

DG4V-3/5

NEW

100DESIGN Series

TOKYO KEIKI

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Solenoid Operated Directional Control Valve

Your Best Solution for a Cost Effective Valve Installation



Cost Efficient

- The new DG4V-3/5 "100-design" directional control valves inherit the quality and features as the current design series at a more competitive price. The new 100-design series will contribute to a more cost competitive hydraulic system without risking your product quality.

Quiet & Low Leak

- The DG4V-3/5 series is a Wet-Type solenoid valve featuring superior durability and low switching sound. The seal-less structure on the sliding surface highly contributes to a lower leakage risk compared to Dry-Type valves.

MODEL CODE

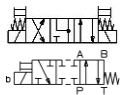
DG4V - * - * * (L) - U - H - 100
 1 2 3 4 5 6 7 8

- 1 Solenoid operated directional control valve
Wet armature type
- 2 Mounting
3: ISO-4401-03
5: ISO-4401-05
- 3 Spool type
3: 0, 2, 3, 6, 7, 8, 23, 31, 33
5: 0, 2, 3, 6, 8, 31
- 4 Spring Set
A: Spring offset (2 position, single solenoid)
B: Spring offset (2 position, single solenoid)
C: Spring center (3 position, double solenoids)
N: No-Spring detent (2 position, double solenoids)
*N type for DG4V-3 series only

- 5 Solenoid Assembly Direction (Apply to Spring Set A&B)
Omit: Standard (energized, P to B, A to T)
L: Left hand built (energized, P to A, B to T)
- 6 Coil Connection
U: DIN43650 connector
- 7 Solenoid coil voltage
H: DC24V
- 8 Design Number

Spool & Solenoid Configuration (as of May.2017, other spool types available upon customer request)

Spool Code	0	2	3	6	7	8	23	31	33
Spool Type	 Open Center	 All-Port Block	 A-T Connect	 A-B-T Connect	 P-A-B Connect	 Tandem	 P-A/B-T&A-T Connect (Single Sol.)	 B-T Connect	 A-B-T Connect (w/restriction)
Mount Size	3 5	3 5	3 5	3 5	3 5	3 5	3	3 5	3 5
Spring Set	A	○	○	○	○	○	○	○	○
	AL	○	○	○	○	○	○	○	○
	B	○	○	○	○	○	○	○	○
	BL	○	○	○	○	○	○	○	○
Spring Set	C	○	○	○	○	○	○	○	○
	N	○	○	○	○	○	○	○	○



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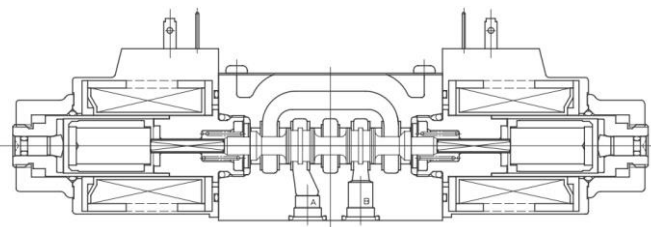
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DG4V-3-100 Design Series / General Specifications

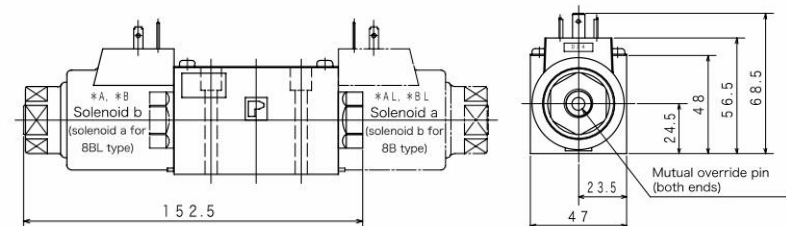
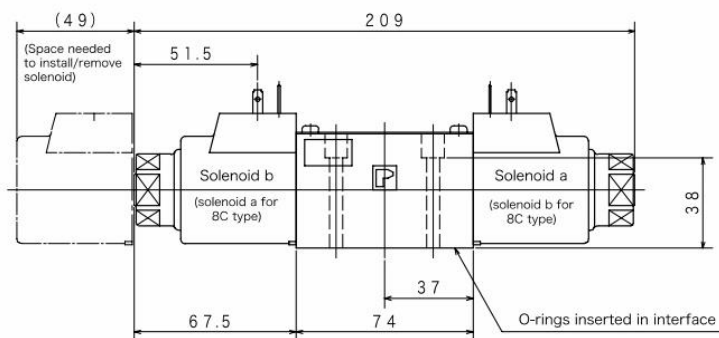
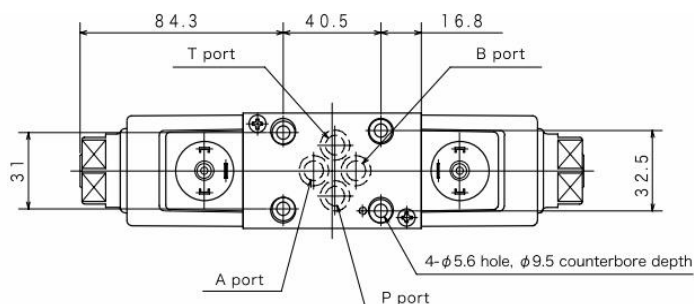


Interface	ISO-4401-03
Max. Operating Pressure	35MPa (5076Psi)
Max. Flow	100ℓ/min (26.4gpm)
Max. Tank Line Pressure	16MPa (2320Psi)
Max. Response Frequency	300/min.

Mass	
Single Solenoid:	≒ 1.6kg (3.5lbs)
Double Solenoid	≒ 2.0kg (4.4lbs)
Power Rating	DC 24V
Holding Amps*	1.16 A
Holding Watts*	28W
Allowable Voltage Tolerance	± 10%

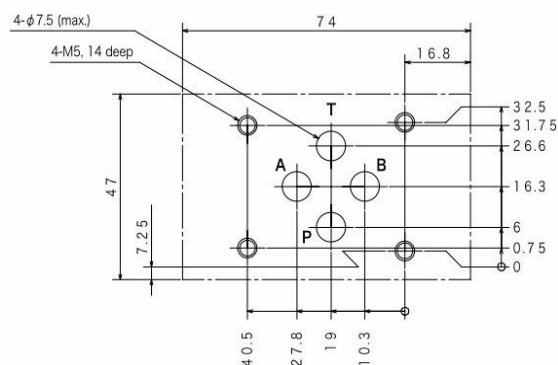
* Values based on 30°C condition. Values may vary depending on actual temperature.

Dimension



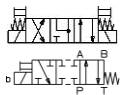
● Mounting surface machining accuracy

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



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



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Spool Types & Pressure/Flow Characteristics

DC Solenoid (applied voltage 90% of rated)

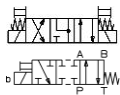
Spool Center Position	Model Code, Functional Symbol			Max. Flow L/min														
	3 Position	2 Position		P→A→B→T P→B→A→T					P→A (B port block)					P→B (A port block)				
	Spring Centered	Spring Offset, B Type																
	- C -	- B -	- BL -	7MPa	14MPa	21MPa	28MPa	35MPa	7MPa	14MPa	21MPa	28MPa	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

DC Solenoid (applied voltage 90% of rated)

Spool Center Position	Model Code, Functional Symbol			Max. Flow L/min														
	2 Position			N, A, AL					N, A					AL				
	No Spring Detented	Spring Offset, A Type		P→A→B→T P→B→A→T					P→A (B port block)					P→B (A port block)				
	- N -	- A -	- AL -	7MPa	14MPa	21MPa	28MPa	35MPa	7MPa	14MPa	21MPa	28MPa	35MPa	7MPa	14MPa	21MPa	28MPa	35MPa
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.



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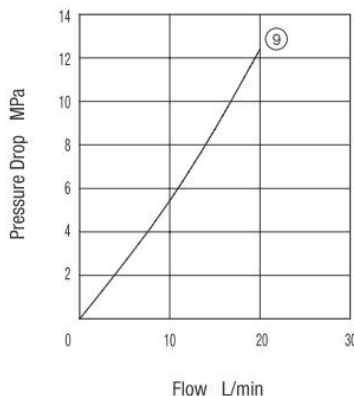
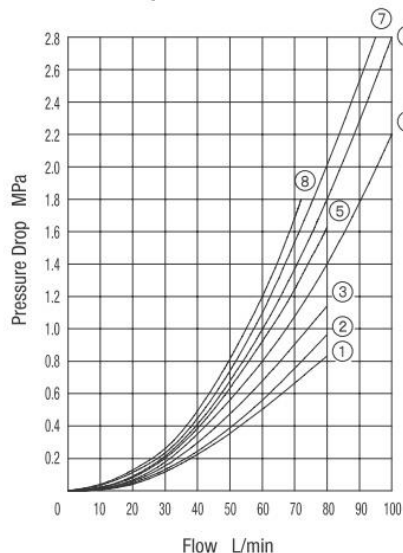
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Solenoid Operated Directional Control Valve

Other Features

Characteristics Curve (viscosity 20 mm²/s, specific gravity 0.87) (typical examples)

Pressure Drop Characteristics



- For pressure drops (ΔP_1) of viscosities other than 20 mm²/s, calculate using multiplier coefficients shown in below table.
- The formula to calculate pressure drops (ΔP_1) for specific gravities other than 0.87 is as follows.

$$\Delta P_1 = \Delta P \times G_1 / G$$

$$\Delta P \dots \dots \dots \text{Values according to characteristics curve}$$

$$G \dots \dots \dots 0.87$$

$$G_1 \dots \dots \dots \text{Desired specific gravity value}$$

Viscosity mm ² /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

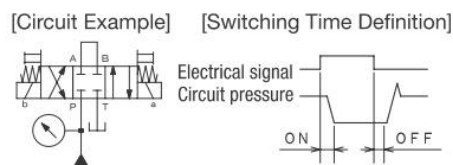
C, B, BL										A, AL					N				
Spool Type	Switched Condition				Neutral Condition					Spool Type	Switched Condition				Spool Type	Switched Condition			
	P ↓ A	B ↓ T	P ↓ B	A ↓ T	P ↓ T	A ↓ T	B ↓ T	P ↓ A	P ↓ B		P ↓ A	B ↓ T	P ↓ B	A ↓ T		P ↓ A	B ↓ T	P ↓ B	A ↓ T
0	④	③	④	③	④	①	①	④	④	0	⑤	④	⑤	④	2	⑦	④	⑦	④
2	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	—	—										

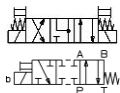
Switching Times

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
	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 mm²/s





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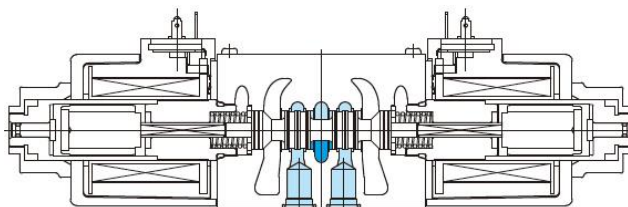
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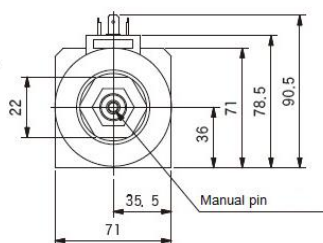
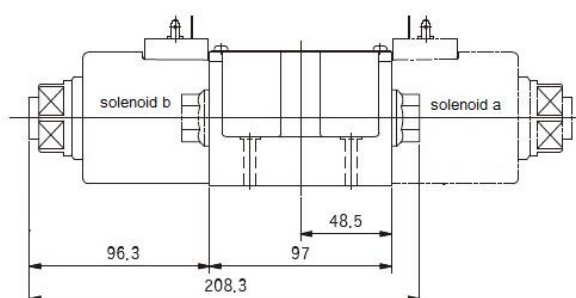
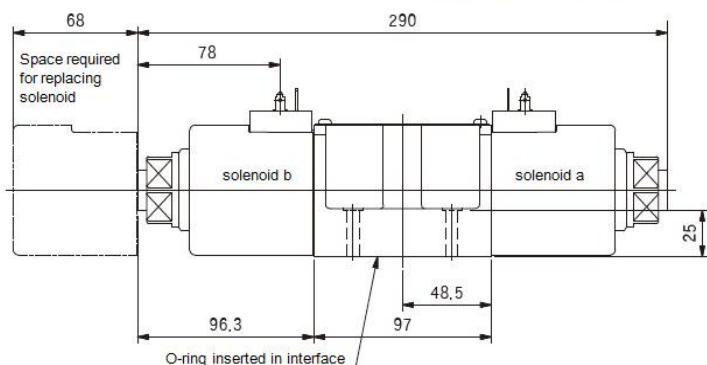
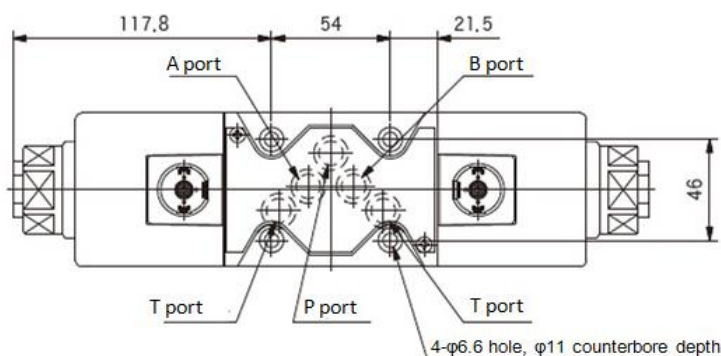


Interface	ISO-4401-05
Max. Operating Pressure	35MPa (5076Psi)
Max. Flow	160ℓ/min (42.2gpm)
Max. Tank Line Pressure	21MPa (3045Psi)
Max. Response Frequency	180/min.

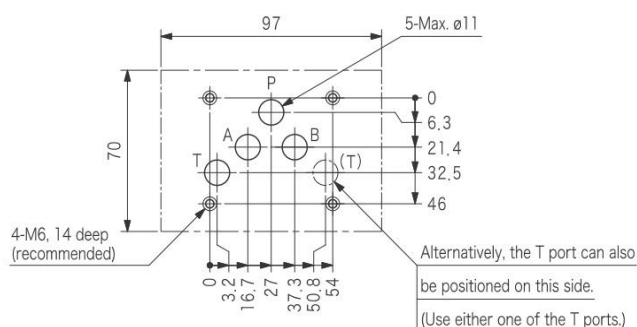
Mass	
Single Solenoid:	≒ 4.0kg (8.8lbs)
Double Solenoid	≒ 5.4kg (11.9lbs)
Power Rating	DC 24V
Holding Amps*	1.58 A
Holding Watts*	38W
Allowable Voltage Tolerance	±10%

* Values based on 20°C condition. Values may vary depending on actual temperature.

Dimension



● Mounting dimensions



Hex Socket Bolts	Qty
M6 × 35	4

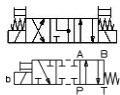
- Mounting bolts must be ordered separately.
- Tightening torque of mounting bolts: 12 to 15 N•m

Subplate	Connection Port Dia. Rc
DGSM-01X-10-JA-M	3/8
DGSM-01Y-10-JA-M	1/2

- Subplate and bolts must be ordered separately.

● 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



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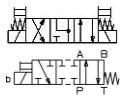
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Spool Types & Pressure/Flow Characteristics

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	Spring Offset, B Type																
	- C -	- B -	- BL -	7 MPa	14 MPa	21 MPa	28 MPa	35 MPa	7 MPa	14 MPa	21 MPa	28 MPa	35 MPa	7 MPa	14 MPa	21 MPa	28 MPa	35 MPa
0	 DG4V-5-0C	 DG4V-5-0B	 DG4V-5-0BL	*	*	*	*	*	160	160	160	160	160	160	160	160	160	160
2	 DG4V-5-2C	 DG4V-5-2B	 DG4V-5-2BL	160	160	160	160	160	160	160	110	100	70	160	160	110	100	70
3	 DG4V-5-3C	 DG4V-5-3B	 DG4V-5-3BL	160	160	160	120	90	160	160	110	100	70	160	160	110	100	70
6	 DG4V-5-6C	 DG4V-5-6B	 DG4V-5-6BL	160	160	160	120	90	160	160	110	100	70	160	160	110	100	70
8	 DG4V-5-8C	 DG4V-5-8B	 DG4V-5-8BL	*	70	55	50	30	160	70	55	50	30	160	70	50	50	30
31	 DG4V-5-31C	 DG4V-5-31B	 DG4V-5-31BL	160	160	160	120	90	160	160	110	100	70	160	160	110	100	70

Spool Transient Condition	Model Code, Functional Symbol		Max. Flow L/min														
	2 Position		N, A, AL			N, A			AL			N, A			AL		
	Spring Offset, A Type																
	- A -	- AL -	7 MPa	14 MPa	21 MPa	28 MPa	31.5 MPa	7 MPa	14 MPa	21 MPa	28 MPa	31.5 MPa	7 MPa	14 MPa	21 MPa	28 MPa	31.5 MPa
0	 DG4V-5-0A	 DG4V-5-0AL	*	*	*	*	*	80	80	80	80	80	160	160	160	150	120
2	 DG4V-5-2A	 DG4V-5-2AL	160	160	90	60	30	120	40	30	30	15	160	140	100	75	50

Note: • Max. flow refers to limit flow without valve malfunction for valve switching.
• Max flow value for * is with A port and B port blocked.



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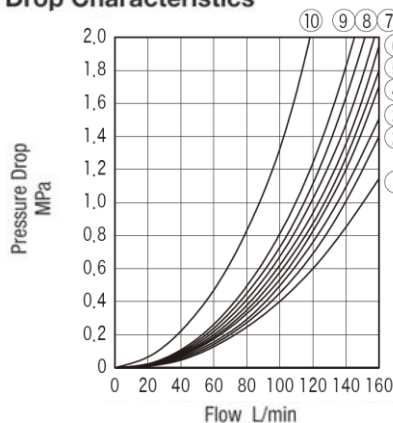
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Other Features

Characteristics Curve (viscosity 36 mm²/s, specific gravity 0.87) (typical examples)

Pressure Drop Characteristics



- For pressure drops (ΔP_1) of viscosities other than 36 mm²/s, calculate using multiplier coefficients shown in below table.
- The formula to calculate pressure drops (ΔP_1) for specific gravities other than 0.87 is as follows.

$$\Delta P_1 = \Delta P \times G_1 / G$$

ΔPValues according to characteristics curve

G0.87

G_1Desired specific gravity value

Viscosity mm ² /s	10	20	30	36	40	50	60	70	80	90	100	110	120	130	140	150
Coefficient	0.73	0.86	0.96	1.00	1.03	1.09	1.14	1.18	1.22	1.26	1.29	1.32	1.35	1.38	1.40	1.43

Pressure Drop Curve Number

C, B, BL										A Note:				
Spool Type	Switched Condition				Neutral Condition					Spool Type	Switched Condition			
	P	B	P	A	P	A	B	P	P		P	B	P	A
	↓	↓	↓	↓	↓	↓	↓	↓	↓		↓	↓	↓	↓
	A	T	B	T	T	T	T	A	B		A	T	B	T
0	⑥	⑨	⑥	⑨	⑦	⑦	⑦	⑤	⑤	0	⑤	⑧	⑤	⑤
2	④	②	④	②	—	—	—	—	—	2	⑤	②	⑤	②
3	④	②	④	⑧	—	③	—	—	—					
6	④	⑧	④	⑧	—	③	③	—	—					
8	①	⑨	①	⑨	⑩	—	—	—	—					
31	④	⑧	④	②	—	—	③	—	—					

Switching Times

Switching Time (ms)	
Energize	Spring Return
60	25

Conditions: No. 2 spool, open loop circuit, flow 80 L/min, supply pressure 17.5 MPa, fluid viscosity 36 mm²/s

[Circuit Example]

[Switching Time Definition]

