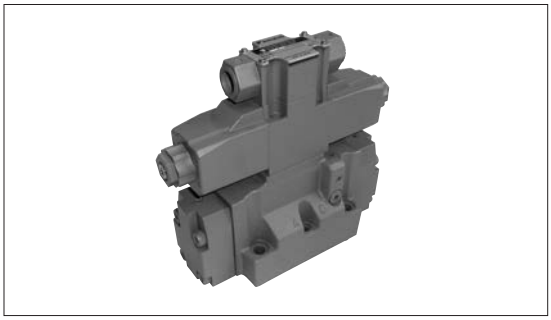
Solenoid pilot operated proportional direction/flow control valve



Features

- These proportional direction/flow control valves of the solenoid pilot type enable control of the forward and reverse motion of an actuator, as a shockless directional control valve.
- Applicable to high-pressure equipment such as press machines with high-pressure capability up to 35 MPa (28 MPa with size 06)
- Combining these valves with a dedicated digital controller enables easy adjustment/setting of conditions required for control with high repeatability.

Nomenclature

KSHP - G ※※ - ※※ - 20 - ※ - ※※※

1 2 3 4 5 6 7

1 Model No.
KSHP: Solenoid pilot operated proportional direction/flow control valve

2 Connections
G: Gasket mount type

3 Nominal diameter
04: ½
06: ¾

4 Spool type (See the spool type table.)
2C, 44C

5 Design No. (The design No. is subject to change.)

6 Main valve option code (See the option code table.)

7 Pilot stack valve code (See the option code table.)

Specifications

Model code	Nominal diameter	Maximum operating pressure MPa {kgf/cm²}	Permissible back pressure (Port T) MPa {kgf/cm²}	Permissible back pressure (Port Dr) MPa {kgf/cm²}	Maximum flow rate (1 land differential pressure: 1 MPa) L/min	Repeatability/ Hysteresis	Pilot pressure MPa {kgf/cm²}	Installation dimensions
KSHP-G04	½	35 {350}	25 {250}	7 {70}	180*2	1% or less/ 5% or less	1.5 to 16*1 {15 to 160}	ISO 4401-07-07-0-05
KSHP-G06	¾	28 {280}			250*2			ISO 4401-08-08-0-05

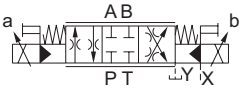
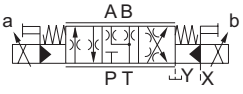
Note: *1 If the working pressure exceeds 16 MPa {160 kgf/cm²}, select the external pilot type, and use with a pilot pressure of no greater than 16 MPa {160 kgf/cm²}. If the working pressure exceeds 16 MPa {160 kgf/cm²} on the internal pilot type, use a model with MG-02P-1-60-S02/R02 (option code: R or RR).
*2 The maximum flow rate varies depending on the 1 land differential pressure. Refer to the Differential pressure - Flow rate characteristics (KSHP-G04: Page J-52, KSHP-G06: Page J-53) for details.

Applicable controller model code

Model code	Power supply voltage
ZHDD-A-10	DC 24 V±10% / Maximum 30 VA

Note: Refer to Page J-94 for details on the controller.

4: Spool type table

Spool type	JIS graphic symbols for hydraulic system
2C	
44C	

6 7: Option code table

6 Code	Option details
Y (Standard)	External pilot, external drain type
N	Internal pilot, external drain type
Z	External pilot, internal drain type
X	Internal pilot, internal drain type

7 Code	Option details*1
R	With MG-02P-60-S02 (reducing valve)
RR	With MG-02P-1-60-R02 (reducing valve)
F	With MFB-02-75-10 (filter block)

Note: *1 If two or more options are selected, sort the option codes in alphabetical order.

Refer to MG-02P (Page I-18) for the specifications of the reducing valve.

Mass (kg)

Details	Pilot stack valve option code	Mass kg	
		KSHP-G04	KSHP-G06
KSHP-G※※-※※-20-※	None	10	14
With MG-02P-1-60-※-02	R, RR	11.3	15.3
With MFB-02-75-10	F	11.2	15.2
With MFB-02-75-10, MG-02P-1-60-※-02	FR, FRR	12.5	16.5

Accessories

Model No.	Hexagon socket head cap bolt	Number	Tightening torque (N·m {kgf·cm})
KSHP-G04	M6 × 45	2	13 to 15 {130 to 150}
	M10 × 50	4	50 to 55 {500 to 550}
KSHP-G06	M12 × 60	6	85 to 110 {850 to 1100}

Handling

● Pilot/drain types

○ The external pilot and external drain type is standard (main valve option code: Y). Set the pilot pressure such that the differential pressure between the pilot pressure and the back pressure of the drain line is the minimum pilot pressure or higher.
Either the internal or external pilot and drain types can be set by fitting/removing plugs. (See the section below for details.)

● Pilot

○ Use the valve with a pilot pressure of 16 MPa {160 kgf/cm^2} or lower.
If a pilot pressure exceeding 16 MPa {160 kgf/cm^2} is required, use valves with the MG-02P-1-60-※02 option (option code: R/RR).

○ With the internal drain type, maintain the pressure difference between the pilot pressure and the back pressure of the tank line is the minimum pilot pressure or higher.

● Drainage

○ Directly connect the drain piping to the tank without merging it with other tank piping.

● The current - flow rate characteristics of these valves vary from valve to valve. The flow rates of individual valves should be finely adjusted even when a valve of the same model is used.

Pilot/drain type setting guide

● Either the internal or external pilot and drain types can be set by fitting/removing plugs.

	Pilot method	Plug A	Plug C (Port X)	Drain method	Plug B	Plug D (Port Y)
Y	External	With plug	Without plug	External	With plug	Without plug
N	Internal	Without plug	With plug	External	With plug	Without plug
Z	External	With plug	Without plug	Internal	Without plug	With plug
X	Internal	Without plug	With plug	Internal	Without plug	With plug
Guide	The pilot type can be set by changing plugs C and A.			The drain type can be set by changing plugs B and D.		

Hexagon socket taper thread plug	Tightening torque (N·m {kgf·cm})
NPTF1/16	6 to 7.5 {60 to 75}

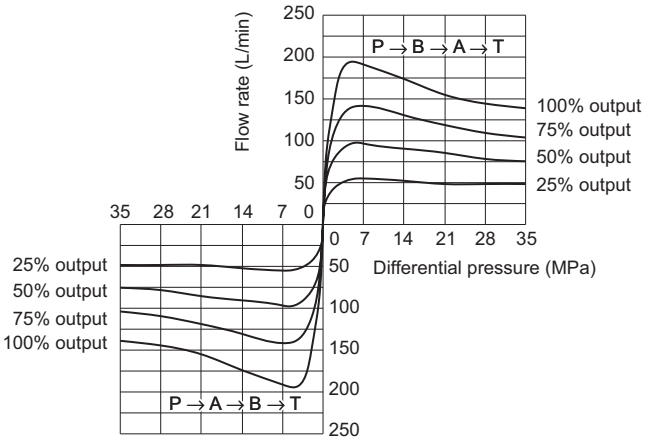
○ Tightening torques for the plugs on valve faces.
- Hexagon socket taper thread plug (R1/8): 13 to 14.5 N·m {130 to 145 kgf·cm}
- Hexagon socket flange head plug (G1/8): 13 to 15 N·m {130 to 150 kgf·cm}

○ See the sectional structural diagram on Page J-56 for the positions of plugs A, B, C and D. Do not wrap the plugs with sealing tape.

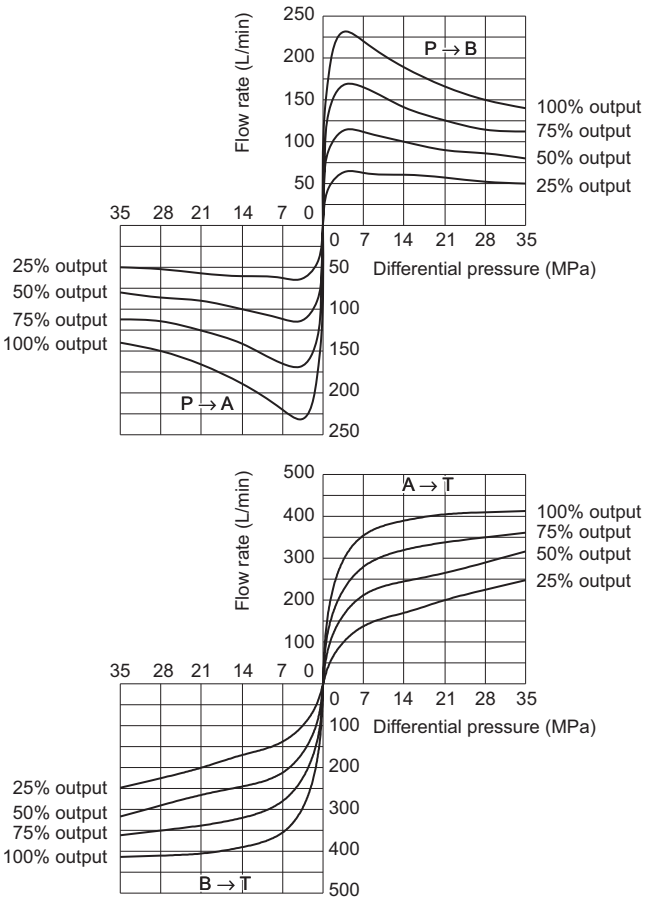
Performance curves (viscosity: 32 mm^2/s {cSt})

●KSHP-G04

■ Differential pressure - Flow rate characteristics (4-way flow): Spool type 2C, 44C

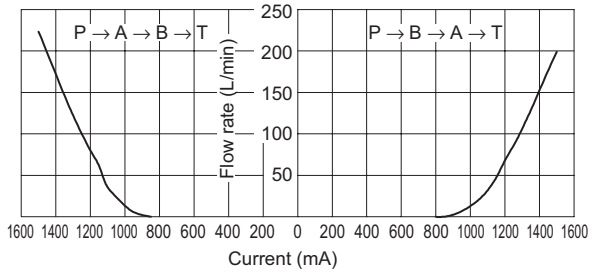


■ Differential pressure - Flow rate characteristics (single side flow): Spool type 2C, 44C



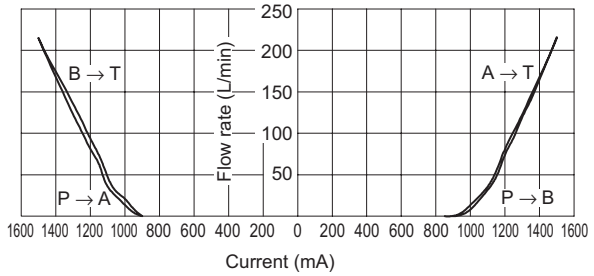
■ Current - Flow rate characteristics (four-way flow): Spool type 2C, 44C

Valve differential pressure ΔP = 2 MPa



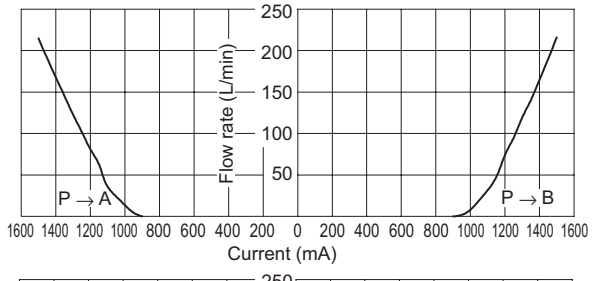
■ Current - Flow rate characteristics (single side flow): Spool type 2C

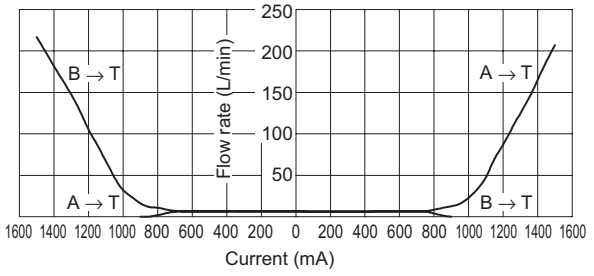
1 land differential pressure ΔP = 1 MPa



■ Current - Flow rate characteristics (single side flow): Spool type 44C

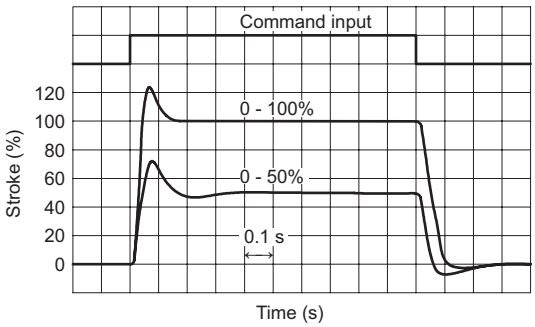
1 land differential pressure ΔP = 1 MPa





■ Step responsiveness (four-way flow): Spool type 2C, 44C

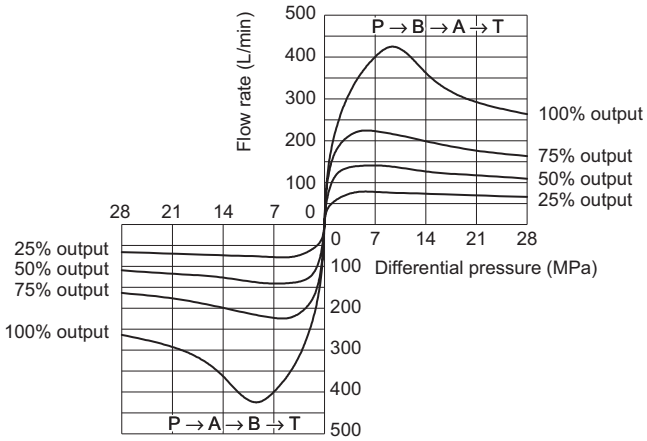
Valve differential pressure ΔP = 2 MPa



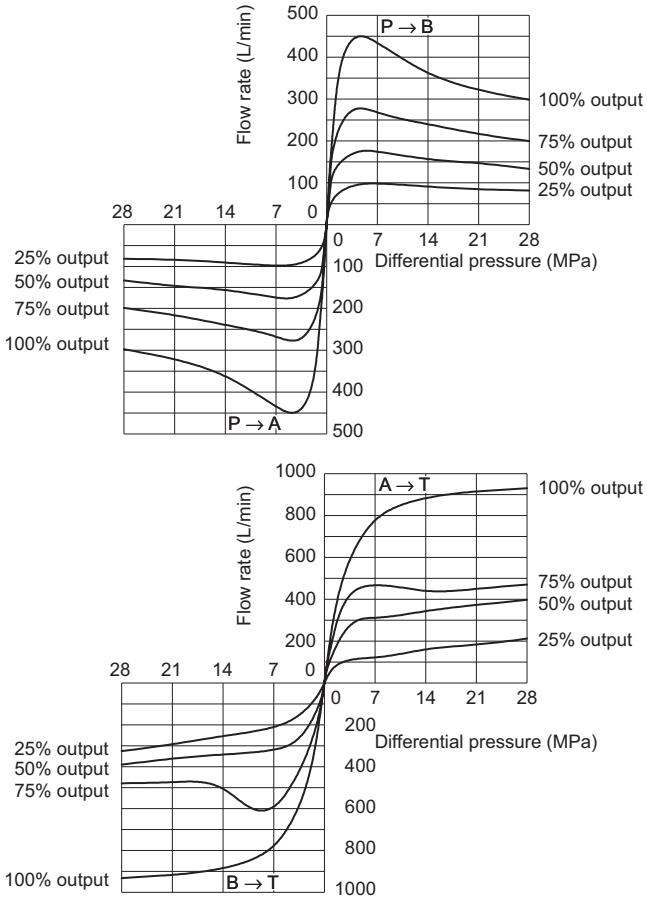
Performance curves (viscosity: 32 mm^2/s {cSt})

●KSHP–G06

■ Differential pressure - Flow rate characteristics (4-way flow): Spool type 2C, 44C

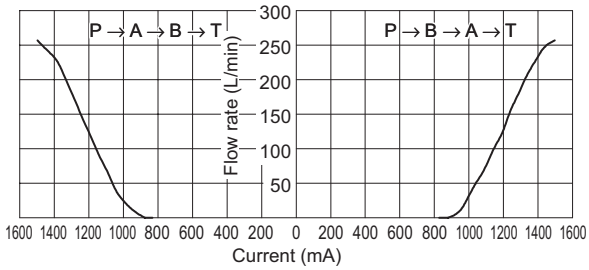


■ Differential pressure - Flow rate characteristics (single side flow): Spool type 2C, 44C



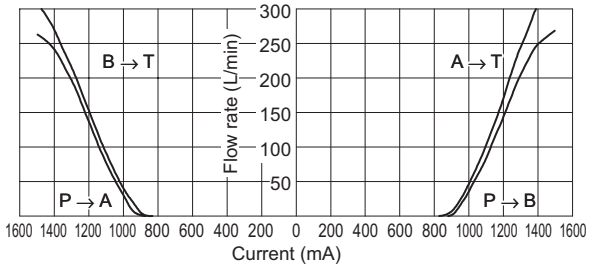
■ Current - Flow rate characteristics (four-way flow): Spool type 2C, 44C

Valve differential pressure ΔP = 2 MPa



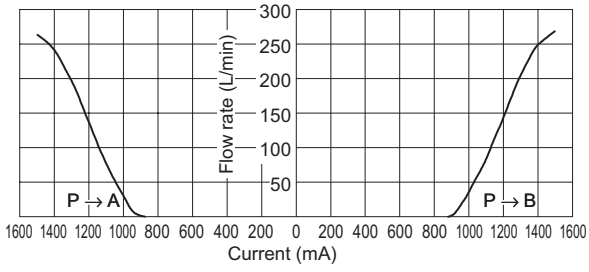
■ Current - Flow rate characteristics (single side flow): Spool type 2C

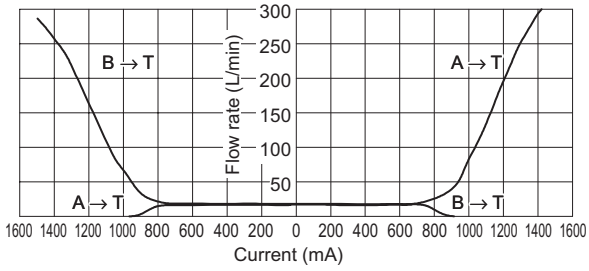
1 land differential pressure ΔP = 1 MPa



■ Current - Flow rate characteristics (single side flow): Spool type 44C

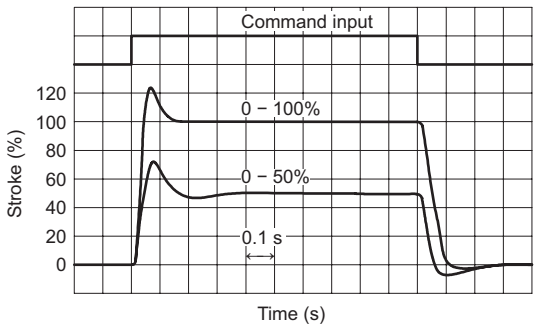
1 land differential pressure ΔP = 1 MPa





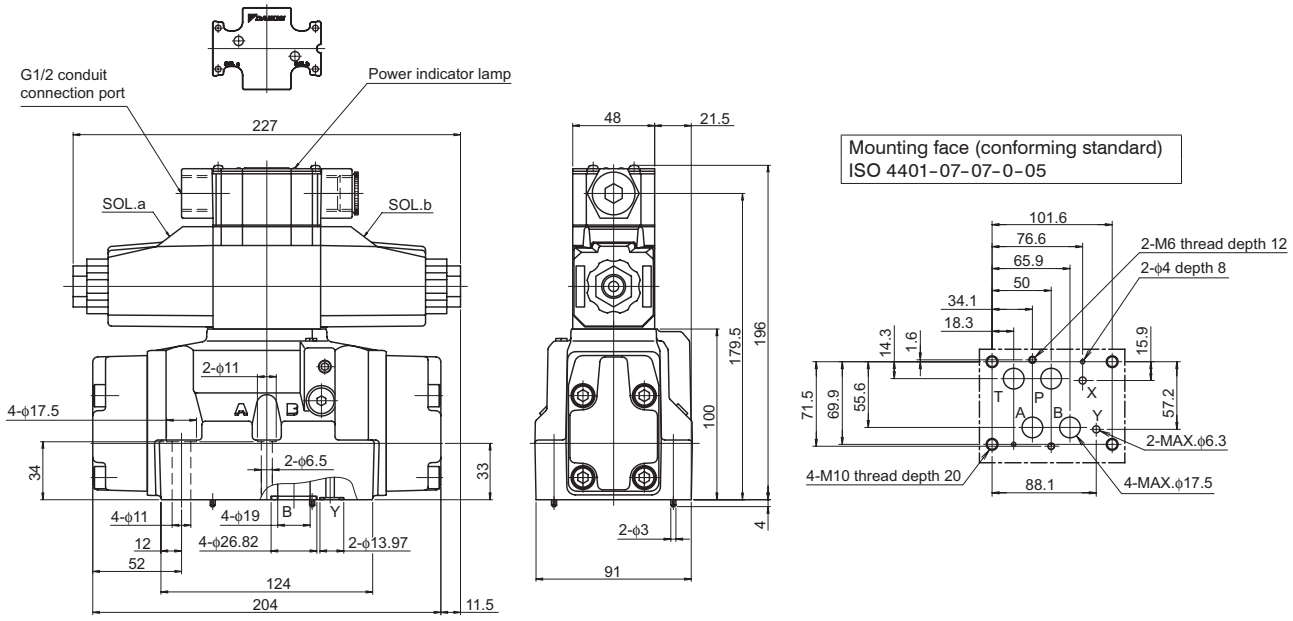
■ Step responsiveness (four-way flow): Spool type 2C, 44C

Valve differential pressure ΔP = 2 MPa

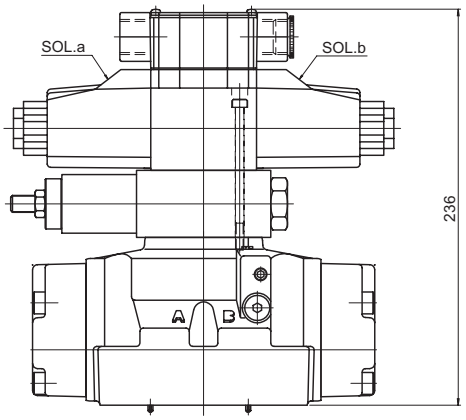


Dimensional outline drawing

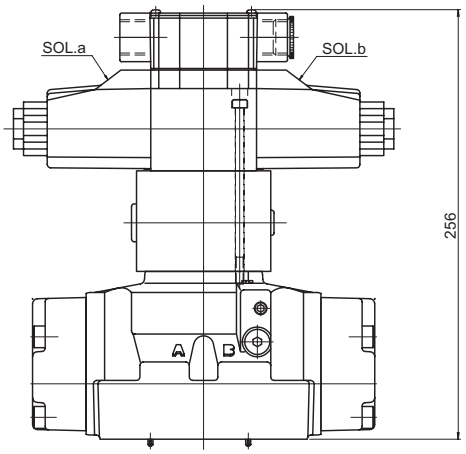
KSHP-G04
(Hexagon socket head cap bolts used: M5 × 45, 4 pcs.)



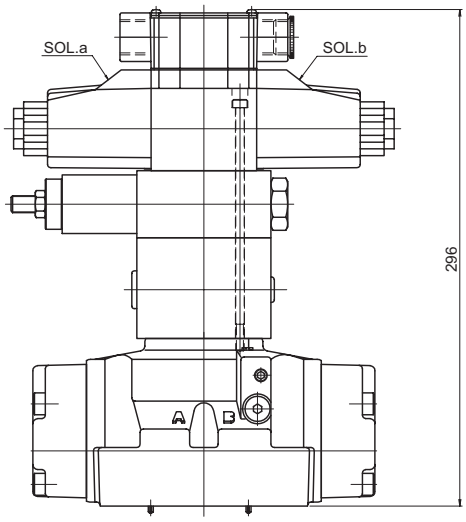
Combination with MG-02P-1-60-※02 (type R, RR)
(Hexagon socket head cap bolts used:
M5 × 85, 4 pcs.)



Combination with MFB-02-75-10 (type F)
(Hexagon socket head cap bolts used:
M5 × 105, 4 pcs.)

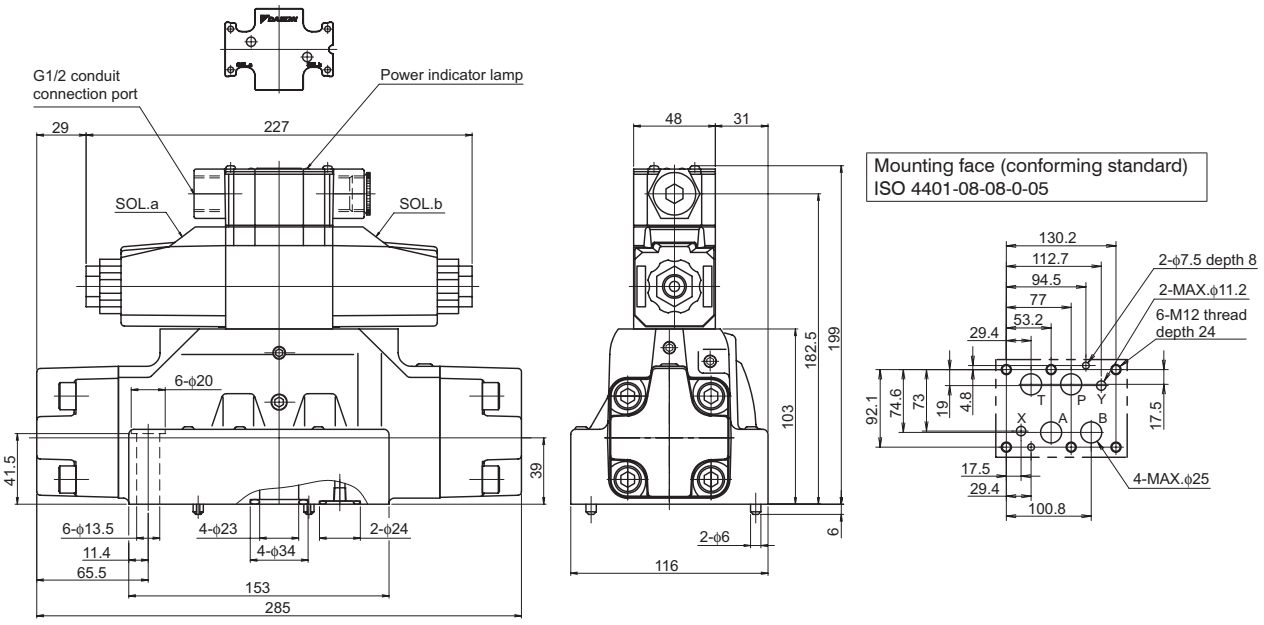


Combination with MFB-02-75-10 and
MG-02P-1-60-※02 (type FR, FRR)
(Hexagon socket head cap bolts used:
M5 × 145, 4 pcs.)

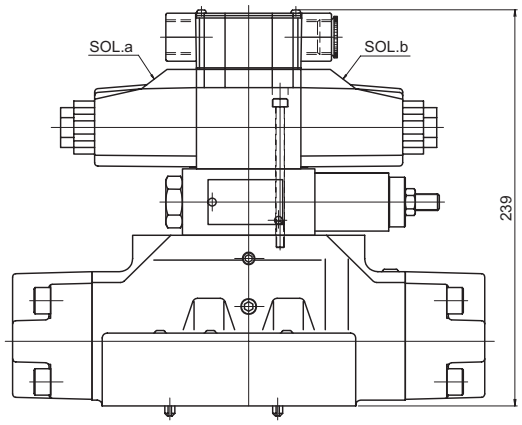


Dimensional outline drawing

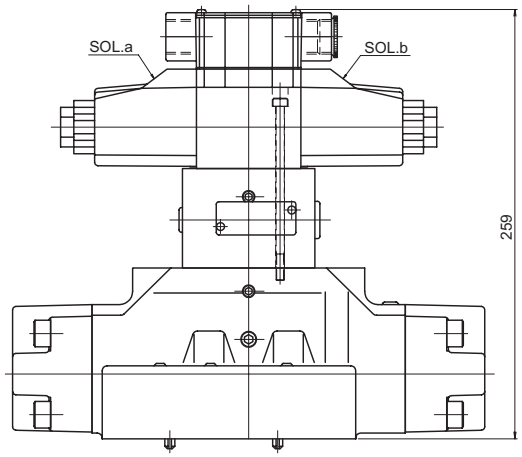
KSHP-G06
(Hexagon socket head cap bolts used: M5 × 45, 4 pcs.)



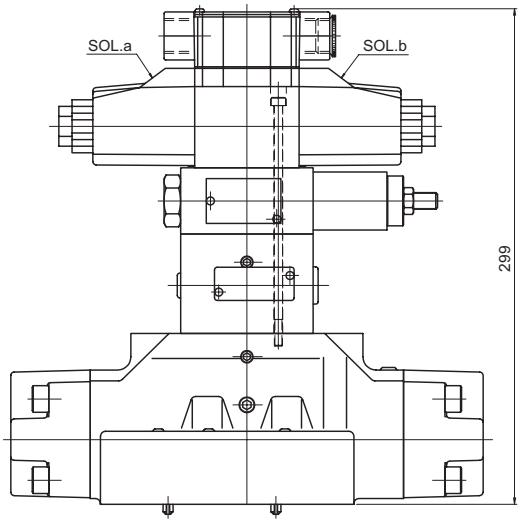
Combination with MG-02P-1-60-※02 (type R, RR)
(Hexagon socket head cap bolts used:
M5 × 85, 4 pcs.)



Combination with MFB-02-75-10 (type F)
(Hexagon socket head cap bolts used:
M5 × 105, 4 pcs.)

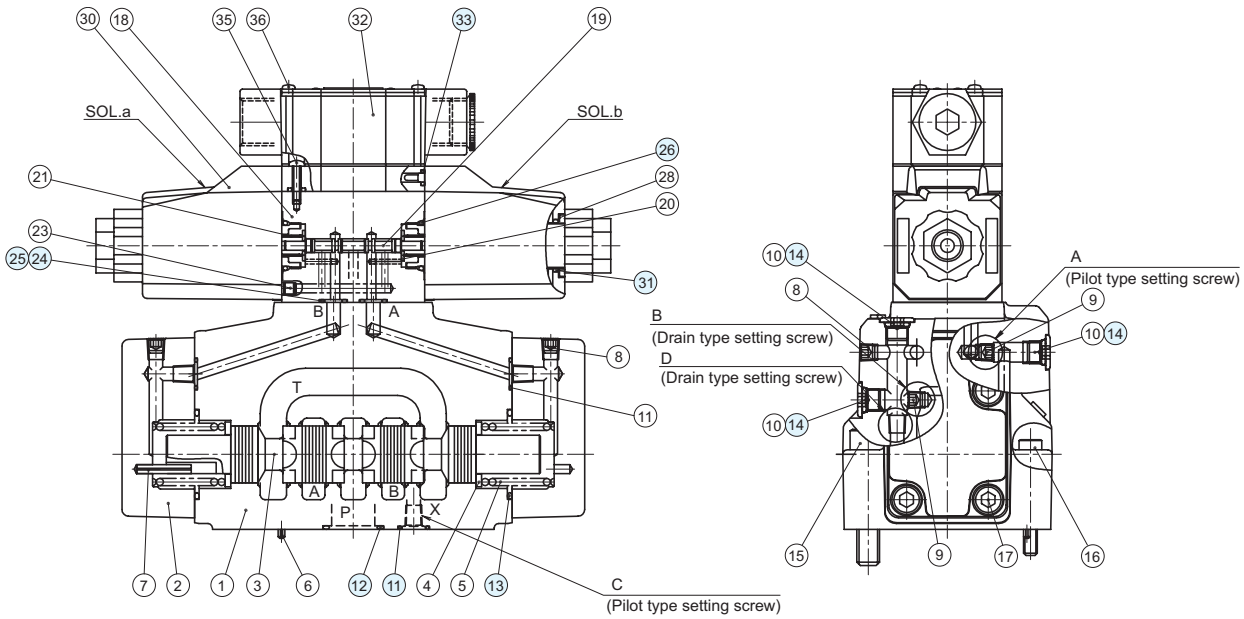


Combination with MFB-02-75-10 and
MG-02P-1-60-※02 (type FR, FRR)
(Hexagon socket head cap bolts used:
M5 × 145, 4 pcs.)



Sectional structural diagram

KSHP-G04

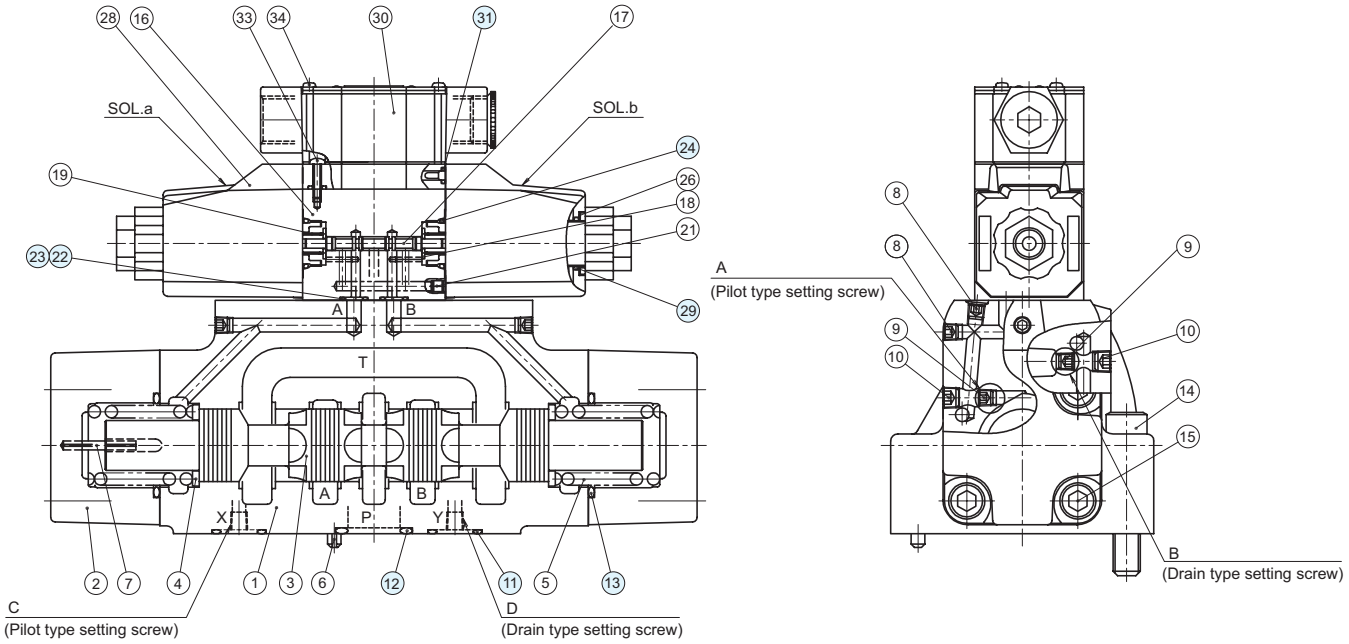


Sealing part table

Part No.	Name	Quantity	Part specifications
11	O-ring	4	AS568-013 Hs90
12	O-ring	4	AS568-118 Hs90
13	O-ring	2	AS568-126 Hs90
14	O-ring	3	JIS B2401 1B P8
24	O-ring	4	AS568-012 Hs90

Part No.	Name	Quantity	Part specifications
25	O-ring	2	AS568-009 Hs90
26	O-ring	2	JIS B2401 1B P18
31	O-ring	4	AS568-019 Hs70
33	O-ring	4	JIS B2401 1A P4

KSHP-G06



Sealing part table

Part No.	Name	Quantity	Part specifications
11	O-ring	2	JIS B2401 1B P20
12	O-ring	4	JIS B2401 1B P28
13	O-ring	2	JIS B2401 1B P40
22	O-ring	4	AS568-012 Hs90

Part No.	Name	Quantity	Part specifications
23	O-ring	2	AS568-009 Hs90
24	O-ring	2	JIS B2401 1B P18
29	O-ring	4	AS568-019 Hs70
31	O-ring	4	JIS B2401 1A P4