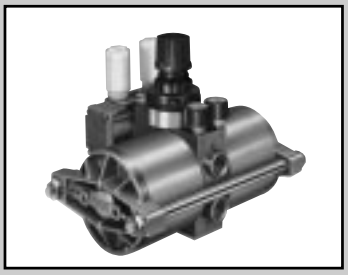
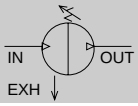


Air booster

ABP Series

JIS symbol



RoHS

Functional explanation

● Primary pressure flowed from IN passes through check valve on IN side, and flows in booster chamber A and B. Primary pressure also passes through pressure adjustment section and switching valve, and flows in drive room A. Piston moves to left hand due to pressure of drive room A. Air in booster chamber A is compressed, and passes through check valve on OUT side, and goes to OUT side.

● If piston reaches stroke end, changeover switch is pushed, and compressed air is supplied to pilot room of switching valve, and switching valve is switched. Then the air in drive room A is exhausted, and the air is delivered to drive room B.

● Therefore, piston moves to right hand and air in booster chamber B is compressed, and passes through check valve on OUT side, and goes to OUT side.

● Boosting on OUT side is compressed, if operations above are repeated. Feedback pressure is transmitted to pressure adjustment section due to OUT side pressure passes through shuttle valve, and boosting is continued until pressure adjustment spring and pressure is balanced.

Specifications

Descriptions	ABP
Working fluid	Compressed air
Max. working pressure MPa	0.99
Min. working pressure MPa	0.2
Set pressure range MPa	From primary pressure to twice primary pressure (1.0MPa max.)
Withstanding pressure MPa	1.5
Flow m^3/min. (ANR)	Refer to the right graph rate flow characteristics
Boosting ratio	Max. double pressure (or equivalent)
Ambient temperature range ℃	0 to 50 (no freezing)
Lubrication	Not required (use the turbine oil Class 1 ISO VG32 if lubricated)
Port size	Rc1/2
Weight kg	4.6
Product service life	5 million (nominal)

How to order

ABP - 12 D - G

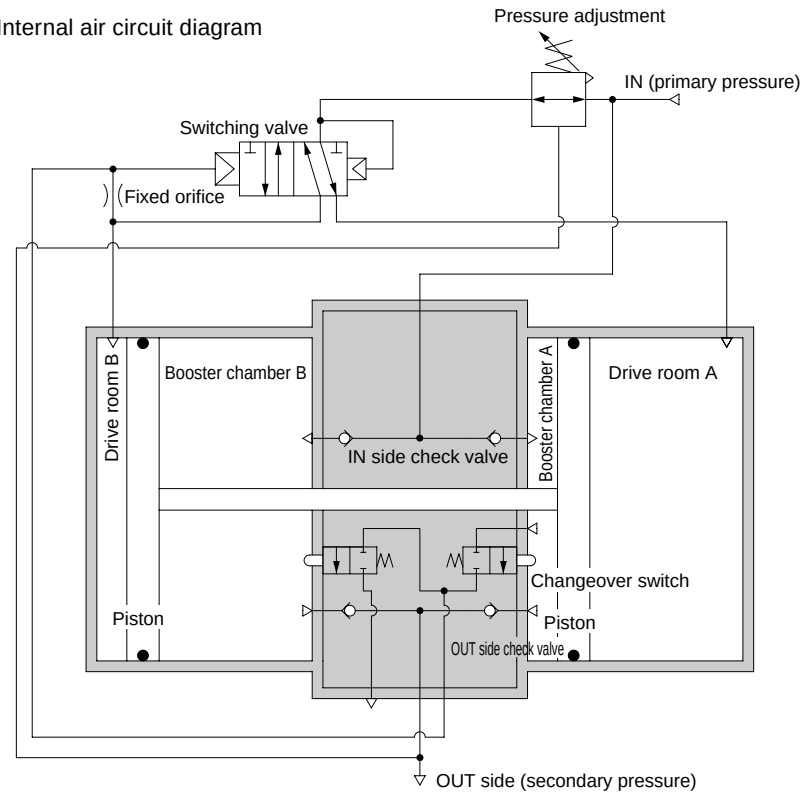
Air booster

Ⓐ OUT port position	
Blank	Same side of IN port
D	Bottom (air tank directly connected)
L	Rear side of IN port

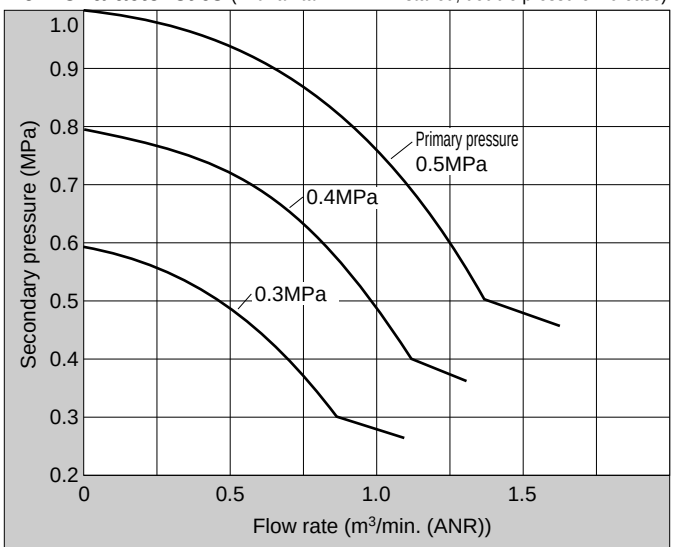
Ⓑ Option	
G	Pressure gauge
S	Silencer
B	Foot bracket

Note) Option G (pressure gauge) is installed onto air booster at shipment. B (foot bracket) and S (silencer) are attached.

● Internal air circuit diagram

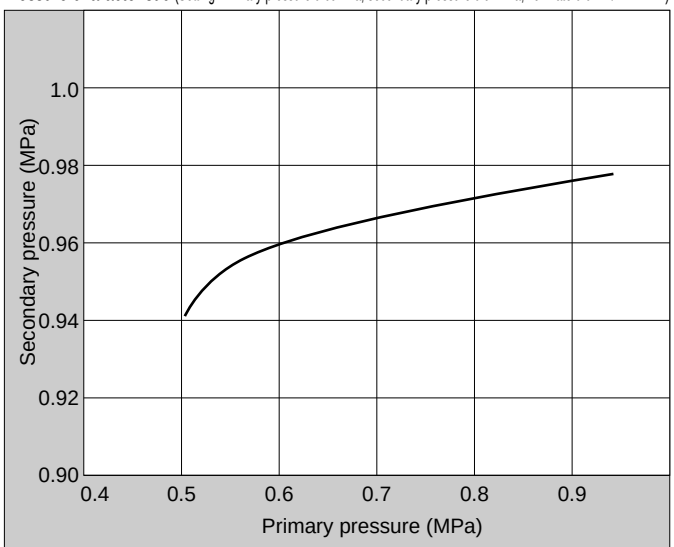


Flow Characteristics (With air tank AT-24 installed, double pressure increase)



Flow rate characteristics show max. flow rate of air booster.
If primary pressure is constant and secondary side flow rate is increased, max. secondary pressure decreases.

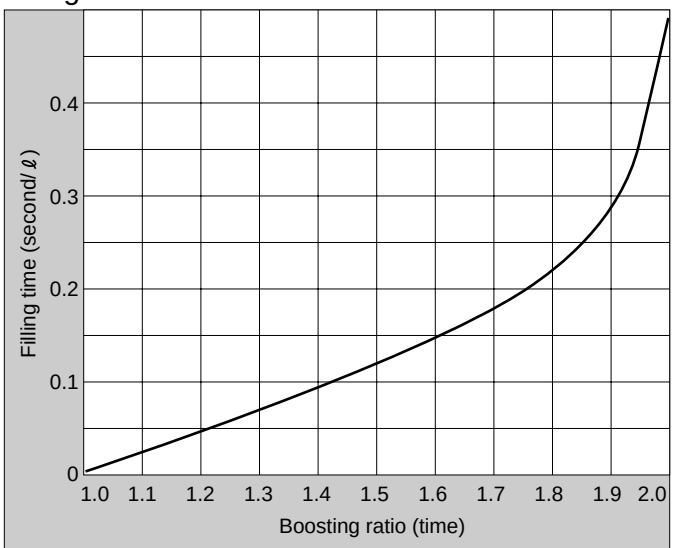
Pressure characteristic (Setting: Primary pressure 0.69MPa, secondary pressure 0.97MPa, flow rate 0.02m³/min. ANR)



Pressure characteristics show variation of set secondary pressure according to primary pressure variation.
If primary pressure decreases, secondary pressure decreases slightly.

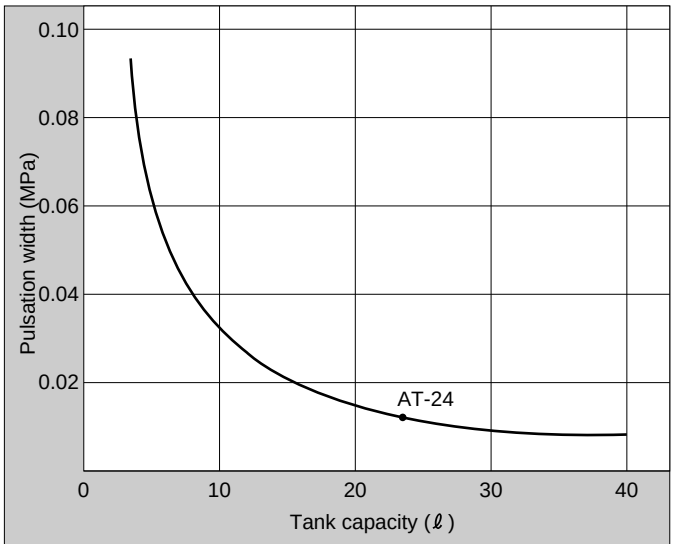
Note) Air booster needs approx. twice secondary side flow rate (max.) for primary side due to structure.
Confirm that the instantaneous flow rate is within the curve.

Filling characteristics



Filling characteristics show relations between boosting ratio and filling time, if tank etc. filled with compressed air.

Pulsation



Pulsation shows width of pulsation if air tank is installed onto secondary side of air booster.

To find filling time, when filling tank with air, where secondary side air pressure P_0, air pressure in tank before filling P_1, air pressure after filling P_2, boosting ratio before filling k_1 and boosting ration after filling k_2, therefore $k_1 = \frac{P_1}{P_0}$ and $k_2 = \frac{P_2}{P_0}$ are led. Find k1 and k_2 at first, then read filling time t_1 and t_2 according to graph where boosting ratio k_1, k_2, finally filling time for tank capacity A (ℓ) is obtained with $t = (t_2 - t_1)$ A.

Formula of air booster operational cycle

$$N = \frac{Q \times 10^3}{7.55P + 0.76}$$

N: Operational cycle
Q: Required flow (m³/min. (ANR))
P: Primary pressure (MPa)

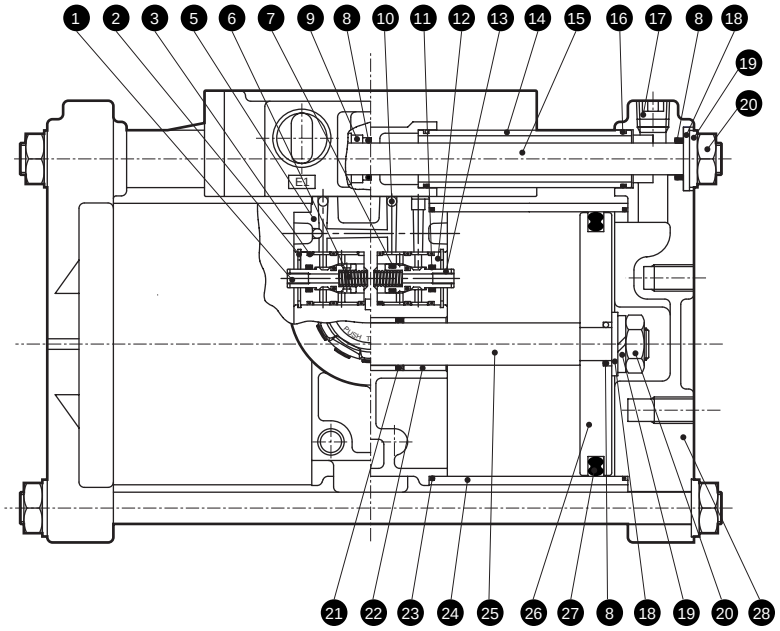
Formula of air booster service life
Since nominal service life of operational cycle is 5 million

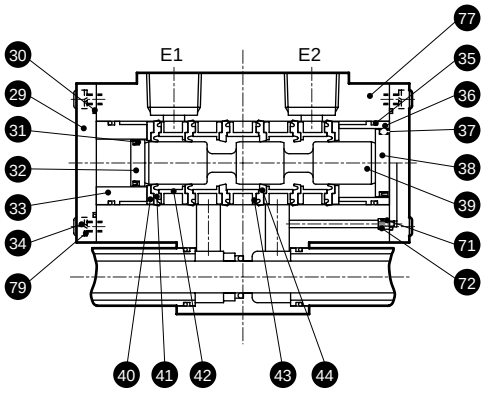
$$T = \frac{5{,}000{,}000}{N \times 60}$$

T: Service life (hour)

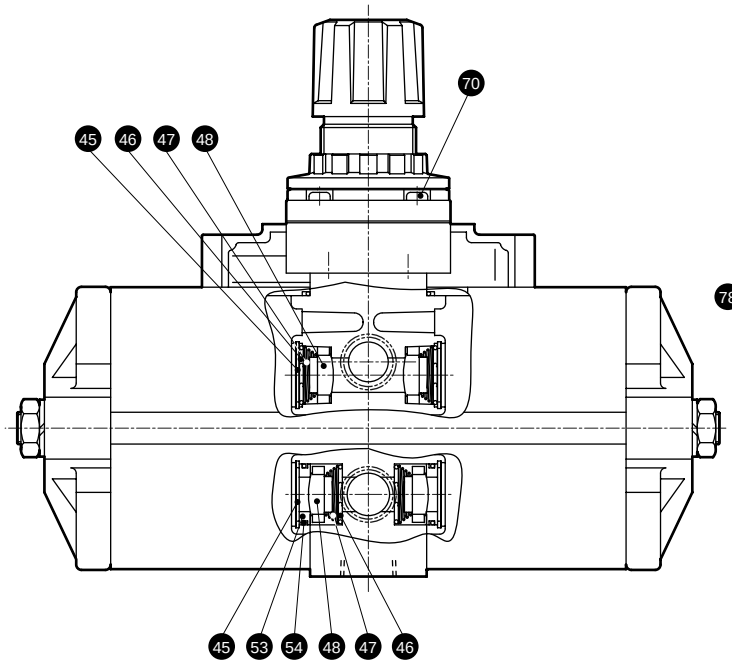
Each characteristics are just reference, but not assured conditions.

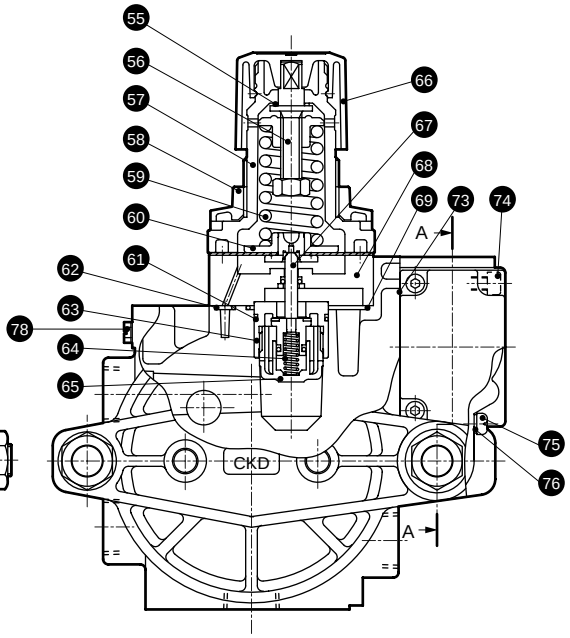
Internal structure





A-A cross section





Parts list

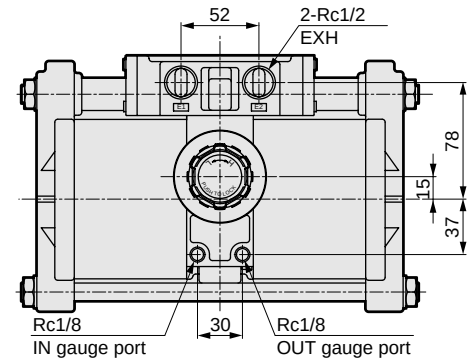
No.	Parts name	Material	Quantity	No.	Parts name	Material	Quantity
1	Valve stem (A)	Stainless steel	1	41	Soft packing seal	Urethane rubber	4
2	C type snap ring for hole	Stainless steel	2	42	Spacer	Aluminum alloy	4
3	O ring	Nitrile rubber	5	43	Spacer	Polyacetal resin	1
5	Body block assembly	Aluminum alloy	1	44	Soft packing seal	Urethane rubber	2
6	Spring	Stainless steel	2	45	C type snap ring for hole	Stainless steel	4
7	O ring	Nitrile rubber	1	46	Spring sheet	Stainless steel	4
8	O ring	Nitrile rubber	5	47	Spring	Stainless steel	4
9	Spacer	Stainless steel	1	48	Check valve	Nitrile rubber	4
10	Steel ball	Steel	3	53	Valve seat	Aluminum alloy	2
11	Packing seal	Nitrile rubber	2	54	O ring	Nitrile rubber	1
12	Detection valve body	Copper alloy	2	55	Slip ring	Polyacetal resin	4
13	Valve stem (B)	Stainless steel	1	56	Adjusting assembly		1
14	Pipe	Stainless steel	2	57	Guard	PBT resin	1
15	Tie rod	Steel	2	58	Mounting nut	Polyacetal resin	1
16	O ring	Nitrile rubber	4	59	Adjusting spring	Steel	1
17	Plug with hexagon head hole	Stainless steel	2	60	Diaphragm assembly		1
18	Plain washer	Steel	4	61	O ring	Nitrile rubber	1
19	Spring washer	Steel	6	62	O ring	Nitrile rubber	1
20	Hexagon nut	Steel	6	63	Valve seat	Copper alloy	1
21	MY packing seal	Nitrile rubber	2	64	Bottom spring	Stainless steel	1
22	Rod bushing	Oil impregnated bearing alloy	3	65	Stud	Polyacetal resin	1
23	O ring	Nitrile rubber	4	66	Knob	Polyacetal resin	1
24	Cylinder tube	Aluminum alloy	2	67	Valve assembly		1
25	Piston rod	Steel	1	68	Regulator assembly		1
26	Piston	Aluminum alloy	2	69	O ring	Nitrile rubber	1
27	Piston packing seal	Nitrile rubber	2	70	Cross-recessed tapping screw	Steel	4
28	Head cover	Aluminum alloy	2	71	Fixed orifice	Copper alloy	1
29	Cap	Aluminum alloy	2	72	O ring	Nitrile rubber	1
30	Gasket	Nitrile rubber	2	73	Master valve gasket	Nitrile rubber	1
31	Lip packing seal	Nitrile rubber	1	74	Hexagon socket head cap bolt	Steel	2
32	Piston	Polyacetal resin	1	75	Cross headed pan	Steel	1
33	Cylinder	Aluminum alloy	1	76	Gasket	Nitrile rubber	1
34	Hexagon socket head cap bolt	Steel	8	77	Valve	Aluminum alloy	1
35	O ring	Nitrile rubber	2	78	Plug	Copper alloy	1
36	Cylinder	Aluminum alloy	1	79	Spring washer	Steel	8
37	Lip packing seal	Nitrile rubber	1				
38	Piston	Polyacetal resin	1				
39	Spool	Aluminum alloy	1				
40	Stopper	Polyacetal resin	2				

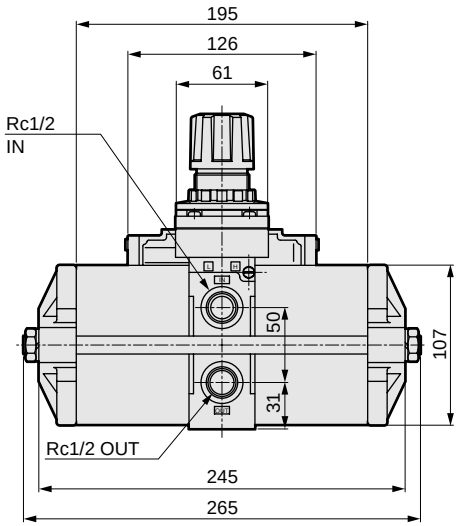
Discrete consumable parts and options

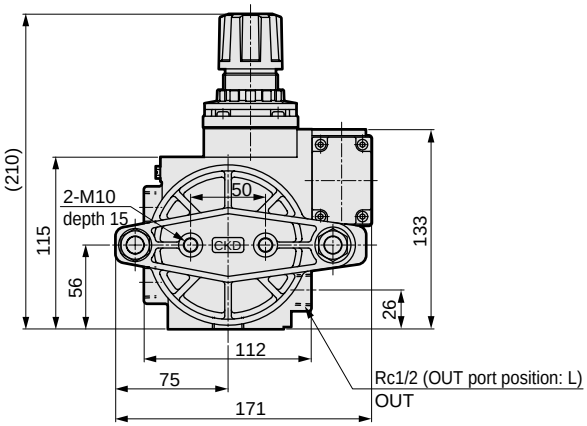
Part name	Model no.	Part number	Remarks
Select switch packing set	ABP-K1	❶ X 1, ❸ x 5, ❻ x 2, ⓫ x 2, ⓬ x 2, ⓭ x 1	
Cylinder section packing seal set	ABP-K2	❽ X 5, ⓰ x 4, ㉑ x 2, ㉓ x 4, ㉗ x 2	
Switching valve piston assembly	ABP-K3	㉛ X 1, ㉜ x 1, ㊲ x 1, ㊳ x 1	
Switching valve sealant assembly	ABP-K4	㊵ X 2, ㊶ x 4, ㊷ x 4, ㊸ x 1, ㊹ x 2	
Check valve shuttle valve assembly	ABP-K5	㊽ X 4, ㊿ x 1, ㊿① x 2, ㊿③ x 2, ㊿④ x 2	Using parts prior to minor changes
Diaphragm assembly	ABP-K6	㊿⓪ X 1	
Pressure adjustment section valve assembly	ABP-K7	㊿① X 1, ㊿② x 1, ㊿⑦ x 1, ㊿⑨ x 1	
Check valve assembly	ABP-K8	㊽ X 4, ㊿③ x 2, ㊿④ x 2	
Bracket	ABP-B		For 1 unit
Pressure gauge	ABP-GAUGE		Pressure gauge 1 pc.
Silencer	SLW-15A		Silencer 1 pc.

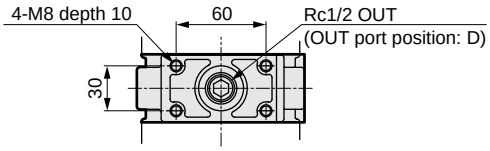
Dimensions

● ABP-12



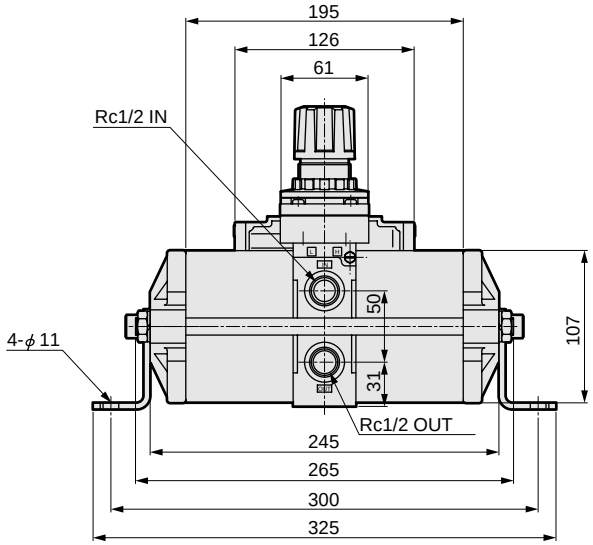


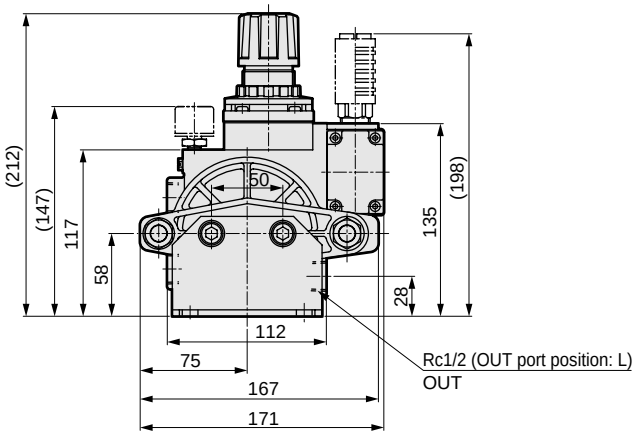




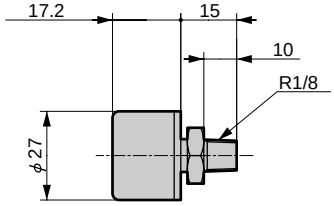
Optional dimensions

● Bracket (ABP-B) installation





● Pressure gauge (ABP-GAUGE)



● Silencer (SLW-15A)