

High pressure, high flow modular valves TGM-5, 50 series (ISO 4401-05)

Common Specifications

- Max. working pressure: 31.5 MPa
- Max. flow: 120 L/min
- Ambient temperature: -20°C~+80°C
(note: there may be limitations depending on the solenoid valve type)
- Hydraulic fluid
 - Working temperature: -20°C~+80°C (mineral oil)
+10°C~+54°C (water based)
 - Max. recommended temperature:
+65°C (to prevent fluid deterioration)
 - Recommended viscosity: 13~54 mm²/s
At startup (max.): 500 mm²/s
- Seals and fluids
Standard seals are nitrile rubber which are suitable for anti-wear hydraulic fluids, and water-glycol fluids.
- External piping connection port thread
Gauge port (G) of each stack valve and external drain port (Y) are configured for G1/8 O-ring seal. Use couplings with diameter 17 (hex 14) to avoid interference with adjacent plugs. For external drain ports (Y), couplings with up to diameter 22 (hex 19) can be used if 3 mm or more undercut is provided.
Special couplings (G1/8-Rc1/4 change coupling, see Fig. 1) for these ports are available.
Also, when port of adaptor plate (tapping plate) is parallel thread, use bonded seal (seal washer, P/N48781938) for piping. Coupling used should have seating surface dimension greater than 14 (round or hex) and diameter less than max. 22.

- Mounting dimensions (see Fig. 2)
Per ISO 4401-05 and figure, extra "TB" ports are provided. With the switching valves which are normally used, the two tank ports (TA and TB) communicate inside the valves so use of either tank port does not pose any problems for the circuit. However, with a method of operation where these switching valves are not used, bear in mind that some valves are limited to one tank port or the other.
- Mounting bolts
 - Use M6-6g (strength class 12.9) mounting bolts - JIS B 1176 (hex socket bolts).
 - Mounting bolt length should be greater than uppermost valve bolt tightening length + total height of stacked valves +9.
 - Tightening torque: 12~15 N·m
 - Hex socket bolts and stud bolts (see G70 Mounting Bolt Selection Chart) should be ordered separately.
- Valves can be mounted at any attitude.
- Options
 - Adjuster
Hex socket adjustment screw (W) is standard. Handle knob adjuster (H) also available.
- Characteristics curve
Characteristics curve is based on fluid viscosity 20 mm²/s (fluid temperature 50°C), specific gravity 0.87. (see "Notes".)
- Other
 - Width across flats dimensions of parts allow use of metric and inch tools.
 - O-ring groove on mounting surface employ proprietary trapezoidal groove to prevent O ring intrusion by flow forces.

Notes:

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

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

ΔP Values according to characteristics curve
 G 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

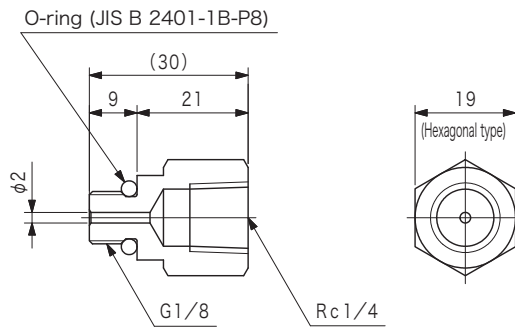
Subplate

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

- Subplate must be ordered separately.
- See page R6-7 for dimensions.
- See page R6-7 for plural mount subplates.
- Max. working pressure is 21 MPa. For higher pressures, install on a manifold block, etc.

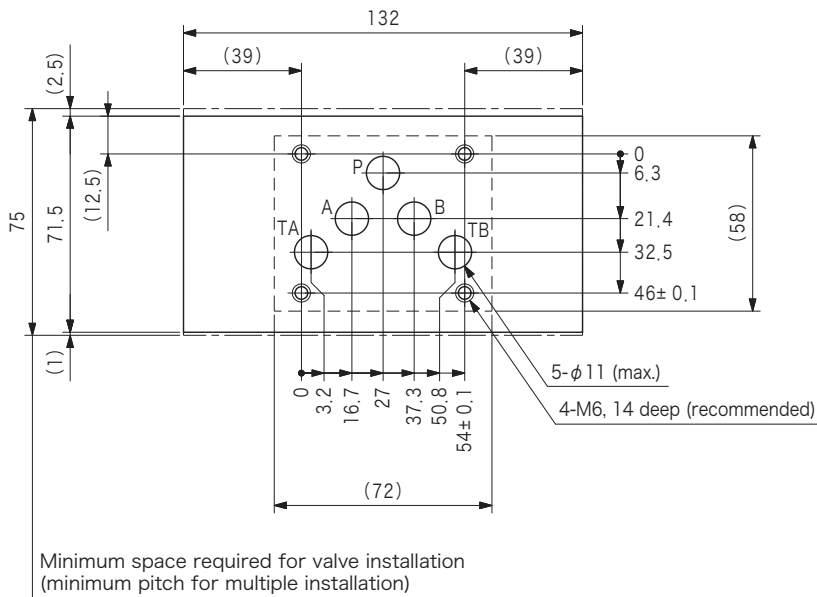
High pressure, high flow modular valves TGM-5,50 series (ISO 4401-05)

Fig. 1: Gauge port (G), external drain port (Y) special coupling
Part No.: 40025980



- Coupling which changes G 1/8 to Rc 1/4.
- Max. Working Pressure.....21 MPa
- O-rings are not included.
(Part No.: 008000619)

Fig. 2: Mounting dimensions

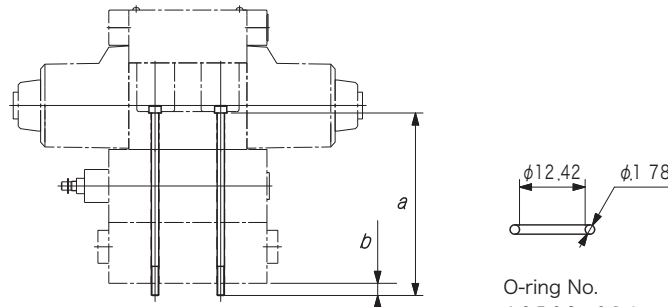


- Normal mounting-related dimensional tolerance ± 0.2 (unless otherwise indicated)
- Mounting surface machining accuracy

Surface Roughness	1.6 μm Ra	$\sqrt{1.6}$
Flatness	Less than 0.01 (□ per 100 mm)	$\square \frac{0.01}{100}$

Note: Solid lines are seating dimensions of stack valve bodies, dotted lines are min. required seating surface dimensions.

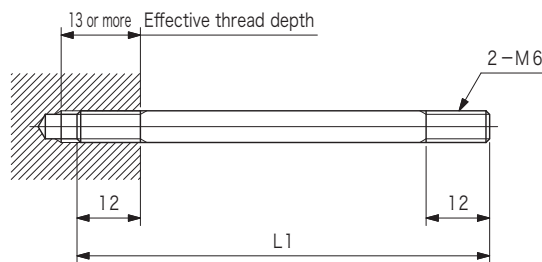
Mounting bolt selection chart (TGM-5, 50 series)



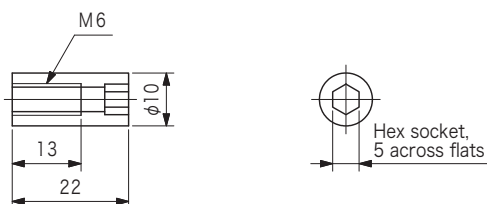
b thread engagement: length should be longer than 9.

Solenoid Valves DG4V-5	Stack Valves Pressure, Flow, Direction	Stack Valves Pressure (except single and double relief valves)	Tapping Plates	Blanking Plates	Crossover Plates	Bolt Length	M6 Mounting Bolts	
						<i>a</i> mm	Bolt Part No.	
Mounted Height mm								
30	50	60	30	30	30			
1						40	001960401	
1	1			1		90	001960901	
1	1	1		1		100	48473755	
1	1		1			120	VA23214	
1		1	1			130	VA23215	
1	2					140	VA23216	
	1	1			1	150	VA22340	
1	1	1				160	40015599	
1		2				170	VA23217	
1	2		1			190	40015599	
1		2	1					
1	3					200	48692898	
1	2	1				210	40015600	
1	1	2				220	40015601	
1	3		1			240	40015602	
1	4					250	40015603	
1	3	1				260	40015604	
1	2	2						

M6 stud bolt



Nut (Part No. 40012606)



M6 Mounting Bolt		M6 Stud Bolt		
Bolt Length mm	Part No.	Total Length L1 mm	Part No.	Bolt Kit Part No.
40	001960401	—	—	—
90	001960901	102	40015606	40039029
100	48473755	112	40015607	40039030
120	VA23214	—	—	—
130	VA23215	—	—	—
140	VA23216	152	40015608	40039031
150	VA22340	162	40015609	40039032
160	40015599	172	40015610	40039033
170	VA23217	—	—	—
190	40015599	202	40015611	40039034
200	48692898	212	40015612	40039035
210	40015600	222	40015613	40039036
220	40015601	232	40015614	40039037
240	40015602	252	40015615	40039038
250	40015603	262	40015616	40039039
260	40015604	272	40015617	40039040

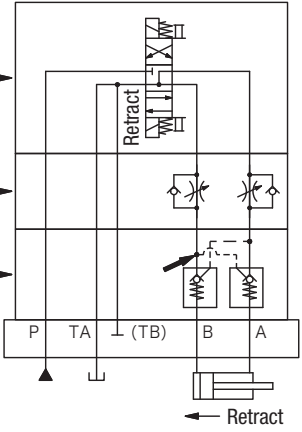
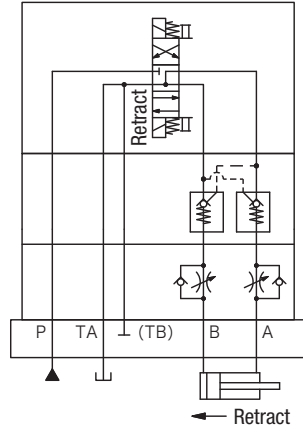
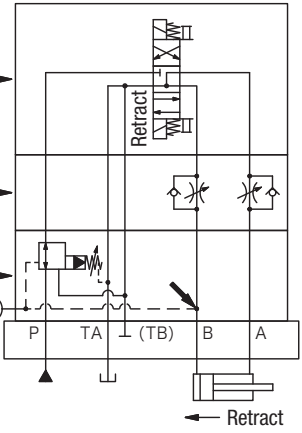
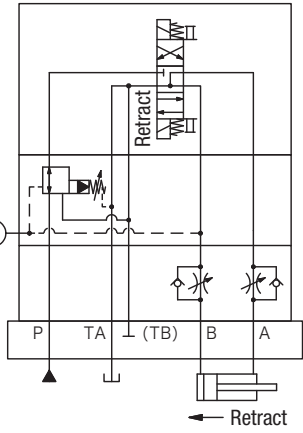
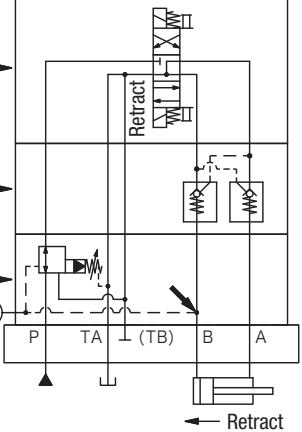
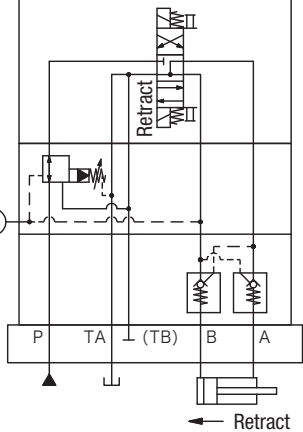
- When using stud bolts, valve working pressure should be less than 21 MPa.
- Bolt kits include stud bolts and nuts (4 each).
Parts should be ordered as bolt kits.

Precautions for configuring systems with stack valves

Modular Circuit Stack Restrictions

Depending on the valve function, there may be restrictions on the stacking order of some of the valves which are similar to restrictions when using valves other than stack valves.

The illustrations below show some recommended for smooth flow control and leakage measures.

Name	Incorrect Stacking Example	Correct Stacking Example	Description
<p>Solenoid Valves</p> <p>One-Way Restrictors (Meter-out)</p> <p>Pilot Operated Check Valves</p>	<p>Figure A₁</p> 	<p>Figure A₂</p> 	<ul style="list-style-type: none"> ● One-way restrictor (meter out) and pilot operated check valve <p>In Fig. A₁, when the cylinder rod is retracted, meter out control by the one-way restrictor in B line causes back pressure in the area indicated by the arrow. Because of this back pressure, although the pilot operated check valve in B line will act to close the valve, when the check valve is closed, back pressure in the area indicated by the arrow will cause the check valve to reopen. This may cause unstable operation and result in “knocking” of the cylinder. Fig. A₂ is example of the recommended configuration which prevents this problem.</p>
<p>Solenoid Valves</p> <p>One-Way Restrictors (Meter-out)</p> <p>Reducing valve (B-line pilot)</p>	<p>Figure B₁</p> 	<p>Figure B₂</p> 	<ul style="list-style-type: none"> ● One-way restrictor (meter out) and reducing valve (A, B line pilot) <p>In Fig. B₁, when the cylinder rod is retracted, meter out control by the one-way restrictor in B line causes back pressure in the area indicated by the arrow. Pilot pressure to the reducing valve taken from B line may cause the spool to close and block flow. Fig. B₂ is example of the recommended configuration which prevents this problem.</p>
<p>Solenoid Valves</p> <p>Pilot Operated Check Valves</p> <p>Reducing valve (B-line pilot)</p>	<p>Figure C₁</p> 	<p>Figure C₂</p> 	<ul style="list-style-type: none"> ● Pilot operated check valve and reducing valve (A, B line pilot) <p>In Fig. C₁, when cylinder is stopped in mid-position, the cylinder may not be able to maintain its position due to internal leakage from the pilot line of the B line reducing valve. Fig. C₂ is example of the recommended configuration which prevents this problem.</p>