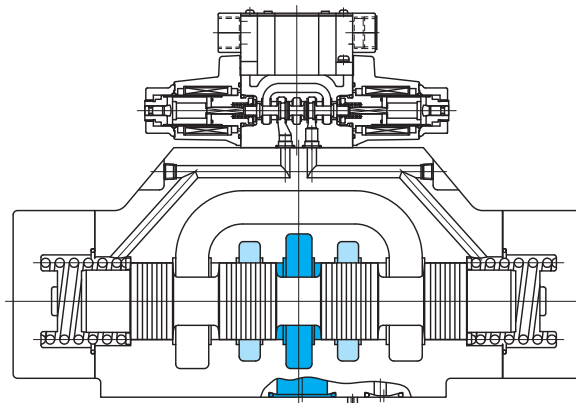
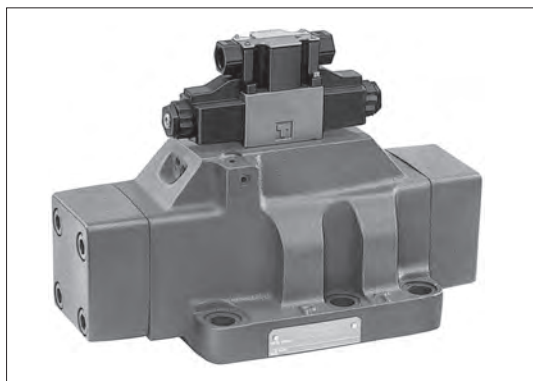


Solenoid controlled pilot operated directional control valves

DG5S-10



Model Code

(F3)-DG5S-10-2A(L)-(2)(E)-(T)-P2-T-84-JA-M

1 2 3 4 5 6 7 8 9 10 11 12 13

- 1 Hydraulic fluid
Omit: mineral oil based fluid, water-glycol based fluid
F3: Phosphate ester
- 2 Solenoid controlled pilot operated directional control valve (gasket mounting)
Wet armature type
- 3 Mounting dimensions
10: ISO 4401-AF-10-4-A
- 4 Spool type
See page E5-2
- 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)
D: Pressure centered type (3 position, double solenoid)
N: No spring detented type (2 position, double solenoid)
- 6 Solenoid assembly configuration (for spring offset, 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 Pilot restrictor (option)
Omit: no pilot restrictor (standard)
2: With pilot restrictor
- 8 Pilot
Omit: internal pilot
E: External pilot
- 9 Drain
Omit: external drain
T: Internal drain
- 10 Electrical wiring (configuration, wiring connection port side)
P: Plug-in solenoids, conduit box, G 1/2
U: DIN43650 connectors, Pg. 11

- 11 Electrical accessories
Omit: no accessories (electrical wiring P) and for no connectors (electrical wiring U)
1: Connectors without accessories (electrical wiring U)
2: With indicator lamp (AC standard)
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	AC	○	×	◎	○	×	×
	DC	○	×	○	◎	×	×
	AC/DC conversion	×	×	×	×	○	○
U	AC	○	○	○	○	×	×
	DC	○	○	×	○	×	×
	AC/DC conversion	×	×	×	×	×	○

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

- 12 Solenoid supply voltage (See page E2-2)
- 13 Design no.

Specifications

Model Code	Size	Max. Working Pressure MPa	Max. Flow L/min	Allowable Tank Port Back Pressure MPa	Max. Pilot Pressure MPa	Min. Pilot Pressure MPa	Weight kg	
							Single Solenoids	Double Solenoids
DG5S-10	10	21	See Pressure-Flow Characteristics	20.6	21	See Min. Pilot Pressure Curves	42	43

Solenoid Controlled Pilot Operated Directional Control Valve

DG4V-3 solenoid valve used as pilot. See page E2-2 for solenoid specifications.
 Following spool/spring arrangement valves are used.

Spring Offset, A Type: DG4V-3-2AL-M-**-7-54

Spring Offset, AL Type: DG4V-3-2A-M-**-7-54

Spring Offset, B Type: DG4V-3-6BL-M-**-7-54

Spring Offset, BL Type: DG4V-3-6B-M-**-7-54

Spring Centered, C Type: DG4V-3-6C-M-**-7-54

No Spring Detented, N Type: DG4V-3-2N-M-**-7-54

Pressure Centered, D Type: DG4V-3-7C-M-**-7-54

The DC4VC-3 (DC 24V) solenoid directional control valve with the built-in drive circuit can also be used as a pilot solenoid switching valve.

For details, consult Tokyo Keiki. (Refer to page E6-1 for details of the DC4VC-3.)

E
5-2

Directional Control Valves

Spool Types and Pressure-Flow Characteristics

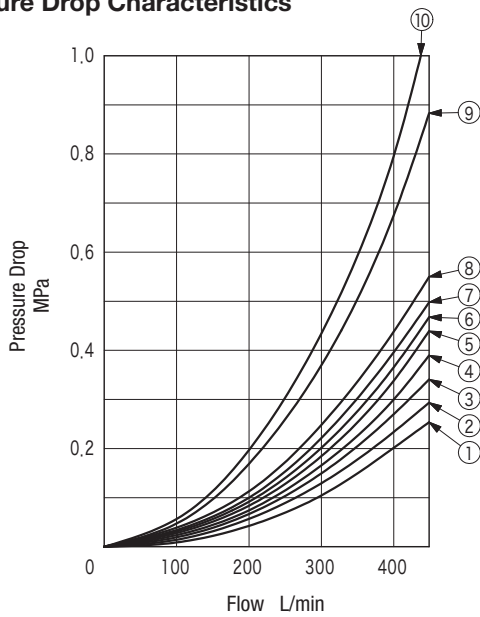
Spool Center Position	Model Code, Functional Symbol		Max. Flow L/min		Pressure Drop Curve No.						
	3 Position		C, B, BL Types	D Type	Switched Condition				Neutral		
	Spring Centered - C -	Pressure Centered Type - D -			P→A	B→T	P→B	A→T		P→T	
0		DG5S-10-0C 	DG5S-10-0D 	600	800	①	⑤	①	③	③	
2		DG5S-10-2C 	DG5S-10-2D 			②	⑥	②	④	—	
3		DG5S-10-3C 	DG5S-10-3D 			②	⑧	②	③	—	
4		DG5S-10-4C 	DG5S-10-4D 			⑥	⑨	⑦	⑩	⑥	
6		DG5S-10-6C 	DG5S-10-6D 			②	④	②	③	—	
8		DG5S-10-8C 	DG5S-10-8D 			④	⑨	⑤	⑩	⑥	
9		DG5S-10-9C 	DG5S-10-9D 			*570	②	④	②	③	—
33		DG5S-10-33C 	DG5S-10-33D 			600	②	⑥	②	⑥	—

Spool Transient Condition	Model Code, Functional Symbol			Max. Flow L/min	Pressure Drop Curve No.			
	2 Position		No Spring Detented - N -		Switched Condition			
	Spring Offset				P→A	B→T	P→B	A→T
0		DG5S-10-0A 	DG5S-10-0AL 	DG5S-10-0N 	①	⑤	①	③
2		DG5S-10-2A 	DG5S-10-2AL 	DG5S-10-2N 	②	⑥	②	④
6		DG5S-10-6A 	DG5S-10-6AL 	DG5S-10-6N 	②	④	②	③
9		DG5S-10-9A 	DG5S-10-9AL 	DG5S-10-9N 	②	④	②	③

Note: • Max. flow refers to limit flow without valve malfunction for valve switching.
 • * mark indicates max. flow at 7 MPa working pressure. At 21 MPa, it is 320 L/min.

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.

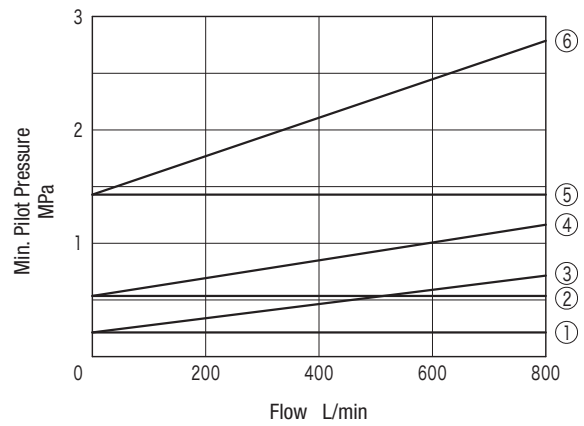
ΔP Values according to characteristics curve

$$\Delta P_1 = \Delta P \times G_1 / G \quad G \dots\dots 0.87$$

G_1 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

Minimum Pilot Pressure



Min. Pilot Pressure Curve No.

Spool/Spring Arrangement	Spool Type	No.
A, AL, N	0, 9	①
	2, 6	③
B, BL, C	0, 4, 8, 9	②
	2, 3, 6, 33	④
D	0, 4, 8, 9	⑤
	2, 3, 6, 33	⑥

Options

Pilot restrictor

A restrictor module valve incorporated with the solenoid pilot operated directional valve enables meter out control of oil from the pilot chamber during shifting of the main valve spool. This reduces transient shock. TGMFN-3-Y-A2W-B2W-50 is used as restrictor module.

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, pressure 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, main spool will be maintained in switched position as long as the pilot pressure is maintained. Also, to ensure sure circuit switching, solenoid should be energized for more than 0.1 second.

● 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.

● Drain and pilot

- For internal drain type valves, pilot pressure (P port pressure of internal pilot valves) must be higher than min. pilot pressure + tank line back pressure. Therefore the pressure difference must be maintained even when surge pressures occur in the tank line.

- External drain type valve is recommended when surge pressures may occur in tank line. Drain line should also be piped directly to tank.

- In case of internal drain valve with spring sets B, C, and D and spool types 0, 4, 8, and 9, internal pilot type valve cannot be used if P to T port pressure drop during solenoid deenergization falls below minimum pilot pressure. Use external pilot type valve in this case.

● Manual operation

For manual switching, push the manual override pin of solenoid pilot operated directional valve while the minimum pilot pressure is maintained. Be aware that, in case of internal drain valve, actuation force increases with higher tank line back pressure. (See page E2-9)

● Solenoid indicator lamp

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

Mounting Bolts (JIS B 1176, Strength Class 12.9)

Hex Socket Bolts	Qty
M20 × 65	6

- Mounting bolts must be ordered separately.
- Tightening torque of mounting bolts: 230 to 290 N•m

Subplate

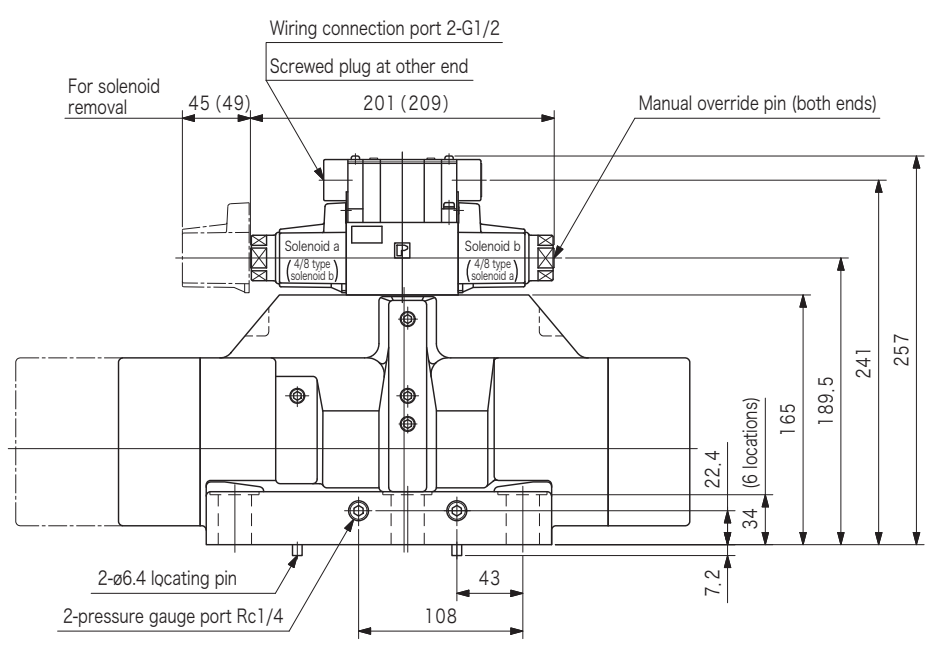
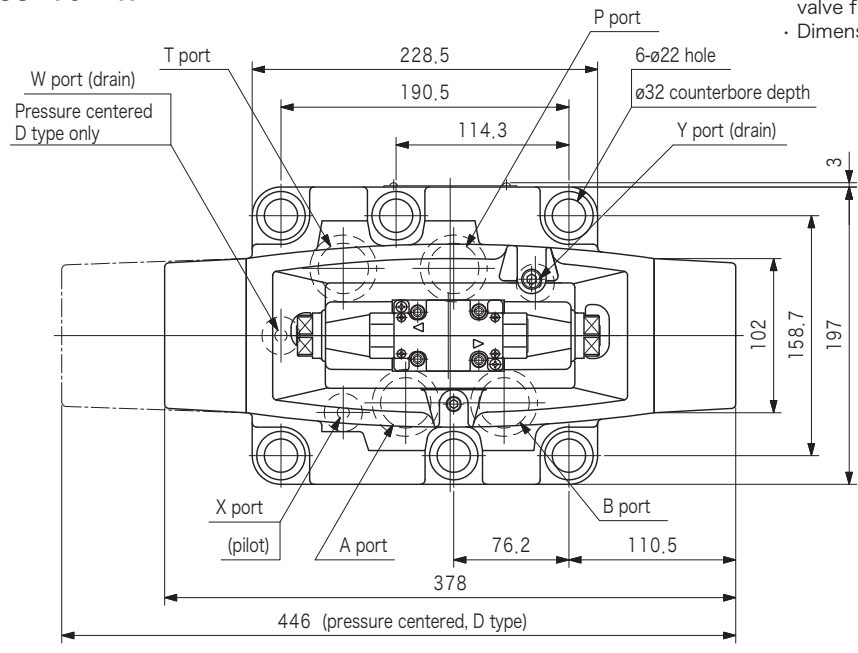
Subplate	Connection Port Dia. Rc	
	P, T, A, B	X, Y, W
DGSM-10-(D)-11-JA-M	1-1/4	3/8
DGSM-10X-(D)-11-JA-M	1-1/2	
DGSM-10Y-(D)-11-JA-M	2	

- Subplate must be ordered separately.
- See page R6-5 for dimensions.
- DGSM-10*-D-11-JA-M used for pressure center type.
- Subplates are supplied with hex socket bolts for mounting valve.

Dimensions

DG5S-10-*C
 DG5S-10-*D
 DG5S-10-*N

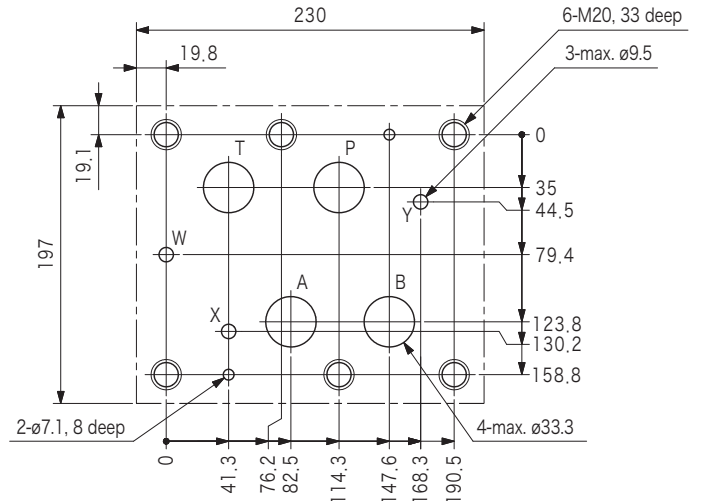
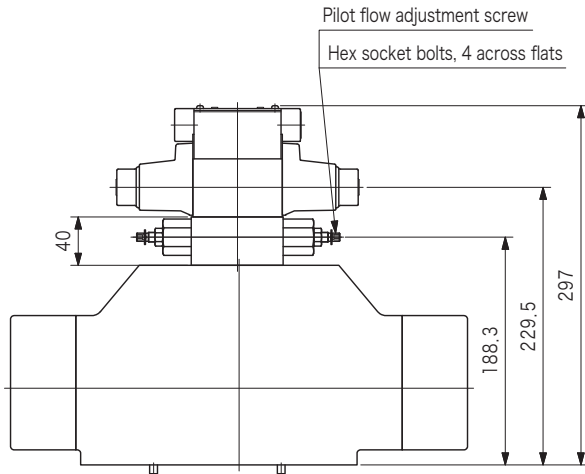
Note: · For DG5S-10-*A, DG5S-10-*B, solenoid valve for pilot will be only for one side (side b).
 · For DG5S-10-*AL, DG5S-10-*BL, solenoid valve for pilot will be only for one side (side a).
 · Dimensions in () indicate DC solenoids.



Dimensions

DG5S-10-**-2

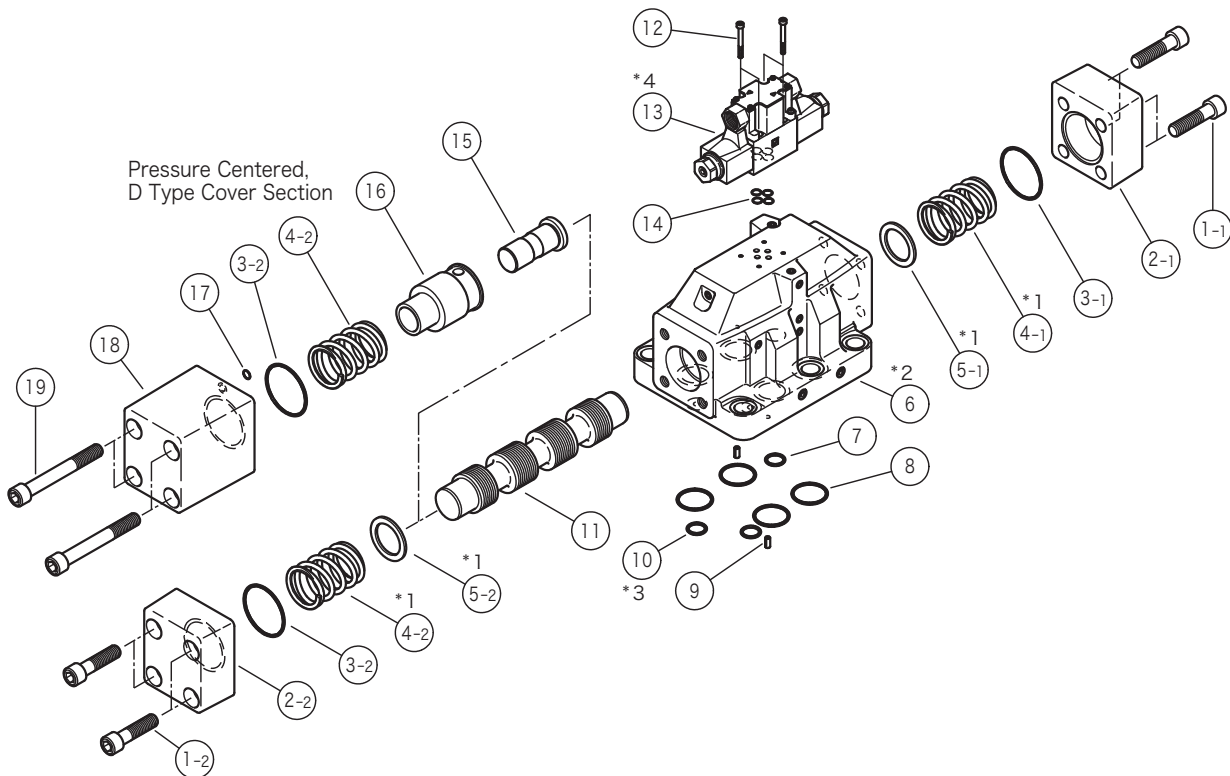
● Mounting dimensions



● 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	

Construction



O-ring

No.	Part No.	Standard	Qty
3	007923019	AS568-230 (NBR, Hs90)	2
7	007921019	AS568-210 (NBR, Hs90)	2
8	007922219	AS568-222 (NBR, Hs90)	4
10	007921019	AS568-210 (NBR, Hs90)	1
14	007901219	AS568-012 (NBR, Hs90)	4
17	007901317	AS568-013 (NBR, Hs70)	1

Note:

- *1 <4> and <5> are not used with spring offset A and no spring detented types.
- *2 <6> body differs according to pilot, internal/external drain combination.
- *3 <10> only used with pressure centered D type.
- *4 <13> solenoid operated directional control valve DG4V-3 model varies according to spool/spring arrangement. See page E5-2.