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# KOGANEI

## ACCESSORIES GENERAL CATALOG

AIR TREATMENT, AUXILIARY, VACUUM,  
AND FLUORORESIN PRODUCTS

## SMALL-SIZED PRECISION REGULATORS CONTENTS

SMALL-SIZED PRECISION REGULATOR

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**Caution**

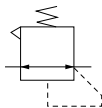
Before use, be sure to read the "Safety Precautions" on p. 49.

# SMALL-SIZED PRECISION REGULATOR

PR100



## Symbol

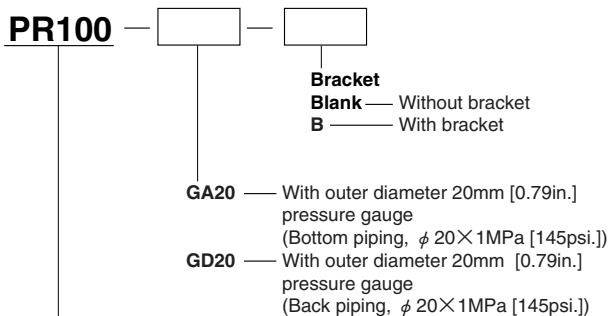


## Specifications

Item	Model	PR100
Media		Air
Port size	Rc	1/8
Sensitivity	MPa [psi.]	0.001 [0.15]
Pressure setting range	MPa [psi.]	0.02~0.5 [2.9~72.5]
Maximum operating pressure	MPa [psi.]	0.93 [135]
Proof pressure	MPa [psi.]	1.5 [218]
Operating temperature range (atmosphere and media)	°C [°F]	5~60 [41~140]
Air consumption <sup>Note</sup>	ℓ /min [ft <sup>3</sup> /min.] (ANR)	1.5 [0.053]
Lubrication		Not required
Mass	kg [lb.]	0.07 [0.15]
Materials		Aluminum

Note: Value when secondary air pressure is set to 0.5MPa [72.5psi.].

## Order Codes



Small-sized precision regulator

Note: The pressure gauge with optional setting is JIS class 3.  
 For situations requiring more precise pressure regulation, use a pressure gauge in or near the JIS class 1.5.  
 For pressure gauge specifications and dimensions, see p.171.

## Options

With outer diameter 20mm [0.79in.] pressure gauge



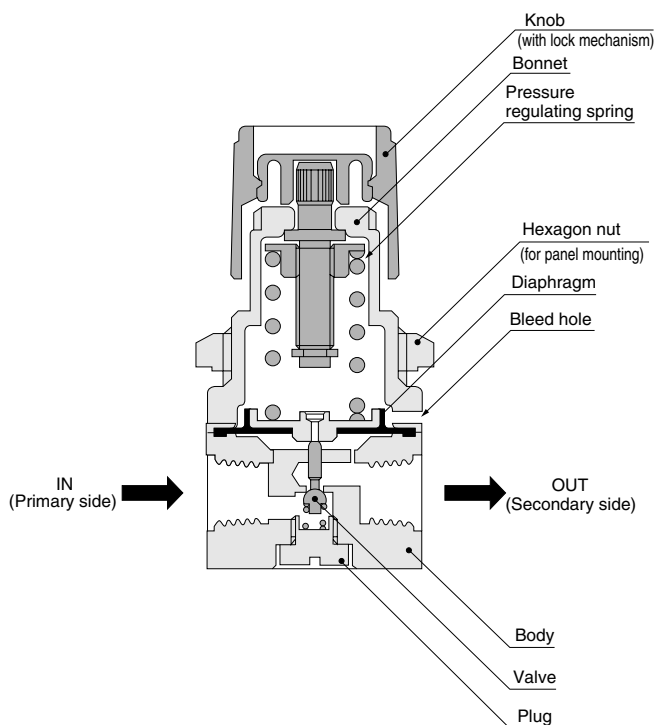
● Bottom piping ● Back piping

**Bracket**  
**● 8-10Z**

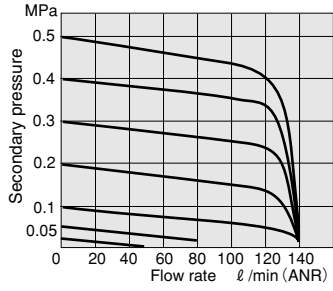
With bracket



## Inner Construction

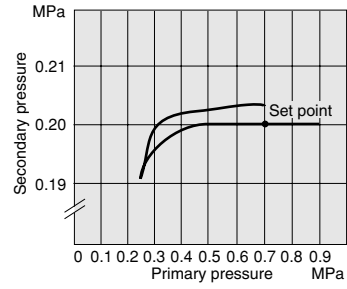


## Flow Rate Characteristics



Remark: Graph shows flow rate characteristics when the primary pressure is fixed at 0.7MPa [102psi].

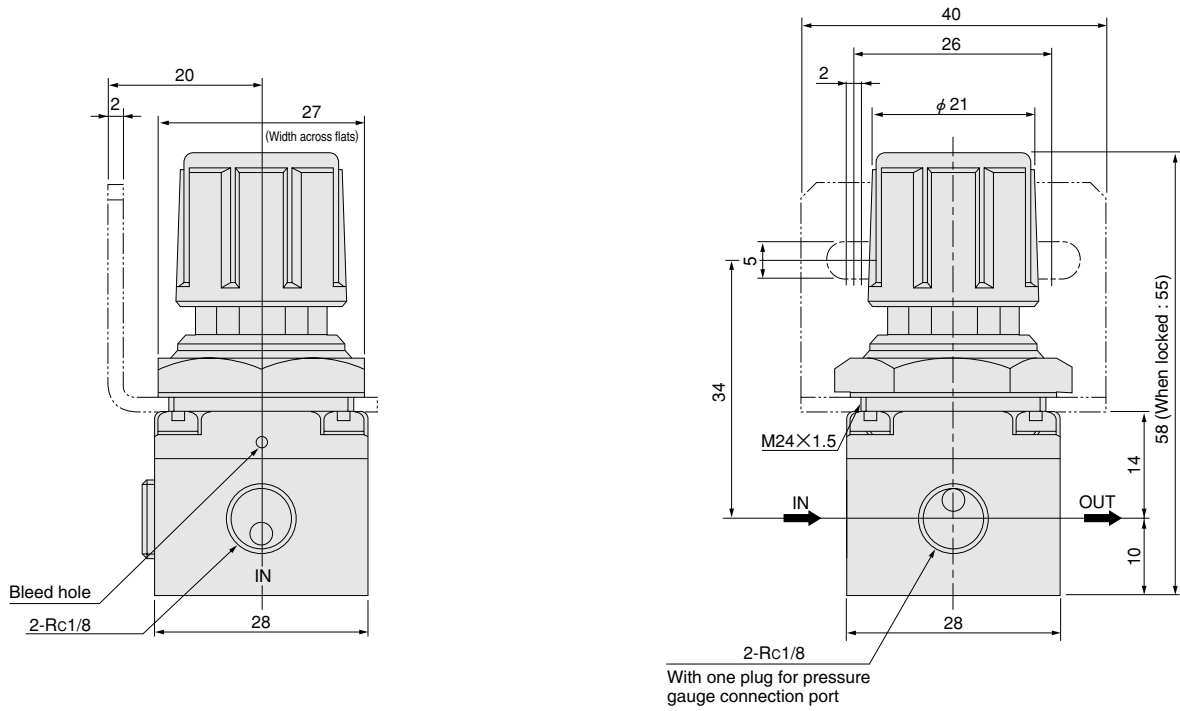
## Pressure Characteristics



1MPa = 145psi. 1 l/min = 0.0353ft<sup>3</sup>/min.

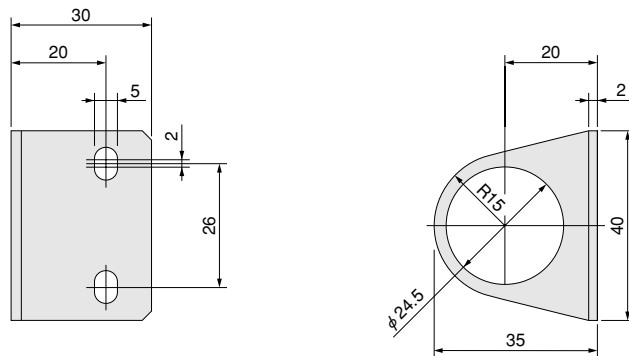
## Dimensions (mm)

### PR100



Remark: Mounting holes for installing PR100 on a panel are  $\phi$  24.5.

### 8-10Z



# Handling Instructions and Precautions



## Mounting and piping

1. If mounting the precision regulator as a single unit, use a bracket (optional). A ring nut for panel mounting can also be used. Mounting holes for mounting the precision regulator on a panel are  $\phi 24.5$  [0.965in.].
2. For piping to the precision regulator, plumb the piping so that the air supply side connects to the IN port and the actuator side connects to the OUT port.



- Cautions:**
1. The regulator cannot be used with the IN port and the OUT port in the reversed positions.
  2. Avoid a mounting position that blocks the bleed hole. Blocking the bleed hole could prevent pressure regulating.



## Pressure regulation

1. Perform pressure regulation by pulling out firmly on the knob. Rotating it to the right (clockwise) increases the pressure, and rotating to the left (counterclockwise) reduces the pressure. After regulating pressure, push the knob back into the body and lock it in place.



- Cautions:**
1. The precision regulator is a bleed type, which means that a slight amount of air constantly bleeds out from the bleed hole while the secondary side is under pressure regulation. This is a normal situation.
  2. The air bleed amount was adjusted at time of shipment from the Koganei. Absolutely never attempt to loosen the plug.



2. Avoid applications that involve setting a valve in the primary side of the precision regulator and repeatedly switching the primary pressure.



## General precautions

1. Always thoroughly blow off (use compressed air) the piping before plumbing. Entering chips, sealing tape, rust, etc., generated during plumbing could result in air leaks or other defective operation.
2. Use air for the media. For the use of any other media, consult us. Use clean air that does not contain deteriorated compressor oil or other contaminants. Install an air filter (with filtration of a minimum  $5\mu m$ ) close to a pressure reducing valve to eliminate any air line condensate or dust. Moreover, clean the air filter at regular intervals. The entering of condensates or other particles, etc., into the small-sized precision regulator could result in defective operation.
3. The product cannot be used when the media or the ambient atmosphere contains any of the substances listed below. Organic solvents, phosphate ester type hydraulic oil, sulphur dioxide, chlorine gas, or acids, etc.
4. If using in locations subject to dripping water, dripping oil, etc., or to large amounts of dust, use something to cover and protect the unit.

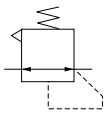
# PRECISION REGULATOR

## PR200

- Single diaphragm type achieves high-precision pressure regulation in a compact size.
- Push lock type regulator knob for light, smooth pressure regulation.



### Symbol



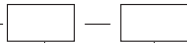
### Specifications

Item	Model	PR200
Media		Air
Port size	Rc	1/4
Sensitivity	MPa [psi.]	0.001 [0.15]
Pressure setting range	MPa [psi.]	0.005~0.25 [0.7~36]
Maximum operating pressure	MPa [psi.]	0.73 [106]
Proof pressure	MPa [psi.]	1.03 [149]
Operating temperature range (atmosphere and media)	°C [°F]	5~60 [41~140]
Air consumption <sup>Note</sup>	ℓ / min [ft <sup>3</sup> /min] (ANR)	5 [0.18]
Lubrication		Not required
Mass	kg [lb.]	0.29 [0.64]
Materials		Aluminum die-casting

Note: Values are at secondary air pressure 0.25MPa [36psi.].

### Order Codes

#### PR200



**Bracket**  
**Blank** — No bracket  
**B** — With bracket

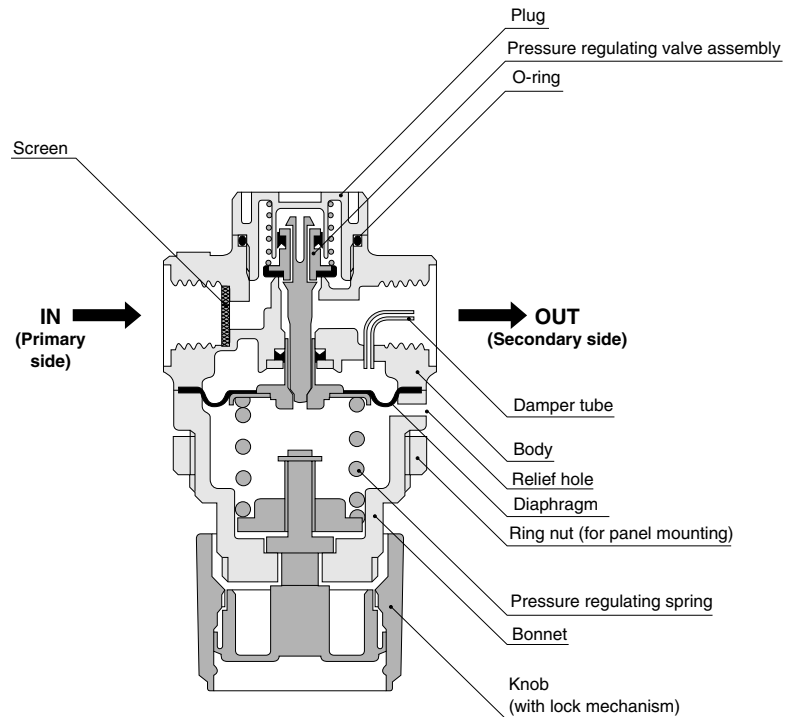
#### Pressure gauge specification

**Blank** — No pressure gauge  
**G3P** — With small precision pressure gauge (0.3MPa [44psi.])<sup>Note 1</sup>  
**G3PS** — With small precision pressure gauge (with throttle valve) (0.3MPa [44psi.])  
**G3** — With pressure gauge<sup>Note 2</sup> (0.3MPa [44psi.])  
**E2** — With pressure gauge with electronic switches<sup>Note 3</sup> (1MPa [145psi.])  
**E21** — With pressure gauge with electronic switches<sup>Note 3</sup> (100kPa [14.5psi.])

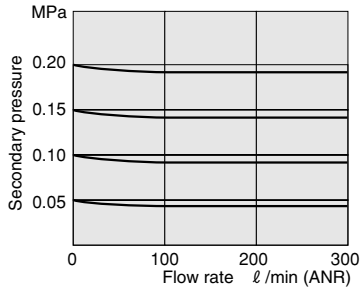
Precision regulator

- Notes: 1. For details about the **G3P** small precision pressure gauge, see p.174.  
 2. For details about the **G3** pressure gauge, see p.172.  
 3. For specifications and dimensions of the pressure gauge with electronic switches, see p.177~181.

### Inner Construction



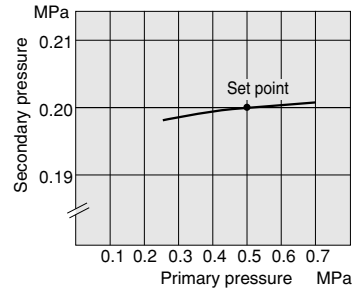
## Flow Rate Characteristics



Remark: Graph shows flow rate characteristics when the primary pressure is fixed at 0.7MPa [102psi.].

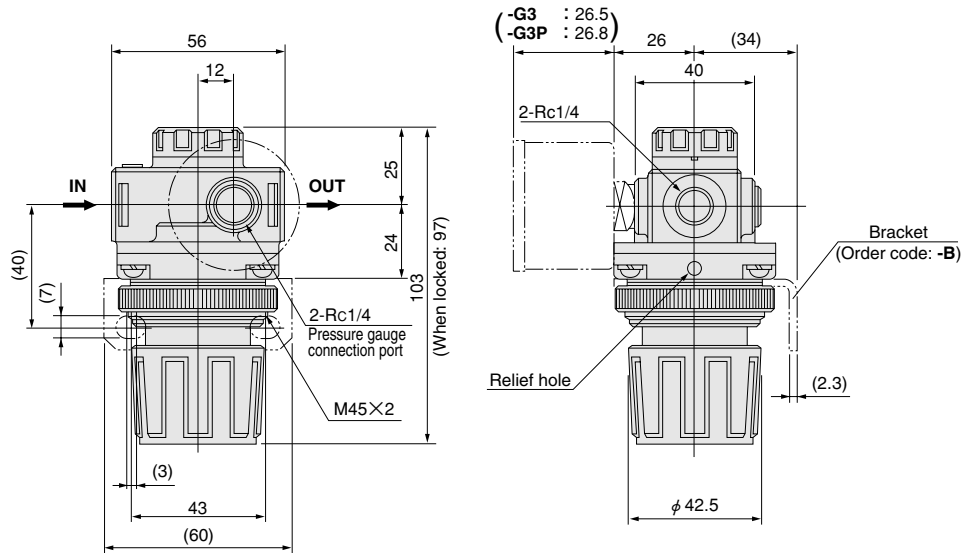
1MPa = 145psi. 1 l/min = 0.0353ft<sup>3</sup>/min.

## Pressure Characteristics



## Dimensions of Precision Regulator (mm)

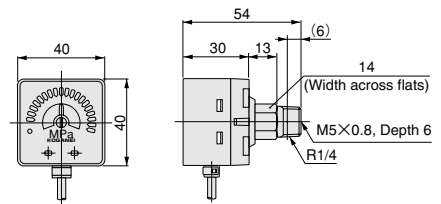
### PR200



Note: The mounting hole for attaching the regulator on a panel, etc. is  $\phi 46$ .  
A panel thickness of 1.5~6mm is required for mounting. Use the ring nuts provided to mount.

### Options

- Pressure gauge with electronic switches: -E2, -E21



# MODULES AND ADAPTERS



- F module is a connector facilitating combinations of Multi Series equipment of the same body size.
- D module offers a mounting bracket function.
- T module provides branch piping at desired locations.
- S adapter allows easy installation and removal of equipment without disturbing the piping.
- Standard can be used as NCU specification.

## Model List

### For 150, 300 and 600 series

Module, adapter Body size	F module (For modules only)	D module (Brackets for combined use)	T module (Branch piping)		S adapter (Port connection)	
	<b>F</b> (For modules only)	<b>D</b> (Brackets for combined use)	<b>T</b> (Branch piping)	<b>DT</b> (Brackets for combined use with branch piping)	<b>S</b> (Port connection)	<b>DS</b> (Brackets for combined use with piping connection)
<b>15</b> (For 150 series)	Multi Series →  ← Multi Series <b>8-15F</b>	Multi Series →  ← Multi Series <b>8-15D</b>	Connection port →  ← Multi Series <b>8-15T</b>	Connection port →  ← Multi Series <b>8-15DT</b>	Connection port →  ← Multi Series <b>8-15S</b>	Connection port →  ← Multi Series <b>8-15DS</b>
<b>30</b> (For 300 series)	 <b>8-30F</b>	 <b>8-30D</b>	 <b>8-30T</b>	 <b>8-30DT</b>	 <b>8-30S</b>	 <b>8-30DS</b>
<b>60</b> (For 600 series)	 <b>8-60F</b>	 <b>8-60D</b>	 <b>8-60T</b>	 <b>8-60DT</b>	 <b>8-60S</b>	 <b>8-60DS</b>

Remark: Material is zinc die-casting.

### For connections between different sizes

Module Body size	D module (Brackets for combined use)
<b>20</b> (For connecting 150 and 300 series)	For 300 series →  ← For 150 series <b>8-20D</b>
<b>40</b> (For connecting 300 and 600 series)	For 600 series →  ← For 300 series <b>8-40D</b>

## Order Codes



### Module and adapter

- F** — F module
- D** — D module for bracket-combined use
- T** — T module
- DT** — T module for bracket-combined use
- S** — S adapter
- DS** — S adapter for bracket-combined use

### Body size

- 15** — For 150 series, HR200 and HRA200
- 20** — For connecting 150 and 300 series<sup>Note 1</sup>
- 30** — For 300 series
- 40** — For connecting 300 and 600 series<sup>Note 1</sup>
- 60** — For 600 series, HR600 and HRA600

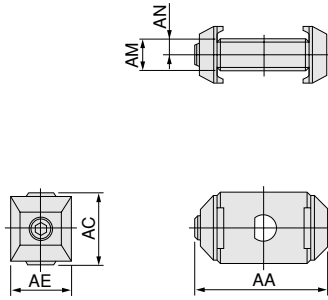
### Port size<sup>Note 2</sup> Rc

1/8	1/4	3/8	1/2	Applicable body size
1	2	3	4	150
2	3	4		300
2 <sup>Note 3</sup>	3	4		600

- Notes: 1. Used only with D module.  
2. Not available in F module or D module.  
3. Used only with S adapter and DS adapter.

For details about equipment combinations, see p.58.

## Dimensions of F Modules (mm)

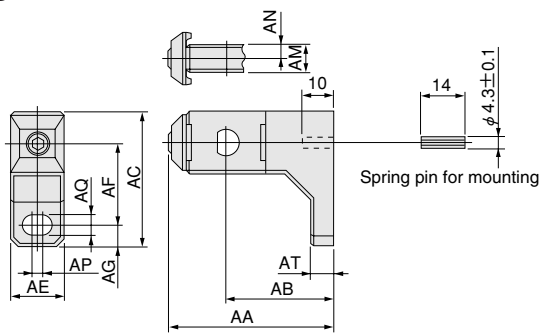
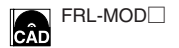


Type Code	AA	AC	AE	AM	AN	Mass g
8-15F	36	20	17.4	8	4	38
8-30F	42	24	19.4	10	5	63
8-60F	56.5	30	31	12	6	150

Note: When assembling with other equipment, add the AM dimensions to the total.

## Dimensions of D Modules (mm)

8-15D  
8-30D

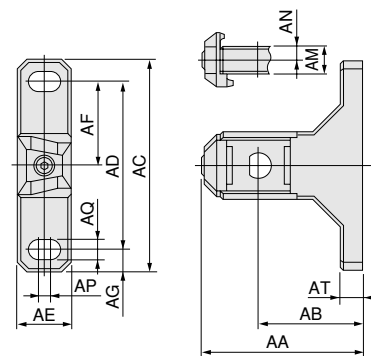


Model Code	AA	AB	AC	AE	AF	AG	AM	AN	AP
8-15D	50.5	32	49	17.4	31	8	8	4	4
8-30D	61.5	40	50.5	19.4	31	8	10	5	4

Model Code	AQ	AT	Mass g
8-15D	7	6	84
8-30D	7	8	137

Note: When assembling with other equipment, add the AM dimensions to the total.

8-20D  
8-40D

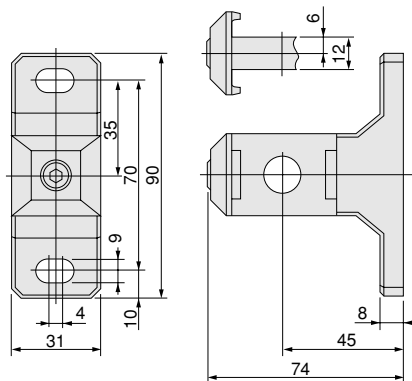


Model Code	AA	AB	AC	AD	AE	AF	AG	AM	AN	AP
8-20D	61.5	40	78	62	19.4	31	8	10	5	4
8-40D	74	45	90	70	31	35	10	16.8	6	4

Model Code	AQ	AT	Mass g
8-20D	7	8	141
8-40D	9	8	300

Note: When assembling with other equipment, add the AM dimensions to the total.

8-60D

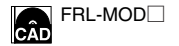


Mass: 260 g

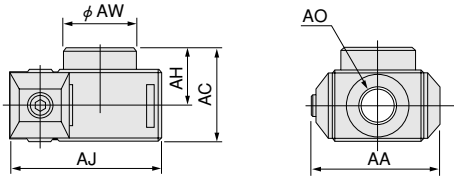
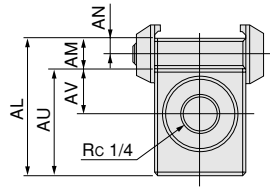
Note: When assembling with other equipment, add 12mm to the total.



# Dimensions of T Modules (mm)



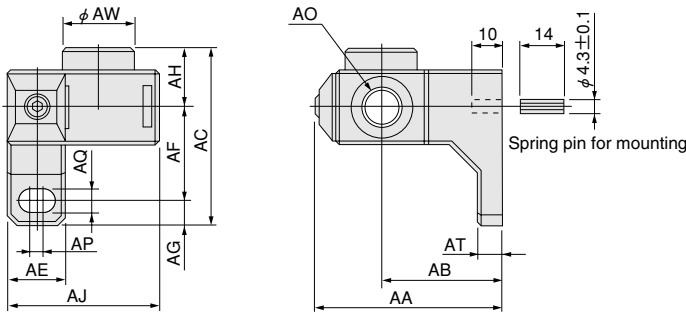
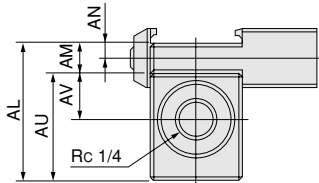
- 8-15T
- 8-30T
- 8-60T



Model Code	AA	AC	AH	AJ	AL	AM	AN	AO	AU	AV	AW	Mass g
8-15T1	36	27	17	43.5	39	8	4	Rc1/8	31	13	20	116
8-15T2	36	27	17	43.5	39	8	4	Rc1/4	31	13	20	110
8-30T2	42	31	19	49.5	45	10	5	Rc1/4	35	15	24	196
8-30T3	42	31	19	49.5	45	10	5	Rc3/8	35	15	24	181
8-60T3	56.5	40	24	66.5	57	12	6	Rc3/8	45	19	32	271
8-60T4	56.5	40	24	66.5	57	12	6	Rc1/2	45	19	32	264

Note: When assembling with other equipment, add the AL dimensions to the total.

- 8-15DT
- 8-30DT



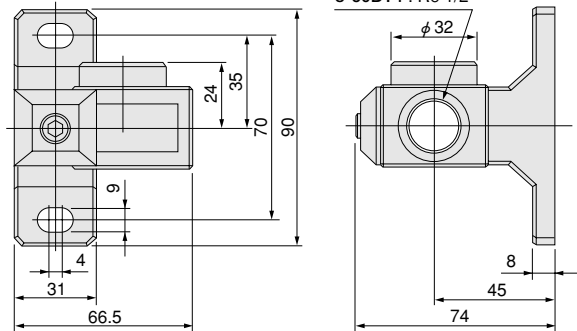
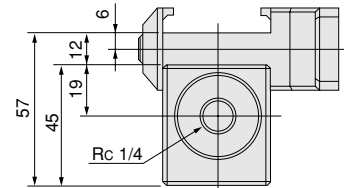
Model Code	AA	AB	AC	AE	AF	AG	AH	AJ	AL
8-15DT1	50.5	32	56	17.4	31	8	17	44	39
8-15DT2	50.5	32	56	17.4	31	8	17	44	39
8-30DT2	61.5	40	58	19.4	31	8	19	50	45
8-30DT3	61.5	40	58	19.4	31	8	19	50	45

Model Code	AM	AN	AO	AP	AQ	AT	AU	AV	AW
8-15DT1	8	4	Rc1/8	4	7	6	31	13	20
8-15DT2	8	4	Rc1/4	4	7	6	31	13	20
8-30DT2	10	5	Rc1/4	4	7	8	35	15	24
8-30DT3	10	5	Rc3/8	4	7	8	35	15	24

Model Code	Mass g
8-15DT1	161
8-15DT2	155
8-30DT2	273
8-30DT3	257

Note: When assembling with other equipment, add the AL dimensions to the total.

- 8-60DT



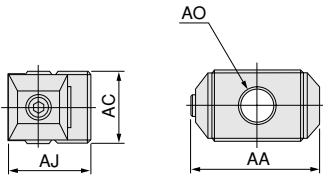
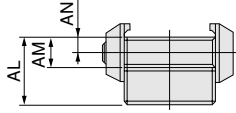
Mass  
 8-60DT3: 385g  
 8-60DT4: 375g

Note: When assembling with other equipment, add 57mm to the total.

Dimensions of S Adapters (mm)



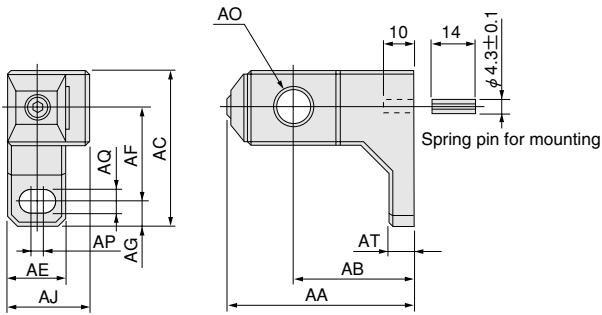
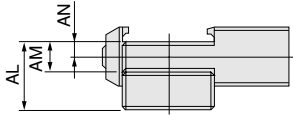
- 8-15S
- 8-30S
- 8-60S



Model	Code	AA	AC	AJ	AL	AM	AN	AO	Mass g
8-15S1		36	20	24.5	20	8	4	Rc1/8	51
8-15S2		36	20	24.5	20	8	4	Rc1/4	49
8-30S2		42	24	26.5	22	10	5	Rc1/4	81
8-30S3		42	24	26.5	22	10	5	Rc3/8	78
8-60S2		56.5	32	37.5	28	12	6	Rc1/4	190
8-60S3		56.5	32	37.5	28	12	6	Rc3/8	187
8-60S4		56.5	32	37.5	28	12	6	Rc1/2	183

Note: When assembling with other equipment, add the AL dimensions to the total.

- 8-15DS
- 8-30DS

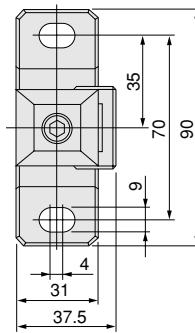
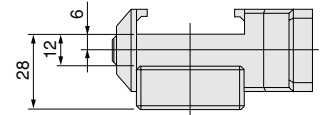


Model	Code	AA	AB	AC	AE	AF	AG	AJ	AL	AM	AN	AO	AP	AQ	AT
8-15DS1		50.5	32	49	18	31	8	25	20	8	4	Rc1/8	4	7	6
8-15DS2		50.5	32	49	18	31	8	25	20	8	4	Rc1/4	4	7	6
8-30DS2		61.5	40	51	20	31	8	27	22	10	5	Rc1/4	4	7	8
8-30DS3		61.5	40	51	20	31	8	27	22	10	5	Rc3/8	4	7	8

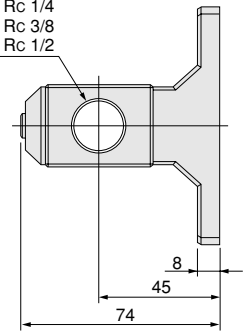
Model	Code	Mass g
8-15DS1		96
8-15DS2		94
8-30DS2		155
8-30DS3		150

Note: When assembling with other equipment, add the AL dimensions to the total.

8-60DS



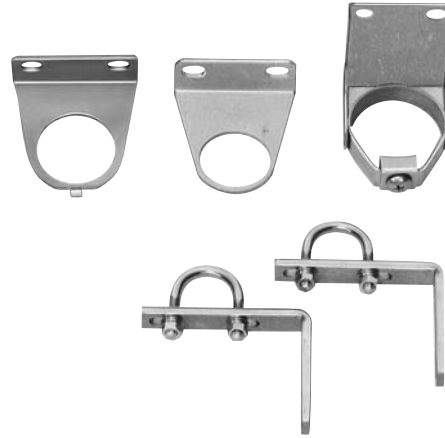
8-60DS2 : Rc 1/4  
 8-60DS3 : Rc 3/8  
 8-60DS4 : Rc 1/2



Mass  
 8-60DS2: 302g  
 8-60DS3: 299g  
 8-60DS4: 295g

Note: When assembling with other equipment, add 28mm to the total.

# BRACKETS



## Bracket Models and Applicable Components

Components type		Bracket model	Remark
F.R.L. combinations	C150	<b>8-15D</b>	D module for bracket-combined use, standard equipment
	C200	<b>8-20D</b>	
	C300	<b>8-30D</b>	
	C400	<b>8-40D</b>	
	C600	<b>8-60D</b>	
Filter regulators	FR150	<b>8-15 (8-15A)</b>	Standard equipment
	FR300	<b>8-30 (8-30A, 8-60B)</b> <sup>Note2</sup>	
	FR600	<b>8-65 (8-60B)</b> <sup>Note2</sup>	
Air filters	F150	<b>8-15A</b>	Body supporting type, optional
	F300	<b>8-30A (8-60B)</b> <sup>Note2</sup>	Piping supporting type, optional
	F600	<b>8-60B</b>	Piping supporting type, optional
Mist filters	MF300	<b>8-30A (8-60B)</b> <sup>Note2</sup>	Body supporting type, optional
	MF400	<b>8-60B</b> <sup>Note2</sup>	Piping supporting type, optional
	MF600		
Micro mist filters	MMF150	<b>8-30A (8-60B)</b> <sup>Note2</sup>	Body supporting type, optional
	MMF300	<b>8-60B</b> <sup>Note2</sup>	Piping supporting type, optional
	MMF400		
Regulators	R150	<b>8-15</b>	Standard equipment
	R300	<b>8-30 (8-60B)</b> <sup>Note2</sup>	
	R600	<b>8-65 (8-60B)</b> <sup>Note2</sup>	
Precision regulator	PR200	<b>8-21Z</b>	Body supporting type, optional
High-relief regulators	HR200	<b>8-22Z</b>	Body supporting type, optional
	HR600		
	HRA200		
	HRA600		
Manifold regulators	MR300	<b>8-30D</b>	D module for bracket-combined use, optional
Lubricators	L150	<b>8-15A</b>	Body supporting type, optional
	L300	<b>8-30A (8-60B)</b> <sup>Note2</sup>	Piping supporting type, optional
	L600	<b>8-60B</b> <sup>Note2</sup>	
Residual pressure exhaust valves	300V	<b>8-31C</b>	Body supporting type, optional
	600V		

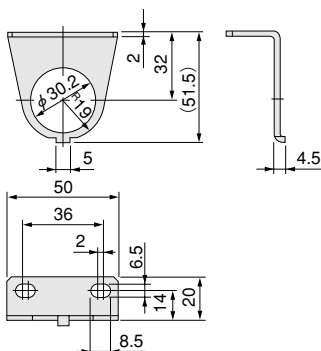
Notes: 1. Models in parentheses ( ) are non-standard, but are acceptable for use.  
 2. Pipe supporting type brackets (8-60B) are sold in a set of two brackets.

# Dimensions of Brackets (mm)



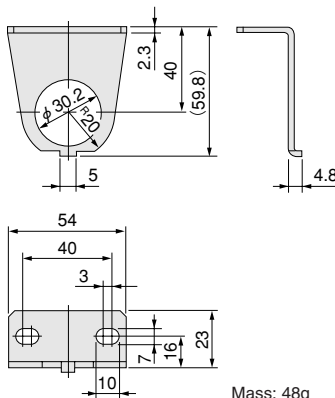
## For Filter Regulator and Regulator

### 8-15



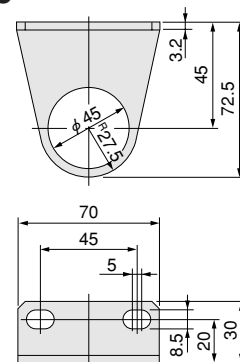
Mass: 31g

### 8-30



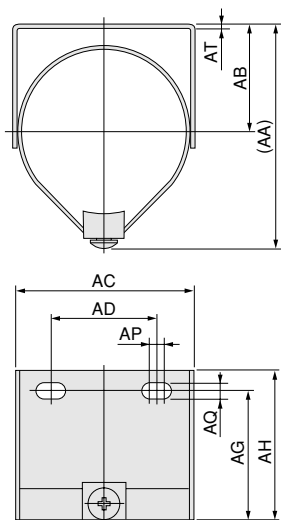
Mass: 48g

### 8-65

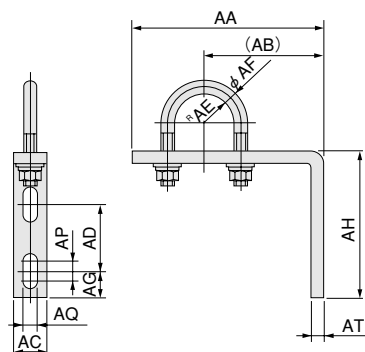


Mass: 69g

## For Air Filter, Mist Filter, Micro Mist Filter, and Lubricator



Mass  
8-15A: 60g  
8-30A: 80g



Mass: 107g

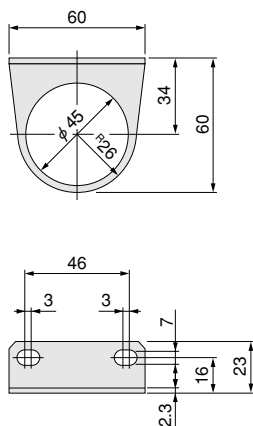
Model	Code	AA	AB	AC	AD	AG	AH	AP	AQ	AT
8-15A		64	32	46	32	50	56	2	6.4	1.2
8-30A		84	40	66.8	40	48	56	5	6.4	1.2

Model	Code	AA	AB	AC	AD	AE	AF	AG	AH	AP	AQ	AT
8-60B		72	45	12	25	11	5	10	55	7	5.5	4.5

Note: Pipe supporting type brackets (8-60B) are sold in a set of two brackets.

## For Precision Regulator

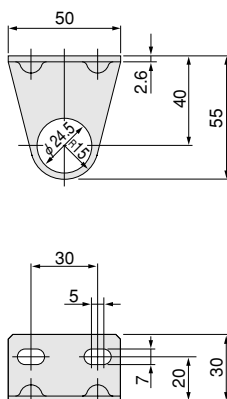
### 8-21Z



Mass: 42g

## For High-relief Regulator

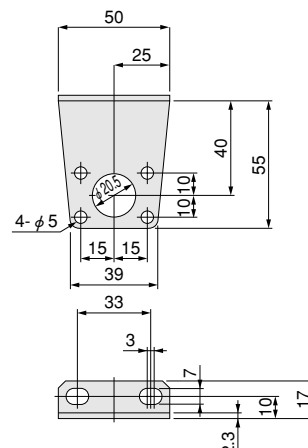
### 8-22Z



Mass: 52g

## For Residual Pressure Exhaust Valve

### 8-31C

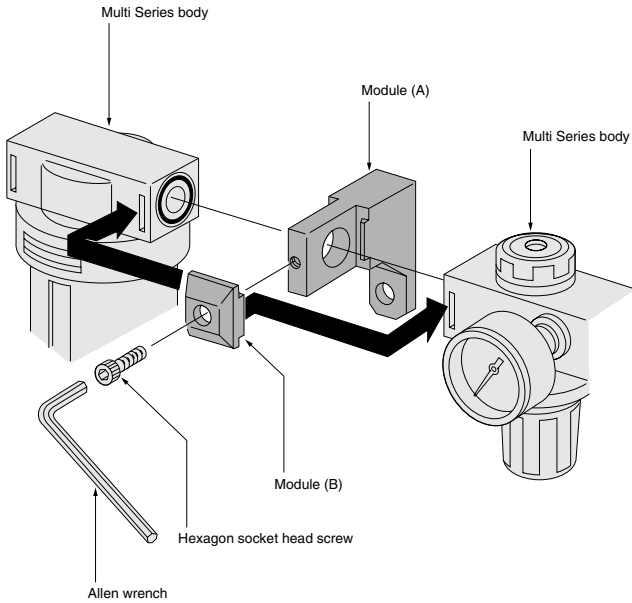


Mass: 50g



## Module

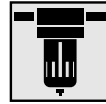
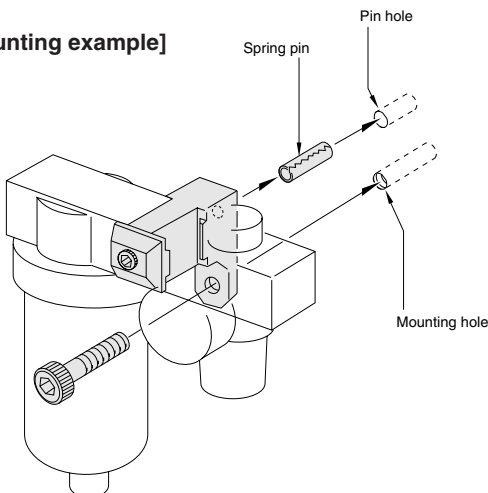
### Installation



1. On all Multi Series equipment, the side displaying an arrow mark on the top of the body indicates the IN port (primary side).
2. Align convex section of modules (A) and (B) in the grooves of the Multi Series body, and use a hexagon socket head screw to tighten and secure them in place.

- Cautions:**
1. For the module types applicable to each Multi Series type, see p.91.
  2. The Multi Series modules should not be allowed to sag when mounted. As there is a possibility that they will sag under the weight of connections of steel piping or other heavy piping, always connect module brackets to both ends of the modules before mounting.
  3. There is only one mounting hole when mounting a module using one of either 8-15D or 8-30D onto a mechanical device, causing an unstable installation. Use the spring pin supplied to prevent the unit from rotating. The pin hole here is  $\phi 4.6$  with a depth of 6.
  4. Assemble the T module so that the piping port faces upward.

### [Mounting example]



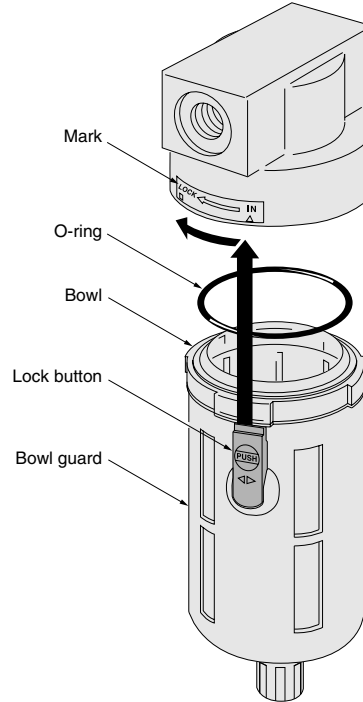
## Filter Regulator, Filter, and Lubricator

### Mounting and piping

Mount in a vertical position, with the piping connections on the top and the drain port on the bottom.

### Bowl

Because the bowl is made of polycarbonate, avoid subjecting it to excessive force or shocks. Also, do not use it in atmospheres subject to organic solvents, etc.



### ● Removing the bowl

While pushing down on the red lock button, rotate the bowl and bowl guard to the right (the direction opposite to the arrow mark) until it is aligned to the IN mark, then remove the bowl and bowl guard from the body.

### ● Mounting the bowl

1. Align the bowl and bowl guard to the convex section along their rims, and set the bowl into the bowl guard.
2. Align the lock button to the IN mark, and insert into the body. While pressing the bowl against the body, rotate it to the left (the direction shown by the arrow mark) until it reaches the LOCK position, and secure in place.

- Cautions:**
1. Always shut off the media before removing or mounting the bowl.
  2. Set the O-ring onto the body, and then mount the bowl and bowl guard.
  3. The bowl for the 150 series is a screw-in type. For removal or mounting, manually rotate the bowl or bowl guard.
  4. Use a neutral detergent to clean the bowl.

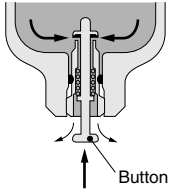
### Filter

1. Drain the collected liquid from the air filter on a periodic basis.
2. To clean the air filter element, remove the element and blow it off with compressed air, etc.

**Drain cock**● **Push type****150 series**

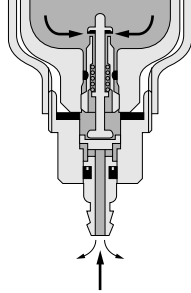
(Air filter Standard  
Lubricator Order code: **-D**)

Pressing the button opens the drain port, and the collected liquid is expelled.

● **Push type with fitting****150 series**

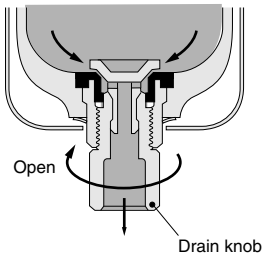
(Air filter Order code: **-BG-F1**  
Lubricator Order code: **-BG-F2**)

Pushing the fitting upward opens the drain port, and the collected liquid is expelled.

● **Screw type****300-600 series**

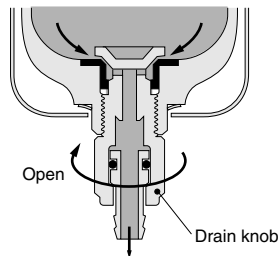
(Air filter Standard  
Lubricator Order code: **-D**)

Rotating the drain knob to the left opens the drain port, and the collected liquid is expelled.

● **Screw type with fitting****300-600 series**

(Air filter Order code: **-F1**  
Lubricator Order code: **-F2**)

Rotating the drain knob to the left opens the drain port, and the collected liquid is expelled.



**Caution:** The drain knob should be operated using the fingertips.

● **Auto drain type****300-600 series**

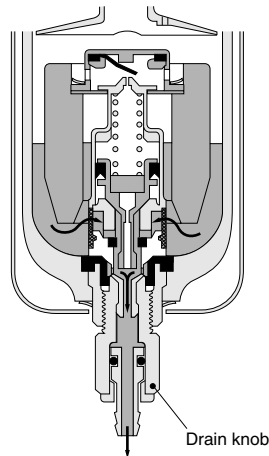
(Air filter Order code: **-A**)

When a certain volume of collected liquid has accumulated, or when the pressure inside the bowl has fallen to less than 0.02MPa [3psi.], the collected liquid is automatically expelled. The collected liquid may also be expelled manually by turning the drain knob to the left.

**Cautions:** 1. In the auto drain, air is exhausted from the drain port until the supply pressure reaches 0.15MPa [22psi.]. This is normal, and even rotating the drain knob in this situation will not prevent the air from bleeding out.

(If the time required for the supply pressure to rise to 0.15MPa [22psi.] seems too long, consult us.)

- The drain knob should be operated using the fingertips.
- If attaching a tube to the fitting, use a nylon tube with inner diameter of 6mm. Do not let the tube bend in the area near the fitting connection.
- The fitting can be rotated freely in any direction. As a result, the tube does not need to be removed even when manually draining the collected liquid.

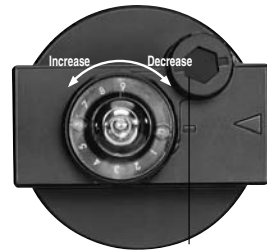
**Lubrication**

- Use Turbine Oil Class 1 (ISO VG32) or an equivalent for lubrication. Avoid using spindle oil or machine oil.
- For lubrication, use an Allen wrench to remove the plug from the lubrication port, and supply oil until the bowl is 80% filled.

**Caution:** Even though lubrication can be carried while supplying compressed air for the L300 and L600, lubrication cannot be carried while supplying compressed air for the L150.

**Oil drip-rate adjustment**

Rotating the lubricator dial to the left increases the oil drip-rate. Use the adjustment marks on the body and the numbers on the dial to adjust the oil drip-rate.



Adjusting mark

- Cautions:** 1. While the dial can be rotated continuously to the right, the rate of change for the oil dripping volume does not correspond to the numbers on the dial.
2. The numbers on the dial represent rough oil drip-rate, not the number of droplets.

# Handling Instructions and Precautions



## Filter Regulator, Regulator, Precision Regulator, Manifold Regulator, and High-relief Regulator

### Mounting and piping

#### ● General overview for regulators

In regulator configurations (with the exception of types with built-in check mechanism), the OUT port (secondary) pressure may not be exhausted to the IN port (primary) side even when the IN port pressure is 0MPa. To ensure that exhaust is performed, either use a type with built-in check mechanism, or install a check valve alongside. If a regulator with built-in check mechanism installed after the solenoid valve for cylinder pressure adjustment performed, make sure that cylinder back pressure does not cause secondary pressure on the regulator with built-in check mechanism to rise above the set pressure. The check mechanism may not operate correctly. (As a guide, use at a pressure differential between the push and pull sides of 0.3MPa or less.)

Also, because regulator (with the exception of the High-relief Regulator) relief ports are smaller than the diameter of the piping port, they may not be able to respond to sudden increases in pressure on the OUT port (secondary) side. For situations where pressures can rise sharply due to a force being applied to the cylinder externally, either use a High-relief Regulator or set the relief valve to OUT.

#### ● Precision Regulator

1. If mounting the Precision Regulator as a single unit, use a bracket (optional). A ring nut for panel mounting can also be used.
2. When piping to the Precision Regulator, position the piping so that the air supply side connects to the IN port and the actuator side connects to the OUT port. To prevent the fitting on the OUT port side from interfering with the damper tube, use piping with inner diameter at least 3mm [0.12in.] or more.



- Cautions:**
1. The regulator cannot be used with the IN port and the OUT port in the opposite positions.
  2. When mounting a fitting on the OUT port, be careful to avoid damaging the damper tube. In addition, avoid using a plug or a fitting with too small inner diameter in the OUT port. Bending the damper tube or blocking the hole could damage the precision regulator function, preventing accurate regulating pressure.
  3. Avoid a mounting position that blocks the relief hole. Blocking the relief hole could prevent regulating pressure.

#### ● Manifold Regulator

1. Use sufficiently large IN port piping, and supply via the IN ports at both manifold ends as much as possible. Moreover, when using five or more units on a manifold, mount a T module somewhere in the middle of the units, and supply via the IN ports in at least three different locations.
2. To stabilize secondary pressure, ensure a sufficiently large pressure differential (0.3MPa [44psi.] MIN.) between the IN port pressure and OUT port pressure.

#### ● High-relief Regulator

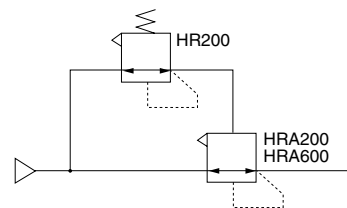
1. The High-relief Regulator's IN port (primary side) is on the top surface of the body, where the arrow mark is located.
2. The High-relief Regulator can be mounted as a module with any equipment in the air preparation Multi Series. Module formation and equipment compatibility for HR200 and HRA200 is the same as the 150 series, and for HR600 and HRA600, the same as the 600 series.
3. For single unit mounting, use brackets (order code :-B). A ring nut for panel mounting can also be used.
4. When mounting a pressure gauge, never grab the pressure gauge body for tightening. Always use a wrench on the square section around the connection port to tighten.
5. When mounting a muffler or exhaust filter on the EXH port, use the following table to select the type.

Model	Recommended muffler, exhaust filter
HR200 HRA200	KM-22, KM-23 EF300, EF600, EF800
HR600 HRA600	KM-31 EF300, EF600, EF800

For details, see p.549 and 552.

6. While any mounting direction is acceptable, mounting with the EXH port pointing straight up could result in noisy operation. In this case, change the pressure setting, increase the exhaust volume, or perform some other preventive measures.
7. If using a mounting ring to mount the regulator, use a mounting torque of 980.7N·cm [86.7in·lbf] or less.

- Cautions:**
1. Avoid operating methods that involve setting a valve on the primary side of the High-relief Regulator and repeatedly switching the primary pressure.
  2. If mounting a muffler, etc., on the EXH port, use a tightening torque for HR200 and HRA200 of 294.2N·cm [26.0in·lbf] or less, and for HR600 and HRA600, 490.3N·cm [43.4in·lbf] or less. When mounting, always use a wrench on the hexagonal section of the exhaust plug. Avoid using steel piping to connect the EXH port.
  3. In the external pilot type, exhausting primary pressure while supplying pilot air could cause damage to the diaphragm. For this reason, exhaust the primary side of the regulator that controls pilot pressure, and the primary side of the external pilot type at the same time.



4. To avoid interfering with the piping volume, select a regulator with a large relief flow rate for the pilot regulator to be used for the external pilot type. In addition, do not allow the pilot air piping length to exceed the values shown in the table below.

O.D × I. D. mm [in.]	Piping length m [ft.]
4×2 [0.157×0.079]	2 [6.6]
6×4 [0.236×0.157]	20 [65.6]
8×6 [0.315×0.236]	50 [164]



### Pressure regulation

**Caution:** Perform the setting while checking the primary pressure and secondary pressure gauge displays. Rotating the knob too far could cause damage to the internal parts. Be particularly careful not to rotate it too far during depressurization, since time is required for relief.

#### ● Filter Regulator, Regulator, Manifold Regulator

Perform pressure regulation by pulling out the knob firmly. Rotating it to the right (clockwise direction) increases the pressure, and rotating to the left (counterclockwise direction) reduces the pressure. After regulating pressure, push the knob back into the body and lock it in place.

- Cautions:**
1. Do not attempt to rotate the knob while in the locked position.
  2. In the FR150 and R150 series, vibration noise can occur when the pressure differential between the primary pressure and setting pressure is large (0.7MPa [102psi.] or more). In this situation, reduce the pressure differential (0.5MPa [73psi.] or less).

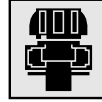
#### ● Precision Regulator, High-relief Regulator

Perform regulating pressure by pulling out the knob firmly. Rotating it to the right (clockwise direction) increases the pressure, and rotating to the left (counterclockwise direction) reduces the pressure. After regulating pressure, push the knob back into the body and lock it in place.



**Remark:** When regulating pressure, connect a pressure gauge of a class JIS 1.5 or equivalent to the Precision Regulator's pressure gauge connection port (Rc1/4).

- Cautions:**
1. To maintain accurate pressure adjustment conditions while locked, the Precision Regulator knob includes a free (neutral) state between the lock state and pressure adjustment state. To switch between the regulating pressure and lock states, pull the knob firmly out or push it in until a clicking sound shows that it has firmly arrived in the lock state or pressure adjustment state.
  2. The Precision Regulator is a bleed type, which means that a slight amount of air constantly bleeds out of the bleed hole while the secondary side is undergoing pressure adjustment. This is a normal situation.
  3. The internal pilot type uses a metal contact seal on the pilot regulator portion that causes it to bleed a slight amount of air. This is a normal situation.



### Residual Pressure Exhaust Valve

#### Mounting and piping

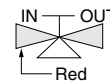
1. When mounting the Residual Pressure Exhaust Valve as a single unit, use either a mounting thread on the R port side or a bracket (optional). If using steel piping, the piping itself can serve as a support.
2. Connect the piping for the Residual Pressure Exhaust Valve so that the P port is on the primary (media) side and the A port is on the mechanical device side. If using as a 2-port valve, use a Rc1/4 plug to block the R port.

- Cautions:**
1. The unit cannot be used with the P port and A port in reversed positions.
  2. If using in locations subject to dripping water, dripping oil, etc., or to large amounts of dust, use something to cover and protect the unit.

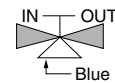
#### Switching valves

To switch between air supply or exhaust, rotate the knob by 90 degrees. Rotation to the left (counterclockwise direction) switches to the air supply state, while rotating to the right (clockwise direction) switches to the exhaust state. As there is no neutral position (where the P port air would return back to A or R), slowly rotating the knob can slowly increase the supply or exhaust volume. To determine the current valve state, check a display window on the side of the knob.

#### Air supply



#### Exhaust



**Caution:** After switching the knob firmly by 90 degrees, always check that it is locked in place.







### General precautions

1. Always thoroughly blow off (use compressed air) the tubing before piping. Entering chips, sealing tape, rust, etc., generated during piping work could result in air leaks or other defective operation.
2. Use clean air for the media. Install an air filter (with filtration of a minimum 5 $\mu$ m). For the use of any other media, consult us.
3. The product cannot be used when the media or the ambient atmosphere contains any of the substances listed below.  
Organic solvents, phosphorate acid ester type hydraulic oil, sulphur dioxide, chlorine gas, acids, or alkali.
4. If using in locations subject to dripping water, dripping oil, etc., or to large amounts of dust, use something to cover and protect the unit.



Before selecting and using the product, please read all the Safety Precautions carefully to ensure proper product use. The Safety Precautions shown below are to help you use the product safely and correctly, and to prevent injury or damage to you, other people, and assets beforehand. Follow the Safety Precautions for: ISO4414 (Pneumatic fluid power—Recommendations for the application of equipment to transmission and control systems), JIS B 8370 (Pneumatic system regulations)

**The directions are ranked according to degree of potential danger or damage: “DANGER!”, “WARNING!”, “CAUTION!”, and “ATTENTION!”**

 <b>DANGER</b>	Expresses situations that can be clearly predicted as dangerous. If the noted danger is not avoided, it could result in death or serious injury. It could also result in damage or destruction of assets.
 <b>WARNING</b>	Expresses situations that, while not immediately dangerous, could become dangerous. If the noted danger is not avoided, it could result in death or serious injury. It could also result in damage or destruction of assets.
 <b>CAUTION</b>	Expresses situations that, while not immediately dangerous, could become dangerous. If the noted danger is not avoided, it could result in light or semi-serious injury. It could also result in damage or destruction of assets.
 <b>ATTENTION</b>	While there is little chance of injury, this content refers to points that should be observed for appropriate use of the product.

- This product was designed and manufactured as parts for use in General Industrial Machinery.
- In the selection and handling of the equipment, the system designer or other person with fully adequate knowledge and experience should always read the Safety Precautions, Catalog, Owner’s Manual and other literature before commencing operation. Making mistakes in handling is dangerous.
- After reading the Owner’s Manual, Catalog, etc., always place them where they can be easily available for reference to users of this product.
- If transferring or lending the product to another person, always attach the Owner’s Manual, Catalog, etc., to the product where they are easily visible, to ensure that the new user can use the product safely and properly.
- The danger, warning, and caution items listed under these “Safety Precautions” do not cover all possible cases. Read the Catalog and Owner’s Manual carefully, and always keep safety first.

 **DANGER**

- Do not use the product for the purposes listed below:
  1. Medical equipment related to maintenance or management of human lives or bodies.
  2. Mechanical devices or equipment designed for the purpose of moving or transporting people.
  3. Critical safety components in mechanical devices.
 This product has not been planned or designed for purposes that require advanced stages of safety. It could cause injury to human life.
- Do not use the product in locations with or near dangerous substances such as flammable or ignitable substances. This product is not explosion-proof. It could ignite or burst into flames.
- When mounting the product and workpiece, always firmly support and secure them in place. Dropping or falling the product or improper operation could result in injury.
- Persons who use a pacemaker, etc., should keep a distance of at least 1 meter [3.28ft.] away from the product. There is a possibility that the pacemaker will malfunction due to the strong magnet built into the product.
- Never attempt to remodel the product. It could result in abnormal operation leading to injury, electric shock, fire, etc.
- Never attempt inappropriate disassembly, or assembly of the product relating to its basic inner construction, or to its performance or functions. It could result in injury, electric shock, fire, etc.
- Do not splash water on the product. Spraying it with water, washing it, or using it underwater could result in malfunction of the product leading to injury, electric shock, fire, etc.
- While the product is in operation, avoid touching it with your hands or otherwise approaching too close. In addition, do not make any adjustments to the interior or to the attached mechanisms (manual override, disconnection or connection of wiring connectors, adjustment of pressure switches, or disconnection of piping tubes or plugs, positioning of mounting products). Improper handling of the product could cause it to fall or operate abnormally, which could result in injury.

 **WARNING**

- Do not use the product in excess of its specification range. Such use could result in product breakdowns, function stop, damage, or drastically reduce the operating life.
- Before supplying air to the device and before starting operation, always conduct a safety check of the area of machine operation. Unintentional supply of air or electricity could possibly result in electric shock, or in injury caused by contact with moving parts.
- Do not touch the terminals and the miscellaneous switches, etc., while the device is powered on. There is a possibility of electric shock and abnormal operation.
- Do not throw the product into fire. The product could explode and/or release toxic gases.
- Do not sit on the product, place your foot on it, or place other objects on it. Accidents such as falling could result in injury. Dropping or toppling the product may result in injury, or it might also damage or break it, resulting in abnormal or erratic operation, runaway, etc.
- When conducting any kind of operation for the product, such as maintenance, inspection, repair, or replacement, always turn off the air supply completely and confirm that residual pressure inside the product or in piping connected to the product is zero before proceeding. In particular, be aware that residual air will still be in the air compressor or vacuum pump or air storage tank. The actuator could abruptly move if residual air pressure remains inside the piping, causing injury.
- In preparation for equipment shutdowns due to emergency stops, power blackouts, or other system problems, prepare safety circuit and equipment designs that prevent the occurrence of equipment damage or personal injury.
- Always release the lock on the locking type manual override before commencing normal operations. An unreleased lock could result in incorrect operation.
- Always shut OFF the power before wiring operations. Wiring with the power ON could result in electrical shocks.
- Always apply the stipulated amount of voltage to the solenoids. Applying the wrong voltage could result in failure to perform the intended function, and could damage or burn the product itself.
- Avoid scratching the cords for the sensor switch lead wires, etc. Letting the cords be subject to scratching, excessive bending, pulling, rolling up, or being placed under heavy objects or squeezed between two objects, may result in current leaks or defective continuity that lead

## CAUTION

For Fluoresin Products, always read the Safety Precautions on p.819 and 866 carefully before use.

to fire, electric shock, or abnormal operation.

- Do not pull out or plug in the connectors while the power is ON. Also, do not put unnecessary stress on the connector. It could result in erratic equipment operation that could lead to personal injury, equipment breakdown, or electrical shock, etc.
- Always check the Catalog to ensure that the product wiring and piping is done correctly. Errors in wiring and piping could lead to abnormal operation of the actuators, etc.
- When mounting a solenoid valve or electro-pneumatic transducing regulator inside a control panel, or when supplying electrical power to such units over long periods of time, take heat radiation measures to ensure that temperatures surrounding the solenoid valve or electro-pneumatic transducing regulator remain within the specified ambient temperature range. If planning long periods of continuous energizing, consult us.
- In low frequency use (more than 30 days between uses), there is a possibility that contacting parts may have stuck together, resulting in equipment operation delays or sudden movements that could lead to personal injury. Run a test operation at a minimum operations frequency of 30 days between tests to confirm that movement is normal.
- Do not locate solenoid valves, electro-pneumatic transducing regulators, or the wiring for controlling such units near power lines carrying large electrical currents, or in areas subject to the generation of powerful magnetic fields or electrical surges. Such location could result in unintentional operations.
- Surge voltages and electromagnetic pulses could occur when solenoid valves and electro-pneumatic transducing regulators are being switched OFF, which could have an effect on the operations of surrounding equipment. Either use solenoids with surge suppression, or take protective measures against surges and electromagnetic pulses on electrical circuits.
- Do not use the product where ozone may be generated, such as near ocean beaches or other places subject to direct sunlight or mercury lamps. Ozone can cause rubber parts to deteriorate, which can lead to degraded performance and functions, or to equipment stoppages. (Excludes items where measures against ozone have been taken.)
- Do not use any media other than shown on the specifications. Use of non-specified media could lead to functional shutdown after a short period, to sudden performance drops, or to shorter operating life.
- In initial operations after the equipment has been idle for 48 hours or more, or has been in storage, there is a possibility that contacting parts may have stuck together, resulting in equipment operation delays or sudden movements. For these initial operations, always run a test operation before use to check that operating performance is normal.
- After wiring operations, always check to ensure that no wiring connection errors exist before turning ON the power.

## CAUTION

- Do not use the product in locations that are subject to direct sunlight (ultraviolet rays), dust, salt, iron powder, high temperature, high humidity, or in the ambient atmospheres that include organic solvents, phosphate ester type hydraulic oil, sulphur dioxide, chlorine gas, acids, etc. It could lead to an early shutdown of some functions or a sudden degradation of performance, and result in a reduced operating life. For the materials used, see Major Parts and Materials.
- When installing the product, leave room for adequate working space around it. Failure to ensure adequate working space will make it more difficult to conduct daily inspections or maintenance, which could eventually lead to system shutdown or damage to the product.
- For mounting or transport of heavy products, use a lift, supporting tool, or several people, to provide firm support, and proceed with due caution to ensure personal safety.
- Always post an "operations in progress" sign for installations, adjustments, or other operations, to avoid unintentional supplying of air, electrical power, etc. Such accidental supplies may cause electric shock or sudden activation of the product that could result in physical injury.
- Do not bring floppy disks or magnetic media, etc., within 1 meter [3.28ft.] of the energized valves or electro-pneumatic transducing regulators. There is the possibility that the data on the floppy disks will be destroyed due to the magnetism of the magnet.
- Depending on the product, generation of leakage current on a control circuit could result in unintentional equipment motion. Take measures to ensure that the amount of current leaking into the control circuit does not exceed the leakage current limits allowed in the product specifications.

- For lubrication of sliding areas, use the specified lubricants. Use of the wrong lubricant could result in alteration or deterioration of the operating material's physical properties, or in degradation of its performance.
- Do not block the product's breathing holes. This will result in pressure changes due to changes in volume during operation. Blocking the breathing holes destroys the pressure balance, and could cause failure of the intended operation, equipment damage, or personal injury.
- The pressure used in vacuum equipment is vacuum (negative) pressure. Be careful to prevent positive pressure from intruding, which could cause damage to vacuum gauges and vacuum pumps. Moreover, supply of pressure greater than 0.2MPa [29psi.] for **VR100**, or 0.5MPa [73psi.] for **VR200** and **NVRA200**, could result in damage to the product.
- The properties of the lubrication oil can change if using in dry air where dew point temperatures is lower than  $-20^{\circ}\text{C}$  [ $-4^{\circ}\text{F}$ ]. It could result in degraded performance or in functional shutdown.

## ATTENTION

- When considering the possibility of using this product in situations or environments not specifically noted in the Catalog or Owner's Manual, or in applications where safety is an important requirement such as in an airplane facility, combustion equipment, leisure equipment, safety equipment, and other places where human life or assets may be greatly affected, take adequate safety precautions such as an application with enough margins for ratings and performance or fail-safe measure. Be sure to consult us about such applications.
- Always check the catalog and other reference materials for product wiring and plumbing setup.
- Use a protective cover, etc., to ensure that human bodies do not come into direct contact with the operating portion of mechanical devices, etc.
- Do not control in a way that would cause workpieces to fall during power failure. Take control measures so that they prevent the table or workpieces, etc., from falling during power failure or emergency stop of the mechanical devices.
- Install a muffler, etc., on the exhaust port. It is effective in reducing exhaust noise.
- After adjusting the pressure, lock the pressure regulating knob.
- When handling the product, wear protective gloves, safety glasses, safety shoes, etc., to keep safety.
- When the product can no longer be used, or is no longer necessary, dispose of it appropriately as industrial waste.
- Pneumatic equipment can exhibit degraded performance and function over its operating life. Always conduct daily inspections of the pneumatic equipment, and confirm that all requisite system functions are satisfied, to prevent accidents from happening.
- For inquiries about the product, contact your nearest Koganei sales office or Koganei overseas department. The address and telephone number is shown on the back cover of this catalog.

## OTHERS

- Always observe the following items.
  1. When using this product in pneumatic systems, always use genuine KOGANEI parts or compatible parts (recommended parts). When conducting maintenance and repairs, always use genuine KOGANEI parts or compatible parts (recommended parts). Always observe the required methods.
  2. Do not attempt inappropriate disassembly or assembly of the product relating to basic configurations, or its performance or functions.

Koganei cannot be responsible if these items are not properly observed.