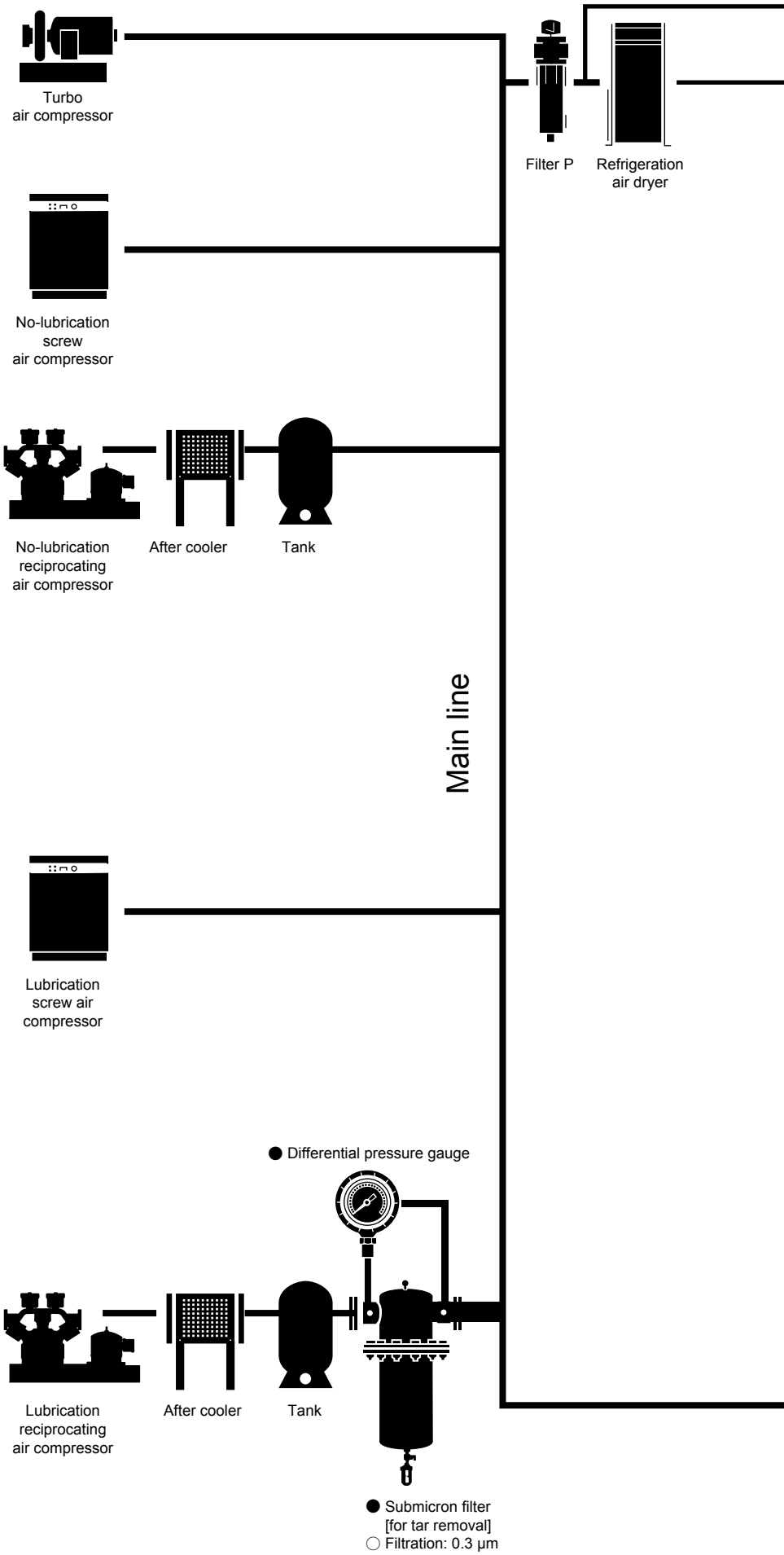
Clean air system

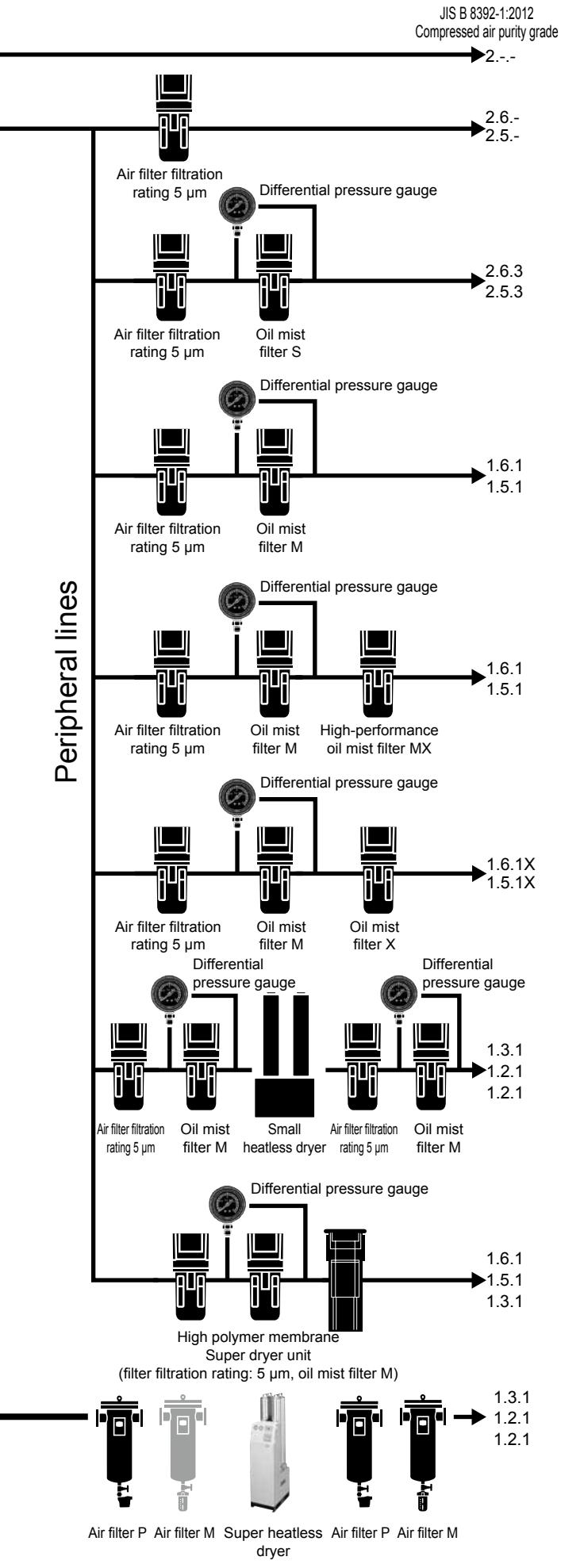
CKD clean air system

CKD clean air system removes impurity in compressed air effectively and economically.
Diverse clean air system is available per industry or application to solve any annoying issues caused by compressed air.

CKD clean air system

An air compressor is normally used to make compressed air by compressing the atmosphere. The compressed air will be highly contaminated with a high content of impurities such as water vapor and small particles too small to see which were originally in the ambient air, but now in high concentrations in proportion to the compression ratio. In some types of lubrication air compressor, lubricant is oxidized by compression heat or frictional heat to form oil oxide, or may generate solid substance such as carbon and tar, etc. Oil-free air compressors will also generate carbon particles. These factors make the compressed air more contaminated.
To remove the impurities in the compressed air, CKD's clean air systems offer an effective and inexpensive means by arranging the components suitably for a specific application, including a submicron filter to remove tar and carbon, a dryer to remove water vapor, and an oil mist filter to remove oil oxides and odor.





JIS B 8392-1:2012 Compressed air purity grade	Impurities in compressed air				Applications
	Solid applications (Nominal)	Moisture	Secondary side oil conc. (21°C)	Odor	
2.-.-	1 µm	-	-	-	Removing water drip/ coarse dust · Construction, civil engineering machines · Air for cleaning (dry air not required)
2.6.3	0.3 µm	Pressure dew point 10°C	0.5 mg/m³	-	General dry air · Air tool · Air drill/air screw driver · Air grinder · Labor saving devices and components/ pneumatic jigs and tools · Air chuck/air vice · Precision part cleaning air blow
2.5.3		Pressure dew point 7°C			
1.6.1	0.01 µm	Pressure dew point 10°C	0.01 mg/m³	-	Oil-free dry clean air · Instrumentation · Measurement · Logic control · Luxury painting · Precision mining industry
1.5.1		Pressure dew point 7°C			
1.6.1	0.01 µm	Pressure dew point 10°C	0.001 mg/m³	-	Ultra-oil-free dry clean air · Precise measurement · Luxury painting
1.5.1		Pressure dew point 7°C			
1.6.1	0.01 µm	Pressure dew point 10°C	0.003 mg/m³	None	Odorless air · Food industry · Pharmaceutical industry · Stirring/transportation/dry · Packing/brewing air
1.5.1		Pressure dew point 7°C			
1.3.1	0.01 µm	Pressure dew point -20°C	0.01 mg/m³	-	Ultra dry air · Drying computer rooms · Drying furnace gas · Ozone generator · Drying the insulation gas of a high-voltage generator · Drying the air supply of a high-voltage breaker · Central control instrumentation
1.2.1		Pressure dew point -40°C			
1.2.1		Pressure dew point -60°C			

*1: The system No. is based on the class below.
X in the table below indicates odor removal. "-" indicates no specification.
*2: The table shows the highest compressed air quality grade that can be achieved by the CKD clean air system. The grade varies depending on the condition at the filter inlet.

JIS B 8392-1:2012 Compressed air purity grade

Grade	Solid particle				Humidity and moisture		Oil
	Max. No. of particles per 1 m³ for particle diameter d (µm)			Mass conc. Cp	Pressure dew point	Water concentration Cw	Total oil concentration
	0.1 < d ≤ 0.5	0.5 < d ≤ 1.0	1.0 < d ≤ 5.0	mg/m³	°C	g/m³	mg/m³
0	Conditions stricter than Grade 1 to be specified by user or supplier.						
1	≤ 20,000	≤ 400	≤ 10	-	≤ -70	-	≤ 0.01
2	≤ 400,000	≤ 6,000	≤ 100	-	≤ -40	-	≤ 0.1
3	-	≤ 90,000	≤ 1,000	-	≤ -20	-	≤ 1
4	-	-	≤ 10,000	-	≤ +3	-	≤ 5
5	-	-	≤ 100,000	-	≤ +7	-	-
6	-	-	-	0 < Cp ≤ 5	≤ +10	-	-
7	-	-	-	5 < Cp ≤ 10	-	Cw ≤ 0.5	-
8	-	-	-	-	-	0.5 < Cw ≤ 5	-
9	-	-	-	-	-	5 < Cw ≤ 10	-
X	-	-	-	Cp > 10	-	Cw > 10	> 5

JIS B 8392-1:2003 has been revised to JIS B 8392-1:2012.

For example,
What is Grade 1:2:1?

- Solid particles 0.1 to 0.5 µm are 20,000 particles or less, 0.5 to 1.0 µm are 400 particles or less, and 1.0 to 5.0 µm are 10 particles or less
- Pressure dew point -40°C or less
- Oil concentration 0.01 mg/m³ or less.

⚠ Precautions for system selection

*1: If your conditions are different, refer to the specifications in the catalog to select a model.
*2: Use anti-rust processed materials for piping (zinc plated pipe, lining pipe or stainless steel pipe). Use stainless steel pipes for ultra dry air.
*3: Always degrease the piping after oil mist filter before use.
*4: Always install the main pipe with a 1/100 slope.
*5: Install a filter immediately before the equipment to be used to remove contaminants caused in piping.

Series variation

F.R.L. unit (Combination)

[Combination]

Modular design (Rotary actuator F.R.L.)

Series	Combination/application F	R	L	W		M	Model No.
	Filter	Regulator	Lubricator	Filter/ regulator	Reverse filter/regulator	Oil mist filter	
● F.R.L. combination P1=0.7 MPa P2=0.5 MPa △P = 0.1 MPa	F1000-W	R1000-W	L1000-W				**C1000-W**
	F2000-W	R2000-W	L3000-W				**C2000-W**
	F3000-W	R2000-W	L3000-W				**C2500-W**
	F3000-W	R3000-W	L3000-W				**C3000-W**
	F4000-W	R4000-W	L4000-W				**C4000-W**
	F6000-W	R6000-W	L8000-W				**C6500-W**
	F8000-W	R8000-W	L8000-W				**C8000-W**
● W.L. combination P1=0.7 MPa P2=0.5 MPa △P = 0.1 MPa			L1000-W	W1000-W			**C1010-W**
			L3000-W	W2000-W			**C2010-W**
			L3000-W	W3000-W			**C3010-W**
			L4000-W	W4000-W			**C4010-W**
			L8000-W	W8000-W			**C8010-W**
● F.R. combination P1=0.7 MPa P2=0.5 MPa △P = 0.1 MPa	F1000-W	R1000-W					**C1020-W**
	F2000-W	R2000-W					**C2020-W**
	F3000-W	R2000-W					**C2520-W**
	F3000-W	R3000-W					**C3020-W**
	F4000-W	R4000-W					**C4020-W**
	F6000-W	R6000-W					**C6020-W**
	F8000-W	R8000-W					**C8020-W**
● F.M.R. combination P1=0.7 MPa	F1000-W	R1000-W				M1000-W	**C1030-W**
	F2000-W	R2000-W				M2000-W	**C2030-W**
	F3000-W	R2000-W				M3000-W	**C2530-W**
	F3000-W	R3000-W				M3000-W	**C3030-W**
	F4000-W	R4000-W				M4000-W	**C4030-W**
	F6000-W	R6000-W				M6000-W	**C6030-W**
	F8000-W	R8000-W				M8000-W	**C8030-W**
● W.M. combination P2=0.7 MPa				W1000-W		M1000-W	**C1040-W**
				W2000-W		M2000-W	**C2040-W**
				W3000-W		M3000-W	**C3040-W**
				W4000-W		M4000-W	**C4040-W**
				W8000-W		M8000-W	**C8040-W**
● R.M. combination P2=0.7 MPa		R1000-W				M1000-W	**C1050-W**
		R2000-W				M2000-W	**C2050-W**
		R2000-W				M3000-W	**C2550-W**
		R3000-W				M3000-W	**C3050-W**
		R4000-W				M4000-W	**C4050-W**
		R6000-W				M6000-W	**C6050-W**
		R8000-W				M8000-W	**C8050-W**
● F.M. combination P1=0.7 MPa	F1000-W					M1000-W	**C1060-W**
	F2000-W					M2000-W	**C2060-W**
	F3000-W					M3000-W	**C3060-W**
	F4000-W					M4000-W	**C4060-W**
	F6000-W					M6000-W	**C6060-W**
	F8000-W					M8000-W	**C8060-W**
● F.F.M. combination P1=0.7 MPa	F3000-W(5 μm) F3000-W(0.3 μm)					M3000-W	**C3070-W**
	F4000-W(5 μm) F4000-W(0.3 μm)					M4000-W	**C4070-W**
	F6000-W(5 μm) F6000-W(0.3 μm)					M6000-W	**C6070-W**
	F8000-W(5 μm) F8000-W(0.3 μm)					M8000-W	**C8070-W**

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* P1 = primary pressure P2 = secondary pressure △P = differential pressure

Port size												Max. flow rate m^3/min (reference)	Page
φ4	φ6	φ8	1/8	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2		
			●	●								0.45/0.63	32
				●	●							1.2/1.7	
				●	●							1.2/1.7	
				●	●							1.28/1.75	
				●	●	●	● Note					1.43/2.4/3.0	
							●	●				4.5/5.0	
							●	●				7.0/7.5	
			●	●								0.45/0.63	40
				●	●							1.2/1.7	
				●	●							1.28/1.75	
				●	●	●	● Note					1.43/2.4/3.0	
							●	●				7/7.5	
			●	●								0.77/1.1	46
				●	●							1.75/2.5	
				●	●							1.75/2.5	
				●	●							2.0/2.6	
				●	●	●	● Note					2.5/4.4/5.0	
							●	●				7/7.7	
							●	●				10	
			●	●								0.15	52
				●	●							0.25	
				●	●							0.36	
				●	●							0.36	
				●	●	●	● Note					0.825	
							●	●				1.27	
							●	●				2.6	
			●	●								0.15	58
				●	●							0.25	
				●	●							0.36	
				●	●	●	● Note					0.825	
							●	●				2.6	
			●	●								0.15	64
				●	●							0.25	
				●	●							0.36	
				●	●							0.36	
				●	●	●	● Note					0.825	
							●	●				1.27	
							●	●				2.6	
			●	●								0.15	70
				●	●							0.25	
				●	●							0.36	
				●	●	●	● Note					0.825	
							●	●				1.27	
							●	●				2.6	
				●	●							0.225	76
				●	●	●	● Note					0.5	
							●	●				0.8	
							●	●				1.1	

Note: Pipe adaptor is mounted.

Modular design (Rotary actuator F.R.L.)

Series	Model No.	Combination/application					Combination option/application				
		F	R	L	W	M	D	S	P	V	K
		Filter	Regulator	Lubricator	Filter/ regulator	Oil mist filter	Distributor	Pressure switch		Shut-off valve	
● F.R.L. combination	C1000-W	F1000-W	R1000-W	L1000-W			D101-W	P1100-W		V1000-W	
	C2000-W	F2000-W	R2000-W	L3000-W			D401-W	P4100-W	P4000-W	V3000-W	V3010-W
	C2500-W	F3000-W	R2000-W	L3000-W			D401-W	P4100-W	P4000-W	V3000-W	V3010-W
	C3000-W	F3000-W	R3000-W	L3000-W			D401-W	P4100-W	P4000-W	V3000-W	V3010-W
	C4000-W	F4000-W	R4000-W	L4000-W			D401-W	P4100-W	P4000-W	V3000-W	V3010-W
*5	C4000-20-W	F4000-W	R4000-W	L4000-W			D401-W	P4100-W	P4000-W	V3000-W	V3010-W
	C6500-W	F6000-W	R6000-W	L8000-W			D801-W	P8100-W			V6010-W
	C8000-W	F8000-W	R8000-W	L8000-W			D801-W	P8100-W			V6010-W
● W.L. combination	C1010-W			L1000-W	W1000-W			P1100-W		V1000-W	
	C2010-W			L3000-W	W2000-W			P4100-W	P4000-W	V3000-W	V3010-W
	C3010-W			L3000-W	W3000-W			P4100-W	P4000-W	V3000-W	V3010-W
	C4010-W			L4000-W	W4000-W			P4100-W	P4000-W	V3000-W	V3010-W
*5	C4010-20-W			L4000-W	W4000-W			P4100-W	P4000-W	V3000-W	V3010-W
	C8010-W			L8000-W	W8000-W			P8100-W			V6010-W
● F.R. combination	C1020-W	F1000-W	R1000-W				D101-W	P1100-W		V1000-W	
	C2020-W	F2000-W	R2000-W				D401-W	P4100-W	P4000-W	V3000-W	V3010-W
	C2520-W	F3000-W	R2000-W				D401-W	P4100-W	P4000-W	V3000-W	V3010-W
	C3020-W	F3000-W	R3000-W				D401-W	P4100-W	P4000-W	V3000-W	V3010-W
	C4020-W	F4000-W	R4000-W				D401-W	P4100-W	P4000-W	V3000-W	V3010-W
*5	C4020-20-W	F4000-W	R4000-W				D401-W	P4100-W	P4000-W	V3000-W	V3010-W
	C6020-W	F6000-W	R6000-W				D801-W	P8100-W			V6010-W
	C8020-W	F8000-W	R8000-W				D801-W	P8100-W			V6010-W
● F.M.R. combination	C1030-W	F1000-W	R1000-W			M1000-W	D101-W	P1100-W		V1000-W	
	C2030-W	F2000-W	R2000-W			M2000-W	D401-W	P4100-W	P4000-W	V3000-W	V3010-W
	C2530-W	F3000-W	R2000-W			M3000-W	D401-W	P4100-W	P4000-W	V3000-W	V3010-W
	C3030-W	F3000-W	R3000-W			M3000-W	D401-W	P4100-W	P4000-W	V3000-W	V3010-W
	C4030-W	F4000-W	R4000-W			M4000-W	D401-W	P4100-W	P4000-W	V3000-W	V3010-W
*5	C4030-20-W	F4000-W	R4000-W			M4000-W	D401-W	P4100-W	P4000-W	V3000-W	V3010-W
	C6030-W	F6000-W	R6000-W			M6000-W	D801-W	P8100-W			V6010-W
	C8030-W	F8000-W	R8000-W			M8000-W	D801-W	P8100-W			V6010-W
● W.M. combination	C1040-W				W1000-W	M1000-W		P1100-W		V1000-W	
	C2040-W				W2000-W	M2000-W		P4100-W	P4000-W	V3000-W	V3010-W
	C3040-W				W3000-W	M3000-W		P4100-W	P4000-W	V3000-W	V3010-W
	C4040-W				W4000-W	M4000-W		P4100-W	P4000-W	V3000-W	V3010-W
*5	C4040-20-W				W4000-W	M4000-W		P4100-W	P4000-W	V3000-W	V3010-W
	C8040-W				W8000-W	M8000-W		P8100-W			V6010-W
● R.M. combination	C1050-W		R1000-W			M1000-W					
	C2050-W		R2000-W			M2000-W					
	C2550-W		R2000-W			M3000-W					
	C3050-W		R3000-W			M3000-W					
	C4050-W		R4000-W			M4000-W					
*5	C4050-20-W		R4000-W			M4000-W					
	C6050-W		R6000-W			M6000-W					
	C8050-W		R8000-W			M8000-W					
● F.M. combination	C1060-W	F1000-W				M1000-W					
	C2060-W	F2000-W				M2000-W					
	C3060-W	F3000-W				M3000-W					
	C4060-W	F4000-W				M4000-W					
*5	C4060-20-W	F4000-W				M4000-W					
	C6060-W	F6000-W				M6000-W					
	C8060-W	F8000-W				M8000-W					
● F.F.M. combination	C3070-W	F3000-W(5 µm) F3000-W(0.3 µm)				M3000-W					
	C4070-W	F4000-W(5 µm) F4000-W(0.3 µm)				M4000-W					
*5	C4070-20-W	F4000-W(5 µm) F4000-W(0.3 µm)				M4000-W					
	C6070-W	F6000-W(5 µm) F6000-W(0.3 µm)				M6000-W					
	C8070-W	F8000-W(5 µm) F8000-W(0.3 µm)				M8000-W					

Combination option list (U□□□)																	Combination position
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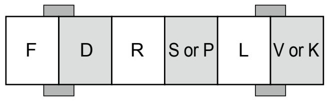
○	○		○		○		○		○				○				
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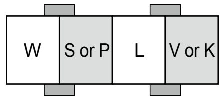
	○		○										○				
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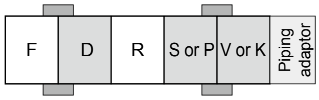
○	●		○		●		○		○				○				
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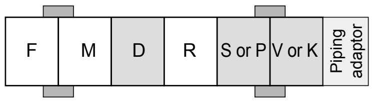
○	●		○		●		○		○				○				
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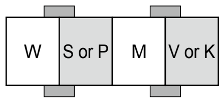
	○		○										○				
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*1: Two T-brackets are included with the combination option.
*2: The T type bracket installation position changes depending on the combination.
*3: T type bracket standard installation position is on the inner side of the end product of each combination.
Note that if the pipe adaptor is combined on the end, the bracket is installed on the inner side of the product past the pipe adaptor.
*4: Use custom combination specifications to change the bracket installation position and for combinations other than combination options.
*5: The pipe adaptor set A400-20-W is assembled on both ends of the C40*0-20-W (port size Rc 3/4).
For products other than the pipe adaptor, the port size is “15” (Rc 1/2).
*6: Only the upward branch direction is available for option “D”.

Series variation

F.R.L. unit (Combination, filter/regulator)

[Combination]

	Series name	Compatible product(s)	Model No.
Separated	● F.R.L. kit P1=0.7 MPa P2=0.5 MPa △P = 0.1 MPa 	Set (with accessory)	**K60570**

[Filter/regulator]

	Series	Compatible product(s) F	R	L	W Rotary actuator		M	Model No.
		Filter	Regulator	Lubricator	Filter/ regulator	Reverse filter/regulator	Oil mist filter	
Modular design (Rotary actuator F.R.L.)	● Filter/regulator P1=0.7 MPa P2=0.5 MPa △P = 0.1 MPa 				●			**WB500 (small)** **W1000-W** **W2000-W** **W3000-W** **W4000-W** **W8000-W**
	● Filter/regulator flame-resistant series P1=0.7 MPa P2=0.5 MPa △P = 0.1 MPa 				●			**W3000-G4** **W4000-G4** **W8000-G4**
	● Reverse filter/regulator P1=0.7 MPa P2=0.5 MPa △P = 0.1 MPa 					●		**W1100-W** **W2100-W** **W3100-W** **W4100-W** **W8100-W**
	● Reverse filter/regulator flame-resistant series P1=0.7 MPa P2=0.5 MPa △P = 0.1 MPa 					●		**W3100-G4** **W4100-G4** **W8100-G4**
	● Filter/regulator outdoor series P1=0.7 MPa P2=0.5 MPa △P = 0.1 MPa 				●			**WW4000** **WW8000**

	Series	Compatible product(s) F	R	L	W Rotary actuator		M	Model No.
		Filter	Regulator	Lubricator	Filter/ regulator	Reverse filter/regulator	Oil mist filter	
Compact	● Compact filter/regulator P1=0.7 MPa P2=0.5 MPa △P = 0.1 MPa 	Push-in fitting and mounting bracket integrated						**WB500**

	Series	Compatible product(s) F	R	L	W Rotary actuator		M	Model No.
		Filter	Regulator	Lubricator	Filter/ regulator	Reverse filter/regulator	Oil mist filter	
Separated	● 7000 Series P1=0.7 MPa P2=0.5 MPa △P = 0.1 MPa 	Filter and regulator integrated filtration rating 5 µm						**B7019-*C**

* P1 = primary pressure P2 = secondary pressure △P = differential pressure

	Port size												Max. flow rate m³/min (reference)	Page
	φ4	φ6	φ8	1/8	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2		
				●	●								0.2/0.3	336

	Port size												Max. flow rate m³/min (reference)	Page
	φ4	φ6	φ8	1/8	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2		
	●	●											0.08/0.18	314
				●	●								0.83/1.15	80
					●	●							1.5/2.0	
					●	●	●						2.15/2.43/2.43	
					●	●	●						2.5/4.35/4.75	
								●	●				10	
					●	●							2.15/2.43	178
					●	●	●						2.5/4.35/4.75	
								●	●				10	
				●	●								0.83/1.15	88
					●	●							1.5/2.0	
					●	●	●						2.15/2.43/2.43	
					●	●	●						2.5/4.35/4.75	
								●	●				10.0	
					●	●							2.15/2.43	184
					●	●	●						2.5/4.35/4.75	
								●	●				10.0	
					●	●	●						2.5/4.35/4.75	250
								●	●				10	

	Port size												Max. flow rate m³/min (reference)	Page
	φ4	φ6	φ8	1/8	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2		
	●	●											0.08/0.18	314

	Port size												Max. flow rate m³/min (reference)	Page
	φ4	φ6	φ8	1/8	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2		
				●	●								0.5/0.9	338

Series variation

F.R.L. unit (Filter)

[Filter]

Modular design

Series	Compatible product(s) F: Filter	R: Regulator	L: Lubricator	W Regulator: Filter/ regulator	W Regulator: Reverse filter/regulator	M: Oil mist filter	Model No.
● Filter P1=0.7 MPa △P = 0.02 MPa 	●						**F1000-W** **F2000-W** **F3000-W** **F4000-W** **F6000-W** **F8000-W**
● Filter/flame-resistant series P1=0.7 MPa △P = 0.02 MPa 	●						**F3000-G4** **F4000-G4** **F8000-G4**
● Filter/medium pressure series P1=1.3 MPa △P = 0.02 MPa 	●						**FM3000-W** **FM4000-W** **FM6000-W** **FM8000-W**
● Filter/outdoor series P1=0.7 MPa △P = 0.02 MPa 	●						**FW4000** **FW8000**

Clean-room

Series	Compatible product(s) F: Filter	R: Regulator	L: Lubricator	W Regulator: Filter/ regulator	W Regulator: Reverse filter/regulator	M: Oil mist filter	Model No.
● Inline clean filter P1=0.7 MPa △P = 0.03 MPa 	●						**FCS500** **FCS1000**

Inline filter

Series	Compatible product(s)	Model No.
● Inline filter P1=0.7 MPa △P = 0.02 MPa 	Inline push-in fitting, for both positive and negative pressures	**FSL100** **FSL200** **FSL500**

Separated

Series name	Compatible product(s)	Model No.
● Air filter P1=0.7 MPa △P = 0.02 MPa 	Wide variation Filtration rating 5 µm	**A1019-*C** **1138-*-E** **1126-*-E**
● Heavy duty air filter P1=0.7 MPa △P = 0.002 MPa 	High moisture removal type Filtration rating 5 µm	**A1338** **1326**
● Submicron air filter P1=0.7 MPa △P = 0.01 MPa 	Tar removing Filtration rating 0.3 µm	**1138-*C-EY** **A1338-*C-Y** **1126-*C-EY** **1326-*C-Y**
● Micro alescer micro naught P1=0.7 MPa △P = 0.01 MPa 	Oil removing Oil removing ratio 0.1 PPMW/W	**1219-2C** **1238-6C** **1226-8C** **1126J-*C**
● Micro alescer micro naught P1=0.7 MPa △P = 0.01 MPa 	For deodorizing	**1238-6C-X** **1226-8C-X** **1226J-*C-X**

* P1 = primary pressure P2 = secondary pressure △P = differential pressure

Port size												Max. flow rate m³/min (reference)	Page
φ4	φ6	φ8	1/8	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2		
			●	●								0.46/0.61	96
				●	●							1.3/1.7	
				●	●							1.23/1.5	
				●	●	●						1.32/2.14/3.0	
							●	●				5.6/6.2	
							●	●				6.4/6.8	
				●	●							1.23/1.5	192
				●	●	●						5.6/6.2	
							●	●				6.4/6.8	
				●	●	●						1.6/2.0	222
				●	●							1.9/2.8/3.8	
							●	●				6.7/8.1	
							●	●				8.1/9.0	
				●	●	●						1.32/2.14/3.0	254
							●	●				6.4/6.8	

Port size														Max. flow rate m³/min (reference)	Page
φ4	φ6	φ8	φ10	φ12	1/8	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2		
●	●	●			●	●								0.05 (φ4,φ6,1/8) / 0.08 (φ8,1/4)	470
		●	●	●		●	●							0.3 to 0.4	474

Port size														Max. flow rate m³/min (reference)	Page
φ4	φ6	φ8	φ10	φ12	1/8	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2		
●	●													0.07/0.10	332
●	●													0.08/0.14	
	●	●	●											0.18/0.36/0.44	

Port size												Max. flow rate m³/min (reference)	Page
φ4	φ6	φ8	1/8	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2		
			●	●								0.55/0.7	340
							●	●				5.5/7.0	370
									●	●	●	18/21/25	
							●	●				1.55	374
									●	●	●	5.8	
							●	●				1.55	376
							●	●				1.55	
									●	●	●	4.9	
									●	●	●	4.9	
				●								0.056	342
							●					1.27	378
								●				2.49	
										●	●	4.8	
							●					1.27	380
								●				2.49	
										●	●	4.8	

Series variation

F.R.L. unit (Oil mist filter)

[Oil mist filter]

Modular design

Series	Compatible product(s) F: Filter	R: Regulator	L: Lubricator	W Rotary actuator: Filter/ regulator	W Rotary actuator: Reverse filter/regulator	M: Oil mist filter	Model No.
● Oil mist filter (S type) P1=0.7 MPa △P = 0.01 MPa · Filtration: 0.3 μm · Secondary side oil concentration 0.5 mg/m³ 						●	M1000-W*-S
							M2000-W*-S
							M3000-W*-S
							M4000-W*-S
							M6000-W*-S
							M8000-W*-S
● Oil mist filter (M type) P1=0.7 MPa △P = 0.01 MPa · Filtration: 0.01 μm · Secondary side oil concentration 0.01 mg/m³ 						●	M1000-W
							M2000-W
							M3000-W
							M4000-W
							M6000-W
							M8000-W
● Oil mist filter (X type) P1=0.7 MPa △P = 0.01 MPa · Filtration rating: suction by activated charcoal · Secondary side oil concentration 0.003 mg/m³ 						●	M1000-W*-X
							M2000-W*-X
							M3000-W*-X
							M4000-W*-X
							M6000-W*-X
							M8000-W*-X
● High-performance oil mist filter P1=0.7 MPa △P = 0.01 MPa · Filtration: 0.01 μm · Secondary side oil concentration 0.001 mg/m³ 						●	MX1000-W
							MX3000-W
							MX4000-W
							MX6000-W
							MX8000-W
● Oil mist filter medium pressure (S type) P1=1.4 MPa △P = 0.01 MPa · Filtration: 0.3 μm · Secondary side oil concentration 0.5 mg/m³ 						●	MM3000-W*-S
							MM4000-W*-S
							MM6000-W*-S
							MM8000-W*-S
● Oil mist filter medium pressure (M type) P1=1.4 MPa △P = 0.01 MPa · Filtration: 0.01 μm · Secondary side oil concentration 0.01 mg/m³ 						●	MM3000-W
							MM4000-W
							MM6000-W
							MM8000-W
● Oil mist filter medium pressure (X type) P1=1.4 MPa △P = 0.01 MPa · Filtration rating: suction by activated charcoal · Secondary side oil concentration 0.003 mg/m³ 						●	MM3000-W*-X
							MM4000-W*-X
							MM6000-W*-X
							MM8000-W*-X
● Oil mist filter outdoor (S type) P1=0.7 MPa △P = 0.01 MPa · Filtration: 0.3 μm · Secondary side oil concentration 0.5 mg/m³ 						●	MW4000-S
							MW8000-S
● Oil mist filter outdoor (M type) P1=0.7 MPa △P = 0.01 MPa · Filtration: 0.01 μm · Secondary side oil concentration 0.01 mg/m³ 						●	MW4000-M
							MW8000-S

* P1 = primary pressure P2 = secondary pressure △P = differential pressure

	Port size												Max. flow rate m^3/min	Page
	φ4	φ6	φ8	1/8	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2		
				●	●								0.15	106
					●	●							0.31	
					●	●							0.45	
					●	●	●						1	
								●	●				1.4	
								●	●				2.9	
				●	●								0.15	106
					●	●							0.25	
					●	●							0.36	
					●	●	●						0.825	
								●	●				1.27	
								●	●				2.6	
				●	●								0.15	106
					●	●							0.36	
					●	●							0.45	
					●	●	●						1.0	
								●	●				1.4	
								●	●				2.9	
				●	●								0.075	116
					●	●							0.18	
					●	●	●						0.37	
								●	●				0.67	
								●	●				1.48	
					●	●							0.61	228
					●	●	●						1.37	
								●	●				1.92	
								●	●				3.98	
					●	●							0.49	228
					●	●	●						1.13	
								●	●				1.74	
								●	●				3.56	
					●	●							0.61	228
					●	●	●						1.37	
								●	●				1.92	
								●	●				3.98	
					●	●	●						0.825	258
								●	●				2.6	
					●	●	●						1	258
								●	●				2.9	

Series variation

F.R.L. unit (Regulator)

[Regulator]

Series		Compatible product(s)							Model No.	
		F	R		L	W Regulator		M		
		Filter	Regulator	Reverse regulator	Lubricator	Filter/ regulator	Reverse filter/regulator	Oil mist filter		
Modular design	● Regulator P1=0.7 MPa P2=0.5 MPa △P = 0.1 MPa 		●						R1000-W	
									R2000-W	
									R3000-W	
									R4000-W	
									R6000-W	
									R8000-W	
	● Regulator/flame-resistant series P1=0.7 MPa P2=0.5 MPa △P = 0.1 MPa 		●						R3000-G4	
									R4000-G4	
									R8000-G4	
	● Regulator oil-prohibition series P1=0.7 MPa P2=0.5 MPa 		●						RN3000-W	
									RN4000-W	
									RN8000	
	● Regulator medium pressure series P1=1.6MPa P2=0.5 MPa 		●						RM3000-W	
									RM4000-W	
	● Regulator/outdoor series P1=0.7 MPa P2=0.5 MPa △P = 0.1 MPa 		●						RW4000	
									RW8000	
	● Reverse regulator P1=0.7 MPa P2=0.5 MPa △P = 0.1 MPa 			●					R1100-W	
									R2100-W	
									R3100-W	
									R4100-W	
									R6100-W	
									R8100-W	
Compact	● Regulator P1=0.7 MPa P2=0.5 MPa △P = 0.1 MPa 		●						RA800	
									RB500	
	● Block manifold regulator 		●						MNRB500A	
									MNRB500B	
Precision	● Regulator P1=0.7 MPa P2=0.5 MPa △P = 0.1 MPa 		●						RJB500	
	● Block manifold regulator 		●						MNRJB500A	
									MNRJB500B	
Clean-room	● Clean regulator P1=0.7 MPa P2=0.5 MPa △P = 0.1 MPa 		●						RC2000	
	● Clean regulator P1=0.7 MPa P2=0.5 MPa △P = 0.1 MPa 		●						2619	

[Electro pneumatic regulator]
Refer to page 506 for the series variation of electro pneumatic regulators.

* P1 = primary pressure P2 = secondary pressure △P = differential pressure

	Port size												Max. flow rate m^3/min (reference)	Page
	φ4	φ6	φ8	1/8	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2		
				●	●								0.77/1.35	124
					●	●							1.75/2.5	
					●	●							2.0/2.6	
					●	●	●						2.5/4.4/5.0	
								●	●				7/7.7	
								●	●				14.0/11.0	
					●	●							2.0/2.6	200
					●	●	●						2.5/4.4/5.0	
								●	●				14.0/11.0	
					●	●							1.6/2.6	214
					●	●	●						2.4/3.0/3.0	
								●	●				4.5/6	
					●	●							2.0	234
					●	●	●						3.0	
					●	●	●						2.5/4.4/5.0	262
								●	●				14.0/11.0	
				●	●								0.77/1.35	132
					●	●							1.75/2.5	
					●	●							2.0/2.6	
					●	●	●						2.5/4.4/5.0	
								●	●				7/7.7	
								●	●				14.0/11.0	
				●	●								0.35	308
	●	●											0.1/0.2	312
	●	●	●										0.1/0.2	318
	●	●											0.1/0.2	
	●	●											0.06/0.08	416
	●	●	●										0.06/0.08	418
	●	●											0.06/0.08	
					●	●	●						0.8	492
				●	●								0.18/0.18	496

Series variation

F.R.L. unit (Regulator/lubricator)

[Regulator]

	Series name	Compatible product(s)	Model No.
Separated	● Regulator P1=0.7 MPa P2=0.5 MPa △P = 0.1 MPa 	Extensive models	**B2019-*C** **2215-*C**
Separated	● Reverse regulator P1=0.7 MPa P2=0.5 MPa △P = 0.1 MPa 	Check valve integrated, no by-pass circuit required	**2419-*C** **2415-*C**
Separated	● Dial air regulator P1=0.7 MPa P2=0.5 MPa 	With setting dial	**2302-*C** **2303-*C** **2304-*C**
Separated	● Remote dial air regulator P1=0.7 MPa P2=0.5 MPa 	For remote control	**2302-*C-R** **2303-*C-R** **2304-*C-R**
Separated	● Relief valve Set pressure 0.7 MPa, pressure rise 0.08 MPa 	For maintaining the set pressure	**B6061-*C**

[Lubricator]

	Series	Compatible product(s) F: Filter	R: Regulator	R: Reverse regulator	L: Lubricator	W: Filter/ regulator	W: Reverse filter/regulator	M: Oil mist filter	Model No.
Modular design	● Lubricator P1=0.5 MPa △P = 0.3 MPa 				●				**L1000-W** **L3000-W** **L4000-W** **L8000-W**

	Series name	Compatible product(s)	Model No.
Separated	● Lubricator econo-mist P1=0.5 MPa △P = 0.03 MPa 	Supplies fine oil mist	**A3019-*C** **3003E-*C** **3004E-*C**
Separated	● Lubricator auto-fill 	Automatic supply	**3003E-*C-V**

* P1 = primary pressure P2 = secondary pressure △P = differential pressure

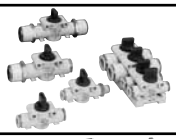
	Port size											Max. flow rate m^3/min (reference)	Page
	φ4	φ6	φ8	1/8	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2	
				●	●								0.5	344
								●	●	●			14	384
				●	●								0.5	346
								●	●	●			14	388
					●	●	●	●					3.0	390
								●	●	●			10.0	
											●	●	30.0	
					●	●	●	●					3.0	393
								●	●	●			10.0/30.0	
											●	●	30	
				●	●								0.15	348

* P1 = primary pressure △P2 = differential pressure

	Port size											Max. flow rate m^3/min (reference)	Page
	φ4	φ6	φ8	1/8	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2	
				●	●								0.55/0.7	140
					●	●							1.1/2.25	
					●	●	●						1/1.7/2.7	
								●	●				6.3/10.0	

	Port size											Max. flow rate m^3/min (reference)	Page
	φ4	φ6	φ8	1/8	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2	
				●	●								0.1/0.4	350
								●	●				3.5/4.0	396
										●	●	●	15/20	
								●	●				3.5/4.0	400

[Shut-off valve]

Series name	Compatible product(s)	Model No.	
● Shut-off valve 	Preventing accidents due to residual pressure in pneumatic lines.	**V1000-W**	
		V3000-W	
● Shut-off valve with keyhole (OSHA compliant)	Preventing accidents due to residual pressure in pneumatic lines.	**V3010-W**	
		V6010-W	
● Quick valve 	2- and 3-port valves are available.	**2QV**	
		3QV	
● Slow start valve 	Ensuring safety when starting and stopping	**V3301-W**	
		V3321-W	
● 3-port solenoid valve with spool position detection 	Spool position detection for reliable open/close detection Module connection also allows double cutoff	**SNP**	

[Other related products]

Series name	Compatible product(s)	Model No.	
● Clean exhaust filter 	Provide direct exhaust within a clean room	**FAC10**	
		FAC100	
		FAC200	
		FAC300	
● Exhaust cleaner 	For exhaust, improving the environment	**FA331-10A**	
		FA431-15A	
		FA531-20A	
		FA631-25A	
		FA731-40A	
		FA831-50A	
● Drain discharger 	Automatic drain	**DT3000/4000-W**	
	Heavy duty drain	**DB1000/3000**	
	Tank drain	**5100-4C**	
● Moisture indicator (P1 = 0.7 MPa)	For dew point monitor of desiccant dryer	**6119-2C**	
● Air pressure switch 	Setting accuracy within ±0.02 MPa	**APE-8T**	
		APE-8N	
		APE-8F	
		P4000-W	
		P*100-W	
		APS	
● Pressure gauge 	Low-profile pressure gauge ideal for embedding in devices	**G401**	
	Pressure gauge with safety marker	**G40D**	
	Pressure gauge with limit marker	**G45D**	
	General-use pressure gauge	**G49D/G59D**	
	Pressure gauge for panel mounting	**G53D**	
	Pressure gauge with switch	**G52D**	
	Miniature pressure gauge	**G29D**	
	Compact round pressure gauge	**G39D**	
	Vacuum pressure gauge	**VG41D**	
● Differential pressure gauge 	Air filter life measuring	**GA400-8-P02**	

Port size														Max. flow rate	Page
φ4	φ6	φ8	φ10	φ12	1/16	1/8	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2		
						●	●									154
							●	●	●							
							●	●	●							157
										●	●					
●	●	●	●	●		●	●	●	●							160
●	●	●	●	●		●	●	●	●							
							●	●	●							168
							●	●	●							
								●	●	●						171

Port size														Max. flow rate	Page
φ4	φ6	φ8	φ10	φ12	1/16	1/8	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2		
	●														10	480
						●	●								100	
								●	●						200	
								●	●						600	
								●							0.3	694
									●						0.6	
										●					1	
											●				3	
													●		6	
														●	10	
								●	●							1716
									●	●	●					1724
									●							1732
							●								0.05	305
							●									1040
							●									
							●	●	●							148
						●	●	●	●	●	●					150
						●										1044
															0 to 0.4 MPa 0 to 1.0 MPa	290
						●	●								0 to 1.0 MPa 0 to 0.4 MPa	291
						●	●								0 to 0.2 MPa 0 to 0.4 MPa 0 to 1.0 MPa	292
						●	●								0 to 0.2 MPa 0 to 0.4 MPa 0 to 1.0 MPa 0 to 2.0 MPa	293
						●	●								0 to 0.2 MPa 0 to 0.4 MPa 0 to 1.0 MPa	296
							●								0 to 1.0 MPa	298
					●	●									0 to 1.0 MPa	300
						●									0 to 0.4 MPa 0 to 1.0 MPa	301
						●									-100 to 0 kPa	302
							●									304

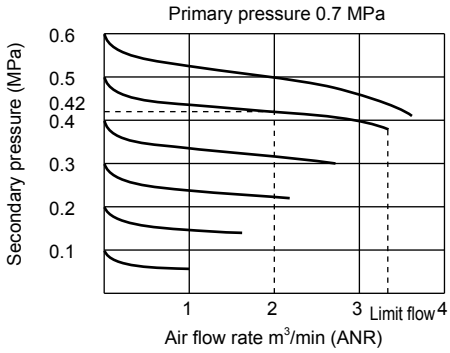
F.R.L. Combination

Reading the Properties Table

1. Combination, filter regulator, and regulator flow characteristics

The flow characteristics table indicates changes (pressure drop) in the set secondary pressure in regard to the changes (air flow) in the amount of air consumed on the secondary side.

When the primary side is 0.7 MPa and the secondary pressure is set with an air flow of "0", the secondary pressure fluctuation and limit flow for a specified air flow can be confirmed.



1) Finding the pressure fluctuation

If secondary pressure is 0.5 MPa and air flow is 2 m^3/min, secondary pressure is 0.42 MPa.

Using the flow characteristics table, draw a perpendicular line at an air flow of 2 m^3/min. Then draw a horizontal line along the 0.5 MPa flow curve and read off the secondary pressure where the lines intersect.

2) Finding the limit flow rate

Straight down from the right end of the flow curve at an air flow of 3.6 m^3/min. is the limit flow rate.

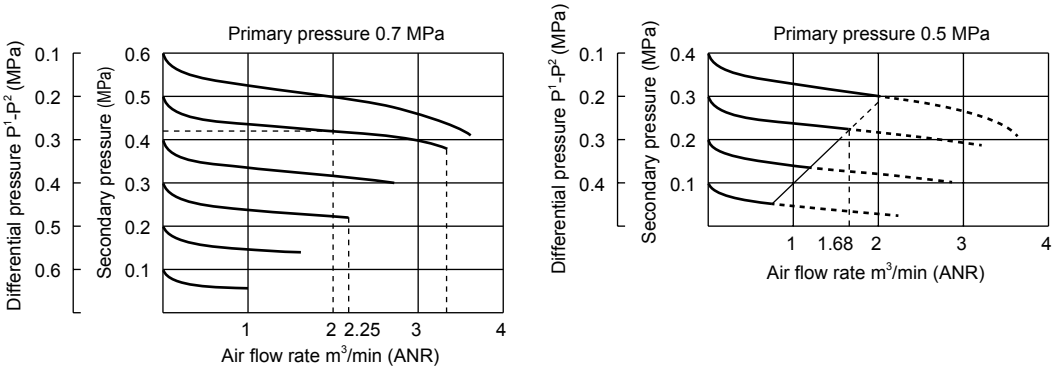
Notes

1) The actuator's working flow rate should be within 0.1 MPa of the regulator pressure drop.
2) The limit flow greatly changes depending on the pipe's effective section area (piping inner diameter, pipe length, etc.). Graphs in the catalog are all measured using steel pipe according to JIS B8372-1.
3) Keep differential pressure between primary and secondary sides to 0.1 MPa or more during use.

2. Approximate characteristics when primary side pressures of combination, filter regulator, and regulator flow characteristics differ from the catalog value (primary side pressure 0.7 MPa)

Using the catalog flow characteristics table (primary pressure 0.7 MPa) and a flow curve in which the pressure difference of primary and secondary set pressure is the same, variations in the secondary pressure for the required primary pressure are estimated.

Example) Flow rate properties for which the primary pressure is 0.5 MPa, use 0.4, 0.3, 0.2, and 0.1 MPa flow curves for the secondary pressure catalog values (primary pressure of 0.7 MPa) of 0.6, 0.5, 0.4, and 0.3 MPa, respectively.



The limit flow rate varies with the absolute pressure ratio of the primary pressure. An approximate value is calculated using the following formula:

$$Q = Qo \times \frac{P1 + 0.1}{0.8}$$

Qo = Each secondary pressure limit flow rate for the catalog primary pressure of 0.7 MPa

Q = Approximate limit flow rate m^3/min

*P*1 = Required primary side pressure MPa

Example) The approximate limit flow rate at the primary side pressure 0.5 MPa and secondary side pressure 0.3 MPa is:

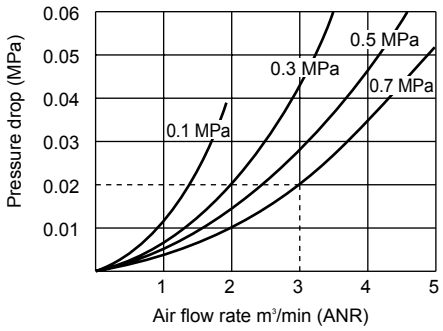
$$Q = 2.25 \times \frac{0.5 + 0.1}{0.8} = 1.68 (m^3/min)$$

Qo can be obtained by reading the limit flow rate at the secondary side pressure 0.3 MPa in the catalog.

3. Air filter flow characteristics

The flow characteristics table indicates the pressure drop (pressure loss on primary and secondary sides of the air filter) at the air filter for air consumed (air flow) on the secondary side.

The pressure drop is shown for air flow for 0.1, 0.3, 0.5, or 0.7 MPa primary pressure.

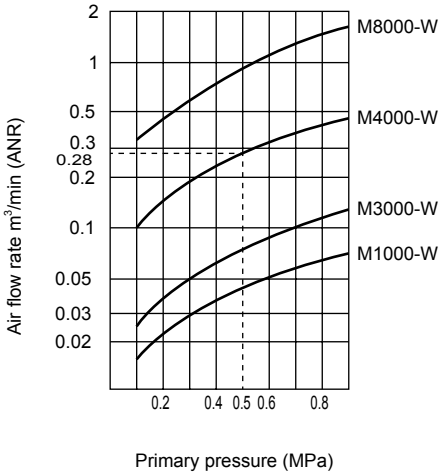


Example) If air flow is 3.0 m^3/min at primary pressure of 0.7 MPa, pressure drops 0.02 MPa (secondary pressure is 0.68 MPa).

Read the pressure drop by drawing a vertical line from air flow 3.0 m^3/min and drawing a horizontal line where it intersects the primary pressure 0.7 MPa curve.

4. Oil mist filter and Y element air filter flow characteristics

Flow characteristics indicate the max. air consumption (air flow rate) corresponding to the primary side working pressure that allows oil and tar removal. If the product is used at an air flow higher than that indicated, oil and tar within the specified value will not be removed.



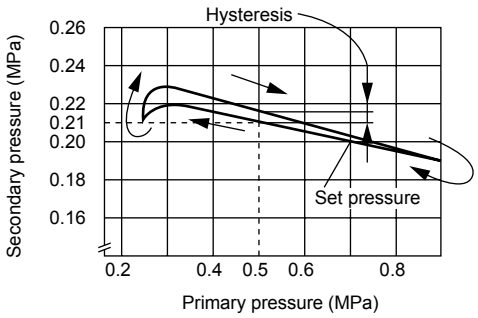
Example) When using the M4000-W with a primary pressure of 0.5 MPa, max. air flow is 0.28 m^3/min.

Read max. air flow by drawing a vertical line from primary pressure 0.5 MPa, and drawing a horizontal line where it crosses the working product curve.

5. Regulator pressure characteristics

The pressure characteristics table shows changes in secondary set pressure for changes in primary pressure.

Primary pressure is, for example, set to 0.7 MPa, secondary set pressure to 0.2 MPa, and air consumption to 25 ℓ/min (atmosphere release thanks to use of φ1 orifice). Changes in secondary set pressure when primary pressure drops to 0.25 MPa, rises to 0.9 MPa, then returns to the original 0.7 MPa are shown.



Example) Secondary set pressure rises to 0.21 MPa when primary pressure changes to 0.5 MPa.

Read secondary pressure by drawing a vertical line from primary pressure 0.5 MPa and drawing a horizontal line where it intersects the pressure characteristics curve.

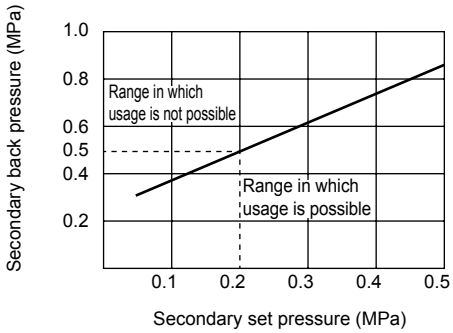
Hysteresis causes pressure difference when the primary pressure rises and falls.

Reading the Properties Table

6. Set pressure range for reverse regulator back pressure

The properties table indicates the limit of secondary back pressure (secondary rise in pressure) enabling reversal (exhaust of regulator secondary pressure to the primary side) of the secondary set pressure.

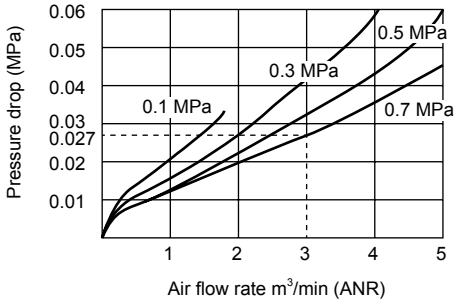
Example) This indicates that reversal is possible if secondary back pressure is 0.5 MPa or less when set pressure is 0.2 MPa.
Read secondary back pressure by drawing a vertical line from set pressure 0.2 MPa and drawing a horizontal line where it intersects the curve.
The area below the curve is reversible.



7. Lubricator flow characteristics

The flow characteristics table shows the pressure drop (primary and secondary pressure difference) at each primary pressure of the air flow.

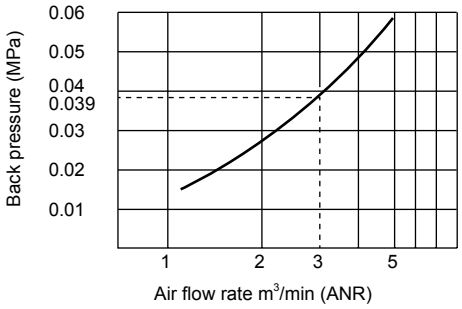
Example) If air flow is 3 m^3/min at primary pressure of 0.7 MPa, pressure drops 0.027 MPa (secondary pressure is 0.673 MPa).
Read the pressure drop by drawing a vertical line from air flow 3.0 m^3/min and drawing a horizontal line where it intersects the primary pressure 0.7 MPa curve.



8. Exhaust cleaner flow characteristics

The flow characteristics table indicates back pressure applied to the IN side of the exhaust cleaner for the processing flow rate. If the product is used with a processing flow rate higher than that indicated, silencing and oil mist collection within the specified value will not be attained.

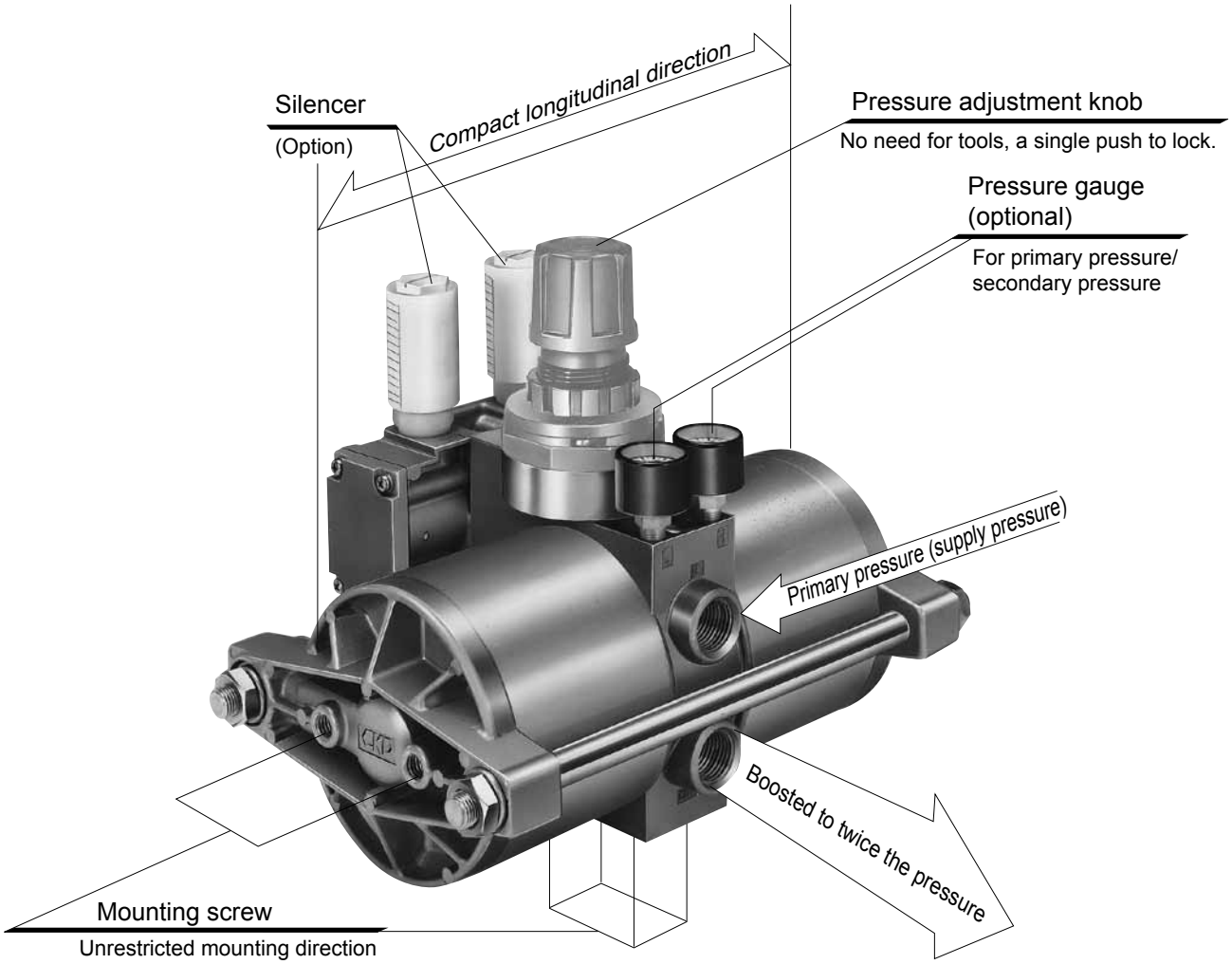
Example) When processing flow rate is 3 m^3/min, 0.039 MPa back pressure is generated at the exhaust cleaner IN side.
Read back pressure by drawing a vertical line from flow 2 m^3/min and drawing a horizontal line where it intersects the curve.



Obtain twice as much high pressure air

ABP Air Booster that needs no electricity

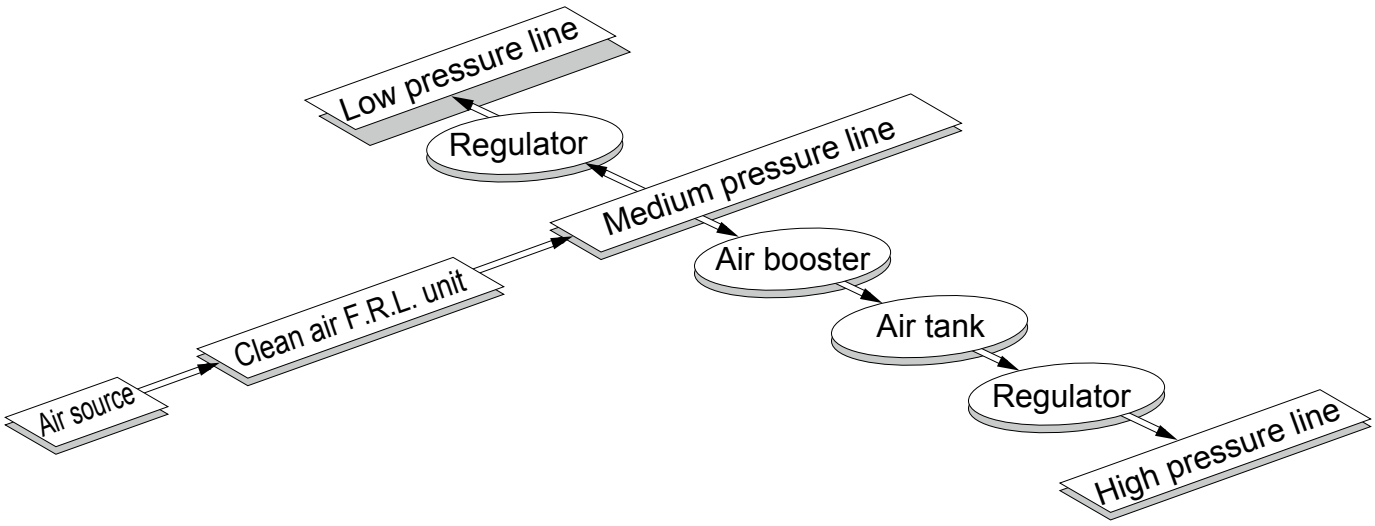
Produce highly compressed air (Max 0.99 MPa)
up to twice the primary pressure (equivalent).



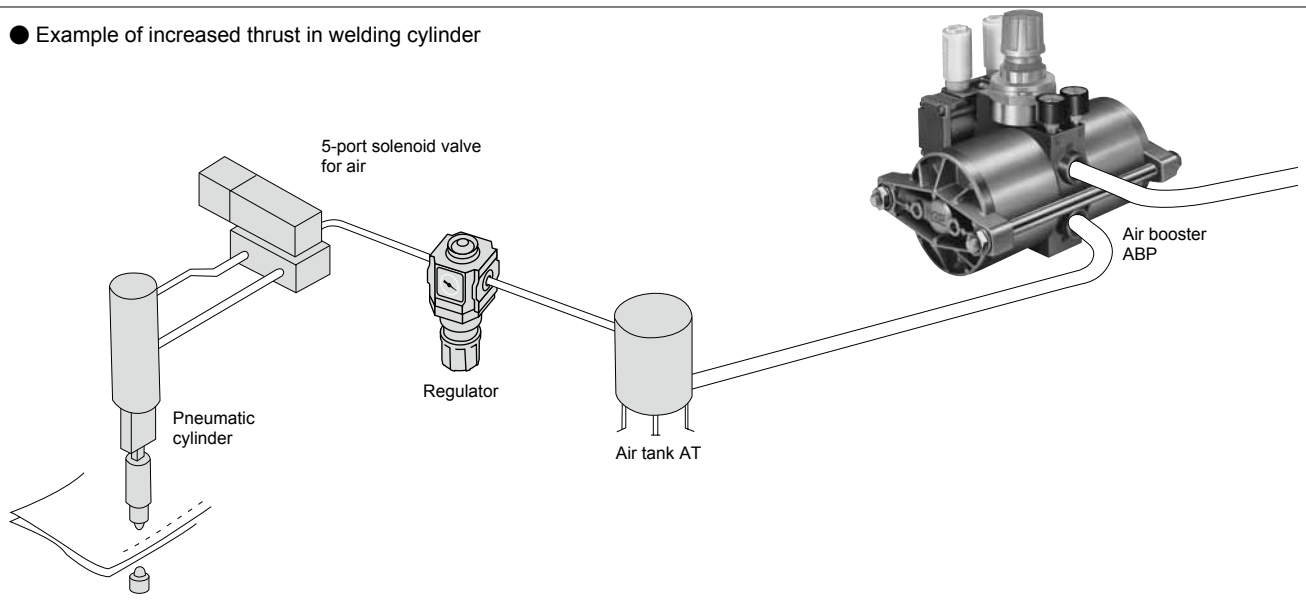
Compact design and flexible installation

⚠ Be sure to read the precautions on page 610 before use.

Plant-wide total cost reductions are possible.

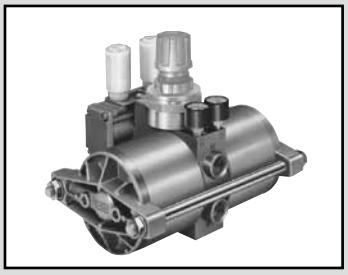


● Example of increased thrust in welding cylinder



● Other applications

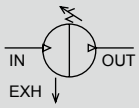
1. Reducing the footprint of the air cylinder.
2. Improving output capacity of driving components (air cylinder, air motor, etc.)
3. Quick filling of high-pressure air to air tanks
4. Boosting in explosion-proof atmospheres
5. Countering pressure changes in factory lines (fall in air pressure of lines, etc.)



Air booster

ABP Series

JIS symbol



RoHS CAD

Functions

● Primary pressure flowing from IN passes through the check valve on the IN side, and flows into the booster chambers A and B. The primary pressure passes through the pressure adjustment section and switching valve, and flows into the driving chamber A. The piston moves to the left due to the pressure of the driving chamber A. Air in booster chamber A is compressed, passes through the check valve on the OUT side, and goes to the OUT side.

● When the piston reaches the stroke end, the changeover switch will be pushed, causing compressed air to be supplied to the switching valve pilot chamber and causing the switching valve to change over. Then the air in drive chamber A is exhausted, and the air is delivered to drive chamber B.

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

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

Specifications

1 MPa ≈ 145.0 psi, 1 MPa = 10 bar

Descriptions	ABP
Working fluid	Compressed air
Max. working pressure MPa	0.99 (≈140 psi, 9.9 bar)
Min. working pressure MPa	0.2 (≈29 psi, 2 bar)
Set pressure MPa	From a primary pressure of +0.1 MPa to twice the primary pressure (max. 0.99 MPa)
Proof pressure MPa	1.5 (≈220 psi, 15 bar)
Flow rate m^3/min(ANR)	Refer to the flow characteristics in the graph on the right
Boosting ratio	Max. twice (or equivalent)
Ambient temperature °C	0 (32°F) to 50 (122°F) (no freezing)
Lubrication	Not required (use turbine oil class 1 ISO VG32 if necessary for lubrication)
Port size	Rc1/2
Weight kg	4.6
Durability	5 million (nominal)

How to order

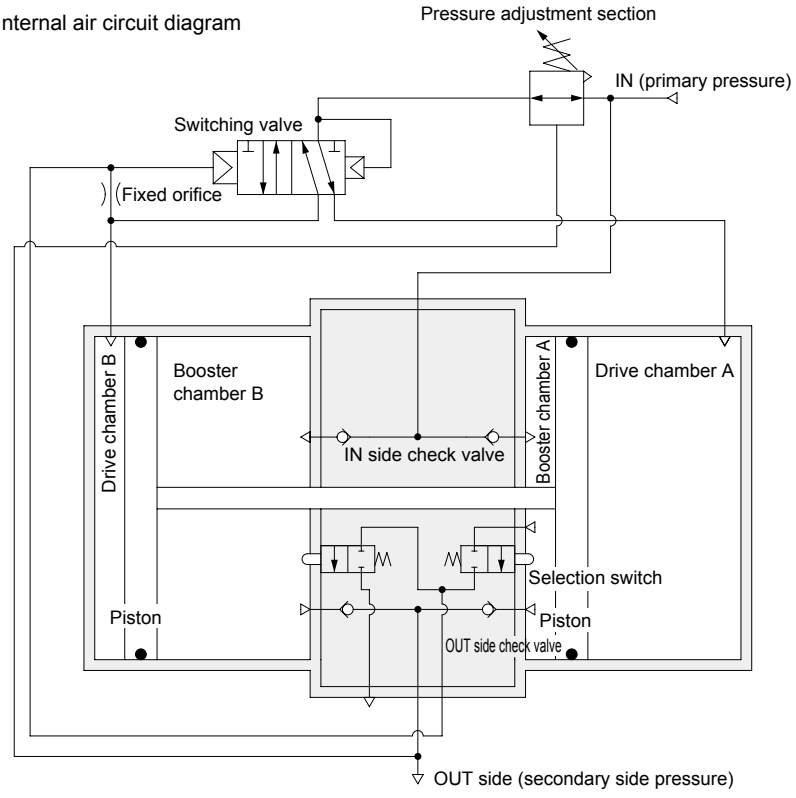
ABP - 12 D - G

Air booster

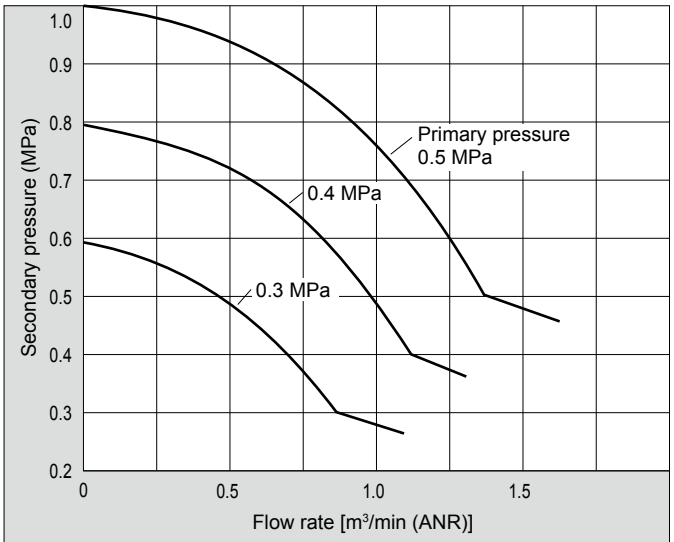
Ⓐ OUT port position	
Blank	Same side as IN port
D	Bottom (direct connection to air tank)
L	Back side of IN port
Ⓑ Option	
G	Pressure gauge
S	Silencer
B	Foot bracket

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

● Internal air circuit diagram

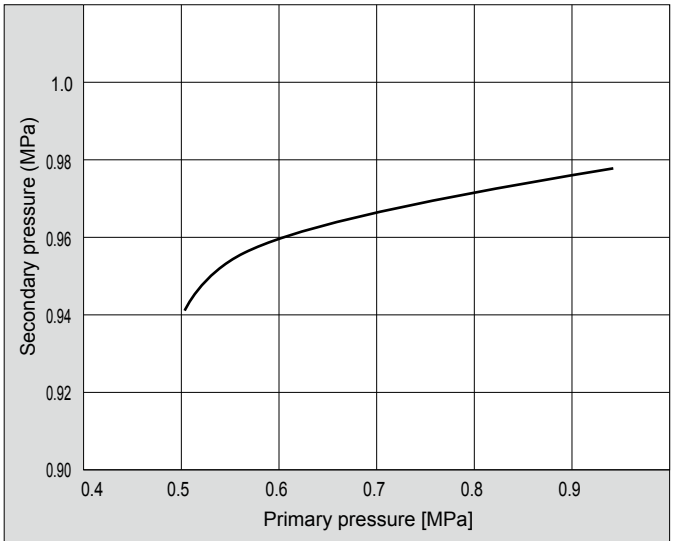


Flow characteristics (with AT-24 air tank, twice the pressure)



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

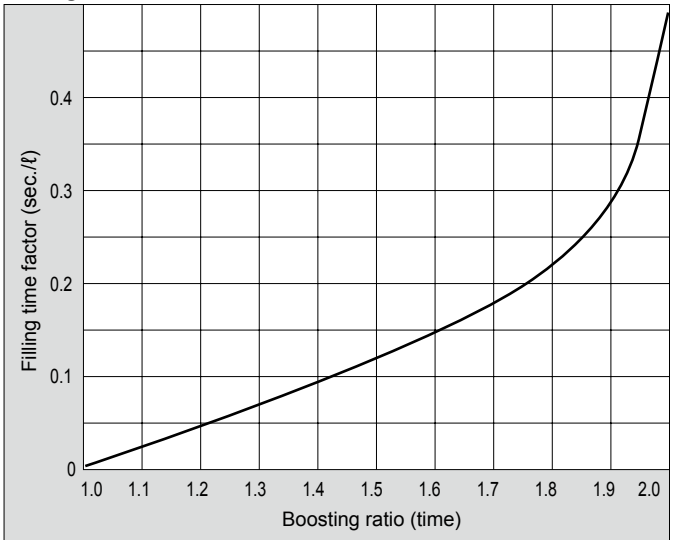
Pressure characteristics (Setting: 0.69 MPa primary pressure, 0.97 MPa secondary pressure, 0.02 m³/min ANR flow rate)



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

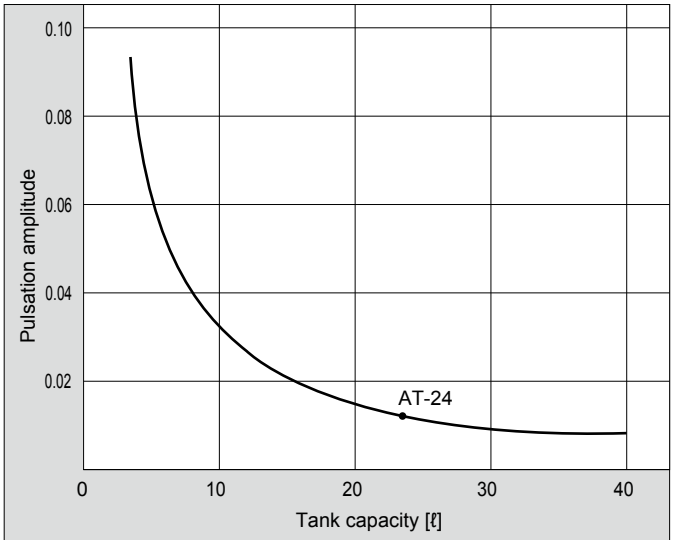
Note) Air booster needs approx. twice secondary side flow rate (max.) for primary side due to structure.
Confirm that the instantaneous flow rate is within the curve.

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.

The time required to fill the tank with air can be calculated as follows. With the primary side pressure P_0, inner tank pressure before filling P_1, inner tank pressure after filling P_2, pre-filling ratio between primary side pressure and inner tank pressure k_1, and post-filling ratio between primary side pressure and inner tank pressure k_2, the formula will be $k_1 = \frac{P_1}{P_0}$, $k_2 = \frac{P_2}{P_0}$. Calculate k_1 and k_2, find the filling time factors t_1 and t_2 at the boosting ratio points k_1 and k_2 in the graph and substitute the values into $t = (t_2 - t_1) A$ to obtain the filling time t of the tank capacity A (ℓ).

Formula for air booster operational cycle

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

N: Operational cycle
Q: Required flow rate [m³/min (ANR)]
P: Primary side pressure [MPa]

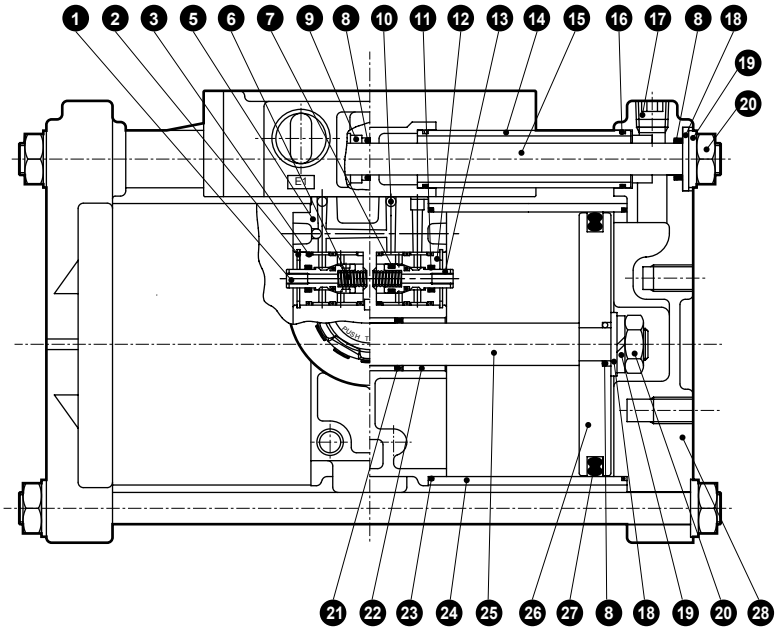
Formula for air booster service life
Nominal life of operational cycle is 5 million times

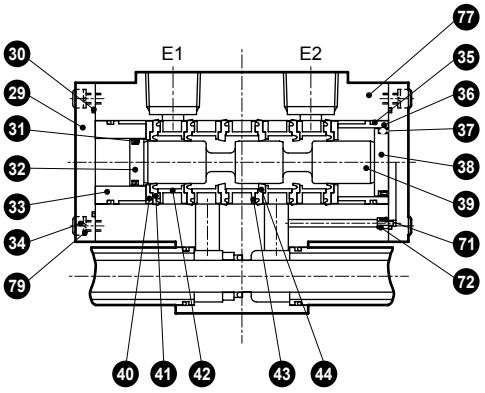
$$T = \frac{5{,}000{,}000}{N \times 60}$$

T: Service life (hours)

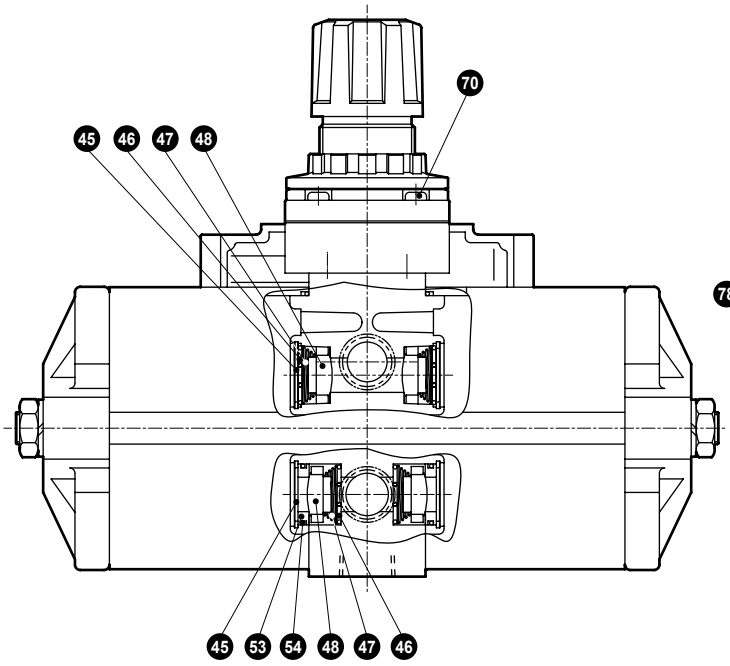
The characteristics above are typical examples, not guaranteed values.

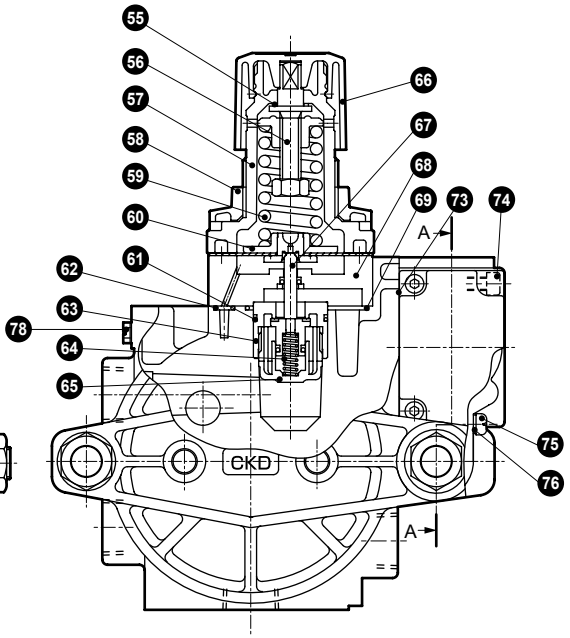
Internal structure





A-A cross section





Parts list

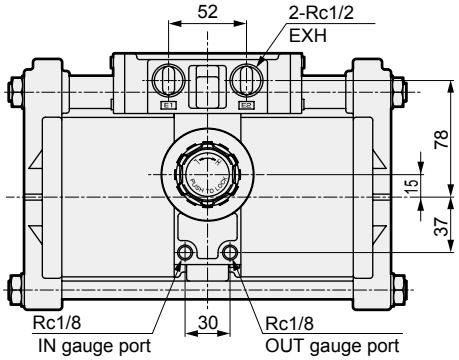
No.	Part name	Material	Quantity	No.	Part name	Material	Quantity
1	Valve bar (A)	Stainless steel	1	41	Soft packing	Urethane rubber	4
2	C type snap ring for hole	Stainless steel	2	42	Spacer	Aluminum alloy	4
3	O-ring	Nitrile rubber	5	43	Spacer	Polyacetal resin	1
5	Body block assembly	Aluminum alloy	1	44	Soft packing	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 seat	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	Nitrile rubber	2	54	O-ring	Nitrile rubber	1
12	Detection valve body	Copper alloy	2	55	Slip ring	Polyacetal resin	4
13	Bar (B)	Stainless steel	1	56	Adjusting assembly		1
14	Pipe	Stainless steel	2	57	Cover	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	Hexagon socket head cap plug	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	Nitrile rubber	2	64	Bottom spring	Stainless steel	1
22	Rod metal	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 body assembly		1
26	Piston	Aluminum alloy	2	69	O-ring	Nitrile rubber	1
27	Piston packing	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	Nitrile rubber	1	74	Hexagon socket head cap screw	Steel	2
32	Piston	Polyacetal resin	1	75	Cross-recessed pan head machine screw	Steel	1
33	Cylinder	Aluminum alloy	1	76	Gasket	Nitrile rubber	1
34	Hexagon socket head cap screw	Steel	8	77	Valve body	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	Nitrile rubber	1				
38	Piston	Polyacetal resin	1				
39	Spool	Aluminum alloy	1				
40	Stopper	Polyacetal resin	2				

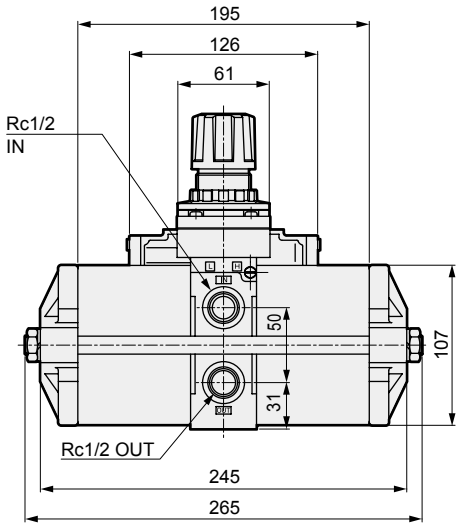
Single unit repair parts and options list

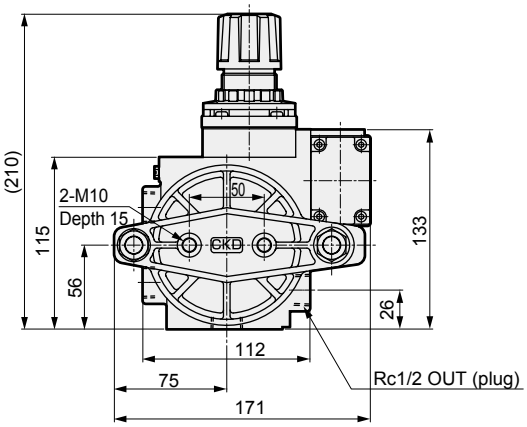
Part name	Model No.	Part No.	Remarks
Changeover switch packing set	ABP-K1	❶×1, ❸×5, ❻× 2, ⓫× 2, ⓬× 2, ⓭× 1, ❼× 1	
Cylinder packing set	ABP-K2	❽× 5, ⓰× 4, ㉑× 2, ㉓× 4, ㉗× 2	
Switching valve piston assembly	ABP-K3	㉛× 1, ㉜× 1, ㉗× 1, ㉘× 1	
Switching valve seal assembly	ABP-K4	㊵× 2, ㊶× 4, ㊷× 4, ㊸× 1, ㊹× 2	
Diaphragm assembly	ABP-K6	㊿× 1	
Pressure adjustment section valve assembly	ABP-K7	㊶× 1, ㊷× 1, ㊼× 1, ㊾× 1	
Check valve assembly	ABP-K8	㊽× 4, ㊸× 2, ㊹× 2	
Bracket	ABP-B		Qty per unit
Pressure gauge	ABP-GAUGE		Pressure gauge x 1
Silencer	SLW-15A		Silencer x 1

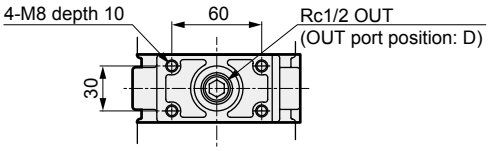
Dimensions

● ABP-12





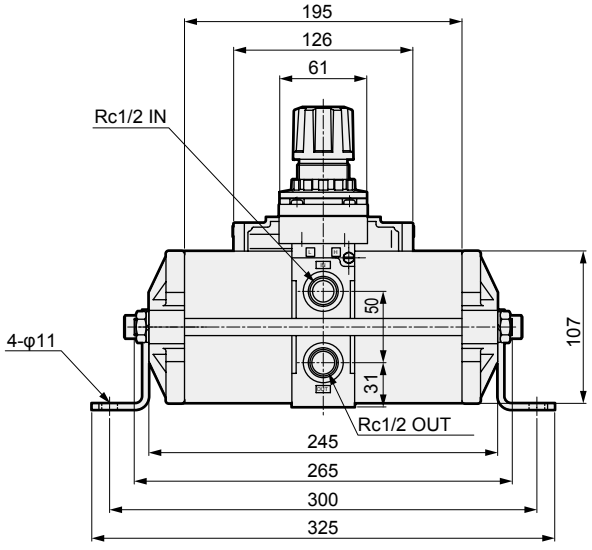


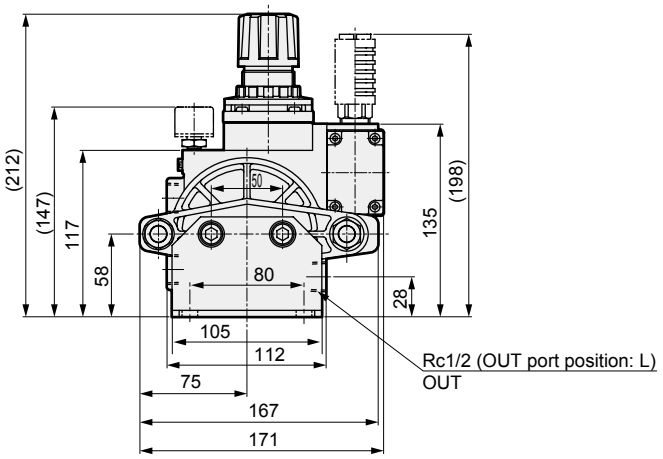


Optional dimensions

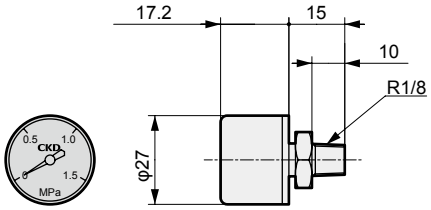
● When mounting the bracket (ABP-B)

Weight: 792 g (excluding ABP body and including bracket/bolt/spring washer)



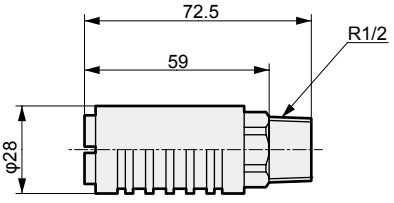


● Pressure gauge (ABP-GAUGE)



Weight: 32g

● Silencer (SLW-15A)



Weight: 21g

Pneumatic components

Safety Precautions

Be sure to read this section before use.
Refer to Intro Page 63 for general precautions.

Product-specific cautions: Air booster ABP Series

Design/selection

⚠WARNING

■ Do not use the air booster for continuous operation such as in a compressor.
The air booster is designed for partial boosting in the factory, etc. Life is shortened if used for high frequency continuous operation, such as in a compressor. (The air booster's nominal life is approximately 5,000,000 uses when used under normal conditions)
Refer to page 605 for the estimated service life calculation.

⚠CAUTION

■ Do not use this product if vibration exceeds 50 m/s^2 or impact exceeds 300 m/s^2.

■ Pressure is raised by air pressure, so half of the air is discharged during boosting.
If the secondary side flow rate must be 1, the primary side requires a flow rate of 1 + 1 = 2.

■ Because the inside is cylindrical, a noise level of 60 to 80 dB (primary side 0.49 MPa and secondary side 0.95 MPa for measurement of 1 m) is generated during boosting.
* This is when a silencer is used.

■ When the air booster is not used, stop the primary pressure. Stop unnecessary operation and prevent air consumption.

Mounting, installation and adjustment

⚠WARNING

■ Do not supply pressure exceeding 0.99 MPa onto the primary side.

■ Check that set pressure does not exceed 0.99 MPa.

⚠CAUTION

■ Install a filter on the primary side to remove rust, foreign matter and drainage. The air booster compresses compressed air so drain is discharged easily from the secondary side. Installation of a filter is recommended to remove any moisture from the piping.

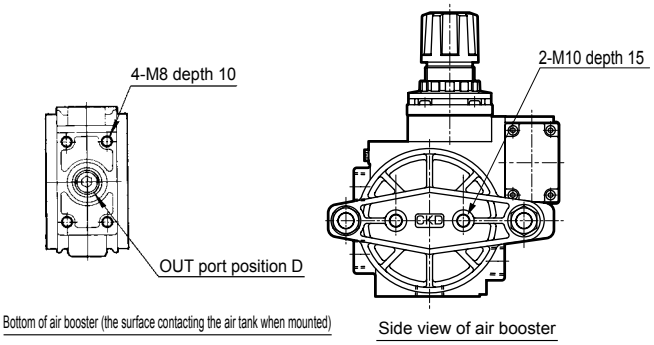
■ Install primary side piping at 1/2B or more to attain sufficient flow.

■ Install a silencer (SLW-15A, SL-15) or exhaust cleaner (FA430-15A) on the exhaust port of the air booster. When using the exhaust cleaner, common porting of the exhaust port is recommended.

■ Use piping with a stop valve at the air tank's drain port.
Regularly discharge drain from the tank.

■ There are no set regulations regarding the air booster's mounting orientation: it should optimally be horizontally installed on a flat surface.

■ Install the air booster using 4-M8 depth 10 screw holes on the bottom or 2-M10 depth 15 screw holes on both sides.
Only use these screw holes for installing the air booster.



Bottom of air booster (the surface contacting the air tank when mounted)

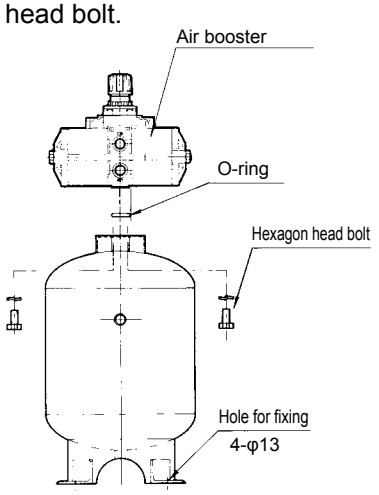
Side view of air booster

■ The bolt used to install the air booster must not exceed the screw hole depth.
Forcibly tightening a long bolt could damage the screw hole and cause air leakage.

■ A foot bracket installed on both ends is available as an option.
(Model No. ABP-12-B)

■ Fix the air tank with the 4- φ13 anchor bolt hole on the bottom.

■ When directly connecting the air booster to the air tank (AT-24), use OUT port position D, and mount the O-ring enclosed with the air tank on the air booster. Then, fix to the top of the air tank with a hexagon head bolt.



■ Installation of an air tank and regulator after the air booster is recommended for attaining stable secondary pressure.

Use/maintenance

⚠WARNING

■ Stop the primary side pressure and release the secondary side pressure before servicing, inspecting, or repairing the air booster.

⚠CAUTION

■ When setting pressure, lift the pressure adjustment knob to release the lock, and then turn the pressure adjustment knob.
Secondary pressure increases when the pressure adjustment knob is turned clockwise. The pressure adjustment knob must be locked after use.

■ If primary pressure exceeds the set pressure due to fluctuations in pressure, etc., air is released from the pressure adjustment knob.
Set a regulator on the primary side, and adjust the pressure at least 0.1 MPa lower from the set pressure.

■ The silencer and pressure gauge are repair parts and must be replaced regularly.

* Refer to the separate Maintenance Manual (ST-130606) for the maintenance procedures.