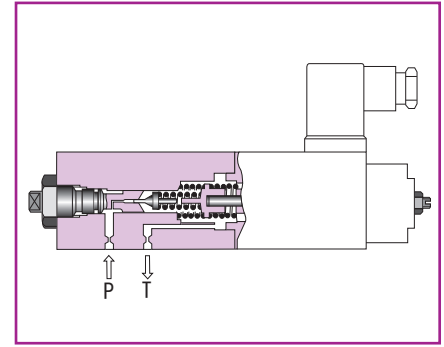
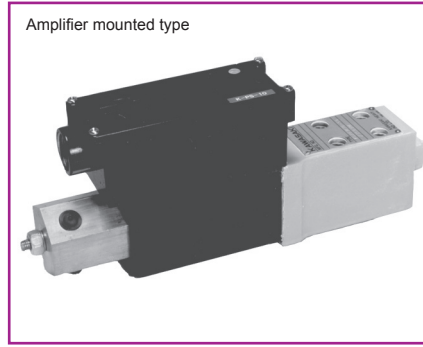
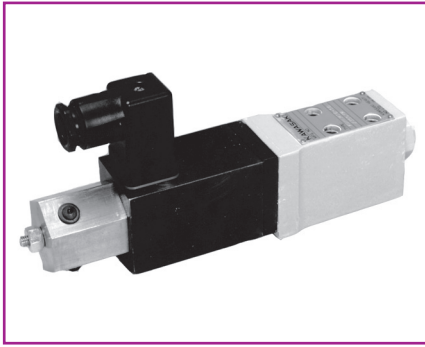


Kawasaki VALVE

KPM

Solenoid proportional direct operated type relief valve – for vent control **RDPV**



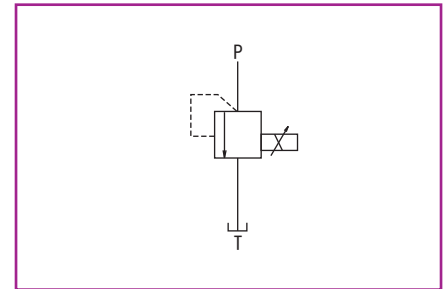
Overview

The solenoid proportional direct operated type relief valve consists of DC proportional solenoid and poppet type direct operated relief valve, and allows hydraulic pressure to be remotely controlled at a given rate in proportion to the input current by connecting it to the vent line of the pilot operation type pressure control valve (relief valve or pressure reducing valve). In addition, amplifier mounted types are controlled by voltage input.

Features

1. Special damping mechanism with a spring realises superior stability even at high pressure of 34.3 MPa (350 kgf/cm²).
2. During the initial adjustment or malfunction in the electrical system, manual operation can be done with the manual pressure adjustment thread.
3. The structure is simple and maintenance is easy.
4. Easy handling amplifier mounted type is also lined up.

Hydraulic symbols



Type indication

RDPV5P-10/350-EC-

<p>Solenoid proportional direct operated type relief valve (For vent control)</p> <p>Nominal dimension 5</p> <p>Connection method P = Gasket connection type</p> <p>Series number: 10</p> <p>Highest adjustment pressure</p> <p>50 = 4.9MPa (50kgf/cm²) 100 = 9.8MPa (100kgf/cm²) 150 = 14.7MPa (150kgf/cm²) 250 = 24.5MPa (250kgf/cm²) 315 = 30.9MPa (315kgf/cm²) 350 = 34.3MPa (350kgf/cm²)</p>	<p>Type of hydraulic oil</p> <p>No symbol = Mineral based hydraulic oil V = Phosphate ester based hydraulic oil W = Fatty ester based hydraulic oil Water-glycol based hydraulic oil</p> <p>Electric connection symbol</p> <p>B = DIN connector C = DIN large connector E = Amplifier mounted type</p> <p>Solenoid ratings</p> <p>E = 14.2Ω × 0.8A</p>
--	---

Sub-plate

Valve type	Sub-plate type	Connection diameter	Mass
RDPV5	P-RDPV5R14-0	Rc 1/4	2kg
	P-RDPV5G14-0	G 1/4	

When you use a sub-plate, please place an order for the above sub-plate type.

Accessories

Mounting bolt

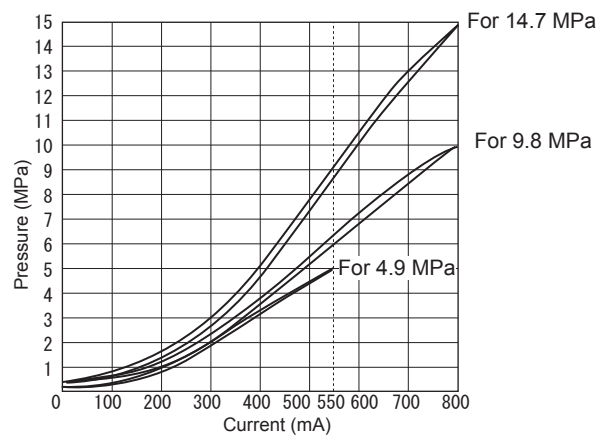
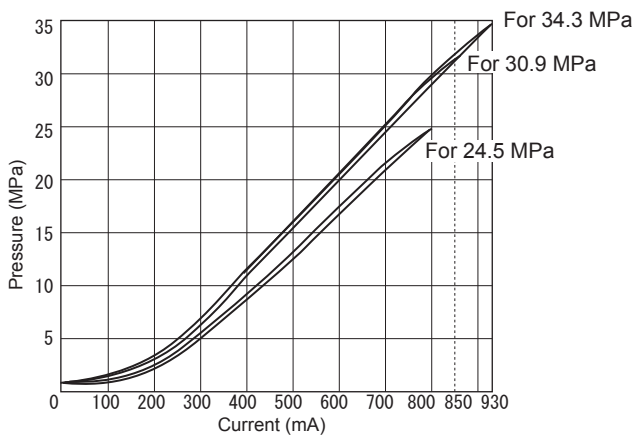
Type	Hexagon socket head cap thread	Quantity	Tightening torque N · m (kgf · cm)
RDPV5	M5 × 55L	4 pcs.	6.9 ± 1.0 (70 ± 10.5)

Specifications

Nominal dimension		5	
Maximum working pressure MPa (kgf/cm ²)	Port P	34.3 (350)	
	Port T	1.0 (10)	
Maximum flow rate L/min		3	
Reproducibility %		2 or less	
Hysteresis %		3 or less	
Electrical specifications	Solenoid rated current mA	See the Current - Pressure Characteristics (the following figure).	
	Coil resistance Ω	14.2 at 20°C	
	Dither (Recommendable value)	200HzPWM/200Hz, 200mAP-P	
	In case the amplifier is installed separately	Standard amplifier type	KC-B10/C-B10-A ¹⁰⁰ / ₂₀₀
	In case of amplifier mounted type	Power source	DC24V
Command voltage		0 to 5V	
Mass kg	RDPV5P-10/*-E ^B / _C	2.7	
	RDPV5P-10/*-EE	3.2	

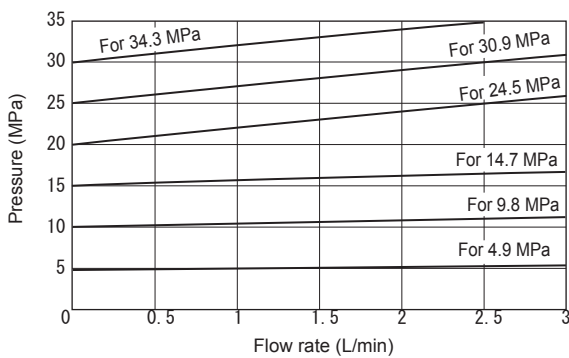
Current - Pressure characteristics (viscosity 25 mm²/s (cSt))

●RDPV5



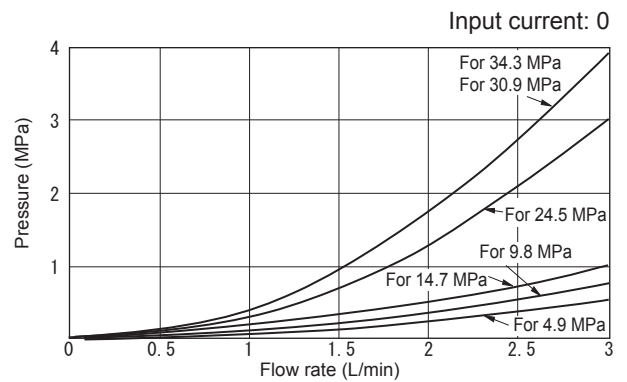
Pressure override characteristics (viscosity 25 mm²/s (cSt))

●RDPV5



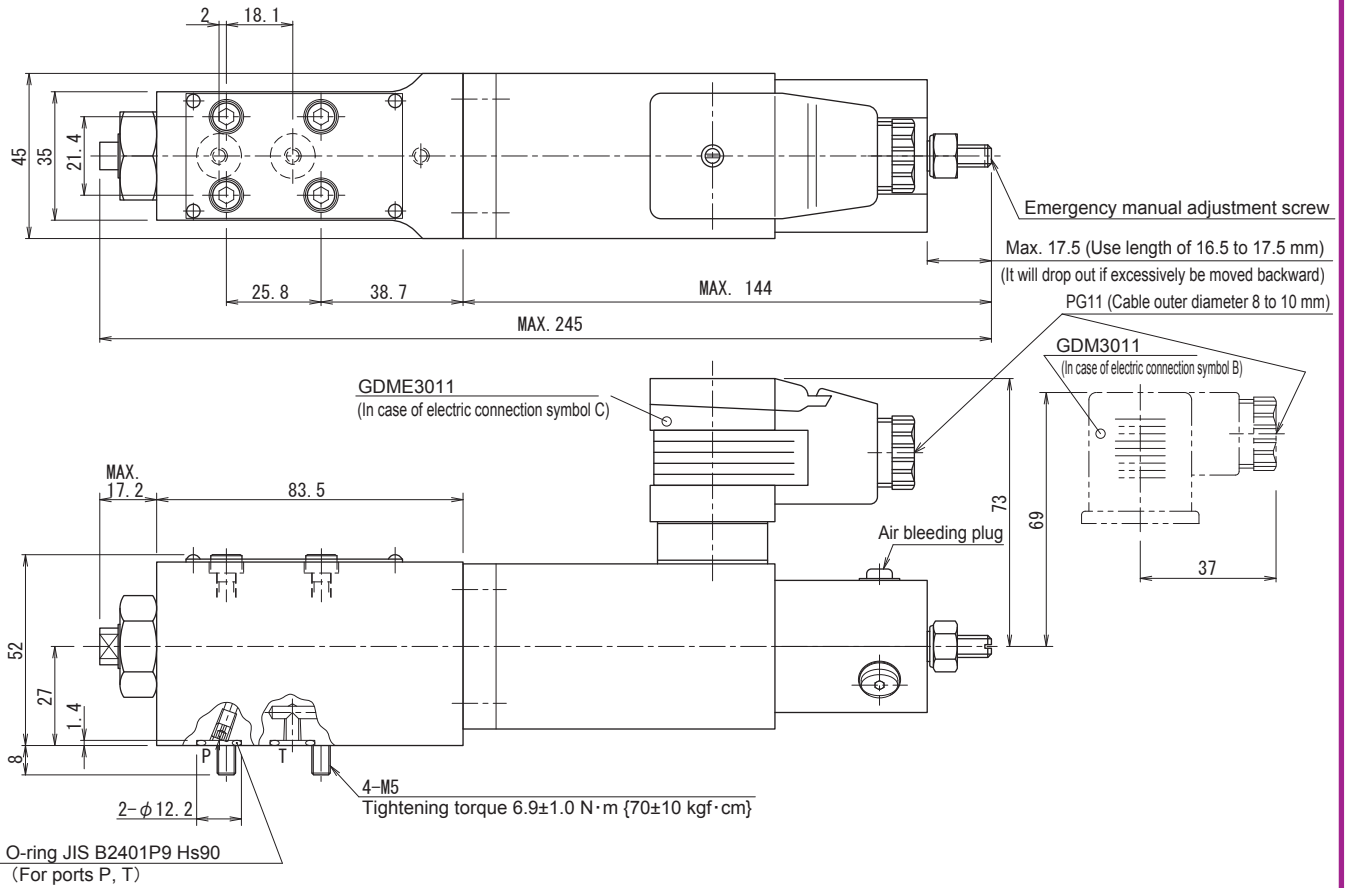
Minimum adjustment pressure characteristics (viscosity 25 mm²/s (cSt))

●RDPV5

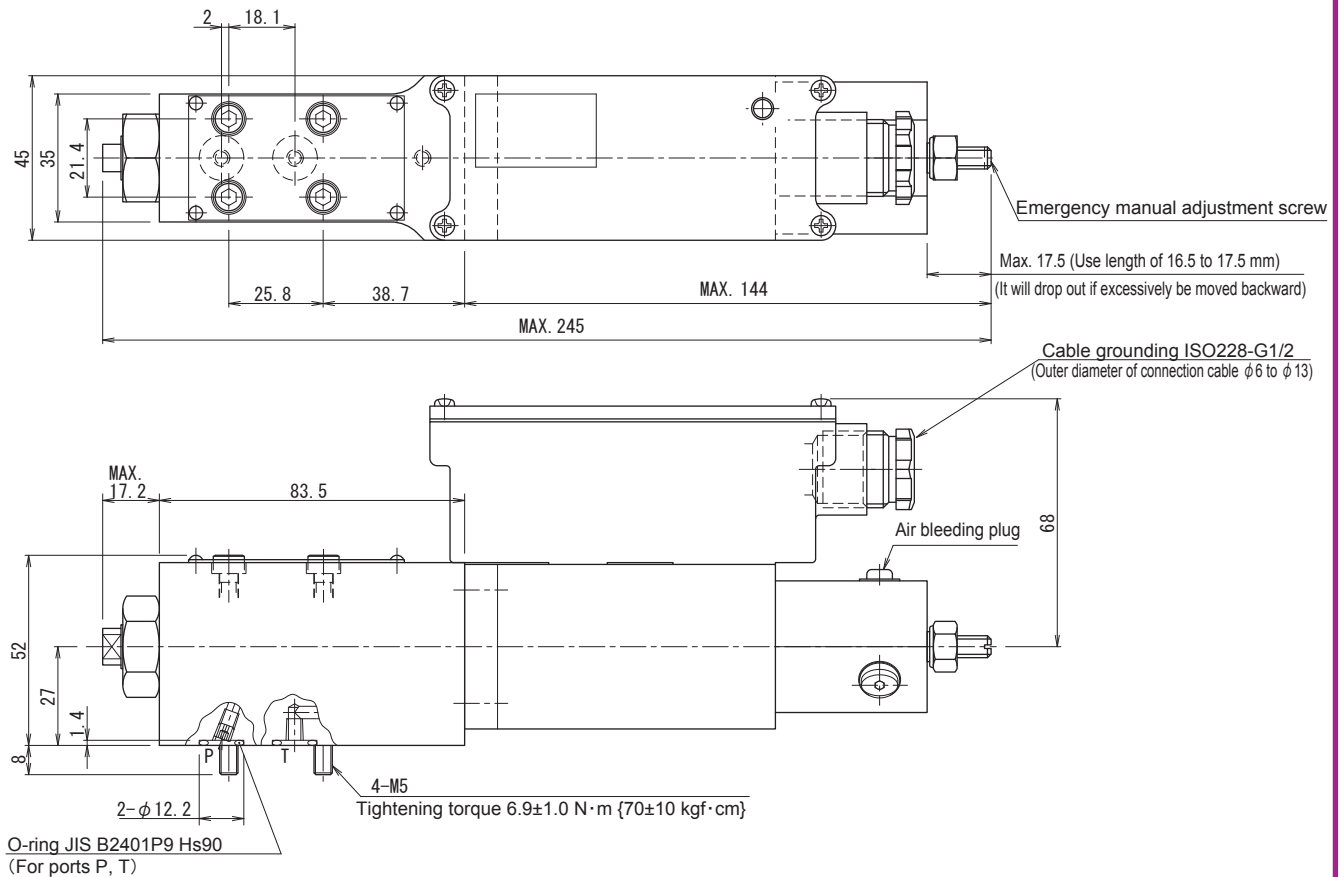


Dimension drawing

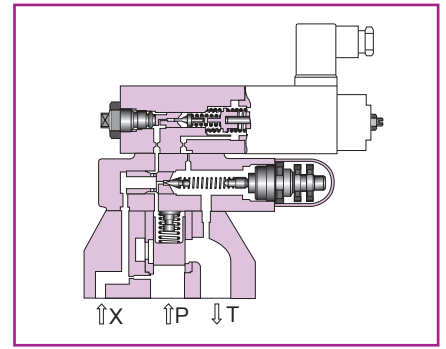
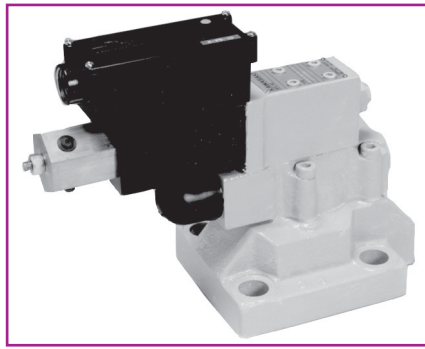
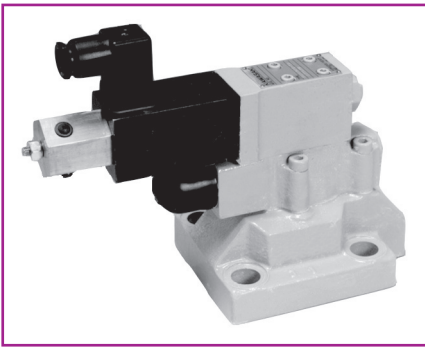
●RDPV5P-10/*E^B_C



●RDPV5P-10/*EE



Solenoid proportional balanced piston type relief valve **RBP**



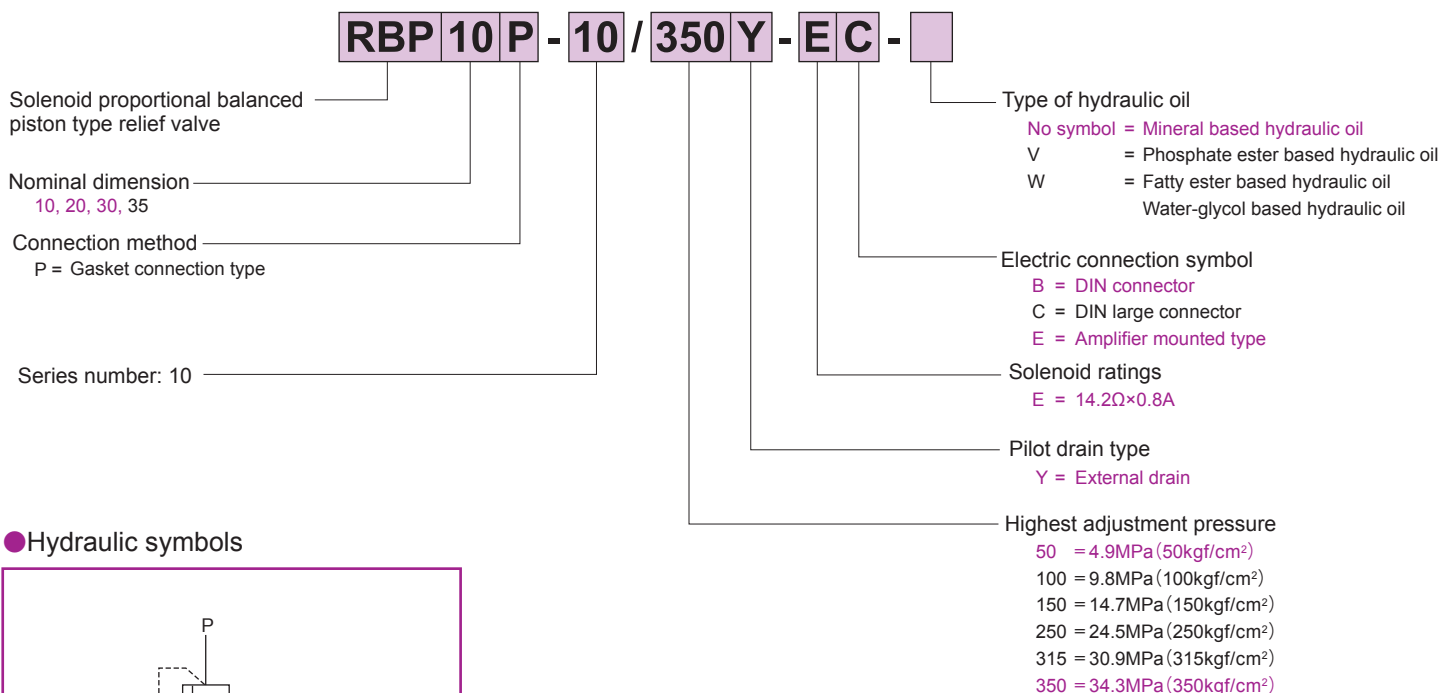
Overview

The solenoid proportional balanced piston type relief valve consists of the solenoid proportional pilot relief valve and balanced piston type relief valve, and allows hydraulic pressure to be remotely controlled at a given rate in proportion to the input current. In addition, amplifier mounted types are controlled by voltage input. Various serieses are lined up including high pressure, high flow rate, therefore, the best suited equipment can be selected for your usage.

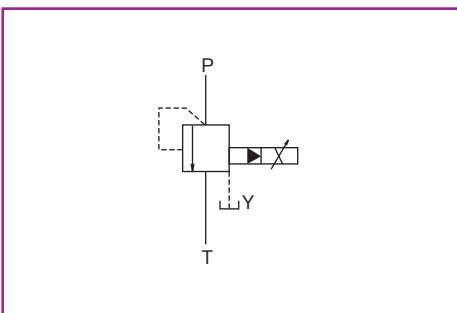
Features

1. The maximum pressure limiting device provides safety measures against abnormal pressure.
2. Special damping mechanism in the solenoid proportional pilot relief valve realises superior stability even at high pressure 34.3 MPa (350 kgf/cm²).
3. During the initial adjustment or malfunction in the electrical system, manual operation can be done with the manual pressure adjustment thread on the pilot relief valve.
4. Easy handling amplifier mounted type is also lined up.

Type indication



Hydraulic symbols



Specifications

Nominal dimension		10	20	30	35
Maximum working pressure MPa (kgf/cm ²)	Ports P, T, and X	34.3 (350)			
	Port Y	1.0 (10)			
Maximum flow rate L/min		150	300	500	700
Reproducibility %		2 or less			
Hysteresis %		5 or less			
Electrical specifications	Solenoid rated current mA	See the Current - Pressure Characteristics (the following figure).			
	Coil resistance Ω	14.2 at 20°C			
	Dither (Recommendable value)	200HzPWM/200Hz, 200mAP-P			
	In case the amplifier is installed separately	Standard amplifier type	KC-B10/C-B10-A ¹⁰⁰ / ₂₀₀		
	In case of amplifier mounted type	Power source	DC24V		
Command voltage		0 to 5V			
Mass kg	RBP*P-10/*-E _C ^B	5.3	6.2	7.1	20.5
	RBP*P-10/*-EE	5.8	6.7	7.6	21

Sub-plate

Valve type	Sub-plate type	Connection diameter	Mass
RBP10	P-RB10R14-0	Rc 1/4	2.1kg
	P-RB10G14-0	G 1/4	
	P-RB10R38-0	Rc 3/8	
	P-RB10G38-0	G 3/8	
	P-RB10R12-0	Rc 1/2	
	P-RB10G12-0	G 1/2	
RBP20	P-RB20R34-0	Rc 3/4	4.4kg
	P-RB20G34-0	G 3/4	
	P-RB20R1-0	Rc1	
	P-RB20G1-0	G1	
RBP30	P-RB30R54-0	Rc1 1/4	6.9kg
	P-RB30G54-0	G1 1/4	
	P-RB30R32-0	Rc1 1/2	
	P-RB30G32-0	G1 1/2	

When you use a sub-plate, please place an order for the above sub-plate type.
For the dimension drawing, refer to page 5 and 6 of the appendix.

Accessories

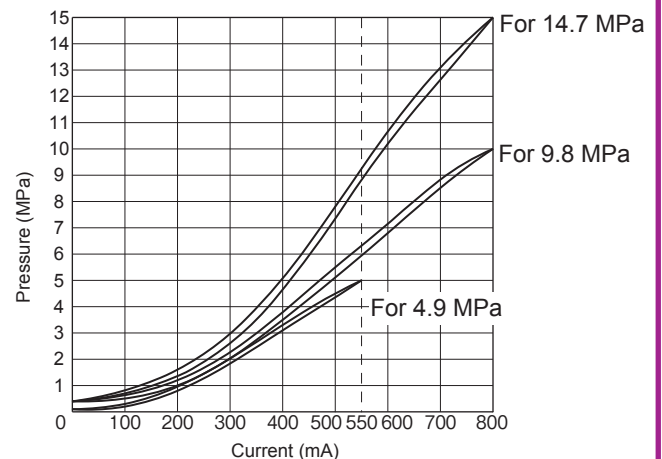
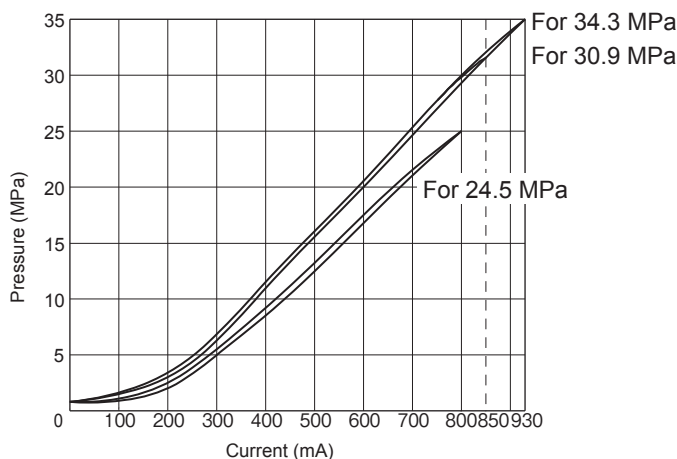
● Mounting bolt

Type	Hexagon socket head cap thread	Quantity	Tightening torque N · m (kgf · cm)
RBP10	M12×45L	4 pcs.	98.0 ± 14.7 (1000 ± 150)
RBP20	M16×50L	4 pcs.	235.2 ± 35.2 (2400 ± 360)
RBP30	M18×50L	4 pcs.	333.2 ± 50.0 (3400 ± 510)
RBP35	M16×70L	6 pcs.	235.2 ± 35.2 (2400 ± 360)

Current - Pressure characteristics (viscosity 25 mm²/s (cSt))

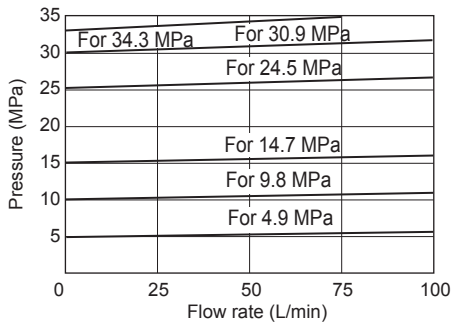
● RBP*

Flow rate: Maximum flow rate×1/2 Dither: 200 HzPWM

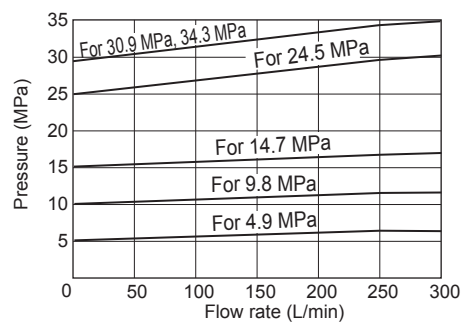


Pressure override characteristics (viscosity 25 mm²/s (cSt))

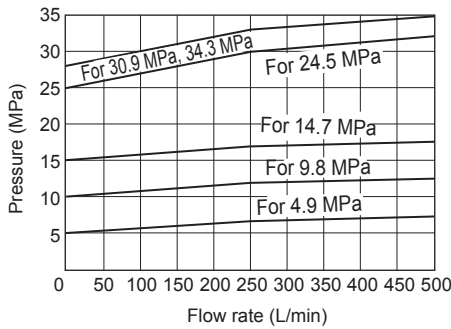
●RBP10



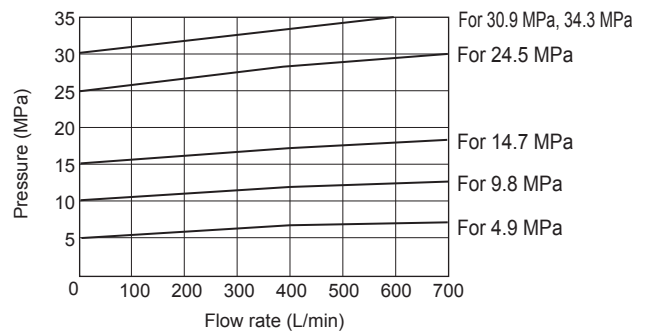
●RBP20



●RBP30

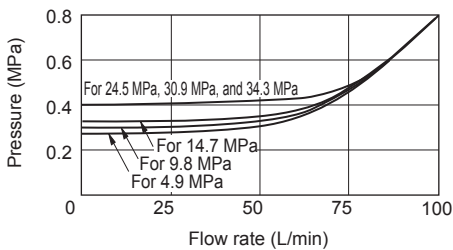


●RBP35

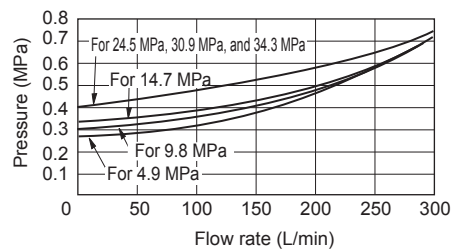


Minimum adjustment pressure characteristics (viscosity 25 mm²/s (cSt)) Input current: 0

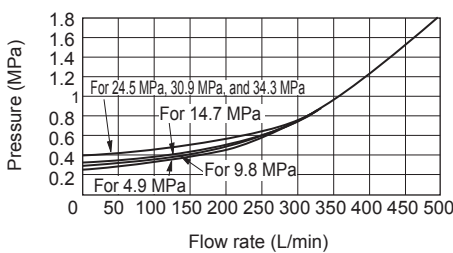
●RBP10



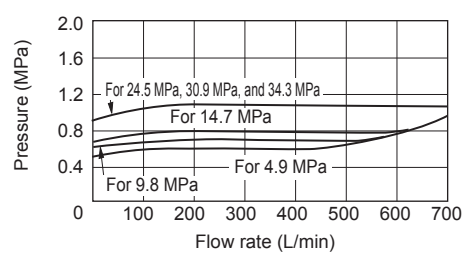
●RBP20



●RBP30

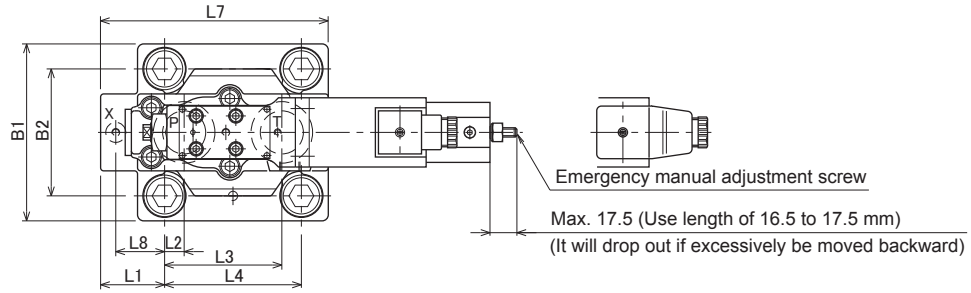


●RBP35



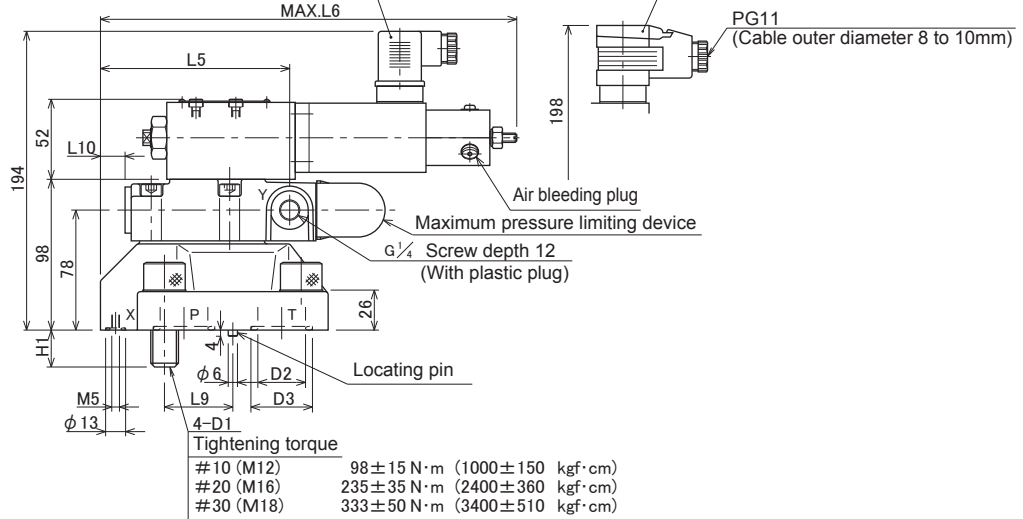
Dimension drawing

● RBP10, 20, 30P-10/*-E^B_C

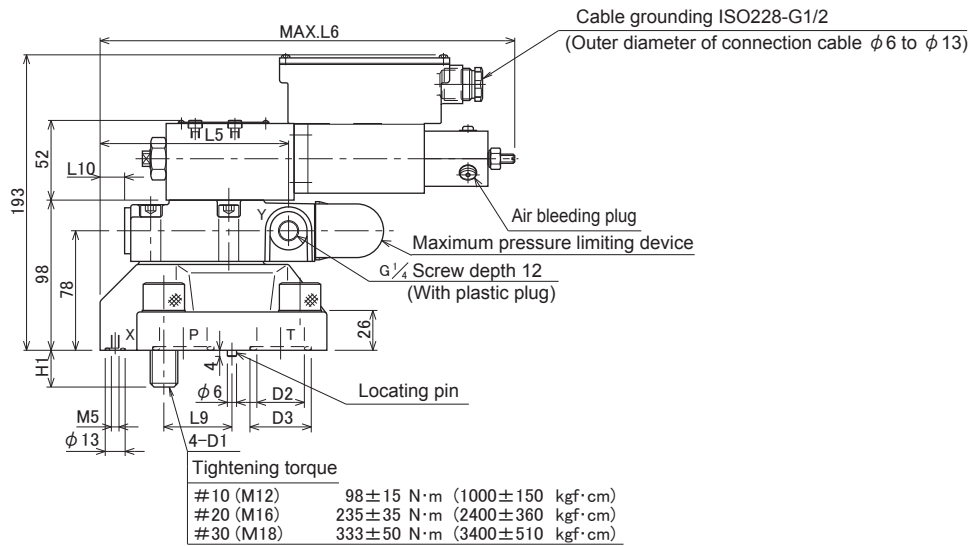
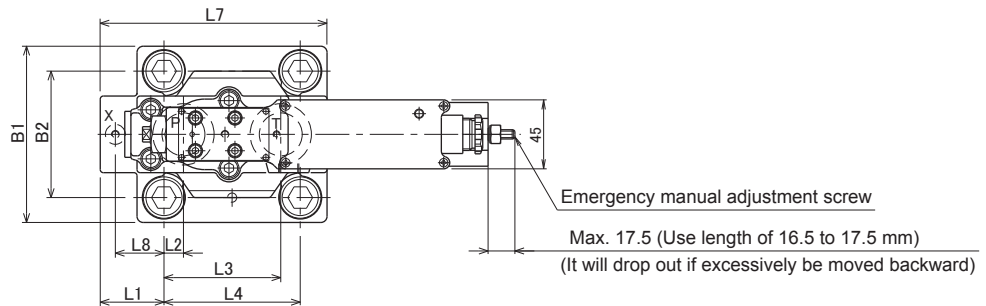


In case of electric connection symbol B (DIN connector GDM3011)

In case of electric connection symbol C (DIN large connector GDME3011)



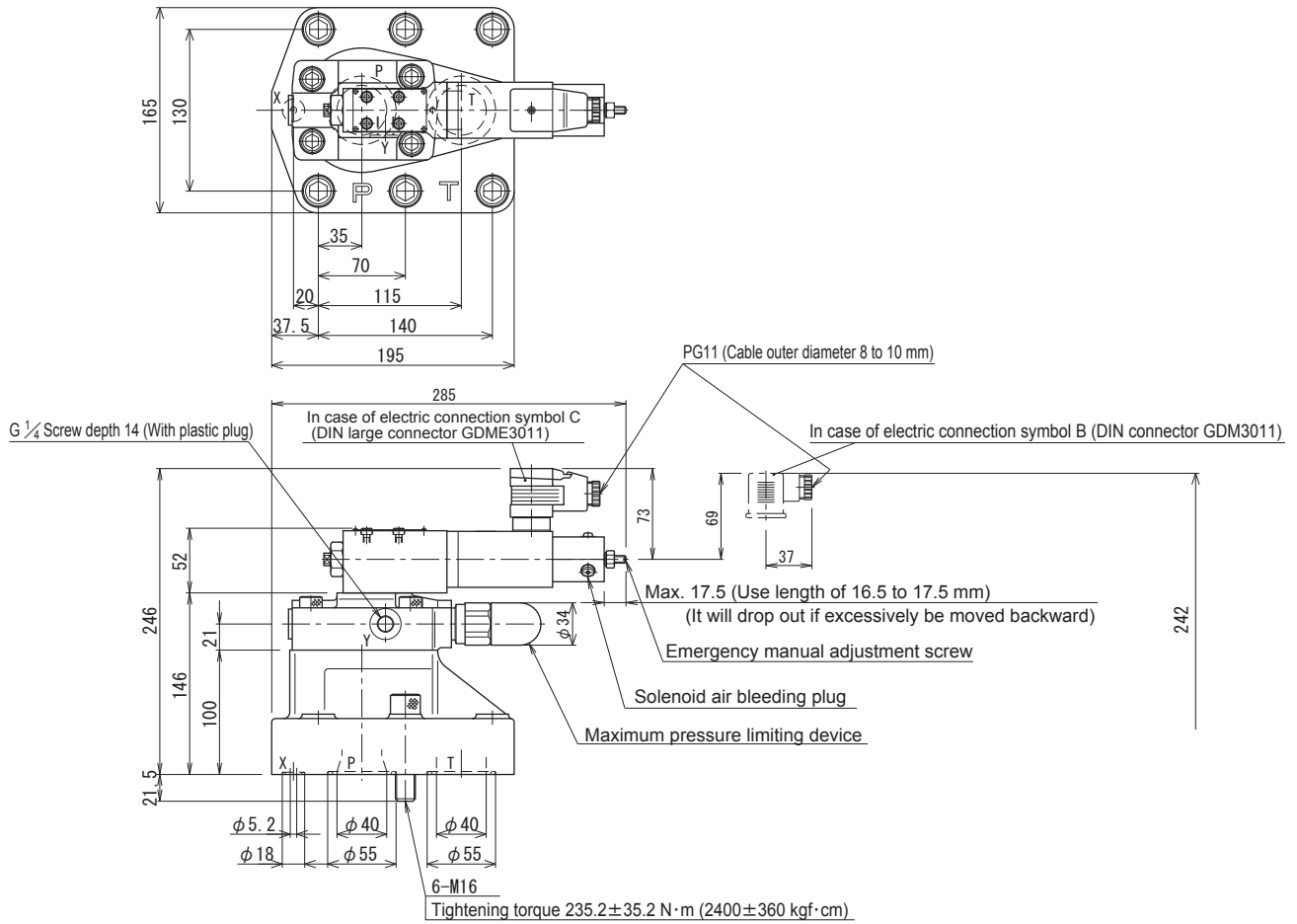
● RBP¹⁰/₂₀/₃₀P-10/*-EE



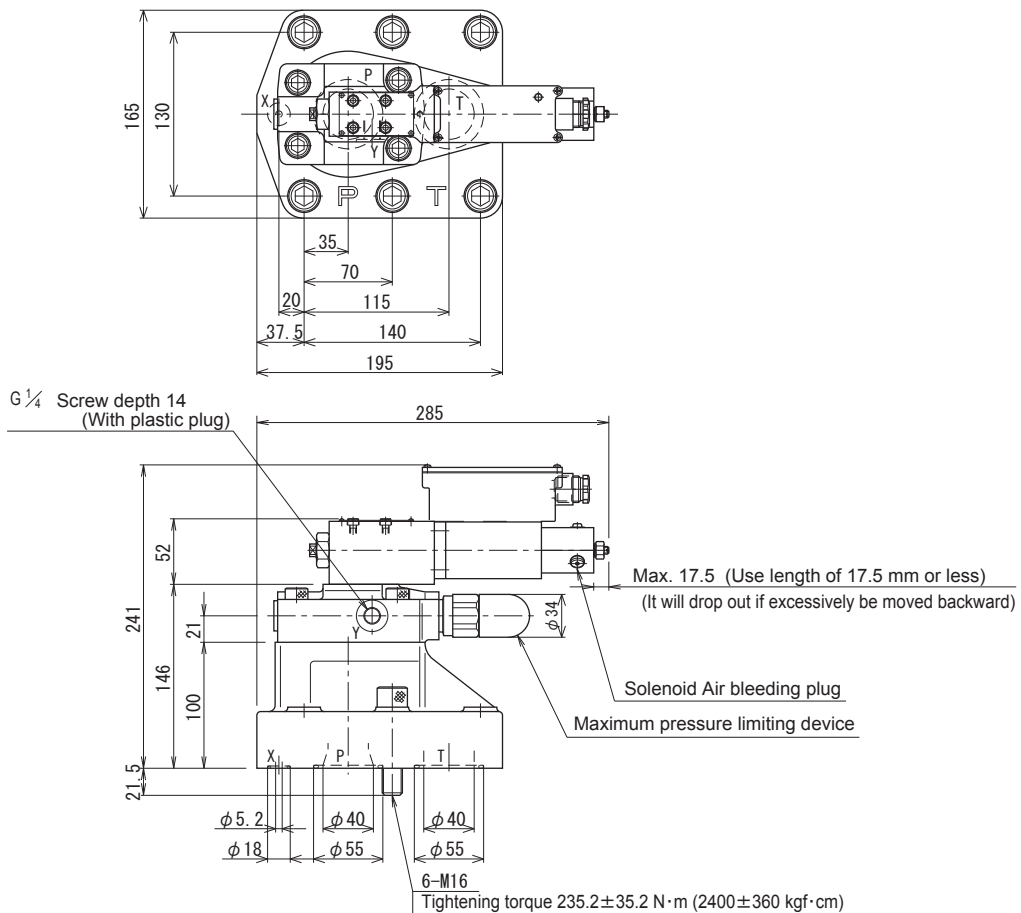
Nominal dimension	B1	B2	D1	D2	D3	L1	L2	L3	L4	L5	L6	L7	L8	L9	L10	H1	O-ring JIS B2401	
																	P and T ports	T port
10	78	54	M12	12	20	23.5	22.1	47.6	54	99.5	251	90	0	22.1	*-7.5	19	P16,Hs 90	P10,Hs 90
20	100	69.8	M16	25	35	34	11.1	55.6	66.7	112.7	265	117	23.8	33.3	5.7	24	G30,Hs 90	P10,Hs 90
30	115	82.5	M18	31	40	41.5	12.7	76.2	88.9	122.9	275	148	31.7	44.4	15.9	24	G35,Hs 90	P10,Hs 90

*The symbol (-) indicates that the dimension shown is measured in the outside position.

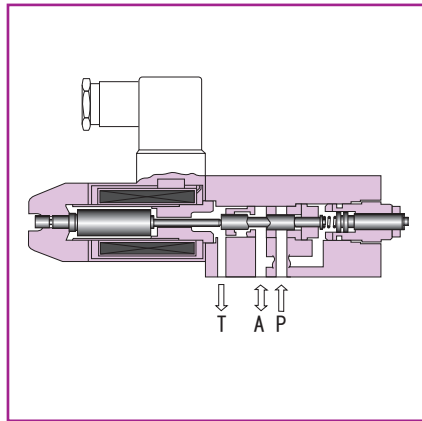
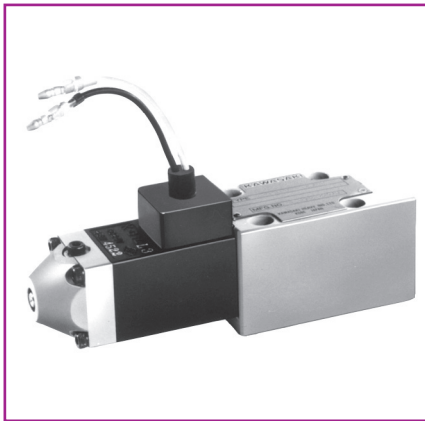
● RBP35P-10/*-E^B_C



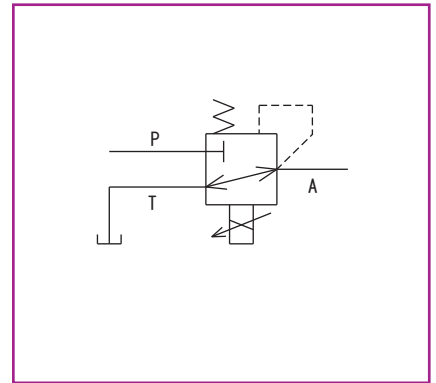
● RBP35P-10/*-EE



Solenoid proportional pilot pressure reducing valve – Direct operated type **PRDP6**



● Hydraulic symbols



■ Overview

It consists of the DC proportional solenoid and spool type direct operated pressure reducing valve, and the position of the directional flow regulating valve and allows tilting angle of the variable capacity pump to be remotely controlled at a rate in proportion to the input current.

■ Features

1. Exclusively for single solenoid type, small size, and inexpensive.
2. Special damping mechanism with a spring realises superior stability.
3. During the initial adjustment or malfunction in the electrical system, manual operation can be done with the push rod.

■ Type indication

PRDP 6 P - 10 / 30 - C B -

Solenoid proportional type
Direct operated type pilot pressure reducing valve

Nominal dimension
6

Connection method
P = Gasket connection type
R = Rc thread connection type
G = G thread connection type

Series number: 10

Maximum adjustment pressure
30 = 2.9MPa (30kgf/cm²)
50 = 4.9MPa (50kgf/cm²)

Type of hydraulic oil

No symbol = Mineral based hydraulic oil
V = Phosphate ester based hydraulic oil
W = Fatty ester based hydraulic oil
Water-glycol based hydraulic oil

Electric connection symbol

B = DIN connector
C = DIN large connector
L = Lead wire (with sure plug)

Solenoid ratings

C = 24Ω × 0.75A
D = 6Ω × 1.5A

■ Specifications

Nominal dimension		PRDP6*-10/30	PRDP6*-10/50
Maximum working pressure MPa (kgf/cm ²)	Port P, A	13.7 (140)	
	Port T	1.0 (10)	
Secondary control pressure MPa (kgf/cm ²)		0 to 2.9 (0 to 30)	0 to 4.9 (0 to 50)
Reproducibility %		2 or less	
Hysteresis %		5 or less	
Electrical specifications	Rated current mA	700/1, 400	
	Coil resistance Ω	24/6 at 20°C	
	Dither (Recommendable value)	60Hz, 150/300mAP-P	
	Standard amplifier type	C-B10-A ¹⁰⁰ / ₂₀₀ /C-B15-D24	
Mass kg		2.5	

■ Sub-plate

Valve type	Sub-plate type	Connection diameter	Mass
PRDP6	P-DE6R14-0	Rc ¼	1.0kg
	P-DE6G14-0	G ¼	
	P-DE6R38-0	Rc ⅜	1.3kg
	P-DE6G38-0	G ⅜	

When you use a sub-plate, please place an order for the above sub-plate type.

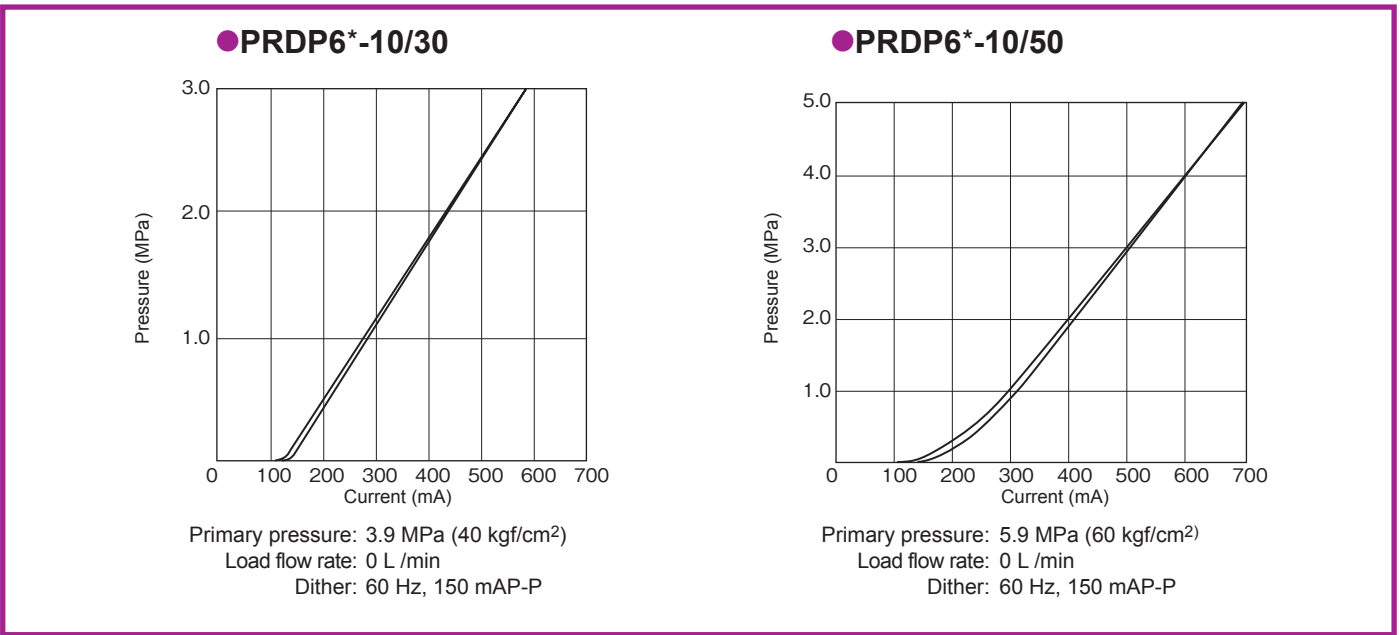
For the dimension drawing, refer to page 11 of the appendix.

■ Accessories

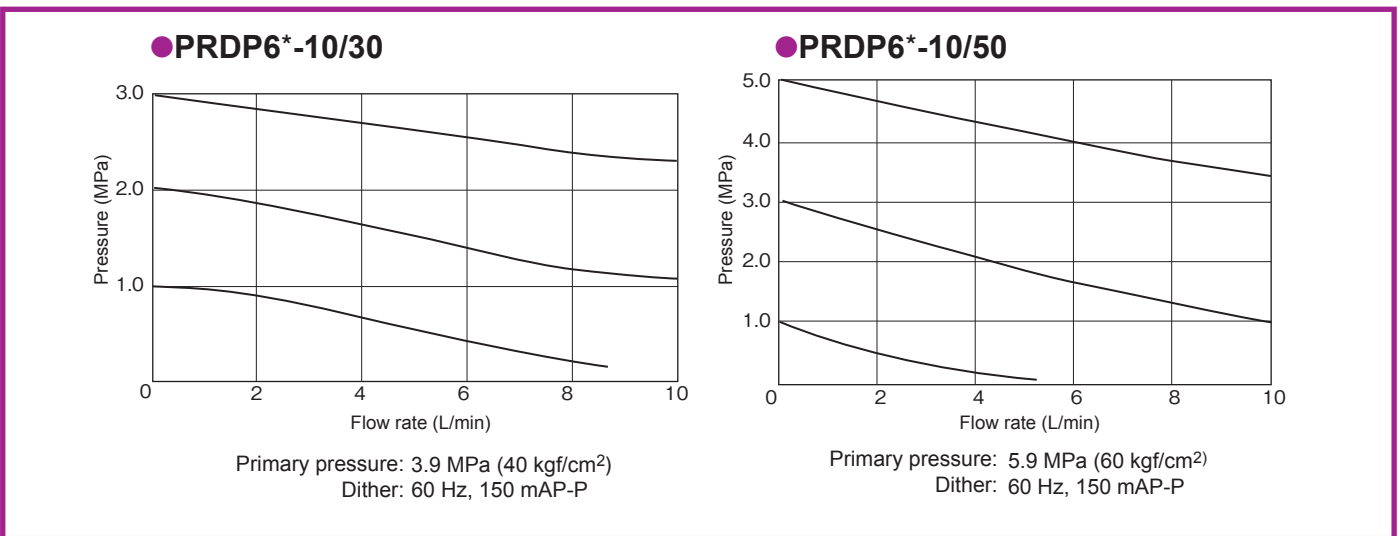
● Mounting bolt

Type	Hexagon socket head cap thread	Quantity	Tightening torque N · m (kgf · cm)
PRDP6	M5 × 50L	4 pcs.	6.9 ± 1.0 (70 ± 10.5)

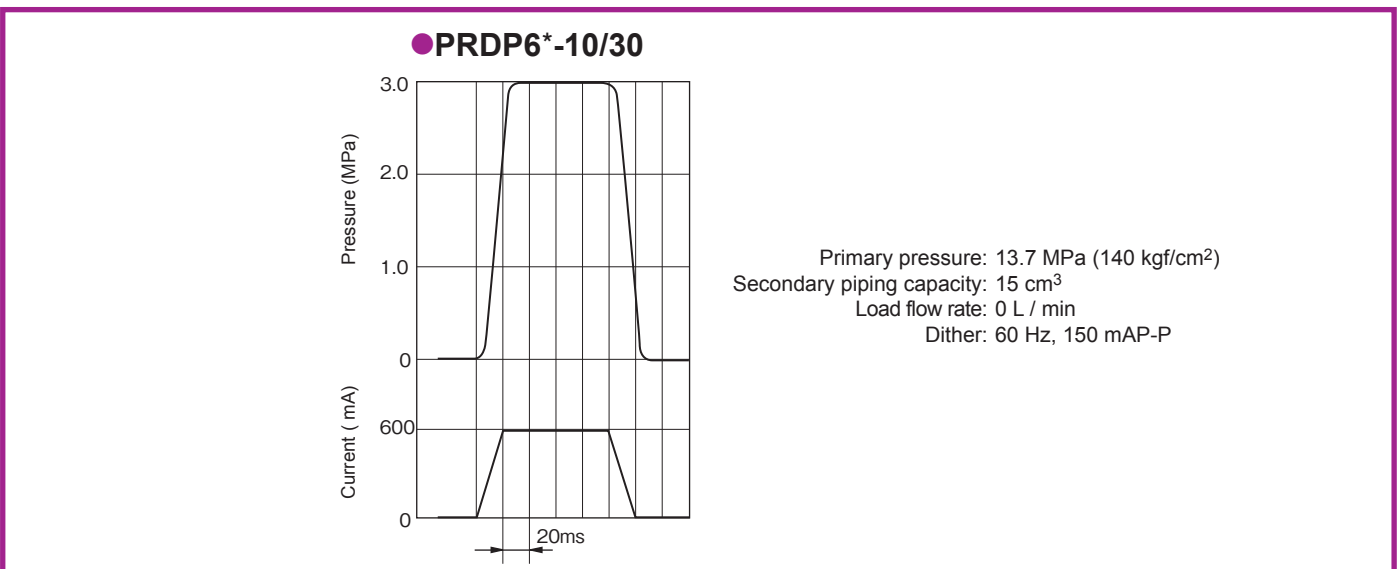
Current - Pressure characteristics (viscosity 25 mm²/s (cSt))



Load pressure – Flow rate characteristics (viscosity 25 mm²/s (cSt))

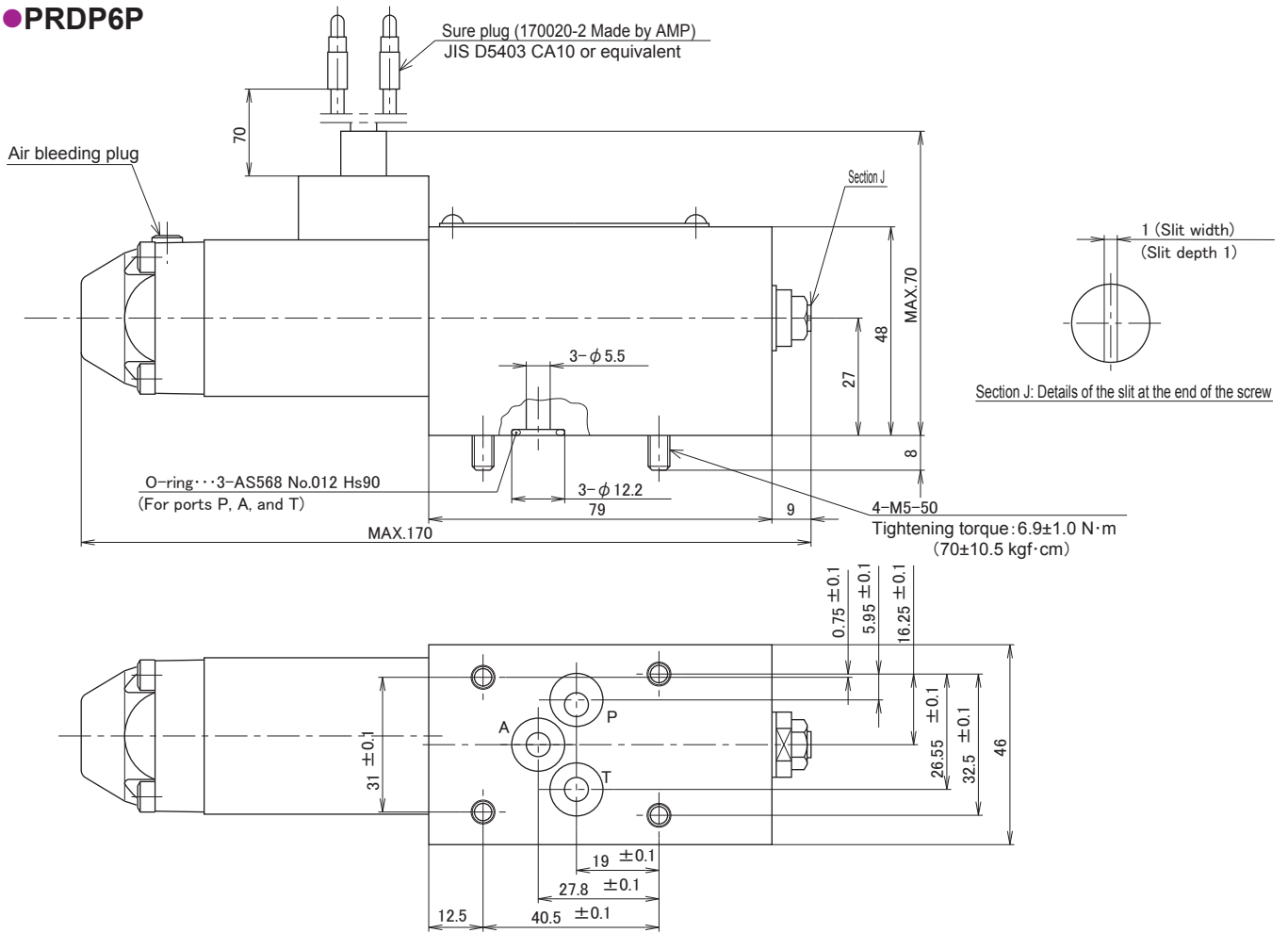


Step response characteristics (viscosity 25 mm²/s (cSt))

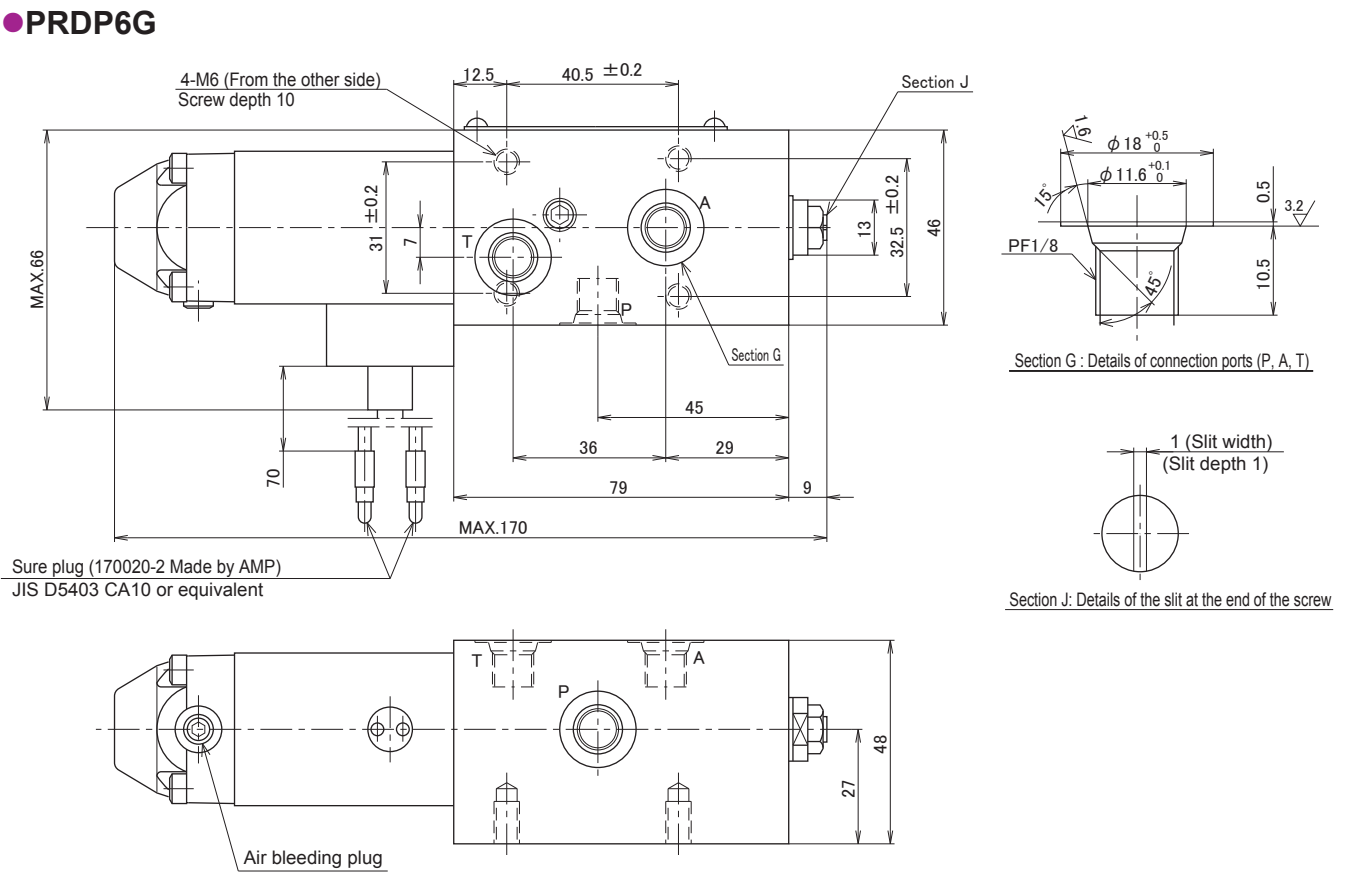


Dimension drawing

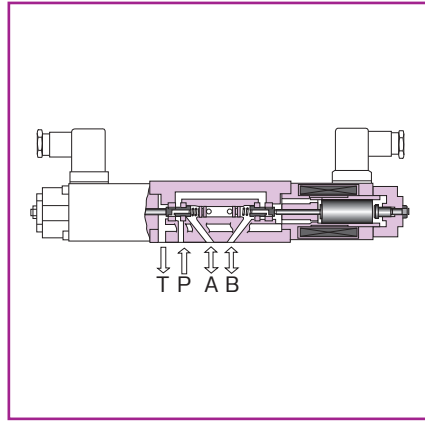
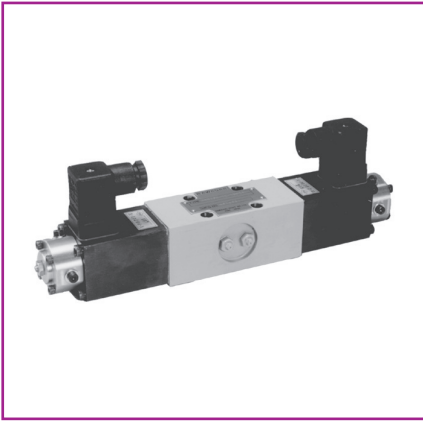
● PRDP6P



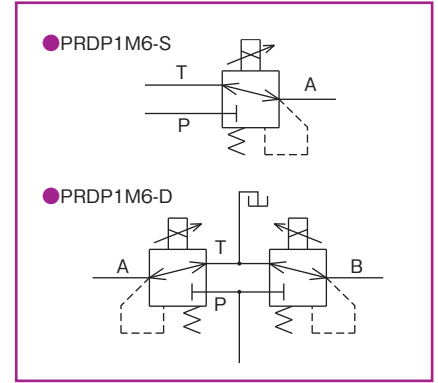
● PRDP6G



Solenoid proportional pilot pressure reducing valve - Direct operated type



● Hydraulic symbols



■ Overview

It consists of the DC proportional solenoid and spool type direct operated pressure reducing valve, and the position of the directional flow regulating valve and allows tilting angle of the variable capacity pump to be remotely controlled at a rate in proportion to the input current.

■ Features

1. Special damping mechanism with a spring realises superior stability even at high pressure of 30.9 MPa (315 kgf/cm²) being applied to the primary side.
2. During the initial adjustment or malfunction in the electrical system, manual operation can be done with the manual pressure adjustment thread.

■ Type indication

PRDP1M 6 P - 10 - D / 20 - AC -

Solenoid proportional type
Direct operated type pilot pressure reducing valve
Nominal dimension
6
Connection method
P = Gasket connection type
Series number: 10
Type of the solenoid
S = Single solenoid type
D = Double solenoid type

Maximum adjustment pressure
15 = 1.5MPa(15kgf/cm²)
20 = 2.0MPa(20kgf/cm²)

Type of hydraulic oil
No symbol = Mineral based hydraulic oil
V = Phosphate ester based hydraulic oil
W = Fatty ester based hydraulic oil
Water-glycol based hydraulic oil
Electric connection symbol
B = DIN connector
C = DIN large connector
Solenoid ratings
A = 33Ω×0.75A
B = 7.2Ω×1.5 A

■ Specifications

Nominal dimension		PRDP1M6-D	PRDP1M6-S
Maximum working pressure MPa (kgf/cm ²)	Port P, A	30.9(315)	
	Port T	1.0(10)	
Working pressure range MPa (kgf/cm ²)		Up to 30.9(315)	
Reproducibility %		2 or less	
Hysteresis %		3 or less	
Electrical specifications	Rated current mA	750/1,500	
	Coil resistance Ω	33//7.2	
	Dither (Recommendable value)	60Hz, 200/350mAP-P	
	Standard amplifier type	CW-B10-A ^① /CW-B15-D24	C-B10-A ^② /C-B15-D24
Mass kg		4.3	3.2

■ Sub-plate

Valve type	Sub-plate type	Connection diameter	Mass
PRDP1M6	P-DE6R14-0	Rc ¹ / ₄	1.0kg
	P-DE6G14-0	G ¹ / ₄	
	P-DE6R38-0	Rc ³ / ₈	1.3kg
	P-DE6G38-0	G ³ / ₈	

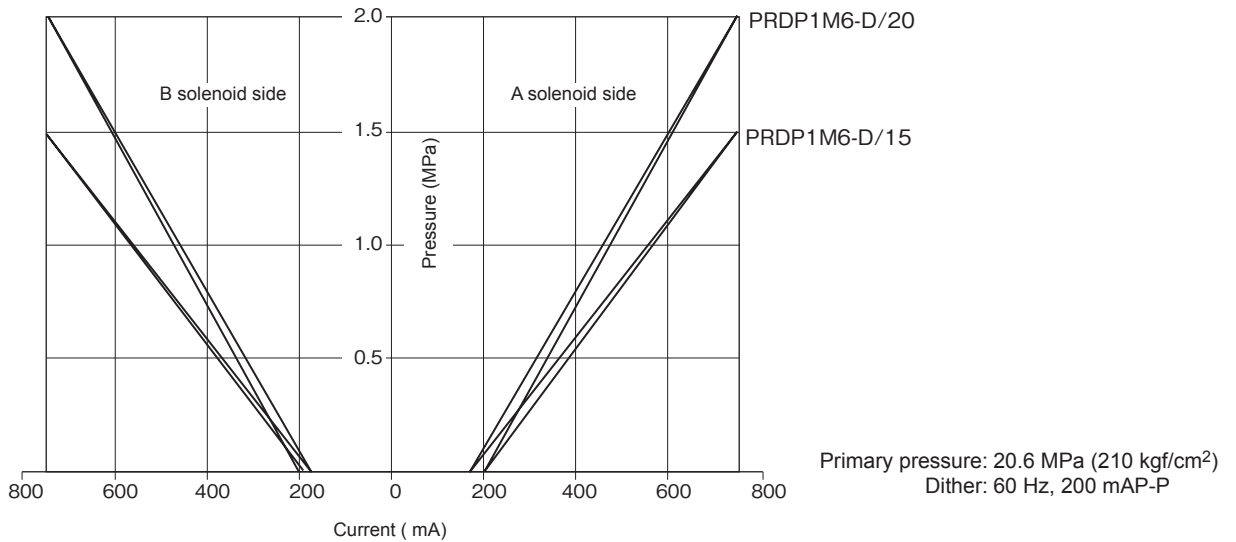
When you use a sub-plate, please place an order for the above sub-plate type. For the dimension drawing, refer to page 11 of the appendix.

■ Accessories

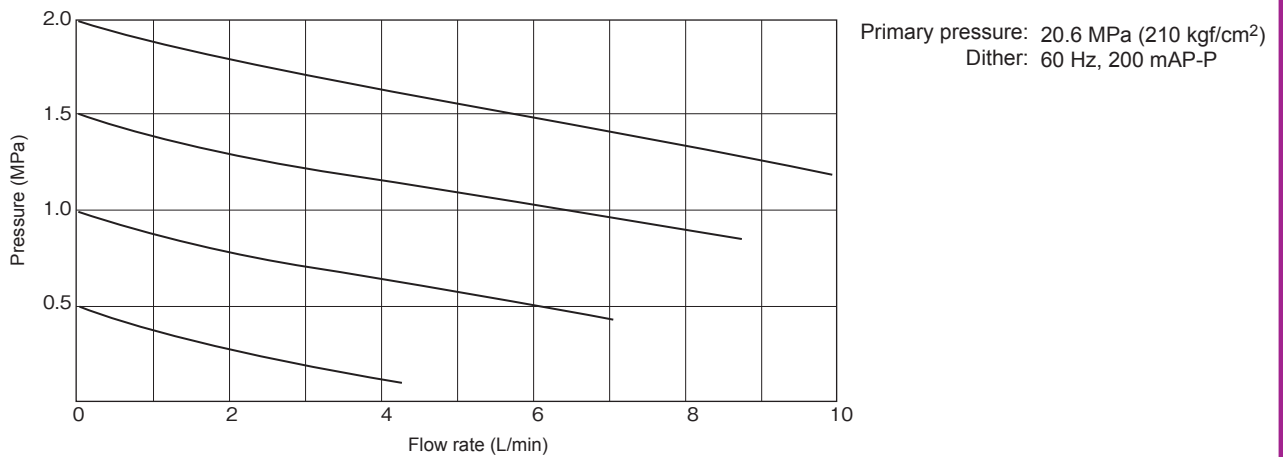
● Mounting bolt

Type	Hexagon socket head cap thread	Quantity	Tightening torque N · m (kgf · cm)
PRDP1M6	M5×50L	4 pcs.	6.9±1.0(70±10.5)

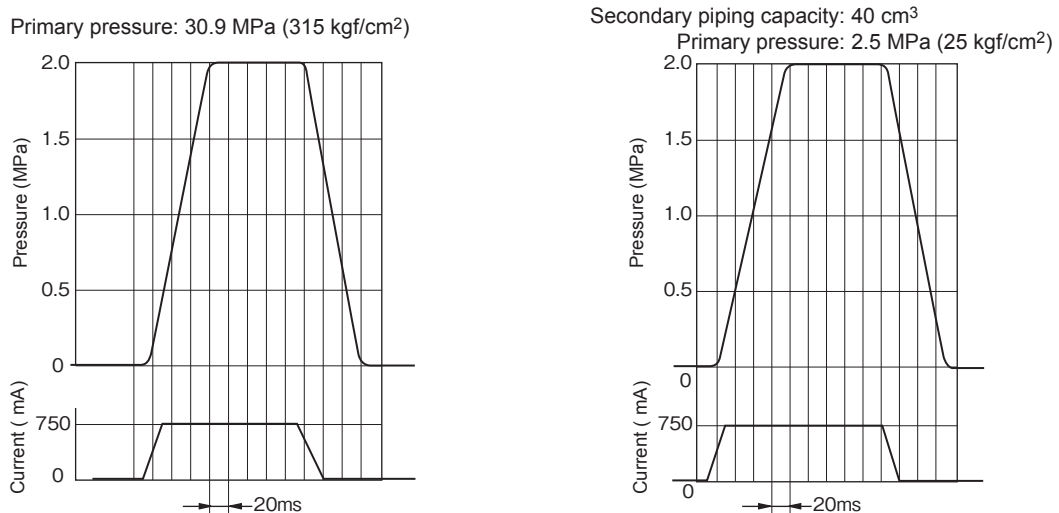
Current - Pressure characteristics (viscosity 25 mm²/s (cSt))



Load pressure – Flow rate characteristics (viscosity 25 mm²/s (cSt))

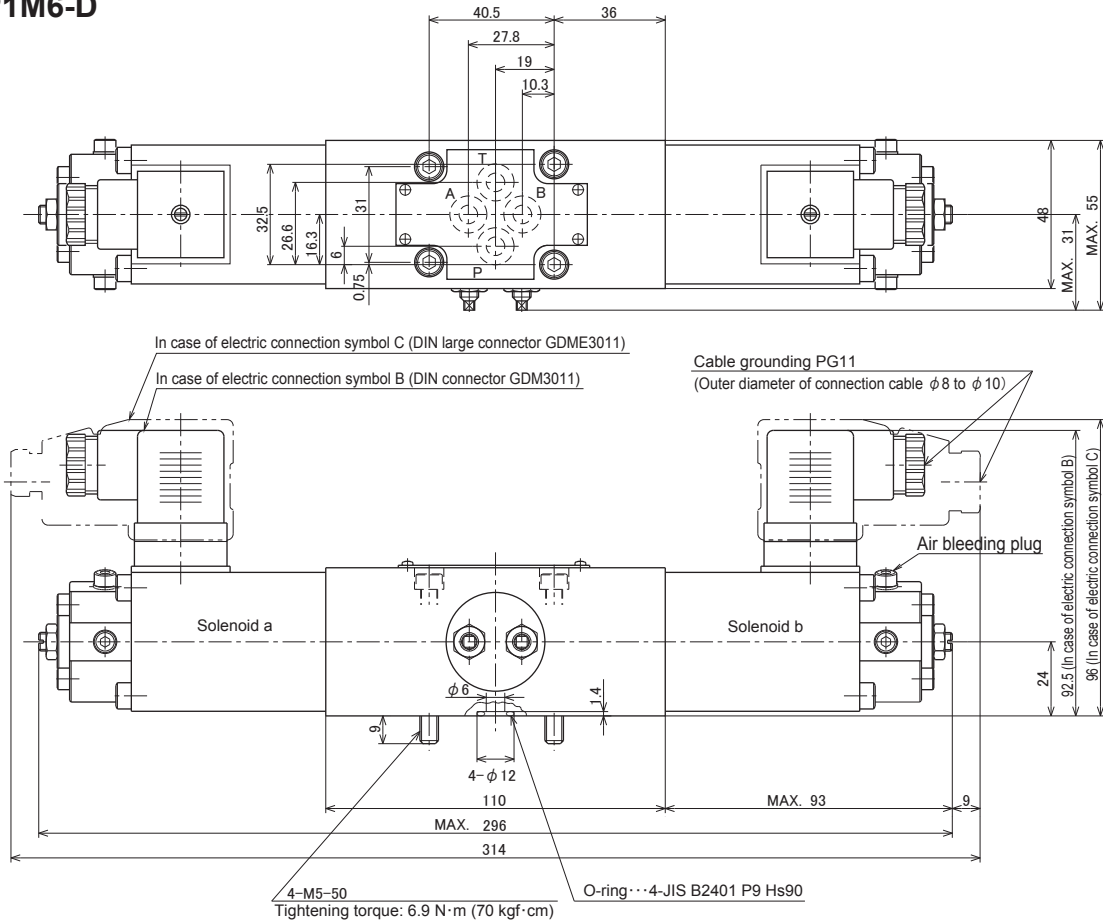


Step response characteristics (viscosity 25 mm²/s (cSt))

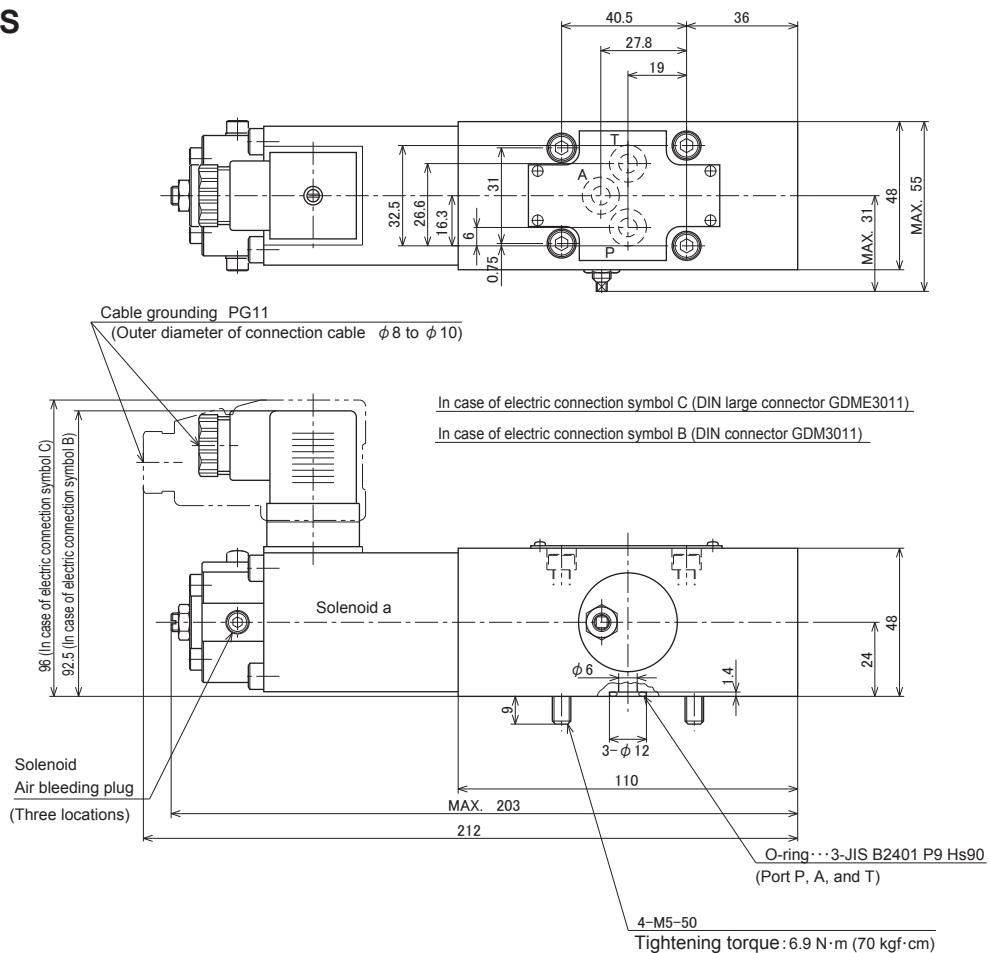


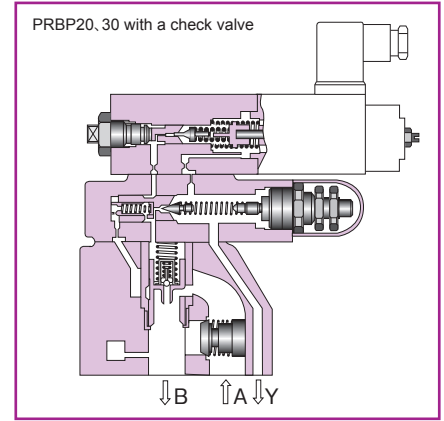
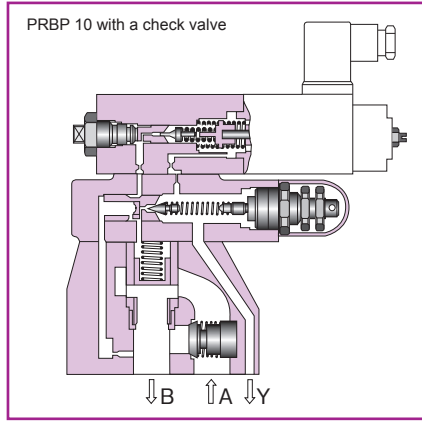
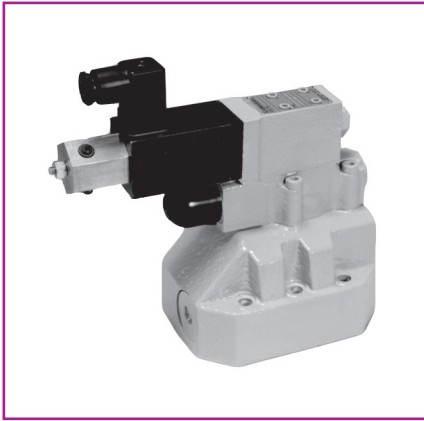
Dimension drawing

● PRDP1M6-D



● PRDP1M6-S





Pressure reducing valve of solenoid proportional balanced piston type

Overview

Pressure reducing valve of solenoid proportional balanced piston type consists of the solenoid proportional pilot relief valve and balanced piston type pressure reducing valve, and allows hydraulic system pressure to be remotely controlled at a given rate in proportion to the input current. In addition, amplifier mounted types are controlled by voltage input.

Features

1. The pilot pressure for the valve is supplied from the primary side, which allows the valve to use pilot flow even when the primary and secondary pressure difference or flow rate increases and provides stable performance. (Nominal dimension 20, 30)
2. The special damping mechanism is used in the solenoid proportional pilot relief valve, even when the primary and secondary pressure drastically changes, superior stability is obtained.
3. The maximum pressure limiting device provides safety measures against abnormal pressure.
4. During the initial adjustment or malfunction in the electrical system, manual operation can be done with the manual pressure adjustment thread on the pilot relief valve.
5. Easy handling amplifier mounted type is also lined up.

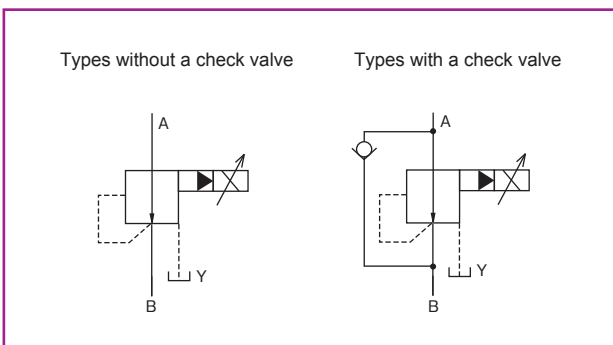
Type indication

PRBP 10 P - 10 / 350 C - EC -

Pressure reducing valve of solenoid proportional balanced piston type
 Nominal dimension
 10, 20, 30
 Connection method
 P = Gasket connection type
 Series number: 10

Type of hydraulic oil
 No symbol = Mineral based hydraulic oil
 V = Phosphate ester based hydraulic oil
 W = Fatty ester based hydraulic oil
 Water-glycol based hydraulic oil
 Electric connection symbol
 B = DIN connector
 C = DIN large connector
 E = Amplifier mounted type
 Solenoid ratings
 E = 14.2Q×0.8A
 Types with/without check valve
 No symbol = Types without the valve
 C = Types with the valve
 Highest adjustment pressure
 50 = 4.9MPa (50kgf/cm²)
 100 = 9.8MPa (100kgf/cm²)
 150 = 14.7MPa (150kgf/cm²)
 250 = 24.5MPa (250kgf/cm²)
 315 = 30.9MPa (315kgf/cm²)
 350 = 34.3MPa (350kgf/cm²)

Hydraulic symbols



Specifications

Nominal dimension		10	20	30
Maximum working pressure MPa (kgf/cm ²)	Ports A, B	34.3 (350)		
	Port Y	1.0 (10) External drain, tank		
Maximum flow rate L/min		80	200	300
Reproducibility %		2 or less		
Hysteresis %		5 or less		
Electrical specifications	Solenoid rated current mA	See the Current - Pressure Characteristics (the following figure).		
	Coil resistance Ω	14.2 at 20°C		
	Dither (Recommendable value)	200HzPWM/200Hz, 200mAP-P		
	In case the amplifier is installed separately	Standard amplifier type	KC-B10/C-B10-A ¹⁰⁰ / ₂₀₀	
	In case of amplifier mounted type	Power source	DC24V	
Command voltage		0 to 5V		
Mass kg	PRBP*P-10/*-E ^B / _C	6.4	8.3	11.1
	PRBP*P-10/*-EE	6.9	8.8	11.6

Sub-plate

Valve type	Sub-plate type	Connection diameter	Mass
PRBP10	P-CHY10R14-0	Rc 1/4	2.1kg
	P-CHY10G14-0	G 1/4	
	P-CHY10R38-0	Rc 3/8	
	P-CHY10G38-0	G 3/8	
	P-CHY10R12-0	Rc 1/2	
	P-CHY10G12-0	G 1/2	
PRBP20	P-CHY20R34-0	Rc 3/4	4.4kg
	P-CHY20G34-0	G 3/4	
	P-CHY20R1-0	Rc 1	
	P-CHY20G1-0	G1	
PRBP30	P-CHY30R54-0	Rc 1 1/4	6.9kg
	P-CHY30G54-0	G 1 1/4	
	P-CHY30R32-0	Rc 1 1/2	
	P-CHY30G32-0	G 1 1/2	

Accessories

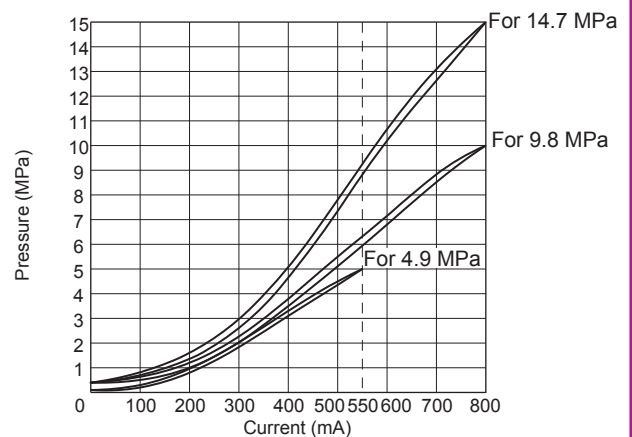
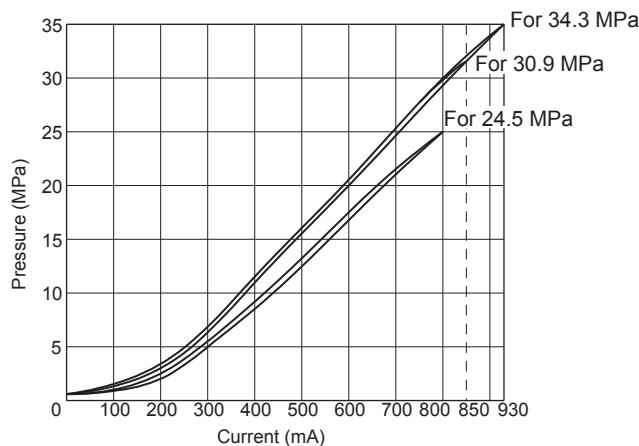
Mounting bolt

Type	Hexagon socket head cap thread	Quantity	Tightening torque N · m (kgf · cm)
PRBP10	M10×40L	4 pcs.	56.8±8.5(580±87)
PRBP20	M10×50L	4 pcs.	
PRBP30	M10×60L	6 pcs.	

When you use a sub-plate, please place an order for the above sub-plate type. For the dimension drawing, refer to page 6, and 7 of the appendix.

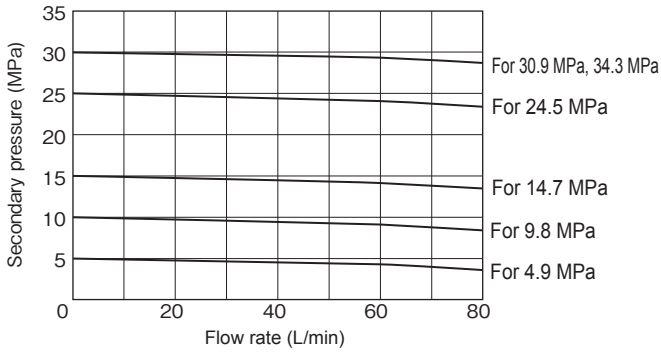
Current - Pressure characteristics (viscosity 25 mm²/s (cSt))

PRBP*

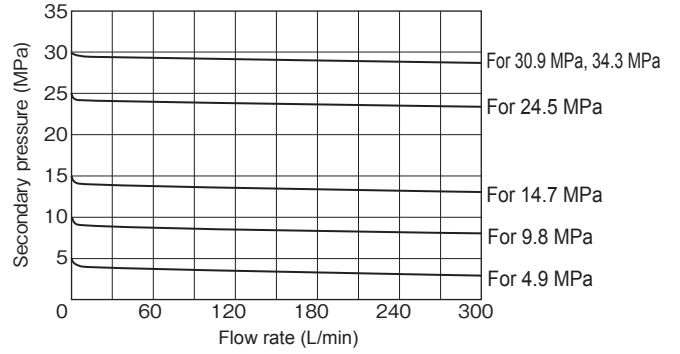


Pressure override characteristics (viscosity 25 mm²/s (cSt))

● PRBP10

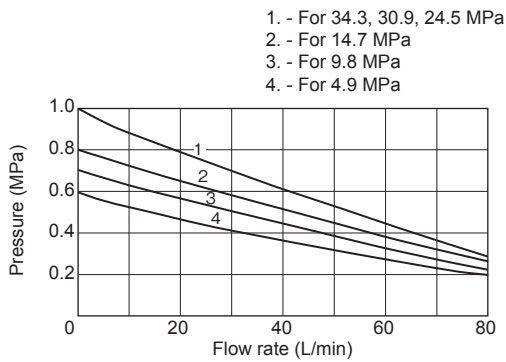


● PRBP20, 30

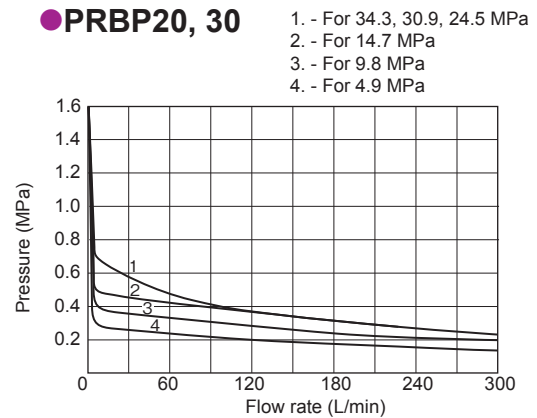


Secondary minimum adjustment pressure characteristics (viscosity 25 mm²/s (cSt)) Input current: 0

● PRBP10

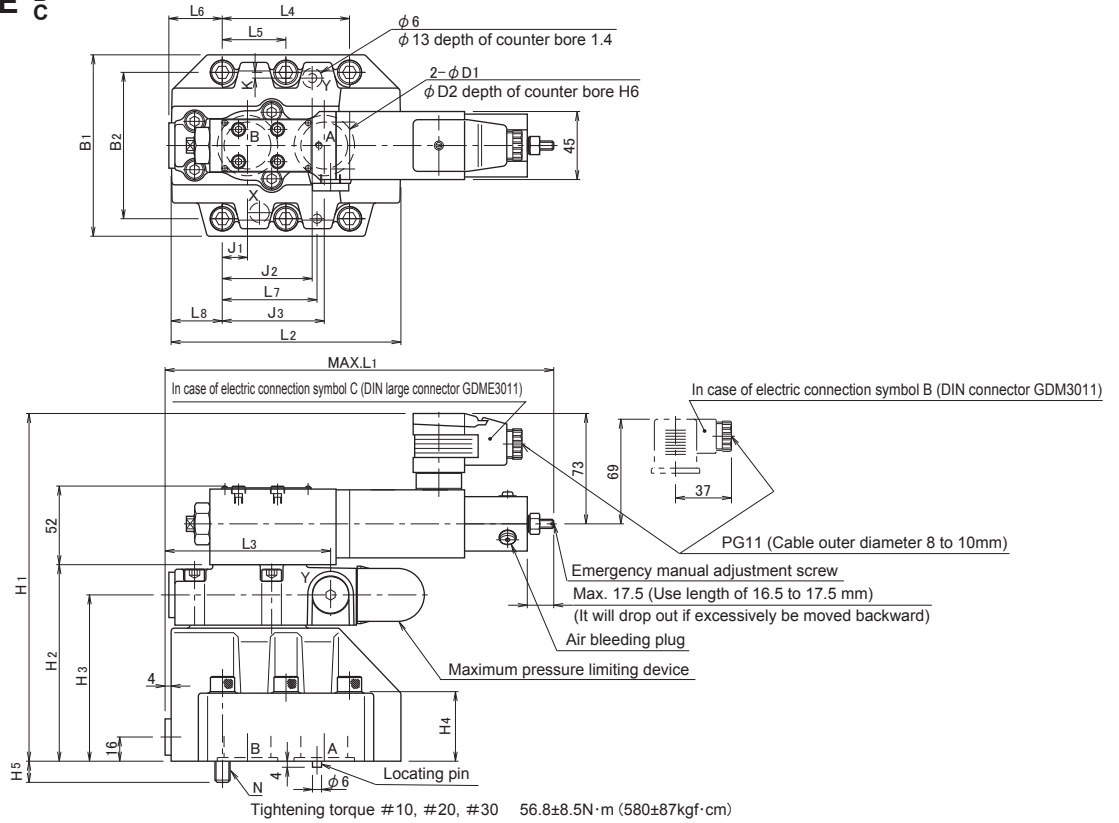


● PRBP20, 30

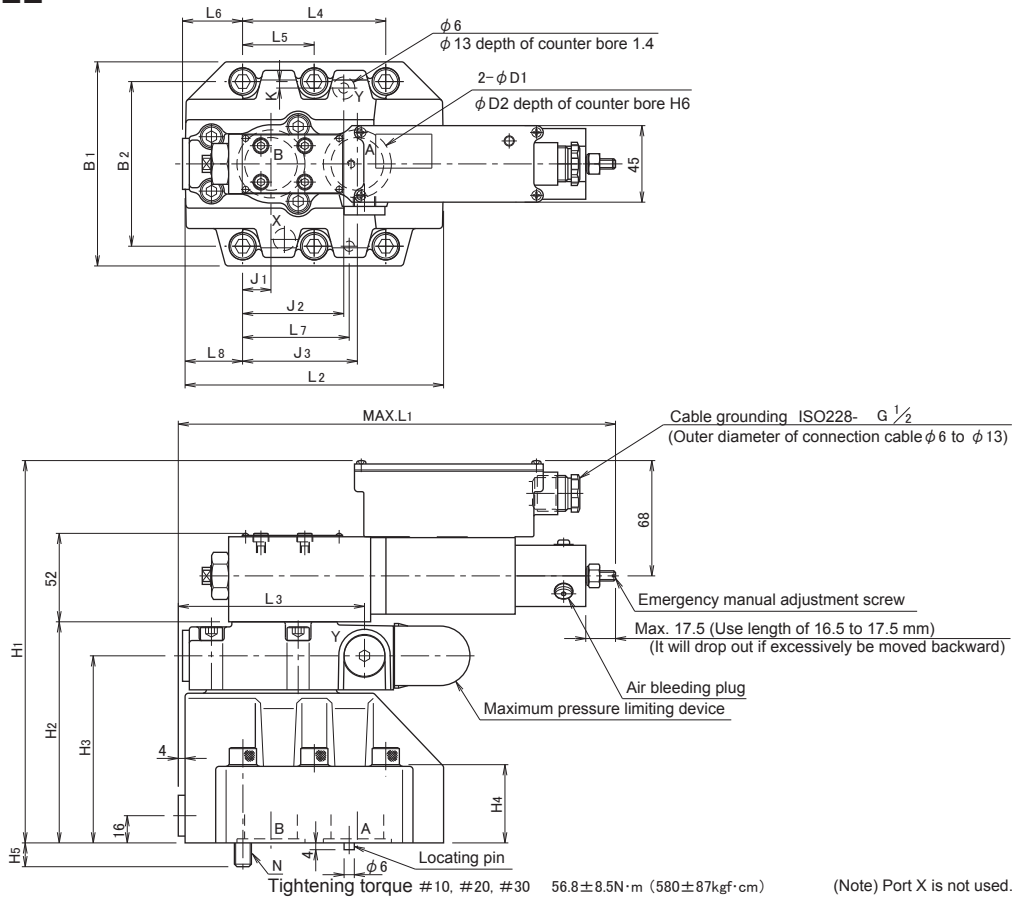


Dimension drawing

● PRBP 10/20/30 P-10/*-E B C

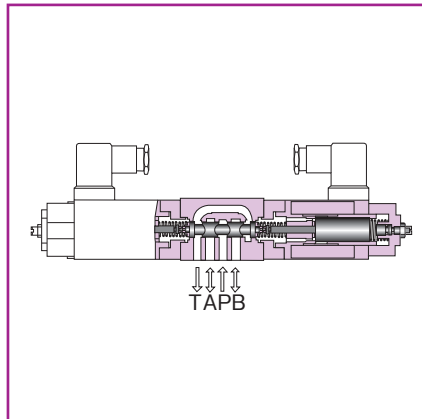
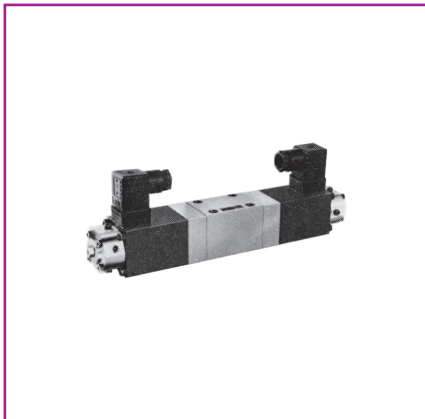
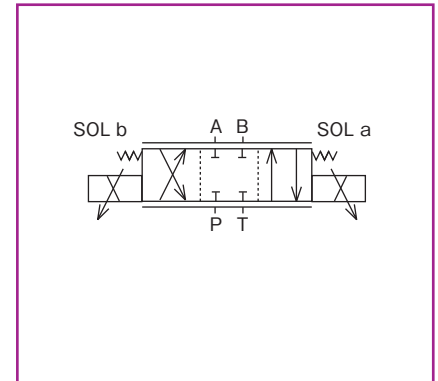


● PRBP 10/20/30 P-10/*-EE



Nominal dimension	B1	B2	N	D1	D2	H1A	H1B	H2	H3	H4	H5	H6	L1	L2	L3	L4	L5	L6	L7	L8	O-ring JIS B2401	
																					A and B ports	X and Y ports
10	85	66.7	4-M10	15	22	212	207	112	92	28	12	1.8	256	104	108	42.9	—	38.5	31.8	35.5	P18, Hs90	P10, Hs90
20	102	79.4		25	35	222	217	122	102	38	12		255	121	107	60.3		40.5	44.5	33.5	G30, Hs90	
30	120	96.8		6-M10	31	40	230	225	130	110	46		14	257	153	109.8		84.2	42.1	35.5	62.7	
Nominal dimension	J1	J2	J3	K																		
10	7.2	21.5	35.8	7.9																		
20	11.1	39.7	49.2	6.4																		
30	16.7	59.5	67.5	3.8																		

Hydraulic symbols



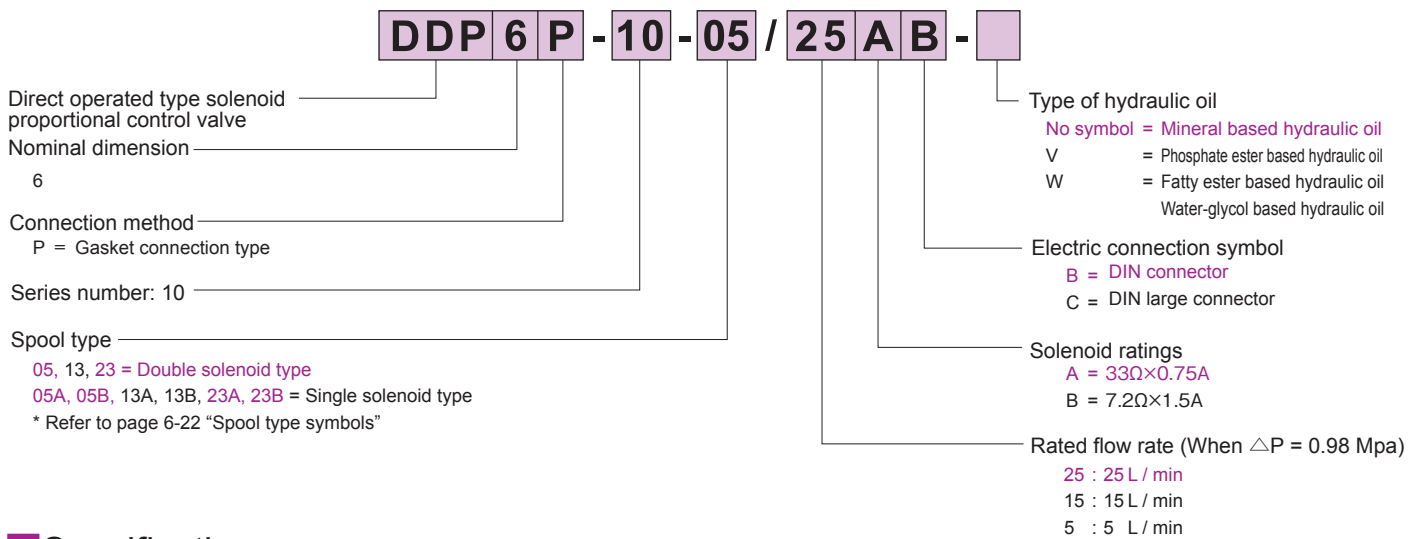
Overview

Direct operated type solenoid proportional control valve consists of DC proportional solenoids and spring balance type direct operated spool valve. The valve operating direction is selected by energizing either one of the two solenoids, and the flow amount is controlled by the open area of the spool that moves in proportion to the input current.

Features

1. During the initial adjustment or malfunction in the electrical system, manual operation can be done with the manual adjustment thread.
2. The structure is simple and maintenance is easy.

Type indication



Specifications

Nominal dimension		6
Maximum working pressure MPa (kgf/cm ²)	Port P, A, B	30.9 (315)
	Port T	1.0 (10)
Rated flow rate L/min ΔP = 0.98 MPa per 1 round		25/15/5
Maximum differential pressure (Per one round) MPa (kgf/cm ²)		5.9 (60)
Maximum flow rate L/min		25/20/13
Reproducibility %		2
Hysteresis %		3
Step response ms	0→100% input	80
	100→0% input	50
Electrical specifications	Solenoid rated current mA	750/1,500
	Coil resistance Ω	33/7.2 at 20°C
	Dither (Recommendable value)	60Hz, 200/350mAP-P
	Standard amplifier type	C-B10-A ¹⁰⁰ / ₂₀₀ /C-B15-D24
Mass kg	Double solenoid type	2.6
	Single solenoid type	1.8

Sub-plate

Valve type	Sub-plate type	Connection diameter	Mass
DDP6	P-DE6R14-0	Rc 1/4	1.0kg
	P-DE6G14-0	G 1/4	
	P-DE6R38-0	Rc 3/8	1.3kg
	P-DE6G38-0	G 3/8	

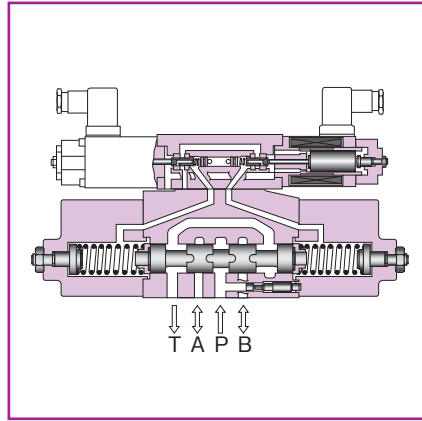
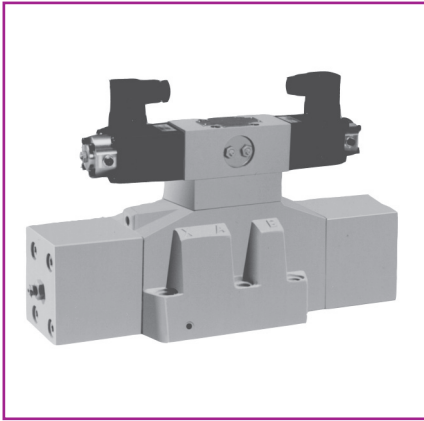
When you use a sub-plate, please place an order for the above sub-plate type.

For the dimension drawing, refer to page 11 of the appendix.

Accessories

Mounting bolt

Type	Hexagon socket head cap thread	Quantity	Tightening torque N · m (kgf · cm)
DDP6	M5×50L	4 pcs.	6.9 ± 1.0 (70 ± 10.5)



Overview

2-stage amplifier type solenoid proportional control valve consists of proportional solenoid pilot pressure reducing valve and pilot pressure - spring balance type spool valve. The valve operating direction is selected by energizing either one of the two solenoids, and flow rate is controlled by the open area of the spool that moves in proportion to the input current.

Features

1. The right and left secondary pressure of the pilot valve can be adjusted independently and the spring of the main valve spool can be adjusted externally. The valve can provide even flow rate for the left and right sides.
2. Special damping mechanism with a spring realises superior stability even when the primary pilot pressure is as high as 30.9 MPa (315 kgf/cm²).
3. The selection of external/internal pilot can be easily implemented by changing the selection plug.

Type indication

DHP 16 P - 10 - 05 / 180 E - A C -

2-stage amplifier type solenoid proportional control valve

Nominal dimension
16, 22

Connection method
P = Gasket connection type

Series number: 10

Spool type

Type of hydraulic oil

- No symbol = Mineral based hydraulic oil
- V = Phosphate ester based hydraulic oil
- W = Fatty ester based hydraulic oil
- Water-glycol based hydraulic oil

Electric connection symbol

- B = DIN connector
- C = DIN large connector

Solenoid ratings

- A = 33Ω×0.75A
- B = 7.2Ω×1.5A

Pilot drain type

- No symbol = external pilot, external drain
- E = internal pilot, external drain
- ET = internal pilot, internal drain
- T = external pilot, internal drain

Rated flow rate (When ΔP = 0.98 Mpa)

- 16 size 35 : 35 L / min
- 100 : 100 L / min
- 180 : 180 L / min
- 22 size 300 : 300 L / min

Spool type	Hydraulic symbols
Double solenoid type	
	05
	23
Single solenoid type	
	05A
	23A

Specifications

Nominal dimension		16	22
Maximum working pressure MPa (kgf/cm ²)	Ports P, A, B, and X	30.9 (315)	
	Ports T	External drain	24.5 (250)
		Internal drain	1.0 (10)
	Ports Y	1.0 (10)	
Rated flow rate L/min (When valve pressure drop amount of $\Delta P = 0.98$ MPa)		180, 100, 35	300
Working pressure range MPa (kgf/cm ²)		2.5 to 30.9 (25 to 315)	
Lowest pilot pressure MPa (kgf/cm ²)		2.5 (25)	
Reproducibility %		2 or less	
Hysteresis %		3 or less	
Electrical specifications	Solenoid rated current mA	750/1,500	
	Coil resistance Ω	33/7.2 at 20°C	
	Dither (Recommendable value)	60Hz, 200/350 mAP-P	
	Standard amplifier type	C-B10-A ¹⁰⁰ / ₂₀₀ /C-B15-D24 (Single solenoid type) CW-B10-A ¹⁰⁰ / ₂₀₀ /CW-B15-D24 (Double solenoid type)	
Mass kg	Double solenoid type	15	22.5
	Single solenoid type	12	17.5

Sub-plate

Valve type	Sub-plate type	Connection diameter	Mass
DHP16	P-DEH16R34-0	Rc ³ / ₄	7.0kg
	P-DEH16G34-0	G ³ / ₄	
	P-DEH16R1-0	Rc 1	14.5kg
	P-DEH16G1-0	G1	
DHP22	P-DEH22R1-0	Rc 1	11kg
	P-DEH22G1-0	G1	
	P-DEH22R54-0	Rc1 ¹ / ₄	24kg
	P-DEH22G54-0	G1 ¹ / ₄	
	P-DEH22R32-0	Rc1 ¹ / ₂	
	P-DEH22G32-0	G1 ¹ / ₂	

When you use a sub-plate, please place an order for the above sub-plate type.
For the dimension drawing, refer to page 9, 10, and 11 of the appendix.

Accessories

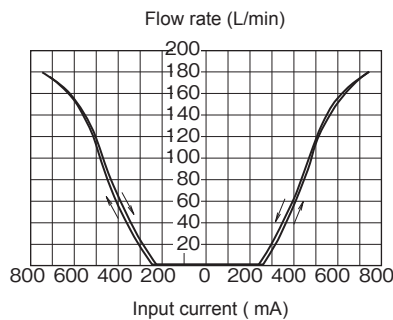
Mounting bolt

Type	Hexagon socket head cap thread	Quantity	Tightening torque N · m (kgf · cm)
DHP16	M6 ×55L	2 pcs.	11.8 ± 1.7 (120 ± 18)
	M10×60L	4 pcs.	56.8 ± 8.5 (580 ± 87)
DHP22	M12×60L	6 pcs.	98.0 ± 14.7 (1000 ± 150)

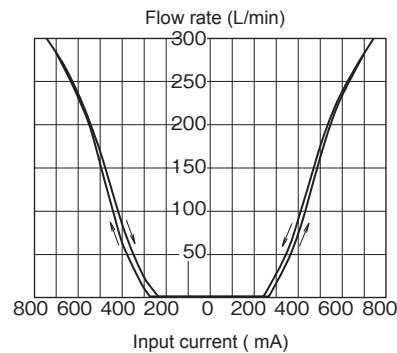
Current - Flow rate characteristics (viscosity 25 mm²/s (cSt))

Primary pressure: 20.6 MPa (210 kgf/cm²), Dither: 60 Hz, 200 to 250 mAP-P, Amount of pressure drop: 0.98 MPa (10 kgf/cm²) Internal pilot, External drain

DHP16



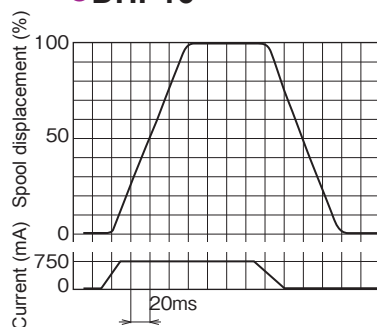
DHP22



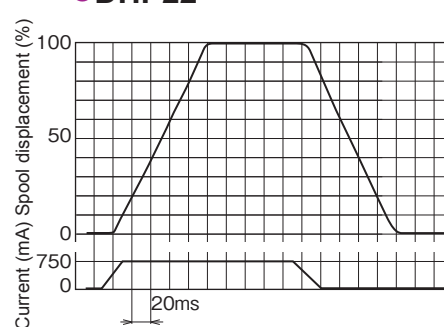
Step response characteristics (viscosity 25 mm²/s (cSt))

Primary pressure: 20.6 MPa (210 kgf/cm²), Internal pilot, External drain

DHP16

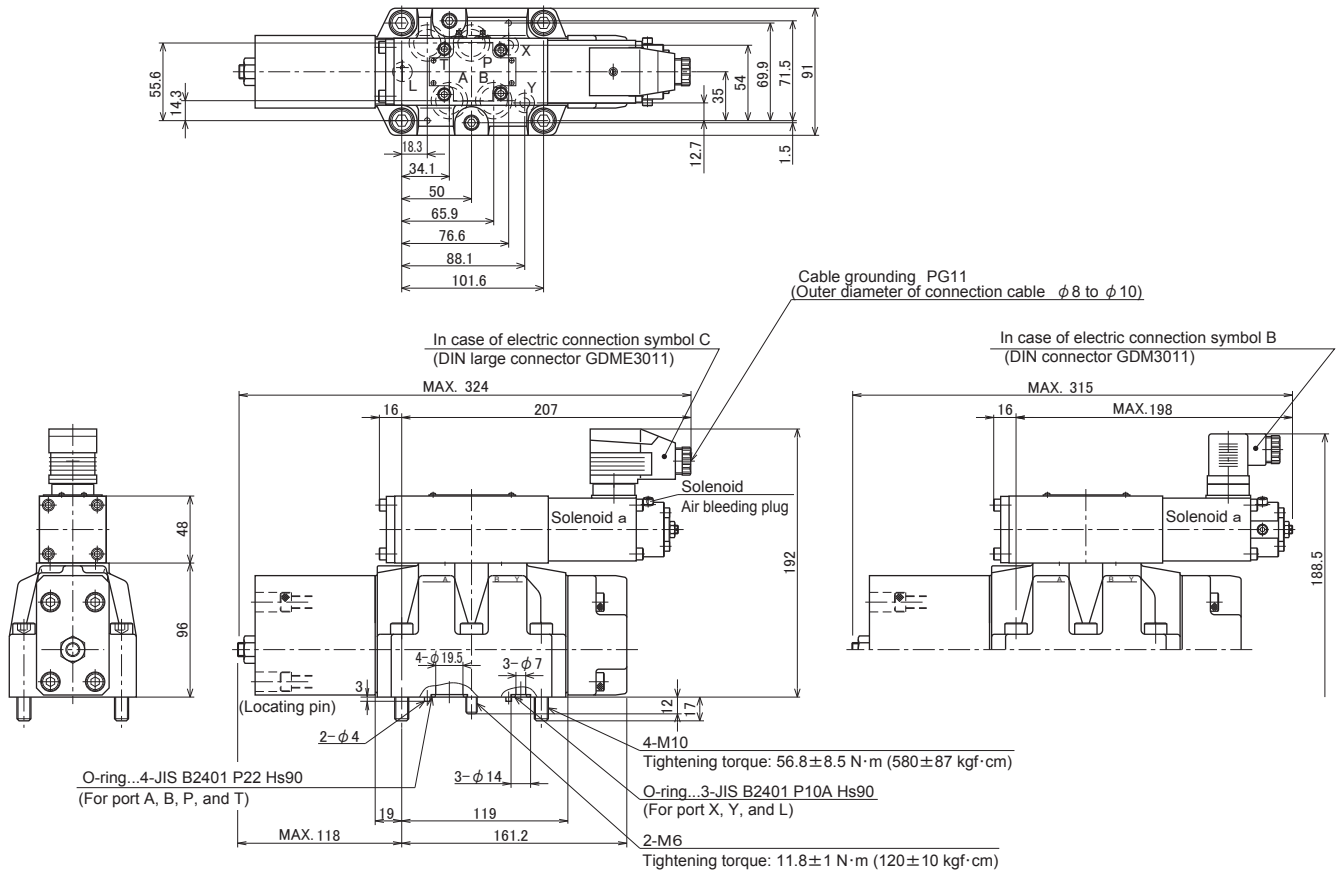


DHP22

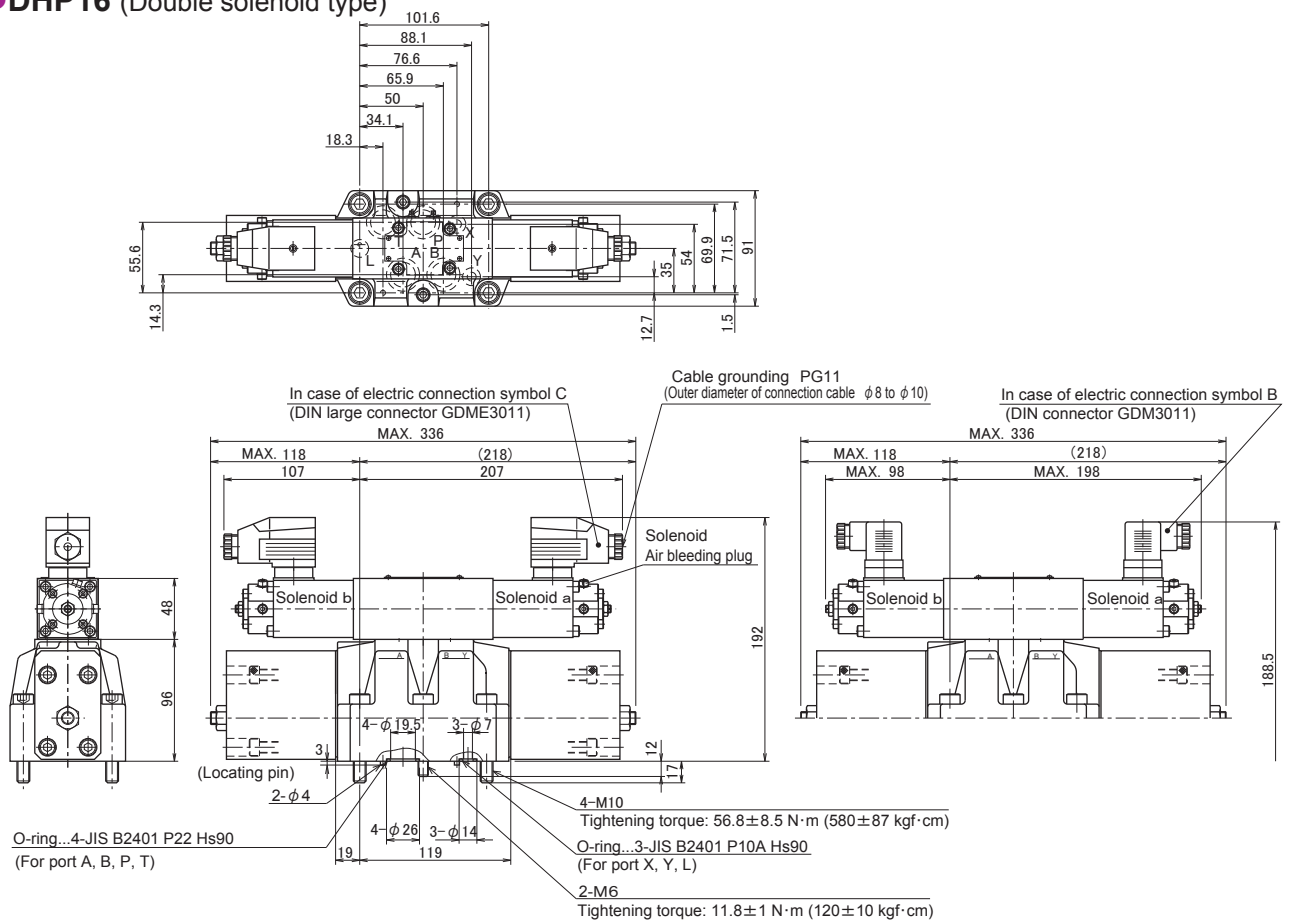


Dimension drawing

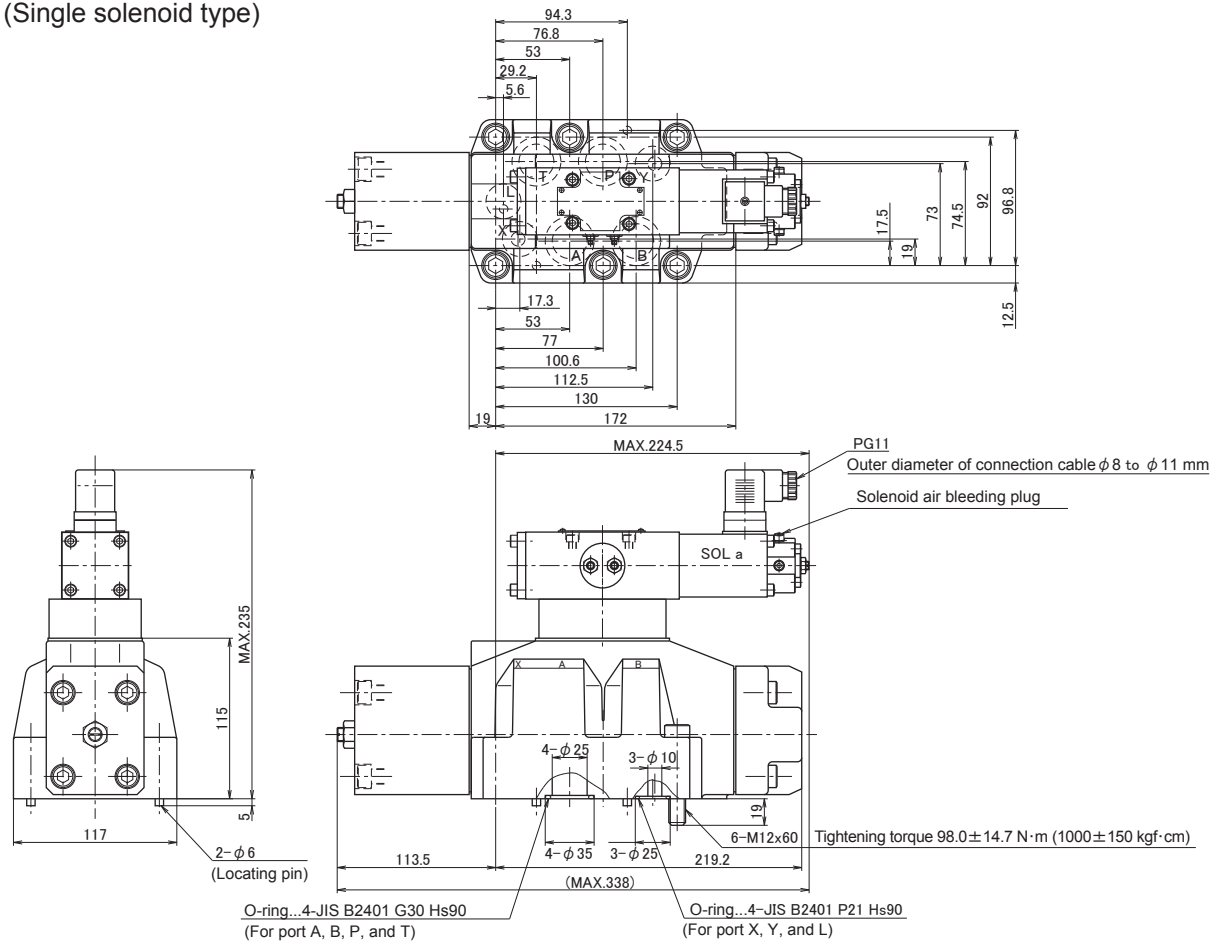
●DHP16 (Single solenoid type)



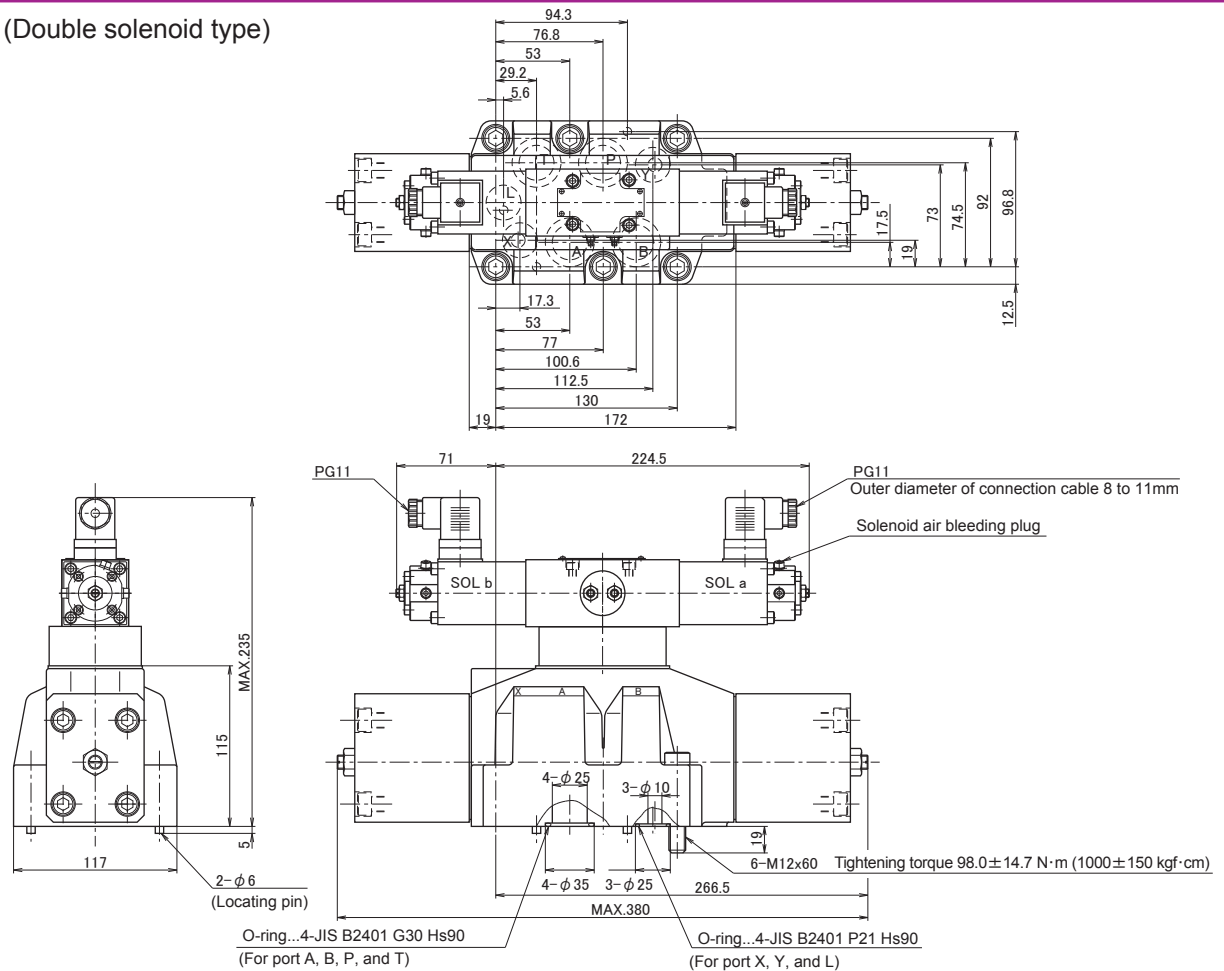
●DHP16 (Double solenoid type)

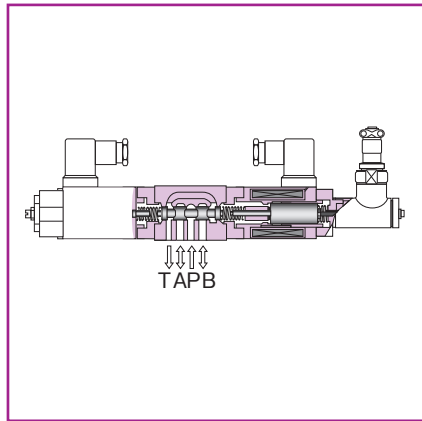
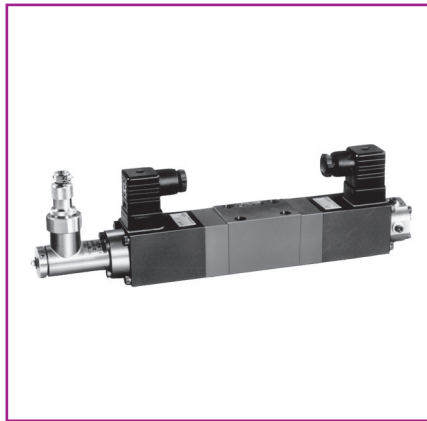


● **DHP22** (Single solenoid type)

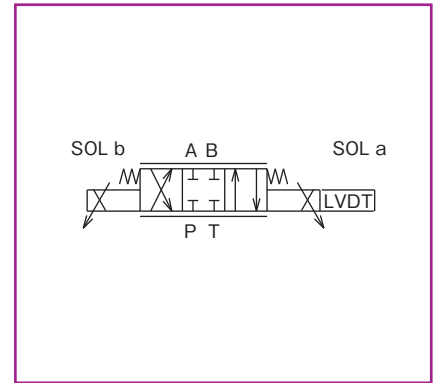


● **DHP22** (Double solenoid type)





● Hydraulic symbols



■ Overview

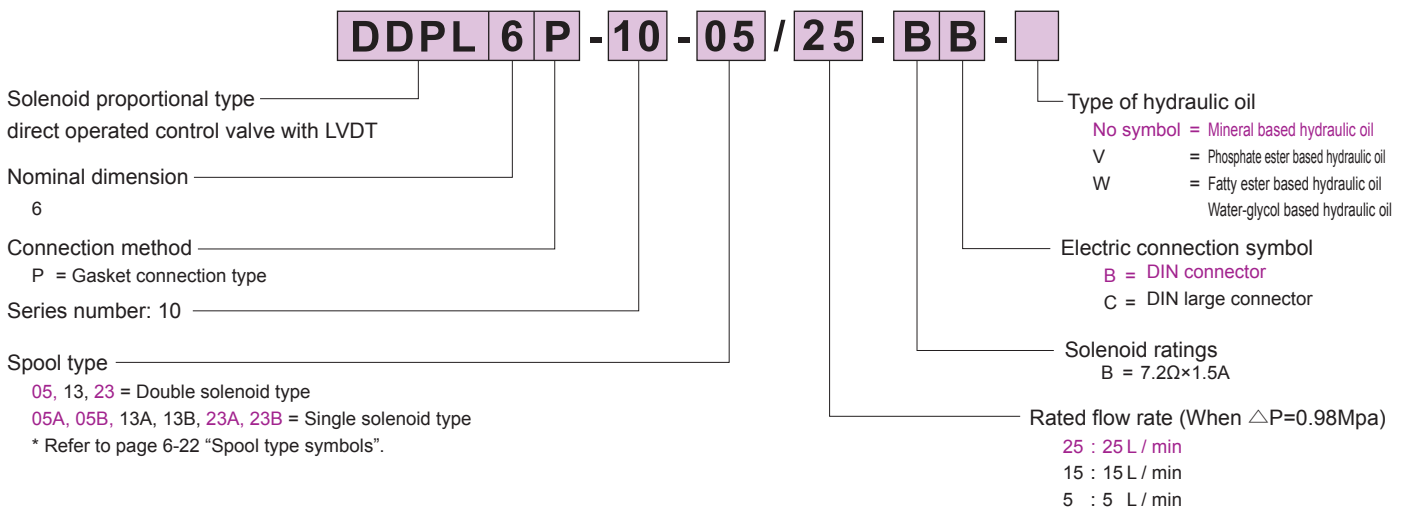
Direct operated type solenoid proportional control valve consists of DC proportional solenoid with differential transformer (LVDT) and spring balance type spool valve, and spool displacement amount is detected by LVDT to make minor feedback.

The valve is used with a special controller to allow operating direction and flow rate to be controlled in proportion to the controller input voltage.

■ Features

1. It has high response and high accuracy, and high performance equivalent to those of a simple servo valve.
2. The dead zone for flow rate adjacent to the neutral point is small.
3. The structure is simple and maintenance is easy.

■ Type indication



■ Sub-plate

Valve type	Sub-plate type	Connection diameter	Mass
DDPL6	P-DE6R14-0	Rc $\frac{1}{4}$	1.0kg
	P-DE6G14-0	G $\frac{1}{4}$	
	P-DE6R38-0	Rc $\frac{3}{8}$	1.3kg
	P-DE6G38-0	G $\frac{3}{8}$	

When you use a sub-plate, please place an order for the above sub-plate type.
For the dimension drawing, refer to page 11 of the appendix.

■ Accessories

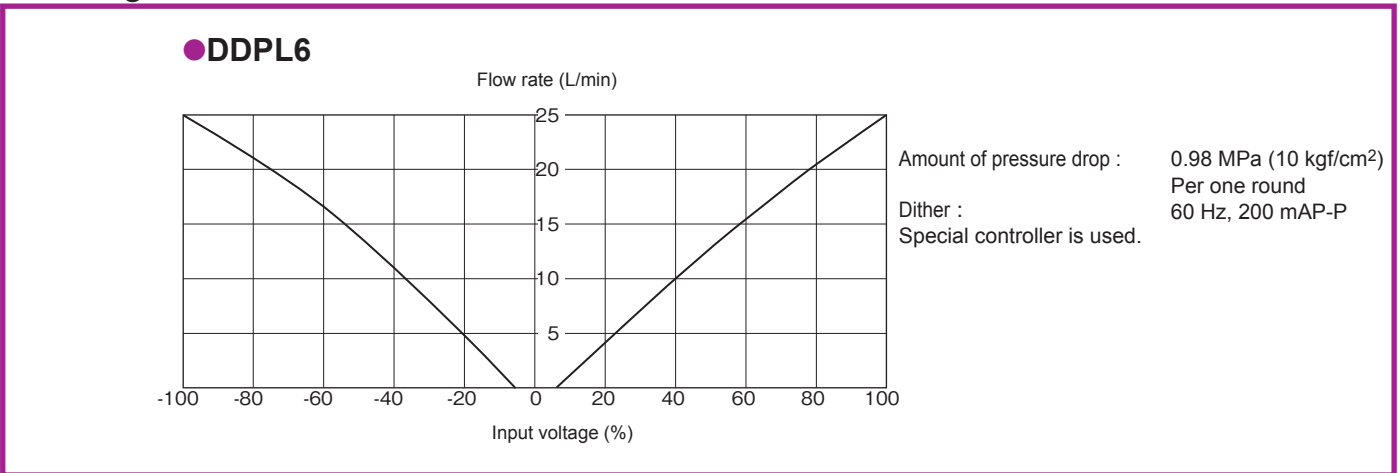
● Mounting bolt

Type	Hexagon socket head cap thread	Quantity	Tightening torque N · m (kgf · cm)
DDPL6	M5×50L	4 pcs.	6.9±1.0 (70±10.5)

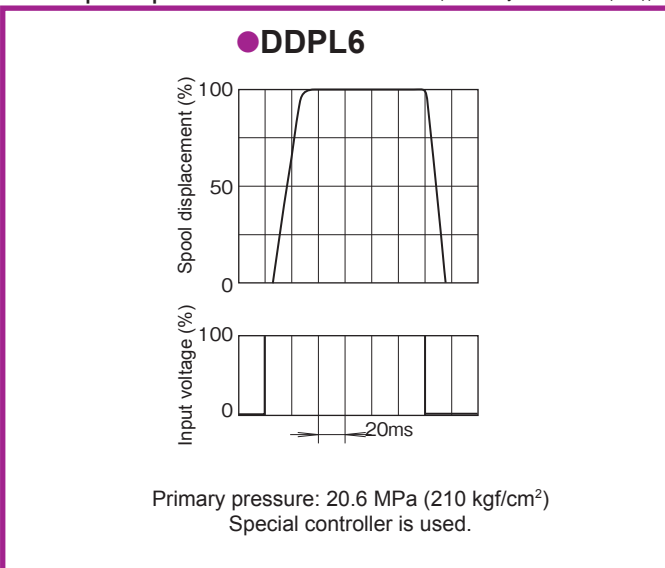
Specifications

Nominal dimension		6
Maximum working pressure MPa (kgf/cm ²)	Port P, A, B	30.9 (315)
	Port T	1.0 (10)
Rated flow rate L/min $\Delta P=0.98$ MPa per 1 round		25/15/5
Maximum differential pressure (Per one round) MPa (kgf/cm ²)		5.9 (60)
Maximum flow rate L/min		30/25/18
Reproducibility %		1 or less
Hysteresis %		1 or less
Step response ms	0→100% input	30
	100→0% input	18
Frequency response Hz ($\pm 2\%$ input)	-3dB	20
	90 degree delay	22
Electrical specifications	Solenoid rated current mA	1,500
	Coil resistance Ω	7.2 at 20°C
	Dither (Recommendable value)	60Hz, 200mAP-P
	Standard amplifier type	CFW-B15-D24
Mass kg	Double solenoid type	3.2
	Single solenoid type	2.3

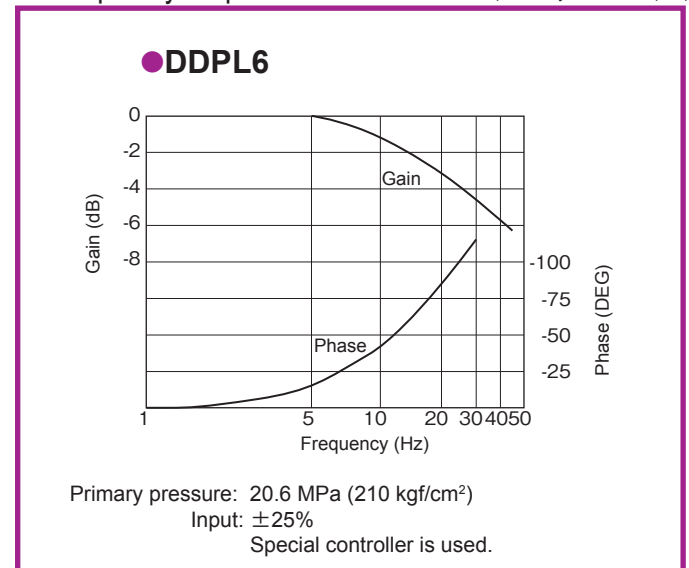
Voltage - Flow rate characteristics (viscosity 25 mm²/s (cSt))



Step response characteristics (viscosity 25 mm²/s (cSt))

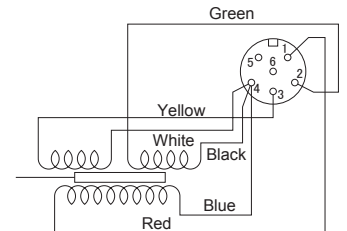
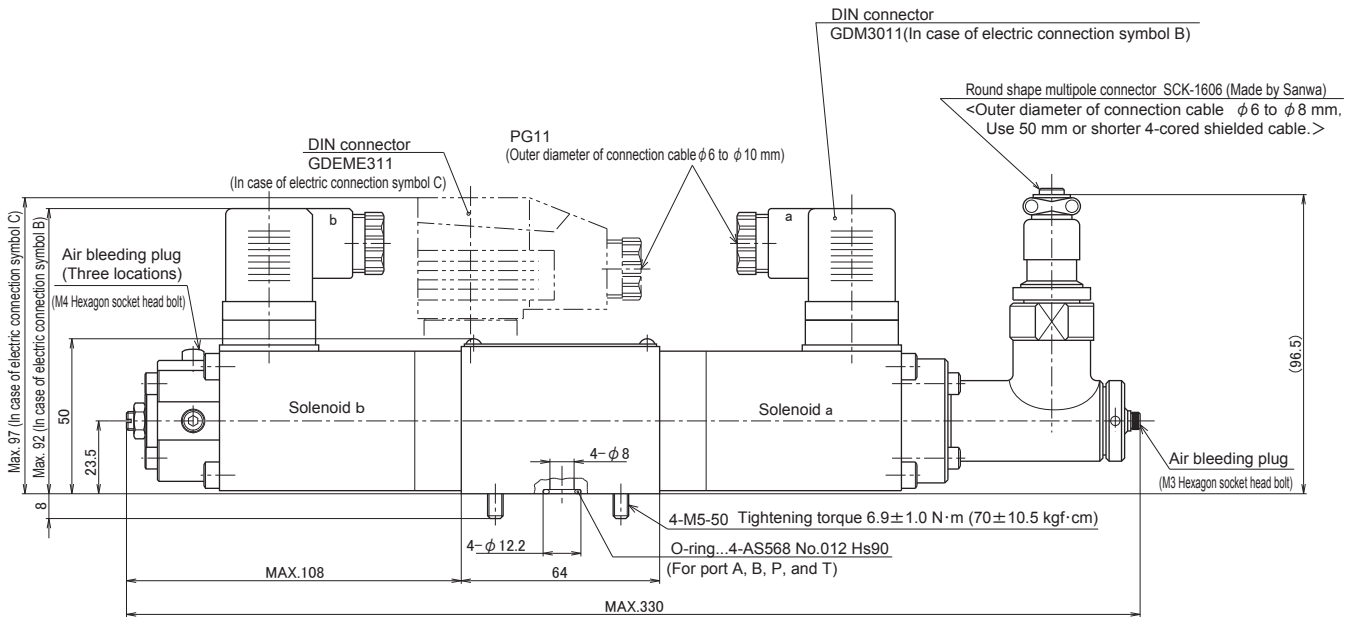
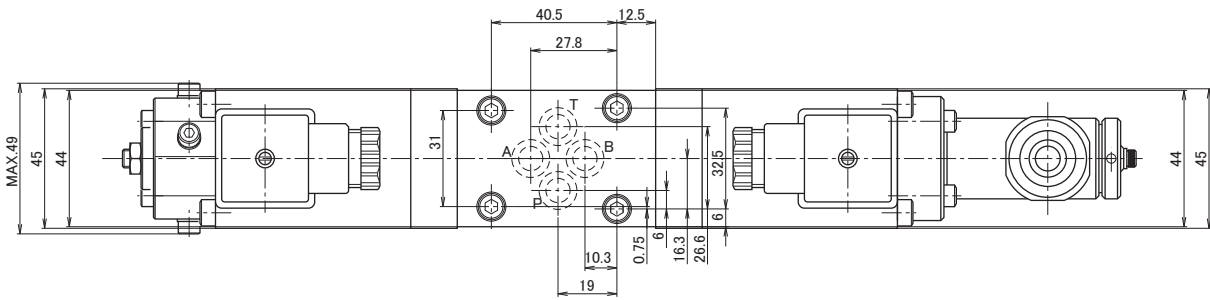


Frequency response characteristics (viscosity 25 mm²/s (cSt))



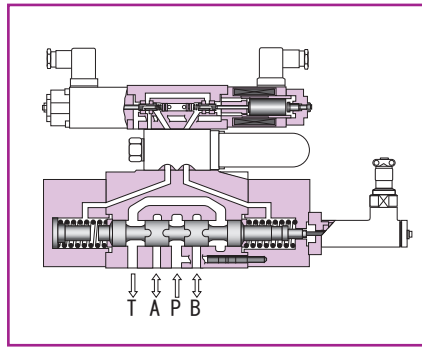
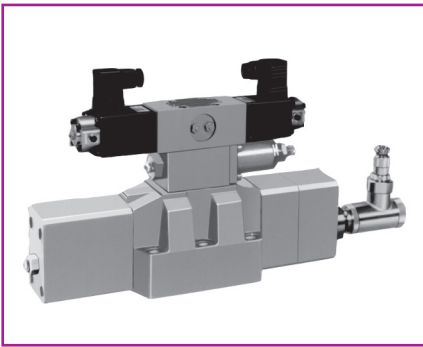
Dimension drawing

●DDPL6

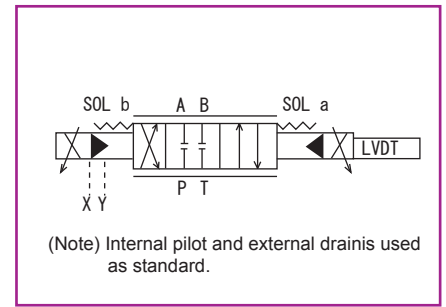


Connection diagram for differential transformer (LVDT) connector pins

Solenoid proportional control valve - Direct operated type, with LVDT



Hydraulic system



Overview

Solenoid proportional control valve consists of solenoid proportional pilot pressure reducing valve, sandwich type pressure reducing valve, spool type main valve, and differential transformer (LVDT). The spool displacement

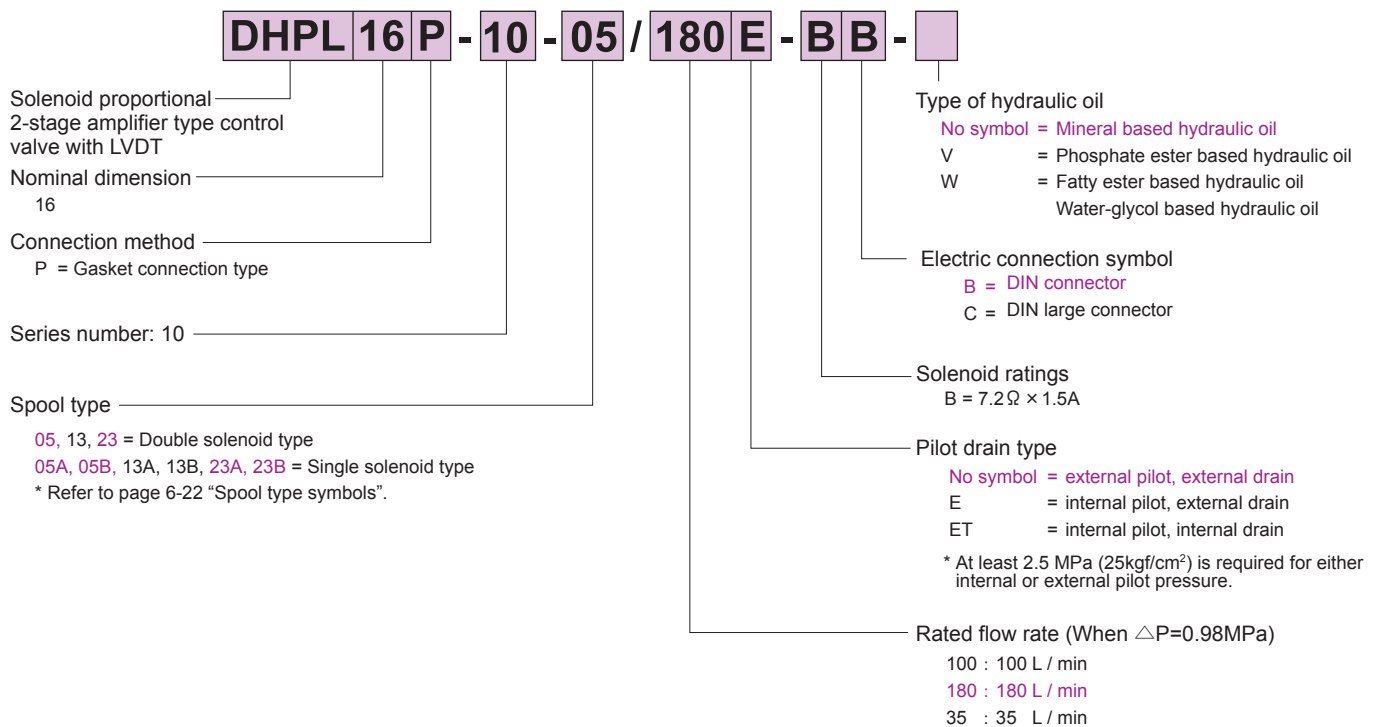
amount is detected by LVDT to make minor feedback.

The valve is used with a special controller to allow operating direction and flow rate to be controlled in proportion to the input voltage.

Features

1. It shows high response and high accuracy control performance.
2. The structure is simple and maintenance is easy.

Type indication



Sub-plate

Valve type	Sub-plate type	Connection diameter	Mass
DHPL 16	P-DEH16R34-0	Rc 3/4	7.0kg
	P-DEH16G34-0	G 3/4	
	P-DEH16R1-0	Rc1	14.5kg
	P-DEH16G1-0	G1	

When you use a sub-plate, please place an order for the above sub-plate type.

For the dimension drawing, refer to page 11 of the appendix.

Accessories

Mounting bolt

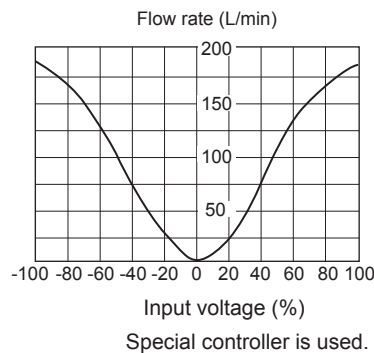
Type	Hexagon socket head cap thread	Quantity	Tightening torque N · m (kgf · cm)
DHPL 16	M6 × 55L	2 pcs.	11.8 ± 1.7 (120 ± 18)
	M10 × 60L	4 pcs.	56.8 ± 8.5 (580 ± 87)

Specifications

Nominal dimension		16	
Maximum working pressure MPa (kgf/cm ²)	Ports P, A, B, and X	30.9 (315)	
	Ports T	External drain	24.5 (250)
		Internal drain	1.0 (10)
	Ports T	1.0 (10)	
Rated flow rate L/min $\Delta P=0.98$ MPa per 1 round		180, 100, 35	
Reproducibility %		1.5 or less	
Hysteresis %		1.5 or less	
Step response ms	0→100% input	100	
	100→0% input	100	
Frequency response Hz ($\pm 2\%$ input)	-3dB	7	
	90 degree delay	5	
Electrical specifications	Solenoid rated current mA	1,500	
	Coil resistance Ω	7.2 at 20°C	
	Dither (Recommendable value)	60Hz, 50mAP-p	
	Standard amplifier type	CFW-B15-D24	
Mass kg		18.5	

Voltage - Flow rate characteristics (viscosity 25 mm²/s (cSt))

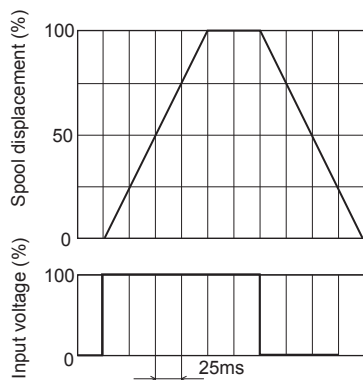
DHPL16



Primary pressure: 20.6 MPa (210 kgf/cm²)
 Amount of pressure drop : 0.98 MPa (10 kgf/cm²)
 Per one round
 Dither: 60 Hz, 350 mAP-P
 Internal pilot/external drain

Step response characteristics (viscosity 25 mm²/s (cSt))

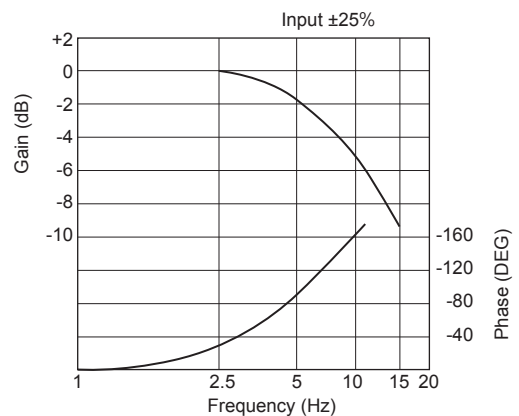
DHPL16



Primary pressure: 6.9 MPa (70 kgf/cm²) internal pilot/external drain
 Special controller is used.

Frequency response characteristics (viscosity 25 mm²/s (cSt))

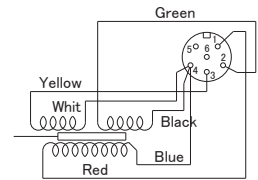
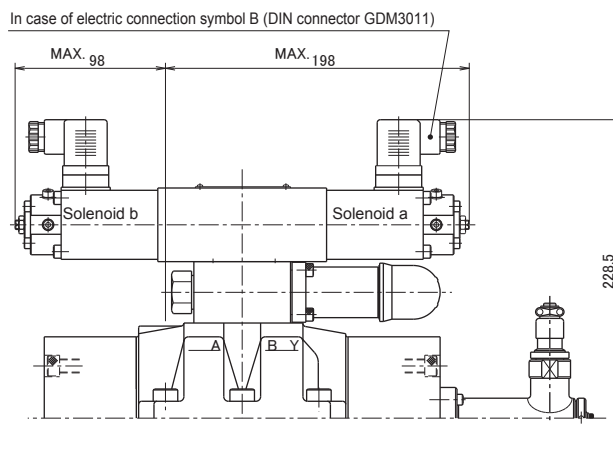
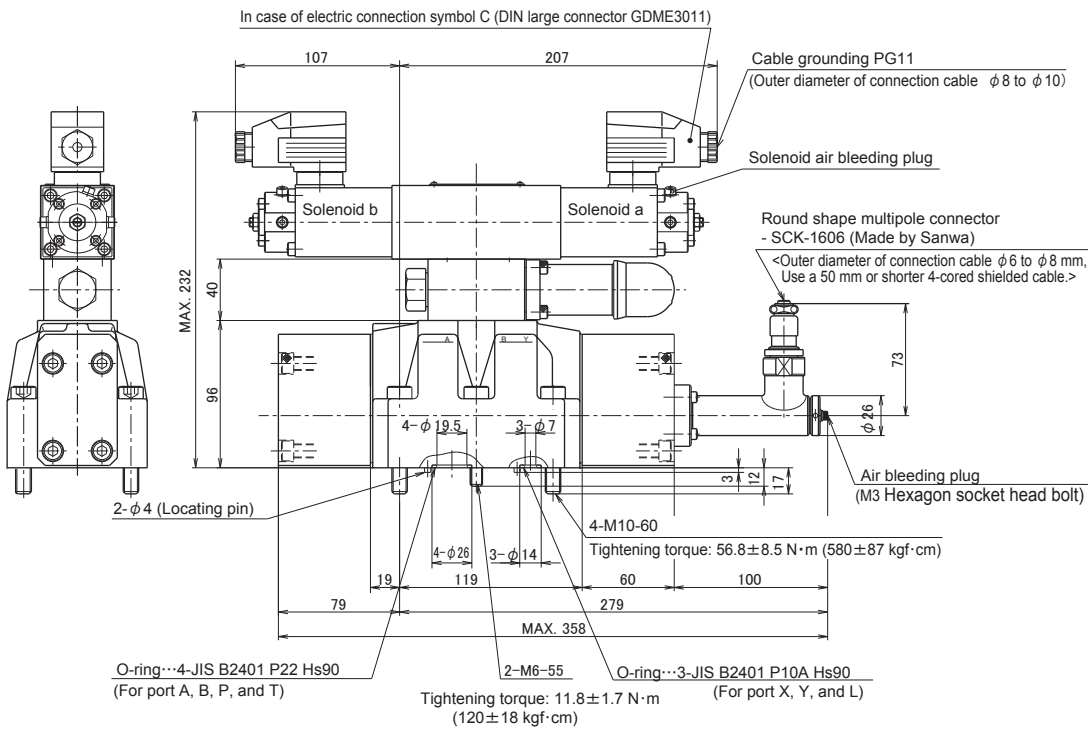
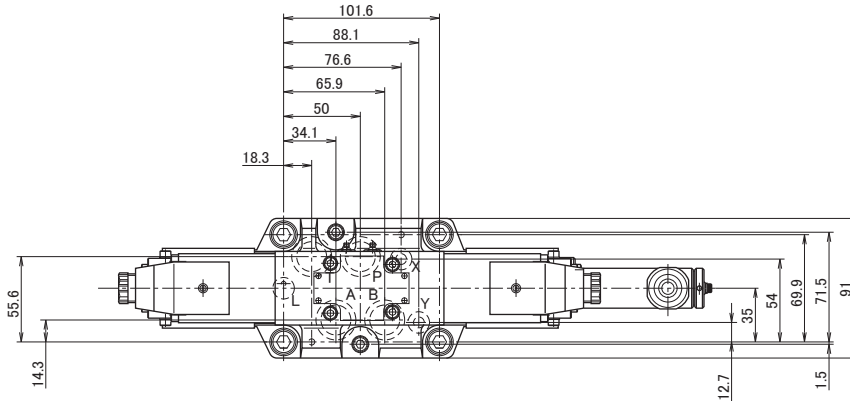
DHPL16



Primary pressure: 6.9 MPa (70 kgf/cm²) internal pilot/external drain
 Special controller is used.

Dimension drawing

●DHPL16



Connection diagram for differential transformer (LVDT) connector pins

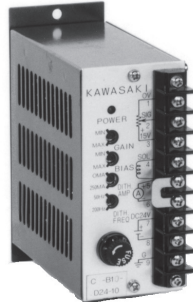
Note : Port L is not used.

Controller

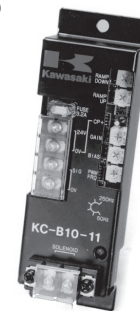
C series/C-B10-A



C series/C-B15-D



KC series/KC-B10



Overview

A controller exclusively used for driving solenoid proportional control valves

Features

1. Excellent constant current characteristics is obtained against the change of supply voltage, ambient temperature, and coil resistance.
2. The output current is PWM-controlled and the heat generation of the controller is extremely low, which makes it small and light weight.
3. As shown in List of Types, we line up various types to meet any usages.
4. KC serie, the small size and inexpensive type is also lined up.

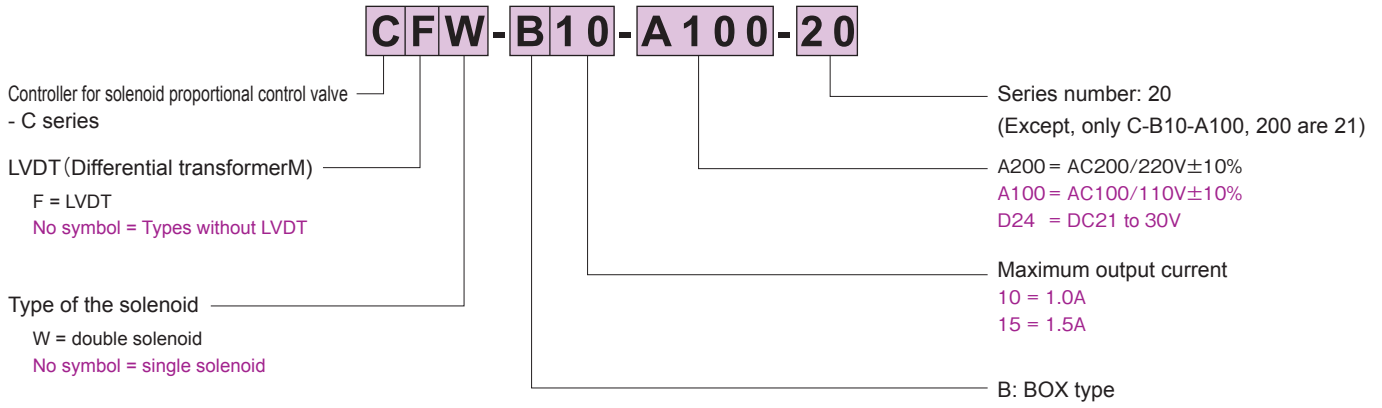
List of controller types and the applicable valve solenoid types

Controller						Applicable solenoid proportional control valves									
Series name	Driving method	Power supply	LVDT feedback	Single/double solenoid	Type	Solenoid relief valve		Solenoid proportional pressure reducing valve				Solenoid proportional control valve		LVDT solenoid proportional control valve (Proportional servo valve)	
						RDPV5	RBP10 to 5	PRDP6	PRBP10 to 30	PRDP1M6-S	PRDP1M6-D	DDP6	DHP16 to 22	DDPL6	DHPL16
C series	PWM + Dither Superposing type	AC power supply AC100/110V AC200/220V	Not provided	Single solenoid type	C-B10-A100/200	E	E	C	E	A	—	A	A	—	—
				Double solenoid type	CW-B10-A100/200	—	—	—	—	—	A	A	A	—	—
		DC power supply DC21 to 30V	Not provided	Single solenoid type	C-B15-D24	E	E	D	E	B	—	B	B	—	—
				Double solenoid type	CW-B15-D24	—	—	—	—	—	B	B	B	—	—
	Provided	Single solenoid type	CF-B15-D24	—	—	—	—	—	—	—	—	—	—	B	B
		Double solenoid type	CFW-B15-D24	—	—	—	—	—	—	—	—	—	—	B	B
KC series	PWM type	DC power supply DC21 to 30V	Not provided	Single solenoid type	KC-B10-11	E	E	—	E	—					

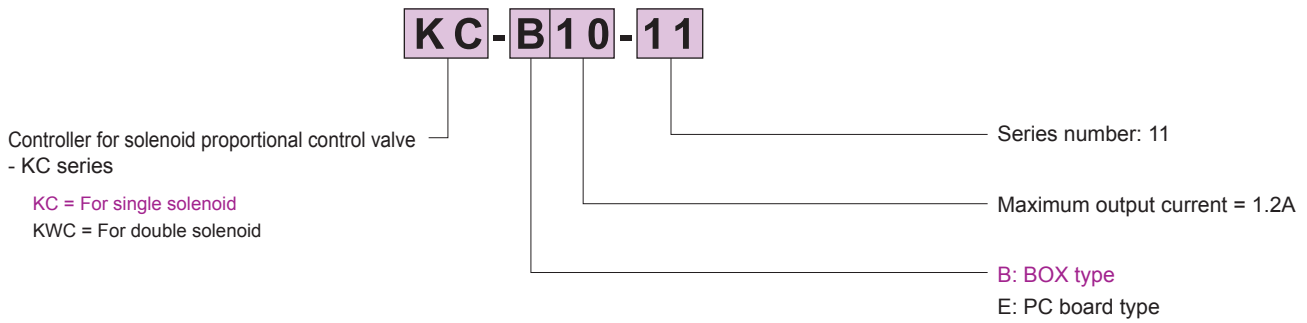
Type of the solenoid	Coil resistance (20°C)	Rated current
A	33Ω	750mA
B	7.2Ω	1,500mA
C	24Ω	750mA
D	6Ω	1,500mA
E	14.2Ω	800mA

■ Type indication

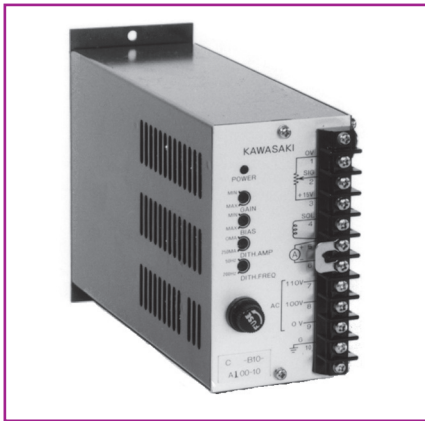
● C series



● KC series



C series



Performance

Linearity	2% FS or below	
Step response	50 ms(0→100%)	
Constant current characteristic	Supply voltage fluctuation	1% FS or below ($\pm 10\%$)
	Change of load resistance	1.5% FS or below (33 to 45 Ω)
	Change of ambient temperature	1% FS or below (0 to 50°C)

(Note) Step response is measured while the solenoid is connected.
FS (Full Scale) means the rating of 750 mA.

Precautions in use

- This controller has internal heat generation. Do not install in a closed place. In addition, when more than one set are installed, keep the distance of 20 mm or more.
- Use a shielded cable for input signal wiring to protect it from noise.

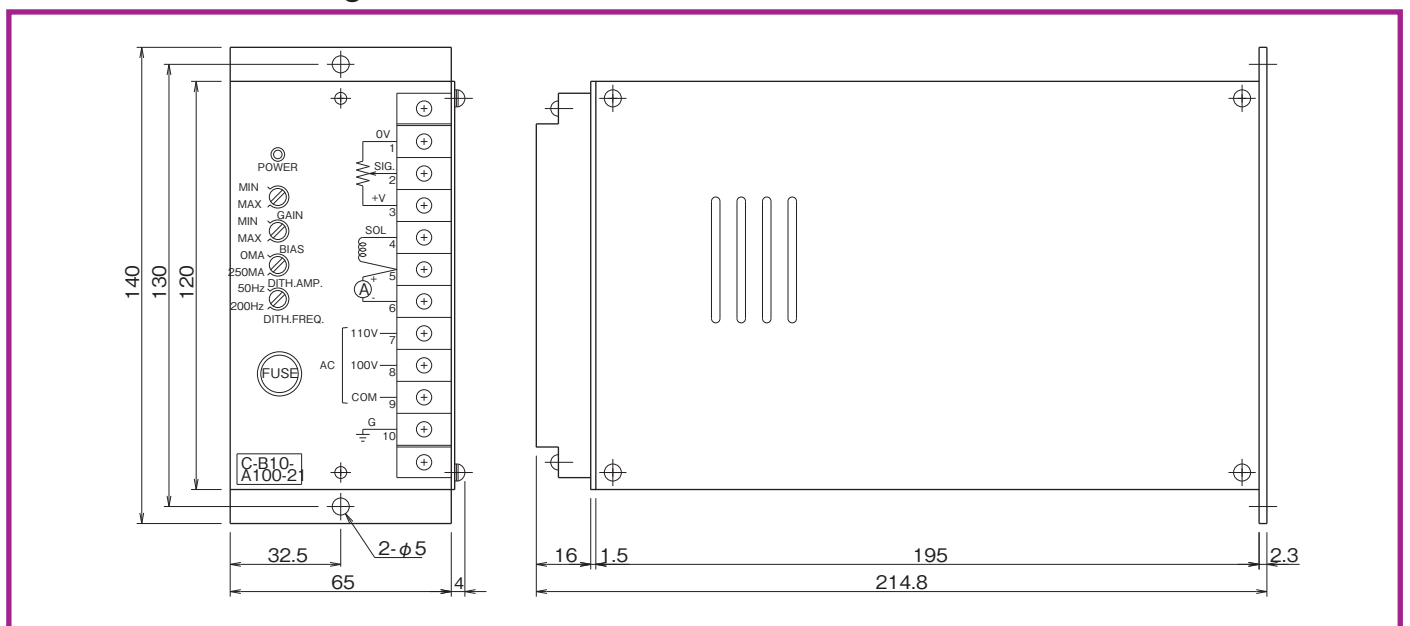
Connection method

Please refer to the operation manual.

Specifications

Type		C-B10-A100-21	C-B10-A200-21
AC power supply (50/60 Hz)		AC100/110V $\pm 10\%$	AC200/220V $\pm 10\%$
Power consumption		40 VA or lower	
Solenoid coil resistance		45 Ω or lower	
Maximum output current		1.0 A	
Input impedance		50 k Ω	
Input command	Voltage input	DC0 to 10V max.	
	Resistance input	Variable resistance 5 k Ω (0.5 W or higher)	
Input gain adjustment		35 to 160 mA/V	
Dither adjustment	Frequency	50 to 200 Hz	
	Amplitude	0 to 250 mAP-P	
Bias adjustment		0 to 250 mA	
Ambient temperature and humidity		0 to 50°C, 90% RH or lower (No condensation)	
Vibration proof		Conforming to JIS C0911 IIB, Class-3 Frequency 16.7 Hz, amplitude 3 mm P-P	
Mass		3.1 kg	

Dimension drawing



C series



Performance

Linearity	2% FS or below	
Step response	50 ms(0→100%)	
Constant current characteristic	Supply voltage fluctuation	1% FS or below ($\pm 10\%$)
	Change of load resistance	1.5% FS or below (33 to 45 Ω)
	Change of ambient temperature	1% FS or below (0 to 50°C)

(Note) Step response is measured while the solenoid is connected.
FS (Full Scale) means the rating of 750 mA.

Precautions in use

- This controller has internal heat generation. Do not install in a closed place. In addition, when more than one set are installed, keep the distance of 20 mm or more.
- Use a shielded cable for input signal wiring to protect it from noise.

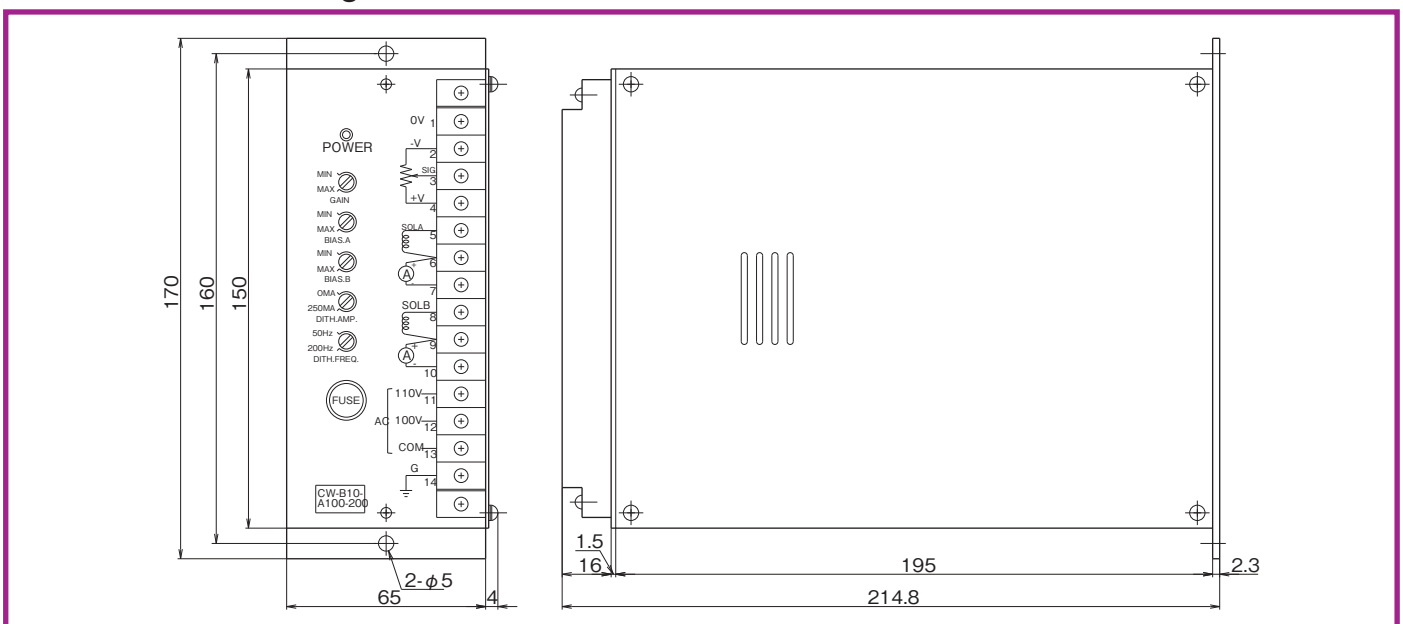
Connection method

Please refer to the operation manual.

Specifications

Type	CW-B10-A100-20	CW-B10-A200-20
AC power supply (50/60 Hz)	AC100/110 V $\pm 10\%$	AC200/220 V $\pm 10\%$
Power consumption	40VA or lower	
Solenoid coil resistance	45 Ω or lower	
Maximum output current	1.0 A	
Input impedance	50 k Ω	
Input command	Voltage input	DC0 to ± 10 Vmax.
	Resistance input	Variable resistance 5 k Ω (0.5 W or higher)
Input gain adjustment	35 to 160 mA/V	
Dither adjustment	Frequency	50 to 200 Hz
	Amplitude	0 to 250 mAP-P
Bias adjustment	0 to 250 mA	
Ambient temperature and humidity	0 to 50°C, 90% RH or lower (No condensation)	
Vibration proof	Conforming to JIS C0911 IIB, Class-3 Frequency 16.7 Hz, amplitude 3 mm P-P	
Mass	3.2 kg	

Dimension drawing



C series



Performance

Linearity	2% FS or below	
Step response	50 ms (0→100%)	
Constant current characteristic	Supply voltage fluctuation	1% FS or below (21 to 30 V)
	Change of load resistance	1.5% FS or below (5 to 11 Ω)
	Change of ambient temperature	1% FS or below (0 to 50°C)

(Note) Step response is measured while the solenoid is connected.
FS (Full Scale) means the rating of 1500 mA.

Precautions in use

- This controller has internal heat generation. Do not install in a closed place. In addition, when more than one set are installed, keep the distance of 20 mm or more.
- Use a shielded cable for input signal wiring to protect it from noise.

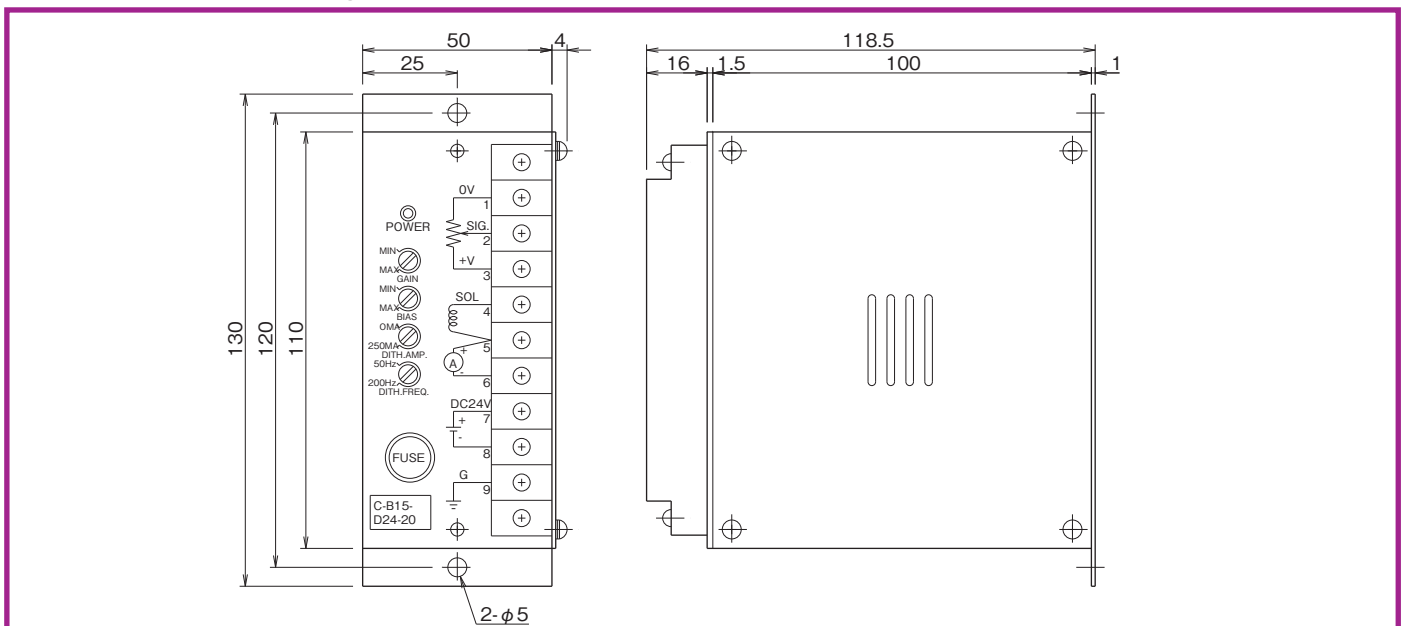
Connection method

Please refer to the operation manual.

Specifications

Type		C-B15-D24-20
DC power supply		DC24 V (21 to 30 V)
Power consumption		30 VA or lower
Solenoid coil resistance		11 Ω or lower
Maximum output current		1.5 A
Input impedance		50 kΩ
Input command	Voltage input	DC0 to 10 Vmax.
	Resistance input	Variable resistance 5 kΩ (0.5 W or higher)
Input gain adjustment		70 to 300 mA/V
Dither adjustment	Frequency	50 to 200 Hz
	Amplitude	0 to 450 mAP-P
Bias adjustment		0 to 500 mA
Ambient temperature and humidity		0 to 50°C, 90% RH or lower (No condensation)
Vibration proof		Conforming to JIS C0911 IIB, Class-3 Frequency 16.7 Hz, amplitude 3 mm P-P
Mass		0.5 kg

Dimension drawing



C series



Performance

Linearity	2% FS or below	
Step response	50ms (0→100%)	
Constant current characteristic	Supply voltage fluctuation	1% FS or below (21 to 30V)
	Change of load resistance	1.5% FS or below (5 to 11Ω)
	Change of ambient temperature	1% FS or below (0 to 50°C)

(Note) Step response is measured while the solenoid is connected.
FS (Full Scale) means the rating of 1500 mA.

Precautions in use

- This controller has internal heat generation. Do not install in a closed place. In addition, when more than one set are installed, keep the distance of 20 mm or more.
- Use a shielded cable for input signal wiring to protect it from noise.

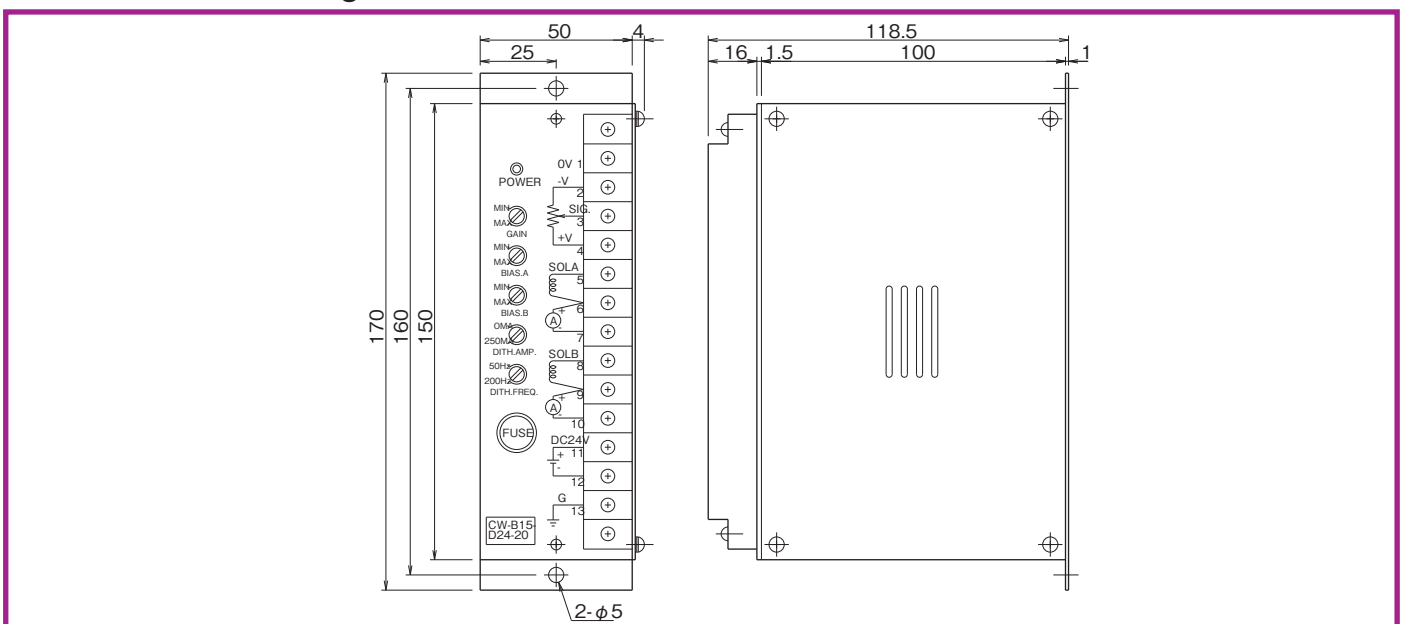
Connection method

Please refer to the operation manual.

Specifications

Type		CW-B15-D24-20
DC power supply		DC24 V (21 to 30 V)
Power consumption		30 VA or lower
Solenoid coil resistance		11 Ω or lower
Maximum output current		1.5 A
Input impedance		50 kΩ
Input command	Voltage input	DC 0 to ±10 Vmax.
	Resistance input	Variable resistance 5 kΩ (0.5 W or higher)
Input gain adjustment		70 to 300 mA/V
Dither adjustment	Frequency	50 to 200 Hz
	Amplitude	0 to 450 mAP-P
Bias adjustment		0 to 500 mA
Ambient temperature and humidity		0 to 50°C, 90% RH or lower (No condensation)
Vibration proof		Conforming to JIS C0911 IIB, Class-3 Frequency 16.7 Hz, amplitude 3 mm P-P
Mass		0.7 kg

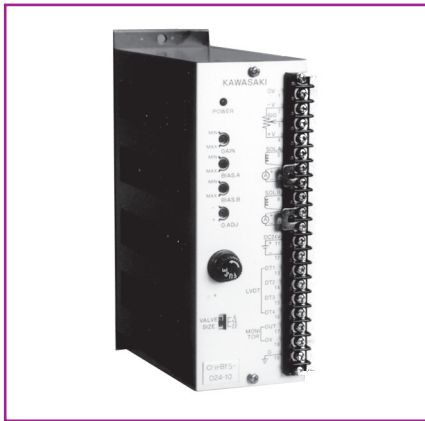
Dimension drawing



For DC power supply double solenoid

For DC power supply single solenoid with LVDT feedback **CF-B15-D**

C series



Performance

Linearity	2% FS or below	
Step response	30ms (0→100%)	
Constant current characteristic	Supply voltage fluctuation	1% FS or below (21 to 30 V)
	Change of load resistance	1.5% FS or below (5 to 11 Ω)
	Change of ambient temperature	1% FS or below (0 to 50°C)

(Note) Step response is measured while the solenoid is connected.
FS (Full Scale) means the rating of 1500 mA.

Precautions in use

- This controller has internal heat generation. Do not install in a closed place. In addition, when more than one set are installed, keep the distance of 20 mm or more.
- Use a shielded cable for input signal wiring to protect it from noise.
- Set the "VALVE SIZE" selection switch to the prescribed position corresponding to the valve size.

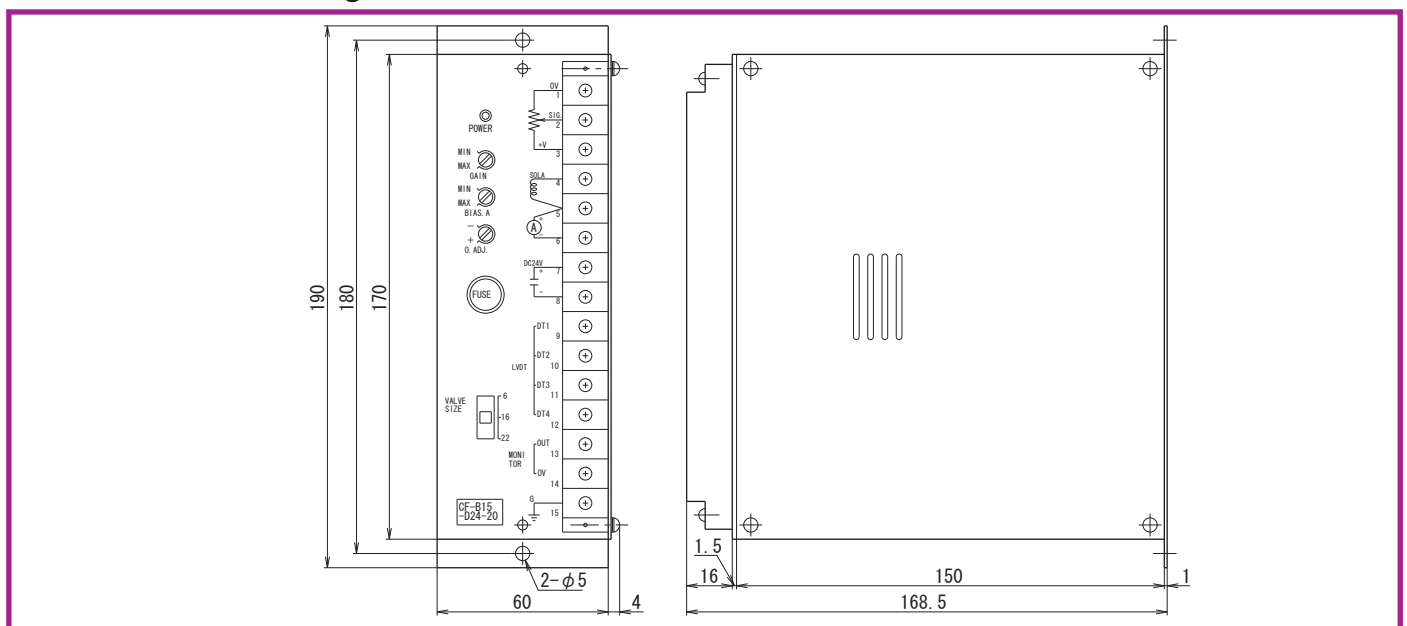
Specifications

Type		CF-B15-D24-20
DC power supply		DC24 V (21 to 30 V)
Power consumption		30 VA or lower
Solenoid coil resistance		11 Ω or lower
Maximum output current		1.5 A
Input impedance		50 kΩ
Input command	Voltage input	DC 0 to 10 Vmax.
	Resistance input	Variable resistance 5 kΩ (0.5 W or higher)
Input gain adjustment		70 to 300 mA/V
Dither adjustment	Frequency	Fixed
	Amplitude	Fixed
Bias adjustment		0 to 500 mA
Zero point adjustment		±20%FS
Monitor output (Spool displacement amount)		10 Vmax.
Ambient temperature and humidity		0 to 50°C, 90% RH or lower (No condensation)
Vibration proof		Conforming to JIS C0911 IIB, Class-3 Frequency 16.7 Hz, amplitude 3 mm P-P
Mass		0.8 kg

Connection method

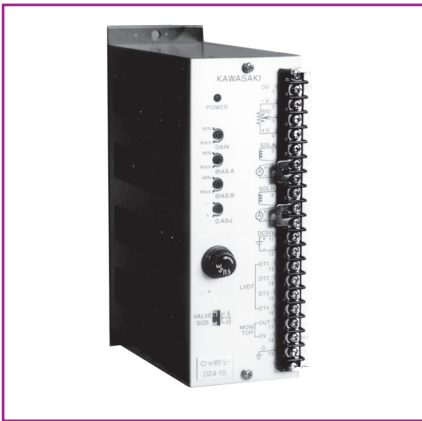
Please refer to the operation manual.

Dimension drawing



For DC power supply double solenoid with LVDT feedback **CFW-B15-D**

C series



Performance

Linearity	2% FS or below	
Step response	30 ms (0→100%)	
Constant current characteristic	Supply voltage fluctuation	1% FS or below (21 to 30 V)
	Change of load resistance	1.5% FS or below (5 to 11 Ω)
	Change of ambient temperature	1% FS or below (0 to 50°C)

(Note) Step response is measured while the solenoid is connected.
FS (Full Scale) means the rating of 1500 mA.

Precautions in use

- This controller has internal heat generation. Do not install in a closed place. In addition, when more than one set are installed, keep the distance of 20 mm or more.
- Use a shielded cable for input signal wiring to protect it from noise.
- Set the "VALVE SIZE" selection switch to the prescribed position corresponding to the valve size.

Connection method

Please refer to the operation manual.

Specifications

Type	CFW-B15-D24-20	
DC power supply	DC24 V (21 to 30 V)	
Power consumption	30 VA or lower	
Solenoid coil resistance	11 Ω or lower	
Maximum output current	1.5 A	
Input impedance	50 kΩ	
Input command	Voltage input	DC 0 to ±10 Vmax.
	Resistance input	Variable resistance 5 kΩ (0.5 W or higher)
Input gain adjustment	70 to 300 mA/V	
Dither adjustment	Frequency	Fixed
	Amplitude	Fixed
Bias adjustment	0 to 500 mA	
Zero point adjustment	±20% FS	
Monitor output (Spool displacement amount)	10 Vmax.	
Ambient temperature and humidity	0 to 50°C, 90% RH or lower (No condensation)	
Vibration proof	Conforming to JIS C0911 IIB, Class-3 Frequency 16.7 Hz, amplitude 3 mm P-P	
Mass	1.0 kg	

Dimension drawing

