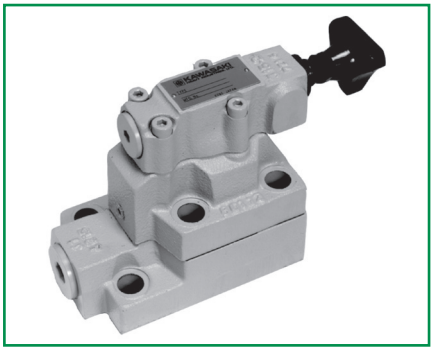
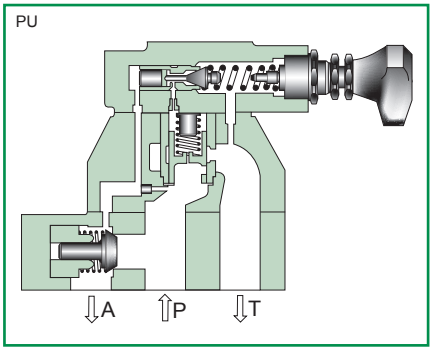
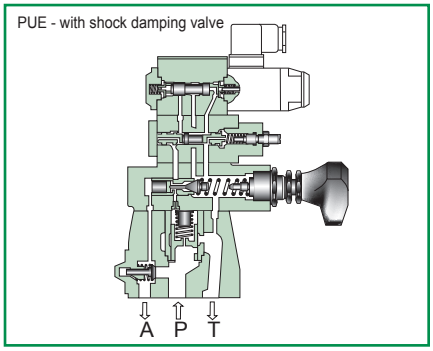
Pilot operated unloading relief valve (1) PU/PUE







Overview

The pilot operated unloading relief valve is used with either an accumulator or a two pump high-low circuit. One state being high flow low pressure and the other low flow high pressure.
In the case of the accumulator circuit, when the pump discharge pressure reaches the cut-out pressure, the valve opens and the pump is unloaded. When the pressure on the accumulator side reaches the cut-in pressure, the valve is closed and the pump is loaded, pumping out the discharged oil to the accumulator side. In the case of the high-low circuit that uses two pumps, when pressure reaches the set pressure (cut-out pressure), the valve opens, pressure oil from the pumps is automatically returned to the tank and the pump is unloaded. When the pressure falls below the set pressure, the valve is closed and the pumps become automatically loaded.

Features

1. The main valve part is of special shape and a shock when unloaded is very small.
2. An pilot operated unloading relief valve with a solenoid operated directional valve that can be unloaded and loaded with electrical signals is also available.

Type indication

●PU

PU 10 P - 10 - 1 / 315 C -

Pilot operated unloading relief valve

Nominal dimension
10, 20, 30

Connection method
P = Gasket connection type

Series number: 10

Shape of pressure adjusting part
1 = Handle adjustment
2 = Thread adjustment (with cap)
3 = Handle with key adjustment

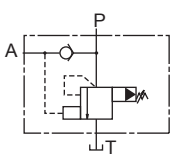
Pressure adjustment range
80 = 2.0 to 7.9MPa (20 to 80kgf/cm²)
160 = 7.9 to 15.7MPa (80 to 160kgf/cm²)
315 = 15.7 to 30.9MPa (160 to 315kgf/cm²)

Check valve provided or not
C = With check valve

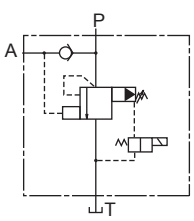
Type of hydraulic oil
No symbol = Mineral based hydraulic oil
V = Phosphate ester based hydraulic oil
W = Fatty ester based hydraulic oil
= Water-glycol based hydraulic oil

●Hydraulic symbols

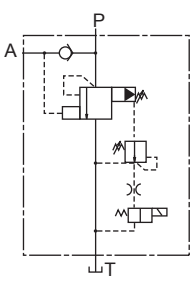
●PU



●PUE



●PUE (with shock damping valve)



●Pressure increase value per turn (clockwise) of adjust thread MPa (kgf/cm²)

Highest adjustment pressure \ Nominal dimension	10, 20, 30
80	1.96 (20.0)
100	3.53 (36.0)
315	7.35 (75.0)

(Note) As the above value is a calculated value, there are slight variations in the product.

●PUE

PUE 10 P - 10 - B 1 / 80 C - W D 24 CL - S -

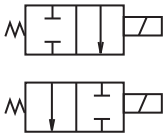
Pilot operated unloading relief valve (with solenoid valve)

Nominal dimension
10, 20, 30

Connection method
P = Gasket connection type

Series number: 10

Spool type of solenoid operated directional valve
A = Normal close
B = Normal open



Shape of pressure adjusting part
1 = Handle adjustment
2 = Thread adjustment (with cap)
3 = Handle with key adjustment

Pressure adjustment range
80 = 2.0 to 7.9MPa (20 to 80kgf/cm²)
160 = 7.9 to 15.7MPa (80 to 160kgf/cm²)
315 = 15.7 to 30.9MPa (160 to 315kgf/cm²)

Check valve provided or not
C = With check valve

Solenoid type
W = Wet type (with standard emergency manual operation)

Input power supply
A = Alternating current
D = Direct current
R = AC/DC conversion

Input voltage
12 = 12V
24 = 24V
100 = 100V
200 = 200V

Electric connection symbol

Symbol	Explanation	Input power supply		
		A	D	R
B	With DIN connector	○	○	—
C	With DIN large connector	○	○	○
CL	With DIN large connector with lamp	○	○	—

Shock damping valve provided or not
No symbol = Without shock damping valve
S = With shock damping valve

Type of hydraulic oil
No symbol = Mineral based hydraulic oil
V = Phosphate ester based hydraulic oil
W = Fatty ester based hydraulic oil
W1 = Water-glycol based hydraulic oil

Specifications

Nominal dimension			10	20	30
Maximum working pressure MPa (kgf/cm²)	Port A, P		30.9 (315) (Note 3)		
	Port T	PU	30.9 (315)		
		PUE	15.7 (160)		
Maximum flow rate L/min			50	100	250
Type of solenoid operated directional valve (Note 1)			Equivalent to DE5P-10-2 01 02		
Type of shock damping valve (Note 2)			ZNS5-1		
Mass kg	PU		3.8	7.7	13.4
	PUE		4.9	8.8	14.5

(Note 1) Refer to the section of the solenoid operated directional valve "DE5".
(Note 2) Refer to "ZNS5" for the specifications.
(Note 3) Pressure adjustment range: When 80 is adjusted to 6.4 to 7.9 MPa (65 to 80 kgf/cm²), the maximum working pressure of A port is up to 9.8 MPa (100 kgf/cm²)
Pressure adjustment range: When 160 is adjusted to 12.8 to 15.7 MPa (130 to 160 kgf/cm²), the maximum working pressure of A port is 15.7 MPa (160 kgf/cm²).

Precautions in use

● If piping from A port to the accumulator (ACC) is thin and long, the difference between the cut-out pressure and cut-in pressure becomes small, causing the operation to be unstable. Install piping so that the pressure drop amount (ΔP) from A port to ACC is [(cut-out pressure – cut-in pressure) x 1/3].

Sub-plate

Valve type	Sub-plate type	Connection diameter	Mass
PU(E)10	P-PU10R38-0	Rc 3/8	2.1kg
	P-PU10G38-0	G 3/8	
	P-PU10R12-0	Rc 1/2	
	P-PU10G12-0	G 1/2	
PU(E)20	P-PU20R34-0	Rc 3/4	4.4kg
	P-PU20G34-0	G 3/4	
	P-PU20R1-0	Rc1	
	P-PU20G1-0	G1	
PU(E)30	P-PU30R54-0	Rc1 1/2	6.9kg
	P-PU30G54-0	G1 1/2	
	P-PU30R32-0	Rc1 1/2	
	P-PU30G32-0	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 12, 13 of the appendix.

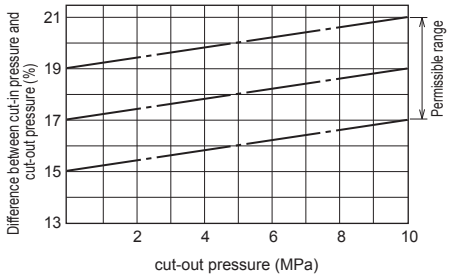
Accessories

●Mounting bolt

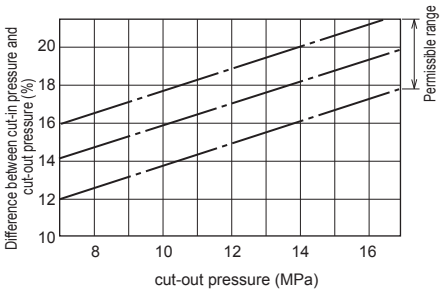
Type	Hexagon socket head cap thread	Quantity	Tightening torque N·m (kgf·cm)
PU(E)10	M10×40L	4 pcs.	56.8 ± 8.5 (580 ± 87)
PU(E)20	M16×50L	2 pcs.	235.2 ± 35.2 (2400 ± 360)
	M16×95L	4 pcs.	
PU(E)30	M18×70L	2 pcs.	333.2 ± 50.0 (3400 ± 510)
	M18×120L	4 pcs.	

Difference between cut-in pressure and cut-out pressure (viscosity 36 mm²/s(cSt))

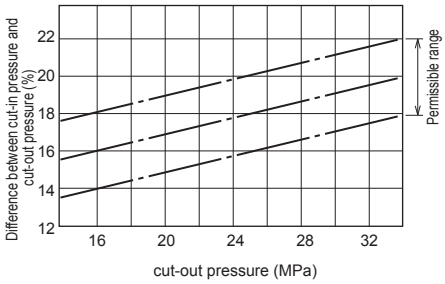
●Pressure adjustment range : 80



●Pressure adjustment range : 160

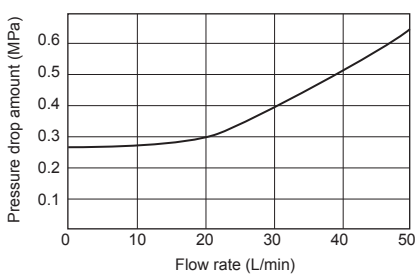


●Pressure adjustment range : 315

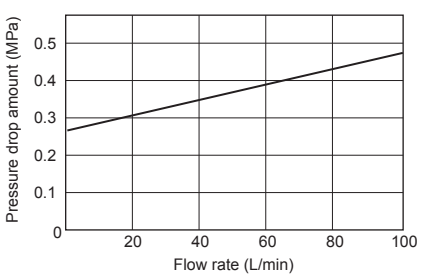


Pressure drop characteristics (viscosity 36 mm²/s(cSt))

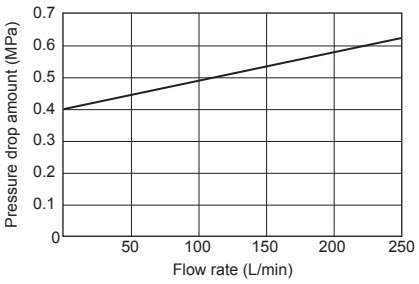
●**PU/PUE10**



●**PU/PUE20**

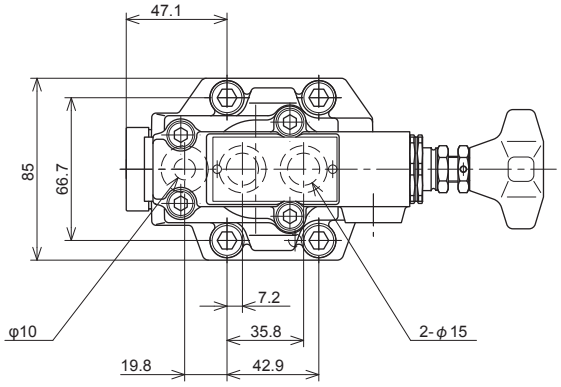


●**PU/PUE30**

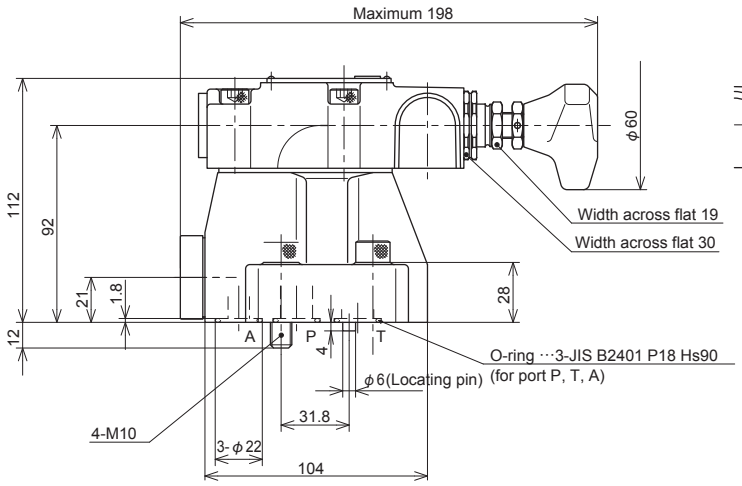


Dimension drawing

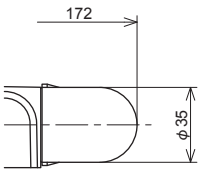
●PU10



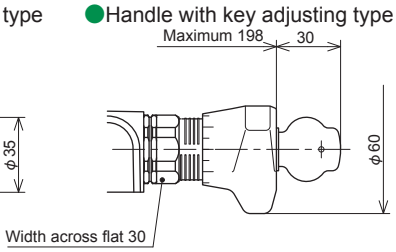
●Handle adjusting type



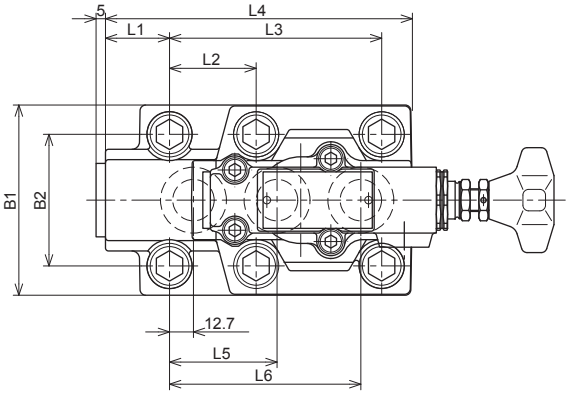
●Screw adjusting type



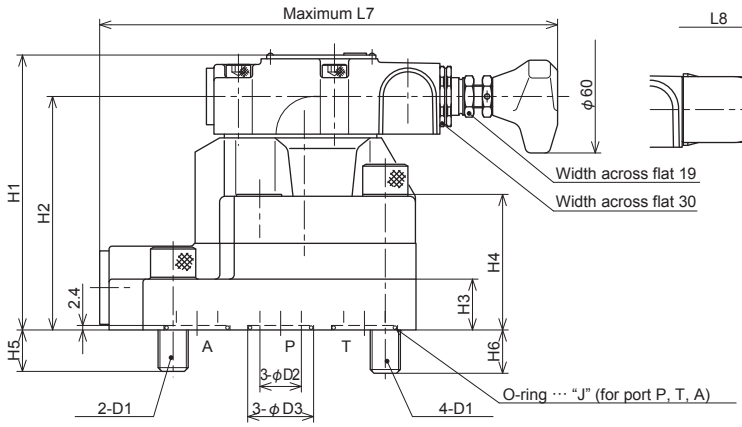
●Handle with key adjusting type



●PU 20 30

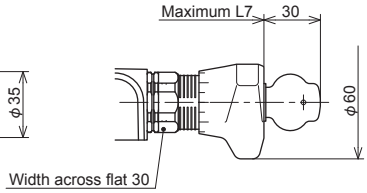


●Handle adjusting type



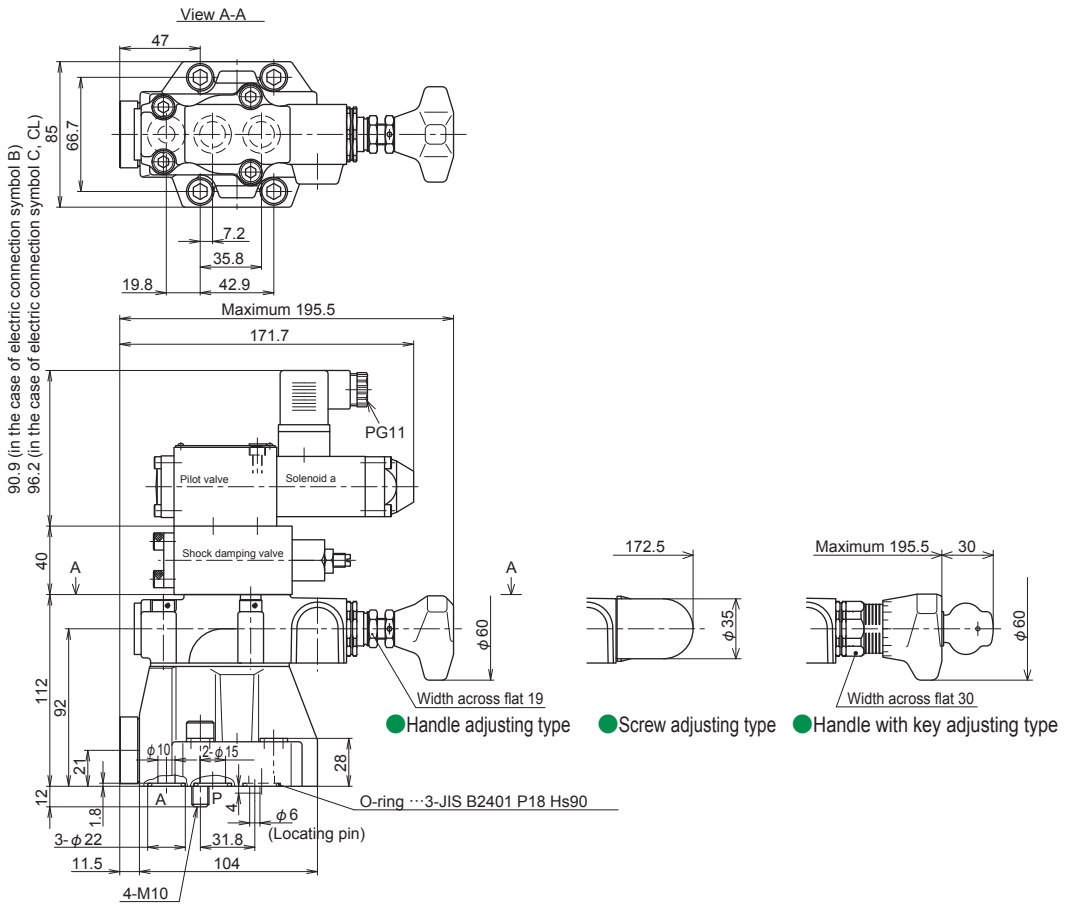
●Screw adjusting type

●Handle with key adjusting type

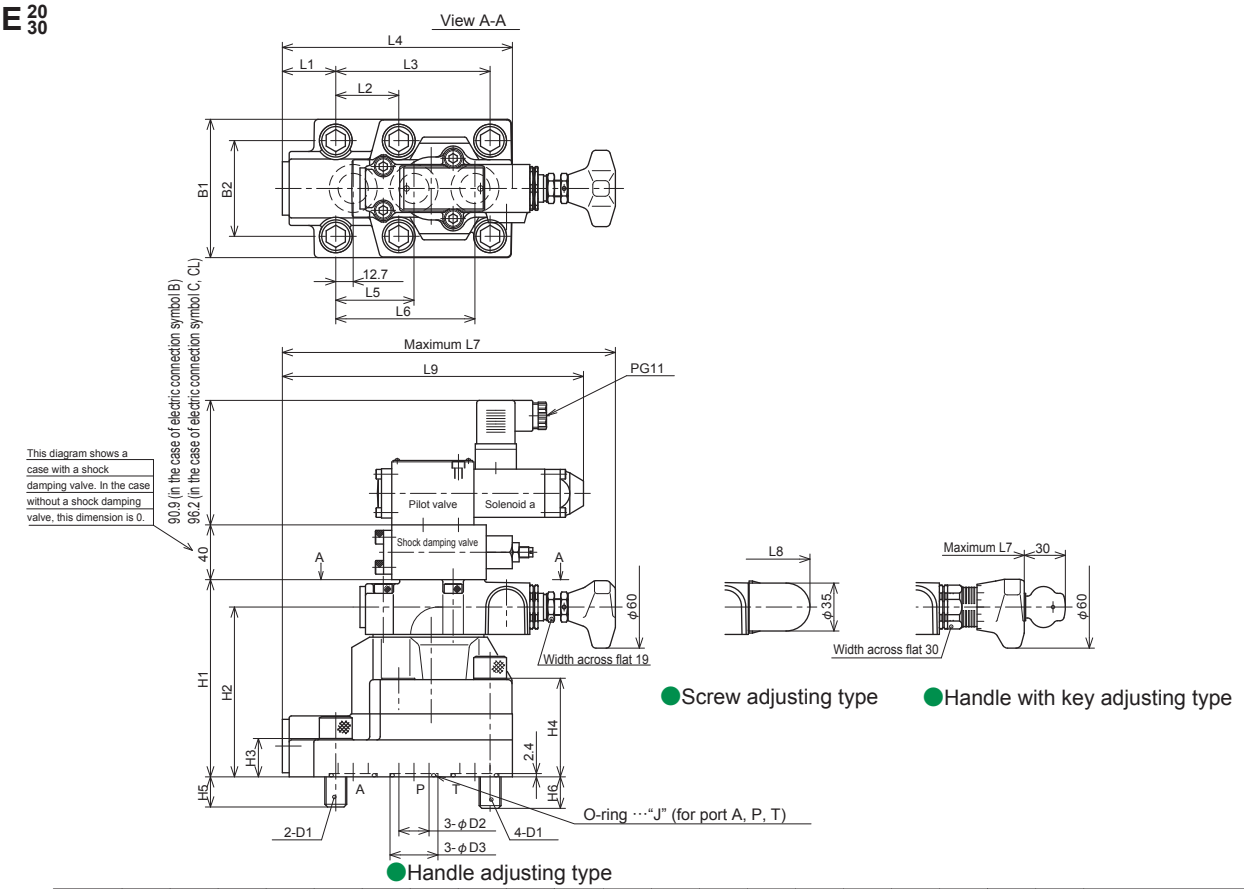


Nominal dimension	B1	B2	L1	L2	L3	L4	L5	L6	L7	L8	D1	D2	D3	H1	H2	H3	H4	H5	H6	O-ring dimension "J"
20	101	69.9	30	46	112.7	159	57.1	101.6	247	215	M16	25	35	144	124	28	72	22	23	JIS B2401G30 Hs90
30	116	82.5	51.5	50.8	139.7	208.5	63.5	127	270.5	243	M18	31	40	165	145	45	93	25	27	JIS B2401G35 Hs90

●PUE10



●PUE 20 30



Nominal dimension	B1	B2	L1	L2	L3	L4	L5	L6	L7	L8	L9	D1	D2	D3	H1	H2	H3	H4	H5	H6	O-ring dimension "J"
20	101	69.9	39	46	112.7	168	57.1	101.6	243.2	220.7	219.9	M16	22	35	144	124	28	72	22	23	3-JIS B2401G30 Hs90
30	116	82.5	60.3	50.8	139.7	217.5	63.5	127	272	249.5	248.7	M18	28	40	165	145	45	93	25	27	3-JIS B2401G35 Hs90