		P → A (B port block)					P → B (A port block)											
		- B -	- BL -	PT TT					PT TT					PT TT						
				7MPa	14MPa	21MPa	28MPa	35MPa	7MPa	14MPa	21MPa	28MPa	35MPa	7MPa	14MPa	21MPa	28MPa	35MPa		
0	DG4VL-3-0C	DG4VL-3-0B	DG4VL-3-0BL	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	
1	DG4VL-3-1C	DG4VL-3-1B	DG4VL-3-1BL	45	45	45	30	25	55 (40)	25 (20)	20 (14)	20 (11)	18 (10)	45	45	45	45	45	45	
2	DG4VL-3-2C	DG4VL-3-2B	DG4VL-3-2BL	80	80	80	80	80	80	45	30	23	19	80	45	30	23	19	19	
3	DG4VL-3-3C	DG4VL-3-3B	DG4VL-3-3BL	80	80	65	35	30	80	30	23	18	14	80	65	35	28	24	24	24
6	DG4VL-3-6C	DG4VL-3-6B	DG4VL-3-6BL	80	80	80	52	42	80	60	38	27	23	80	60	38	27	23	23	23
7	DG4VL-3-7C	DG4VL-3-7B	DG4VL-3-7BL	80	80	80	80	80	70	21	14	12	10	70	21	14	12	10	10	10
8	DG4VL-3-8C	DG4VL-3-8B	DG4VL-3-8BL	45	45	45	30	25	45 (45)	45 (35)	45 (30)	30 (26)	25 (24)	45	45	45	30	25	25	25
22	DG4VL-3-22C	DG4VL-3-22B	DG4VL-3-22BL	—	—	—	—	—	80	34	15	12	12	80	34	15	12	12	12	12
31	DG4VL-3-31C	DG4VL-3-31B	DG4VL-3-31BL	80	80	65	35	30	80	65	35	28	24	80	30	23	18	14	14	14
33	DG4VL-3-33C	DG4VL-3-33B	DG4VL-3-33BL	80	80	80	80	80	80	45	20	15	12	80	45	20	15	12	12	12
34	DG4VL-3-34C	DG4VL-3-34B	DG4VL-3-34BL	80	80	80	80	80	80	45	20	15	12	80	45	20	15	12	12	12

Note: Values in () for spool types 1 and 8 are max. flows with A, B ports blocked.

Spool Types and Pressure-Flow Characteristics

DC Solenoids (applied voltage 90% of rated)

Spool Transient Condition	Model Code, Functional Symbol			Max. Flow L/min															
	2 Position			N, A, AL					N, A			AL			N, A			AL	
	No Spring Detented	Spring Offset, A Type																	
		- N -	- A -	- AL -															
			7MPa	14MPa	21MPa	28MPa	35MPa	7MPa	14MPa	21MPa	28MPa	35MPa	7MPa	14MPa	21MPa	28MPa	35MPa		
0		DG4VL-3-0A 	DG4VL-3-0AL 	80	80	80	80	80	60	60	60	60	60	80	80	80	80	80	
		DG4VL-3-0N 		70	70	70	70	70	60	60	60	60	60	60	60	60	60	60	
2		DG4VL-3-2A 	DG4VL-3-2AL 	80	80	80	63	60	35	15	10	10	10	80	40	26	22	20	
		DG4VL-3-22A 	DG4VL-3-22AL 	—	—	—	—	—	20	15	11	10	10	80	45	28	22	18	
		DG4VL-3-23A 	DG4VL-3-23AL 	70	70	70	70	70	25	15	12	10	10	—	—	—	—	—	
		DG4VL-3-2N 		70	70	70	70	70	60	60	60	50	30	60	60	60	50	30	
6		DG4VL-3-6A 	DG4VL-3-6AL 	80	80	80	80	80	25	15	13	10	10	80	40	35	30	30	
		DG4VL-3-6N 		80	80	80	80	80	50	50	50	50	50	50	50	50	50	50	
7		DG4VL-3-7A 	DG4VL-3-7AL 	50	50	50	50	50	45	20	15	10	10	80	27	17	12	10	
24		DG4VL-3-24A 	DG4VL-3-24AL 	60	60	60	60	60	36	20	13	10	10	—	—	—	—	—	

Characteristics Curve

Pressure Drop Characteristics

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

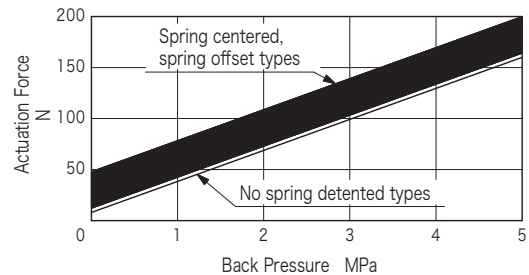
Switching Times

Switching times are the same as DG4V-3 (see page E2-8). (DC power supply)

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**
 - Low power efficiencies are not attained with energization times less than 0.3 seconds.
 - 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 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)



- **Solenoid indicator lamp**
Lamps will light when current flows to the solenoid.
- **Conduit box wiring**
See page E8-5.

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	

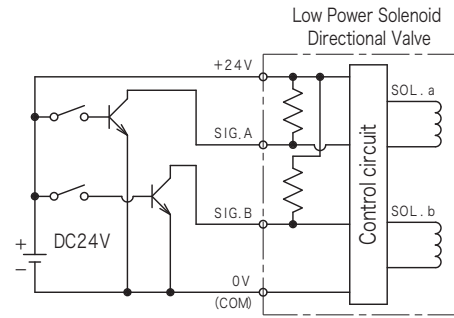
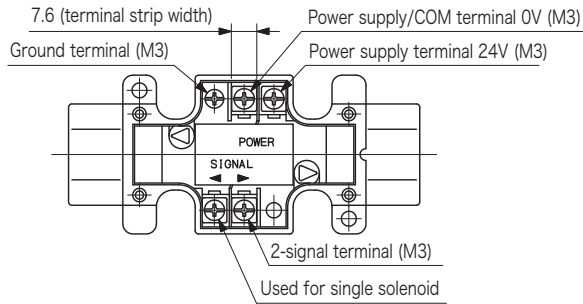
- Subplate and bolts must be ordered separately.
- See page R6-6 for dimensions.
- See page R6-6 for plural mount subplates.
- Max. working pressure is 21 MPa. For higher pressures, valve should be mounted on manifold block.

Dimensions

Dimensions and mounting are same as DG4V-3. See page E2-9 (Mounting) and E2-11 (Dimensions).

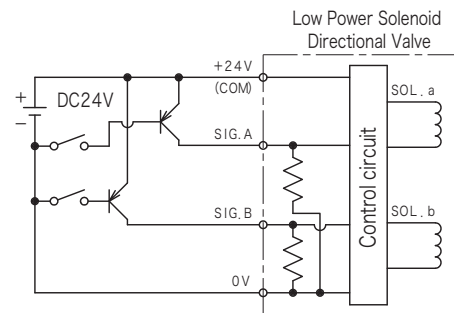
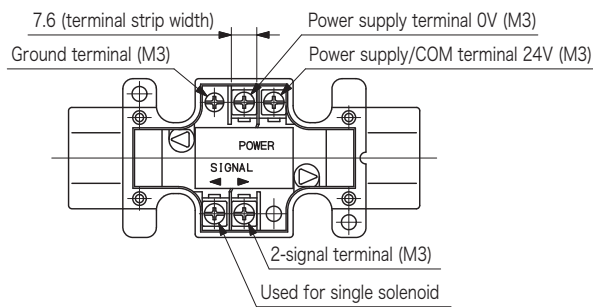
Conduit Box Wiring

- K2: Sink Connection DG4VL-3-*C/N-PK2 (double solenoid)
DG4VL-3-*A/B (L) -PK2 (single solenoid)



- Note:
- Power supply terminal should be wired to smoothed power supply and be always kept energized.
 - Signal terminals should be wired to relays or open collector (NPN) transistors.
 - Programmable controllers, etc., used should have leakage current of less than 200 μ A.

- E2: Source Connection DG4VL-3-*C/N-PE2 (double solenoid)
DG4VL-3-*A/B (L) -PE2 (single solenoid)



- Note:
- Power supply terminal should be wired to smoothed power supply and be always kept energized.
 - Signal terminals should be wired to relays or open collector (PNP) transistors.
 - Programmable controllers, etc., used should have leakage current of less than 200 μ A.

O-ring

No.	Part No.	Standard	Qty	
			A/B	C/N
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
18	007911419	AS568-114 (NBR, Hs90)	1	—
27	007900817	AS568-008 (NBR, Hs70)	1	1

Solenoid coil

No.	Voltage Code	Part No.
3	H	40078305

