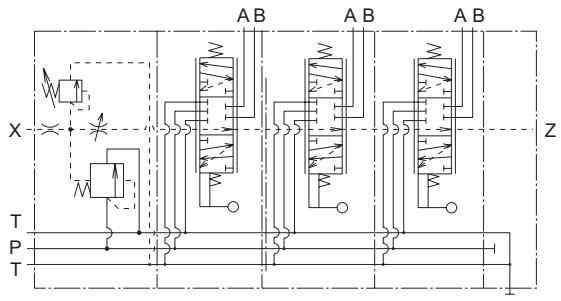
Manual Proportional Directional Control Valve (with Pressure Compensation, Multiple Valve Series)

Hydraulic circuit (Example)



Features

- These stacking type multiple control valves are equipped with the bypass type pressure compensation function and have proportional flow rate characteristics.
- The pump pressure can be changed according to variation of the load pressure that causes the excess flow to go to the tank.
- Enables individual flow rate control at ports A and B.
- Up to 8 valves can be connected in a series and there are 11 directional control valve symbols.
- These valves have the directional control valve neutral unload function and a built-in relief valve.

Nomenclature

These are stacking type manual multi-control valves. The valves can be delivered set up to meet customer requirements.
When placing an order, specify the model codes in the order that the valves are to be combined.

- Inlet valve block (MUV) or connection plate (AN)
- First directional control valve block
- Second directional control valve block
- … … …
- End plate (AP)

When two or more valves with the same model code are included, state the model codes of the individual valves as shown above.

● Inlet valve block

MUV	※※	K	L	※	※	–	※
1	2	3	4	5	6		7

1 Model No.
MUV: Bypass type pressure compensation valve

2 Port size (nominal diameter)
12: ½
16: ¾
20: 1
25: 1¼
32: 1½

3 Mount type
K: Stacking type

4 Maximum operating pressure
L: 21 MPa {210 kgf/cm^2}

5 Unloading pressure (Pressure compensation structure differential pressure)
3: 0.3 MPa {3 kgf/cm^2}
6: 0.6 MPa {6 kgf/cm^2} *1

6 Option code I
S: Pressure adjusting screw type (standard)
H: Pressure adjusting handle type

7 Option code II
No designation: Standard
R: For variable displacement pump control

Note: *1 Used when a large flow passes through the directional control valve or when many series of valves are used. See the spring selection table for details.

Nomenclature

● Directional control valve block

MHV ※※ K L ※ ※ ※ ※ ※※※ – ※※※

1	2	3	4	5	6	7	8	9	10

1 Model No.
MHV: Manual proportional directional control valve

2 Port size (nominal diameter)
12: ½
16: ¾
20: 1
25: 1¼
32: 1½

3 Mount type
K: Stacking type

4 Maximum operating pressure
L: 21 MPa {210 kgf/cm^2}

5 Return spring function
F: Spring center type, spring offset type,
R: No-spring type (with detent)
O: No-spring type (without detent)
S: No-spring type (with braking structure)

6 Lever installation position
W: Opposite side to valve mounting face (See the diagram at the bottom of Page J-62.)
S: Horizontal position
H: Valve mounting face side
U: Without lever

7 Spool differential pressure code *2
3: Differential pressure of 0.3 MPa {3 kgf/cm^2}
6: Differential pressure of 0.6 MPa {6 kgf/cm^2}

8 Spool type (See the spool type table)

9 Rated flow rate (See the specification table) *3

10 Option code

No designation:	Standard
H:	With maximum flow rate adjusting screw *4
Y:	With auxiliary pressure control port
KS:	With micro switch (1 pc.)
SR2:	With micro switches (2 pcs.)

Note: *2 Designate this code only when connecting to a connection plate (model code: AN※※K). When no code is designated, the differential pressure at the inlet valve block applies.
*3 When different rated flow rates are required for ports A and B, designate the code for port A first, then the code for port B. Example: 50-100 (option)
*4 The specifications with the maximum flow rate adjusting screw cannot be selected for the no-spring type (with braking structure).
For the delivery terms for spool type other than A and C and port sizes 25 and 32, consult Daikin separately.

● End plate

AP ※※ K – ※

1	2	3	4

1 Model No.
AP: End plate

2 Port size (nominal diameter)
12: ½
16: ¾
20: 1
25: 1¼
32: 1½

3 Mount type
K: Stacking type

4 Option code

No designation:	Standard
T:	With isolated tank port T1
Z:	With external drainage port Z for unloading

● Connection plate

AN ※※ K

1	2	3

1 Model No.
AN: Connection plate

2 Port size (nominal diameter)
12: ½
16: ¾
20: 1
25: 1¼
32: 1½

3 Mount type
K: Stacking type

Specifications

Port size	Nominal diameter	Maximum operating pressure MPa {kgf/cm^2}	Rated flow rate L/min			Port T Permissible back pressure MPa {kgf/cm^2}	Relief valve/unload valve	
			Q1	Q2	QMAX		Pressure adjustment range MPa {kgf/cm^2}	Unloading pressure MPa {kgf/cm^2}
12	½	21 {210}	25	50	75	2 {20}	3rd pattern: 0.3 to 21 {3 to 210} 6th pattern: 0.6 to 21 {6 to 210}	3rd pattern: 0.3 {3} 6th pattern: 0.6 {6}
16	¾		50	100	130			
20	1		80	160	200			
25	1¼		125	250	300			
32	1½		200	400	500			

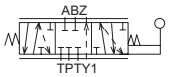
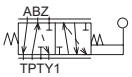
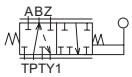
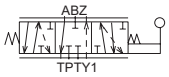
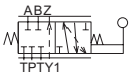
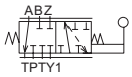
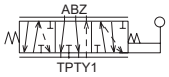
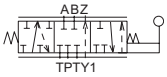
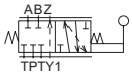
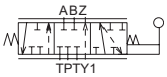
Note: See the spring selection table for the relationships among the rated flow rate, number of directional control valve series, and inlet valve block spring.

Spring selection table/unloading (differential pressure)

Number of directional control valve series		1		2		3		4		5		6	7	8
Rated flow rate	Q1	3	6	3	6	3	6	3	6	3	6	6	6	6
	Q2	3	6	3	6	6		6		6		–	–	–
	QMAX	6		–		–		–		–		–	–	–

Note: 3: Spring for differential pressure of 0.3 MPa {3 kgf/cm²}
6: Spring for differential pressure of 0.6 MPa {6 kgf/cm²}

8: Spool type table

Spool type	JIS graphic symbols for hydraulic system	Spool type	JIS graphic symbols for hydraulic system	Spool type	JIS graphic symbols for hydraulic system
A		E		M	
B		F		N	
C		K		O	
D		L			

Note: ○ With spool types B, C and D, the passage area from port A/B to port T becomes 20% of the standard rated area at the neutral position, and the flow rate to port T is reduced accordingly. 100% of the rated area is secured at the switching position.
○ With spool types E, M and N, the passage area becomes 70% of the standard rated area and the flow rate is reduced accordingly. The pump does not unload at any operation position of the valve.

Mass (kg)

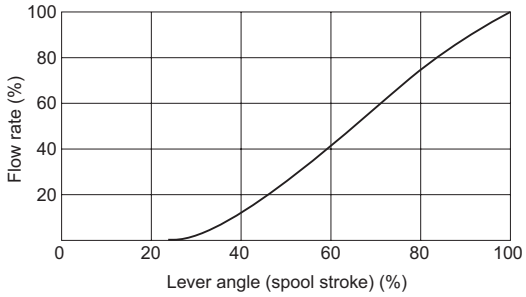
Model No.	Port size				
	12	16	20	25	32
MUV	2.4	4.3	8	12.5	21
MHV	2.8	3.9	7	13	16.5
AP	1	1.7	3	5.4	7
AN	0.9	1.6	3	5.3	7

Handling

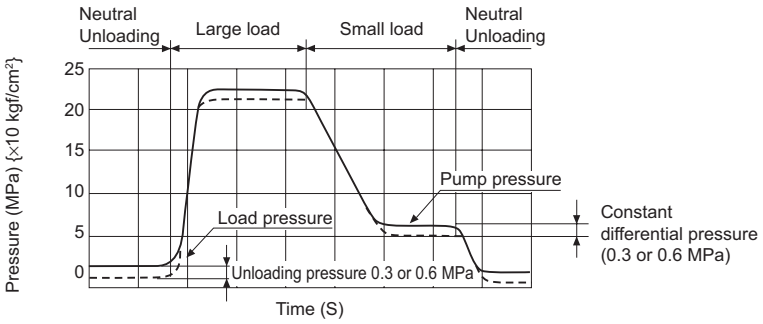
- Use parallel thread joints since the use of taper thread joints may distort the valve and cause malfunctions.
- When setting the maximum pressure at the start of operation, fully open the relief valve's adjusting screw. Adjust the pressure only while the actuator is stopped at the stroke end or the load is the maximum.
  Clockwise rotation of the pressure adjusting screw increases the pressure. The pressure changes by 10 MPa {100 kgf/cm²} per revolution of the adjusting screw.
  Since the pump is unloaded when the directional control valve is at the neutral position, it is not necessary to fully open the relief valve when starting the pump once the relief valve has been set.
- When connecting ports A and B to a cylinder, connect the head side of the cylinder to port B since the pressure drop is smaller in the B → T flow.
  When the flow rate exceeds rated flow rate Q2 or when many series of valves are used, use an end plate with isolated tank port T1 (model code: AP※※K-T).
- Directly connect the piping to the tank without merging it with other piping. If it is merged with other piping, use larger pipes.
- Since this valve incorporates a pressure compensation valve with meter-in control, a back pressure valve such as a counter balance valve needs to be inserted between the outlet port of the actuator and this valve if a negative load will be applied.
- This valve can incorporate only one pressure compensation valve. Therefore, when two directional control valves are used, the pressure compensation function operates only for the directional control valve closer to the inlet valve.

Performance curves

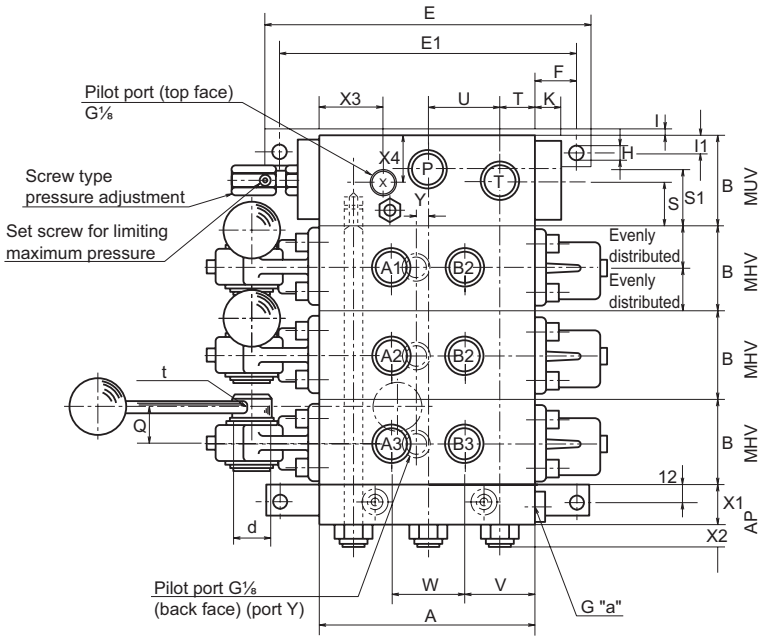
Lever angle - Flow rate characteristics



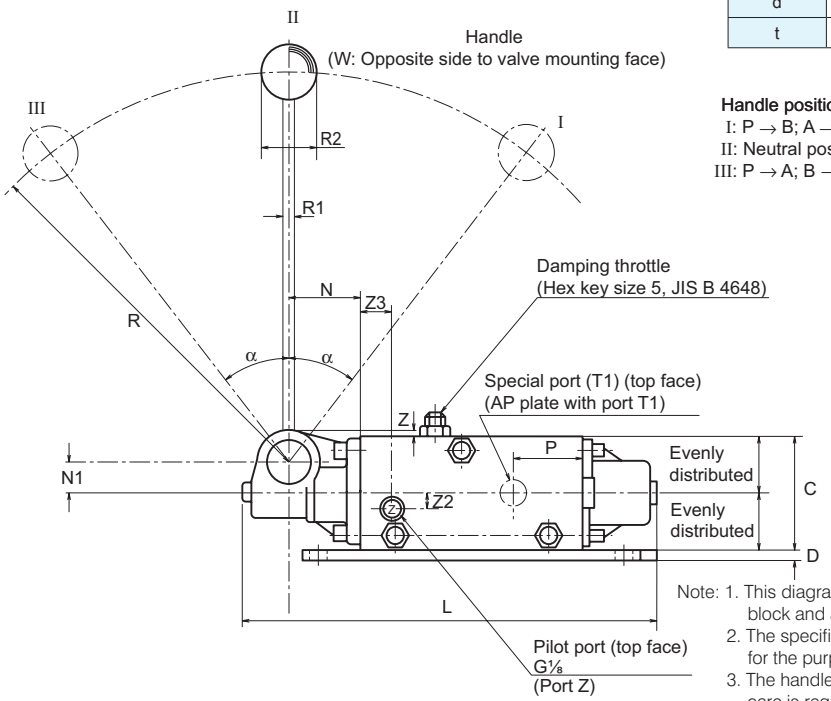
Pressure characteristics



External dimension diagram

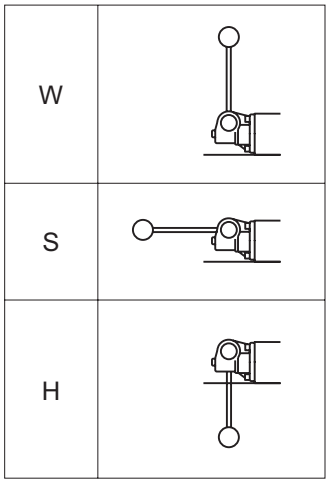


Port size	12	16	20	25	32
Piping diameter G thread	½	¾	1	1¼	1½
Spool stroke	2 × 8	2 × 10	2 × 12	2 × 14	2 × 16
α	30.5°	38°	46°	35.5°	41°
A	110	140	170	200	235
B	46	55	68	76	90
C	60	70	86	100	120
D	5	6	8	9	9
E	165	210	260	322	390
E1	150	190	235	292	355
F	20	25	32.5	46	60
H	7.5	9.5	11.5	13.5	15.5
I	0.5	0.5	0	1	1.5
I1	7.5	10	12.5	15	17.5
I2	8.5	10	12.5	15	17.5
K	11.8	15	20	25	30
L	230.5	270	324	376	434
N	36.5	39	43	55	59
N1	17	18	20	30	30
P	36	46	55	65	75.5
Q	18. 5	23.5	25	33	33
R	224	243	243	268	268
R1	8	10	10	12	12
R2	25	35	35	35	35
S	23	27.5	34	38	45
S1	29	35	42	46	50
T	17.5	22	25	35	38.5
U	37.5	48	60	65	79
V	36	46	55	65	75.5
W	38	48	60	70	84
X1	20	25	30	40	45
X2	11.5	11.5	14.5	16.5	18.5
X3	26	39	48	50	52
X4	20	27.5	34	38	45
Z	7.5	3.5	–2.5	10	0
Z2	–14	9.5	16	19	23
Z3	8	8	8	9	9
Y	6	8	10	12.5	16
a	¼	⅜	½	¾	1
d	20	20	20	30	30
t	M8	M10	M10	M12	M12



Handle position
I: P → B; A → T
II: Neutral position
III: P → A; B → T

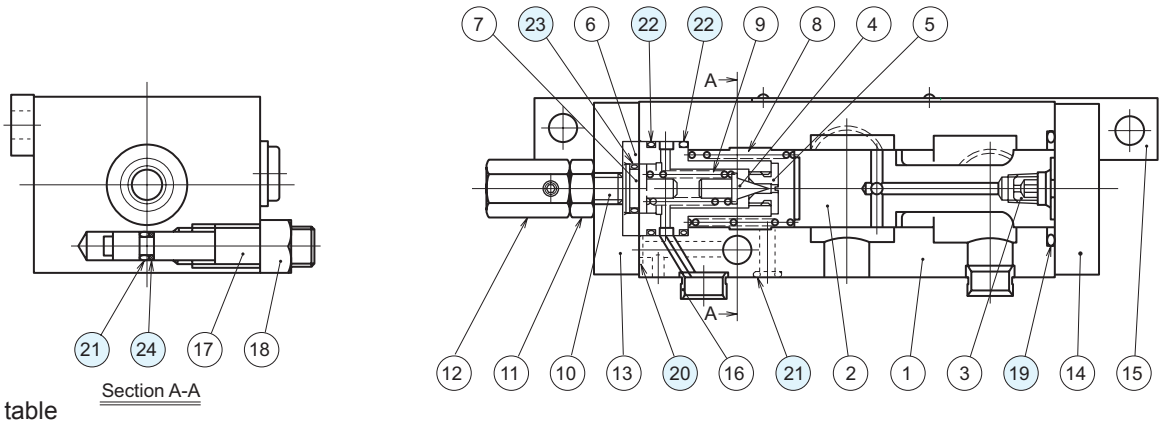
Lever installation position



Note: 1. This diagram shows a valve with an MUV inlet valve block and a 3-valve series.
2. The specifications given here are subject to change for the purposes of improvement.
3. The handle may interfere with piping joints so due care is required.

Sectional structural diagram

MUV※※KL

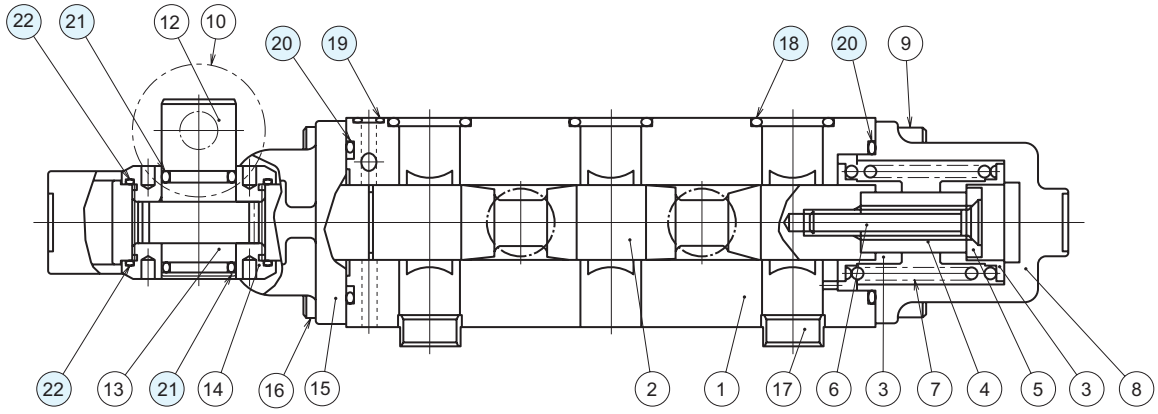


Section A-A

Sealing part table

Part No.	Name	Quantity	Part model					Part specifications
			MUV12	MUV16	MUV20	MUV25	MUV32	
19	O-ring	1	AS568-120	AS568-120	AS568-122	AS568-128	AS568-130	NBR, Hs90
20	O-ring	1	AS568-008	AS568-008	AS568-008	AS568-008	AS568-010	NBR, Hs90
21	O-ring	2	AS568-008	AS568-008	AS568-008	AS568-008	AS568-008	NBR, Hs90
22	O-ring	2	AS568-019	AS568-019	AS568-023	AS568-122	AS568-126	NBR, Hs90
23	O-ring	1	AS568-012	AS568-012	AS568-012	AS568-012	AS568-012	NBR, Hs70
24	Backup ring	1	For AS568-008	For AS568-008	For AS568-008	For AS568-008	For AS568-008	Bias cut

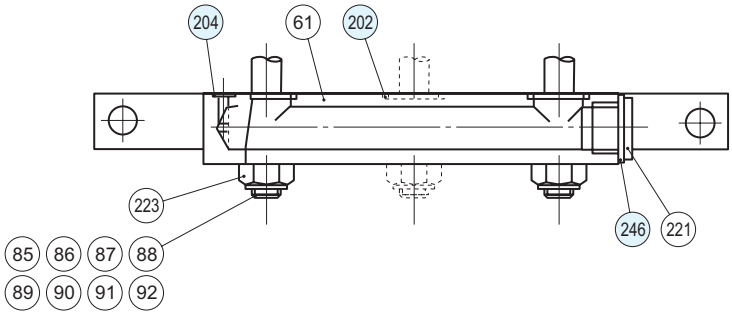
MHV※※KL



Sealing part table

Part No.	Name	Quantity	Part model					Part specifications
			MHV12	MHV16	MHV20	MHV25	MHV32	
18	O-ring	3	AS568-112	AS568-115	AS568-118	AS568-121	AS568-125	NBR, Hs90
19	O-ring	1	AS568-008	AS568-008	AS568-008	AS568-008	AS568-008	NBR, Hs90
20	O-ring	2	AS568-025	AS568-128	AS568-136	AS568-228	AS568-231	NBR, Hs90
21	O-ring	2	AS568-114	AS568-114	AS568-114	AS568-213	AS568-213	NBR, Hs70
22	O-ring	2	AS568-028	AS568-028	AS568-028	AS568-034	AS568-034	NBR, Hs90

AP-※※K-※



Sealing part table

Part No.	Name	Quantity	Part model					Part specifications
			AP12	AP16	AP20	AP25	AP32	
202	O-ring	3	AS568-112	AS568-115	AS568-118	AS568-121	AS568-125	NBR, Hs90
204	O-ring	1	AS568-008	AS568-008	AS568-008	AS568-008	AS568-008	NBR, Hs90
246	Sealing washer	1	SWP-1/4	SWP-3/8	SWP-1/2	SWP-3/4	SWP-1	