

Combinations

● 650 series combination



● 750 series combination



● 900 series combination



Filters and Mist Filters



● Options

- Non-ion specification
- Bowl specification:
Nylon bowls
- Drain cock specification:
Drain cock with fitting
Auto drain type drain cock

Modules

D module for bracket-
combined use



R module



Regulators



RN650
RN651
RN652



RN900
RN902

● Options

Pressure gauge with built-in switch



Pressure gauge



Pressure gauge
for low pressure



Digital pressure
gauge with built-in
sensor



Embedded pressure
gauge

Modules

D module for bracket-
combined use



R module



Lubricators



LN650
LN651



LN900
LN901
LN902

● Options

- Non-ion specification
- Lubricator specification:
 - Micro lubricator
 - Machine lubricator
- Bowl specification:
 - Nylon bowls
- Drain cock specification:
 - Drain cock with fitting
 - Screw type drain cock









List of Equipment Combination

Body size		650 series						900 series										
Model		FN650	RN650	RN651	RN652	LN650	LN651	FN900	FN901	RN900	RN902	LN900	LN901	LN902	MF800	MF1000	MMF600	MMF800
650 series	FN650	8-65F	8-90ND				8-65F	8-90ND				8-65F	8-90ND					
	RN650	8-65ND	8-90DT				8-65ND	8-90DT				8-65T	8-90DT					
	RN651	8-65T	8-90DS				8-65T	8-90DS				8-65S	8-90DS					
	RN652	8-65DT						8-65DT	8-90R ^{Note}									
	LN650	8-65S						8-65S	8-90M ^{Note}									
	LN651	8-65DS						8-65DS										
900 series	FN900							8-65F	8-90ND				8-65F	8-90ND				
	FN901	8-65F	8-90ND				8-65F	8-90ND				8-65F	8-90ND					
	RN900	8-65ND	8-90DT				8-65ND	8-90DT				8-65T	8-90DT					
	RN902	8-65T	8-90DS				8-65T	8-90DS				8-65S	8-90DS					
	LN900	8-65DT	8-90R ^{Note}				8-65DT	8-90R ^{Note}				8-90R ^{Note}						
	LN901	8-65S	8-90M ^{Note}				8-65S	8-90M ^{Note}				8-90M ^{Note}						
	LN902	8-65DS						8-65DS										
	MF800							8-90ND	8-90R ^{Note}				8-65F	8-90ND				
	MF1000	8-65F	8-90ND				8-90DT	8-90M ^{Note}				8-65T	8-90DT					
	MMF600	8-65T	8-90R ^{Note}				8-90DS					8-65S	8-90DS					
MMF800	8-65S	8-90M ^{Note}				8-90DS						8-65S	8-90DS					

Note: Only for RN900 and RN902. For connection with RN900 or RN902, modules other than 8-90R and 8-90M cannot be used. These also cannot be used to connect modules other than RN900 and RN902 to each other.

List of Module Adapter Types

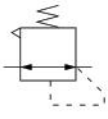
For 650, 900 series

Module and adapter	F module	D module	T module	
	F	ND	T	DT
Body size	 (For modules only)	 (Brackets for combined use)	 (Branch piping)	 (Brackets for combined use with branch piping)
65 (650 series)	8-65F	8-65ND	8-65T	8-65DT
90 (900 series)		8-90ND		8-90DT
Modules and adapters	R module	M module	S adapter	
	R	M	S	DS
Body size	 (For regulator only)	 (For supporting regulator piping only)	 (Port connection)	 (Brackets for combined use with piping connection)
65 (650 series)	—	—	8-65S	8-65DS
90 (900 series)	8-90R	8-90M		8-90DS

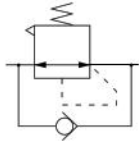
REGULATORS

RN650, RN651, RN652, RN900, RN902

Symbols



- Standard specification
- Low pressure specification



- Built-in check valve specification



Specifications

Item	Series		650 series			900 series	
	Type	Model	Standard	Low pressure	Built-in check mechanism	Standard	Built-in check mechanism
			RN650	RN651	RN652	RN900	RN902
Media	Air or non-corrosive gas						
Port size	Rc	3/4, 1					
Pressure setting range	MPa [psi.]	0.05~0.83 [7~120]	0.05~0.25 [7~36]	0.05~0.83 [7~120]			
Max. operating pressure	MPa [psi.]	0.97 [141]					
Proof pressure	MPa [psi.]	1.47 [213]					
Operating temperature range	°C [°F]	5~60 [41~140]					
Pressure gauge connection port	Rc	1/4 (2 places)					
Construction		Relieving type					
Max. processed flow rate ^{Note}	ℓ/min [ft ³ /min] (ANR)	2500 [88]	1500 [53]	2500 [88]	8000 [282]		
Lubrication		Not required					
Mass	kg [lb.]	0.53 [1.17]			1.26 [2.78]		
Materials	Body	Aluminum die-casting					
	Bonnet	Polyacetal			Aluminum die-casting		
	Knob	ABS			PBT		
	Diaphragm	Synthetic rubber with layer cloth					
Standard attachments	Bracket	Standard attachments					
	Mounting ring	Standard attachments					
Embedded pressure gauge	Pressure indicator range	MPa [psi.] 1 [145]					
	Max. operating pressure	MPa [psi.] 0.95 [138]					
	Operating temperature range	°C [°F] 5~60 [41~140]					
	Materials	Bourdon tube	Brass tube				
Cover (case)		PPS					
Digital pressure gauge with built-in sensor	Rated pressure range	MPa [psi.] 0~1.000 [0~145]					
	Setting pressure range	MPa [psi.] 0~1.000 [0~145]					
	Materials	Case ABS					

Note: This is the maximum processed flow rate when the air primary pressure is 0.69MPa [100psi.] and the secondary setting pressure is 0.5MPa [73psi.].

Order Codes

RN — — — — — —

Regulator

Body model

Port size

Non-ion specification

Blank — Standard specification

NCU — Non-ion specification

Bracket specification^{Note3}

Blank — Mounting bracket

BR — Bracket module (only for 900 series)

BM — Module for supporting piping (only for 900 series)

Pressure gauge specification

Blank — No pressure gauge

G1A — 1MPa [145psi.] specification, ϕ 40 pressure gauge^{Note1}

G1B — 1MPa [145psi.] specification, \square 30 Embedded pressure gauge (only for 900 series)^{Note2}

G3 — 0.3MPa [44psi.] specification, ϕ 40 pressure gauge (only for 650 series)^{Note1}

GS1A — 1MPa [145psi.] specification, \square 50 Pressure gauge with built-in switch, lead wire type for DC24V^{Note1}

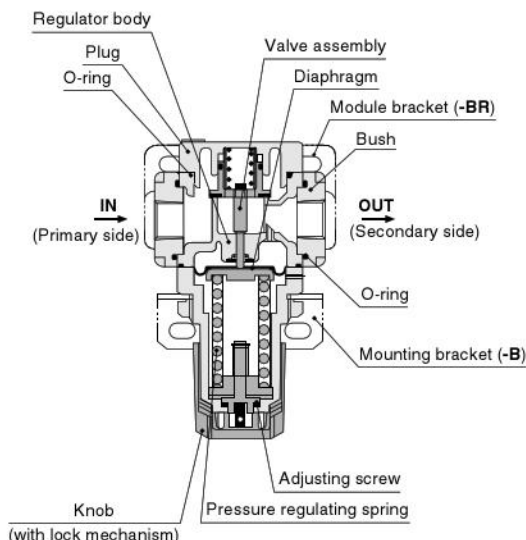
GS1B — 1MPa [145psi.] specification, \square 50 Pressure gauge with built-in switch, lead wire type for AC100V, AC200V^{Note1}

GS1C — 1MPa [145psi.] specification, \square 50 Pressure gauge with built-in switch, with DIN connector for DC24V^{Note1}

GS1D — 1MPa [145psi.] specification, \square 50 Pressure gauge with built-in switch, with DIN connector for AC100V, AC200V^{Note1}

GS2 — 1MPa [145psi.] specification, \square 30 Digital pressure gauge with built-in sensor, (only for 900 series)^{Note2}

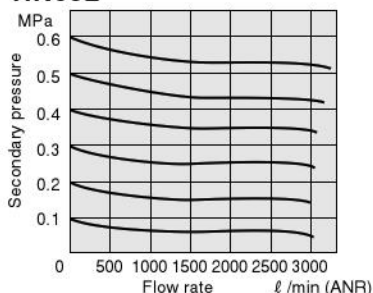
Notes: 1. For the specifications, order codes, and dimensions of the pressure gauge and the pressure gauge with built-in switch, see p.172 and 183.
2. If a non-ion specification is selected, note that **-G1B** and **-GS2** cannot be selected.
3. For the bracket and module order codes and specifications, see p.147~152.



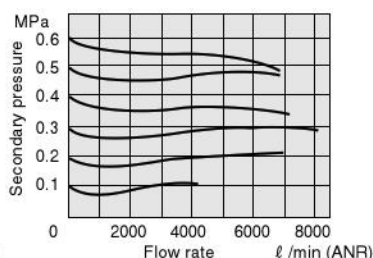
Flow Rate Characteristics

● Standard and built-in check mechanism specifications

**RN650
RN652**

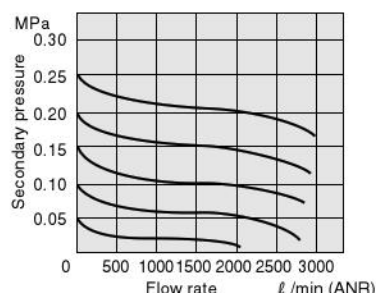


**RN900
RN902**



● Low pressure specification

RN651

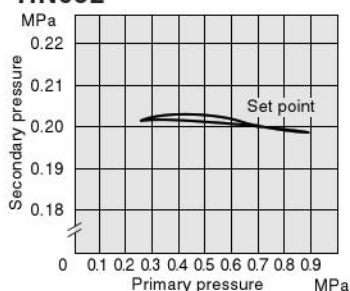


Pressure Characteristics

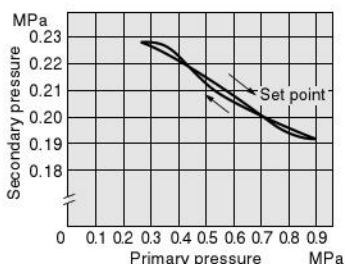
Remark: Graphs show flow rate characteristics when the primary pressure is at 0.7MPa [102psi]. 1 l/min = 0.0353ft³/min.

● Standard and built-in check mechanism specifications

**RN650
RN652**

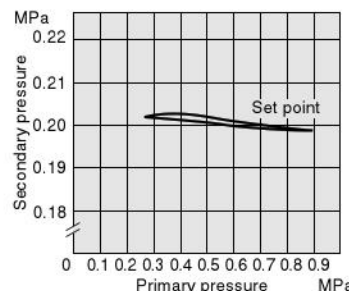


**RN900
RN902**



● Low pressure specification

RN651



1MPa = 145psi.

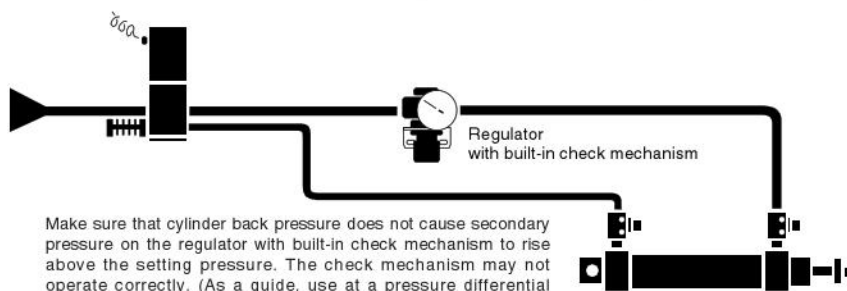
System Upgrade Using a Regulator with Built-in Check Mechanism

The regulator with built-in check mechanism is equipped with a built-in check valve that opens up when the primary pressure falls off, causing the pressure balance to collapse and simultaneously opening up the main valve to relieve the secondary pressure to the primary side.

Changing push side and pull side thrust

The thrust on an air cylinder's push side and pull side can be changed easily. Cylinders can be operated at low pressure on the side where thrust is not required, allowing reduction of air consumption.

Example: More thrust on push side, less thrust on pull side
Push side air pressure: 0.5MPa
Pull side air pressure: 0.3MPa

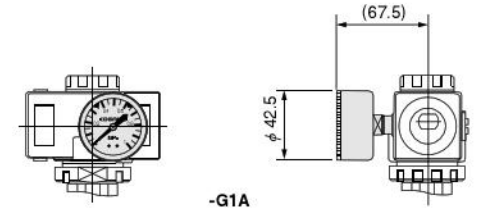
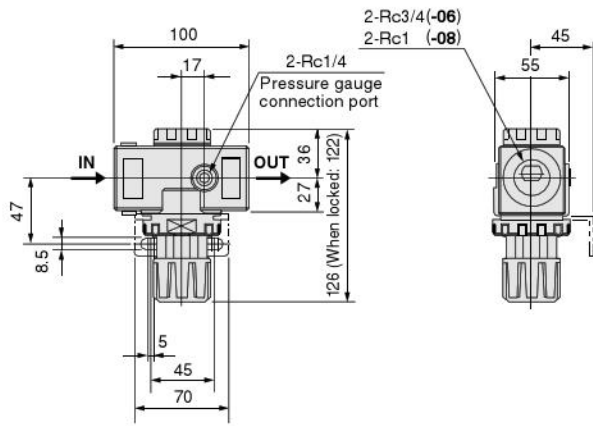


Make sure that cylinder back pressure does not cause secondary pressure on the regulator with built-in check mechanism to rise above the setting pressure. The check mechanism may not operate correctly. (As a guide, use a pressure differential between the push and pull sides of 0.3MPa or less.)

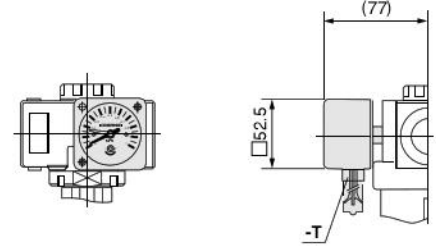
Dimensions of Regulators (mm)

- RN650
- RN651
- RN652

● Optional pressure gauges  RN650



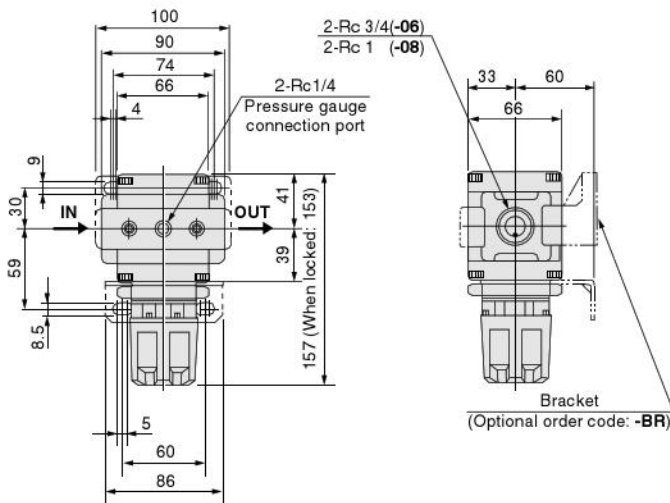
-G1A
-G3



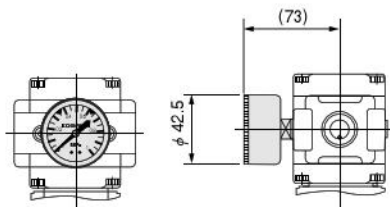
-GS1□

- RN900
- RN902

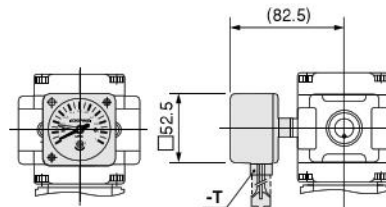
 RN900



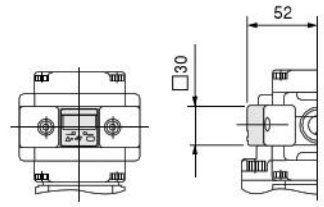
● Optional pressure gauges



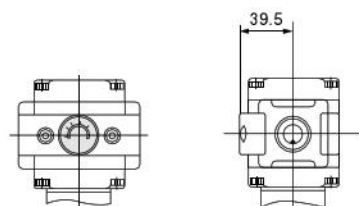
-G1A



-GS1A□

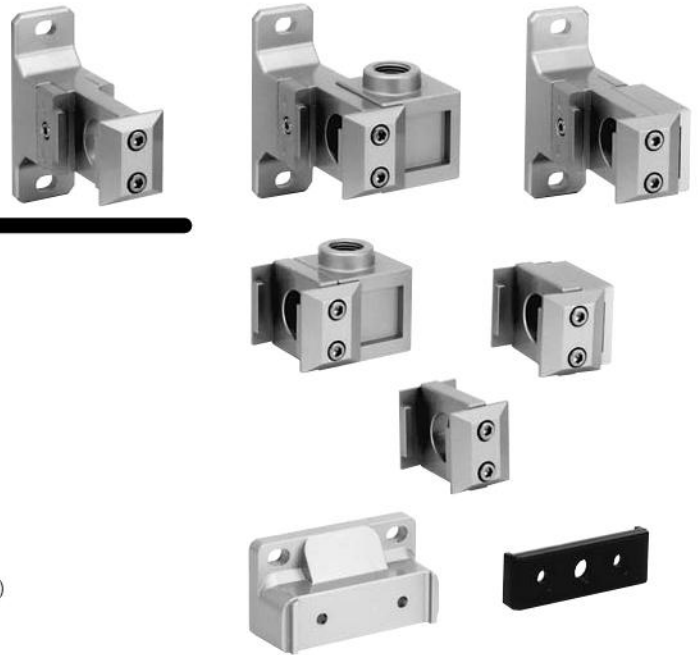


-GS2

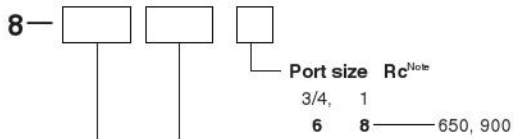


-G1B

MODULES AND ADAPTERS



Order Codes



Module and adapter









- F — F module
- ND — D module for bracket-combined use
- T — T module
- DT — T module for bracket-combined use
- R — R module (For regulator only)
- M — Piping supporting type M module (For regulator only)
- S — S adapter
- DS — S adapter module

Body size

- 65 — For 650 series
- 90 — For 900 series

Note: Port size selection is not allowed for F module (F), D module for bracket-combined use (ND), R module (R), and piping supporting type M module (M).

Model List

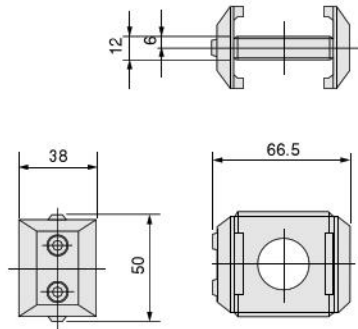
Modules and adapters	F module	D module	T module	
	F	ND	T	DT
Body size	 (For modules only)	 (Brackets for combined use)	 (Branch piping)	 (Brackets for combined use with branch piping)
65	8-65F ● Applicable model FN650 RN650, RN651, RN652 LN650, LN651 FN900, FN901 LN900, LN901, LN902	8-65ND ● Applicable model CN650, CY650, CN750 FN650 RN650, RN651, RN652 LN650, LN651 FN900, FN901, LN900, LN901, LN902	8-65T ● Applicable model FN650 RN650, RN651, RN652 LN650, LN651 FN900, FN901 LN900, LN901, LN902	8-65DT ● Applicable model FN650 RN650, RN651, RN652 LN650, LN651 FN900, FN901 LN900, LN901, LN902
90		8-90ND ● Applicable model CZ650 MF800, MF1000 MMF600, MMF800		8-90DT ● Applicable model MF800, MF1000 MMF600, MMF800
Modules and adapters	R module	M module	S adapter	
	R	M	S	DS
Body size	 (For regulator only)	 (For supporting regulator piping only)	 (Port connection)	 (Brackets for combined use with piping connection)
65	—	—	8-65S ● Applicable model FN650 RN650, RN651, RN652 LN650, LN651 FN900, FN901 LN900, LN901, LN902	8-65DS ● Applicable model FN650 RN650, RN651, RN652 LN650, LN651 FN900, FN901 LN900, LN901, LN902
90	8-90R ● Applicable model CN900 CY900 CZ900 RN900, RN902	8-90M ● Applicable model RN900, RN902		8-90DS ● Applicable model MF800, MF1000 MMF600, MMF800

Remark: The applicable models shown in the tables are typical examples. For details, see p.125.

Dimensions of F Module (mm)

● 8-65F

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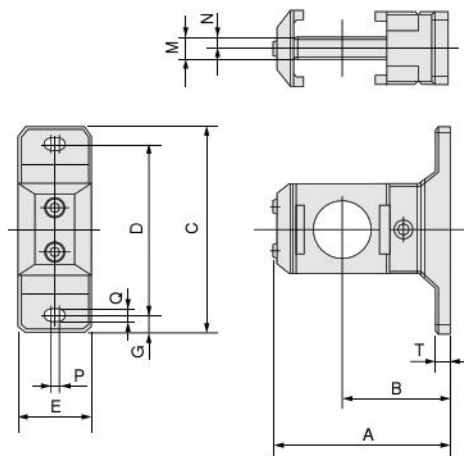
F.R.L. LARGE FLOW SERIES

Dimensions of D Module for Bracket-combined Use (mm)

● 8-65ND

● 8-90ND

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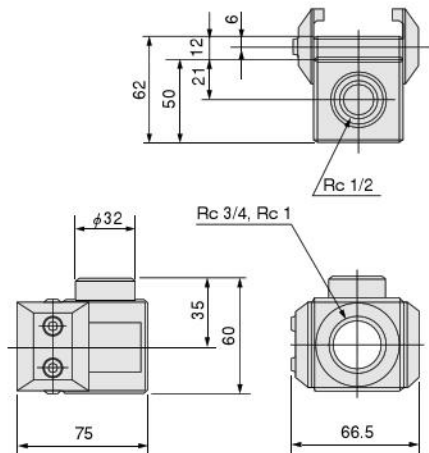


Model	A	B	C	D	E	G	M	N	P	Q	T
8-65ND	94	60	110	90	38	10	12	6	4	9	8
8-90ND	111	77	110	90	38	10	12	6	4	9	7

Dimensions of T Module (mm)

● 8-65T

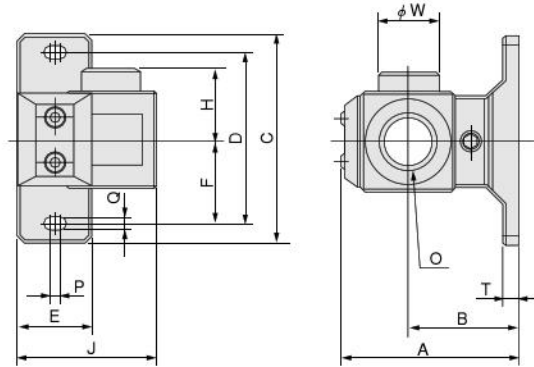
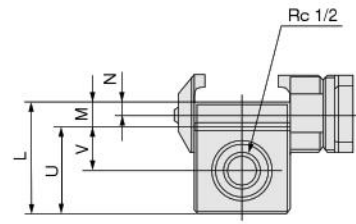
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Dimensions of T Module for Bracket-combined Use (mm)

- 8-65DT
- 8-90DT

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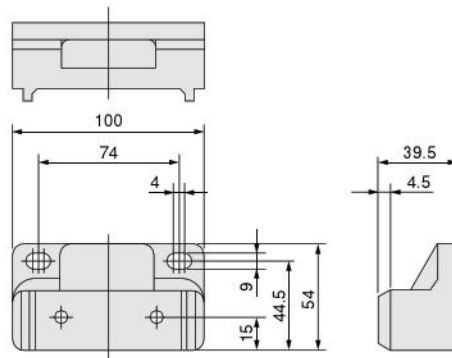


Model	A	B	C	D	E	F	H	J	L	M	N	O	P	Q	T	U	V	φW
8-65DT	94	60	110	90	38	45	35	75	62	12	6	Rc3/4 Rc1	4	9	8	50	21	32
8-90DT	111	77	110	90	38	45	35	75	62	12	6	Rc3/4 Rc1	4	9	7	50	21	32

Dimensions of R Module (For Regulator Only) (mm)

- 8-90R

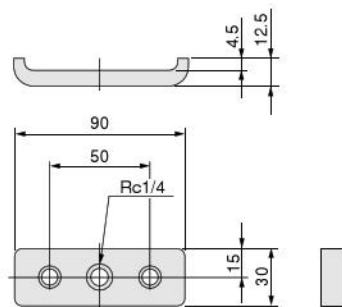
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Dimensions of Piping Supporting Type M Module (mm)

- 8-90M

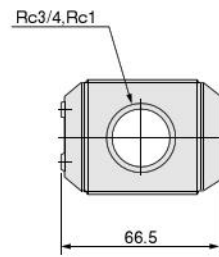
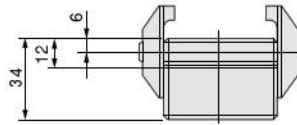
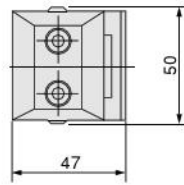
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Dimensions of S Adapter (mm)

● 8-65S

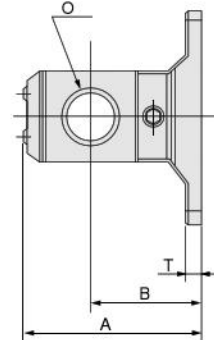
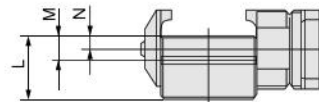
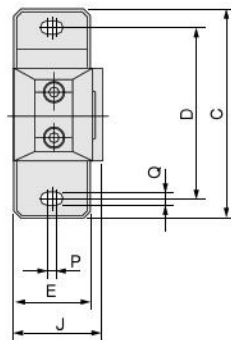
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Dimensions of S Adapter Module (mm)

● 8-65DS
● 8-90DS

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Model	A	B	C	D	E	J	L	M	N	O	P	Q	T
8-65DS	94	60	110	90	38	47	34	12	6	Rc3/4 Rc1	4	9	8
8-90DS	111	77	110	90	38	47	34	12	6	Rc3/4 Rc1	4	9	7

BRACKETS



Bracket Models and Applicable Component

Component type		Bracket model	Remark
Air filters	FN650	8-65B ^{Note}	Piping supporting type, optional
	FN900	8-90A	Body supporting type, optional
Mist filters	MF800	8-80A	Body supporting type, optional
	MF1000		
Micro mist filters	MMF600	8-80A	Body supporting type, optional
	MMF800		
Regulators	RN650	8-65	Standard
	RN900	8-90	
Lubricators	LN650	8-65B ^{Note}	Piping supporting type, optional
	LN900	8-90A	Body supporting type, optional

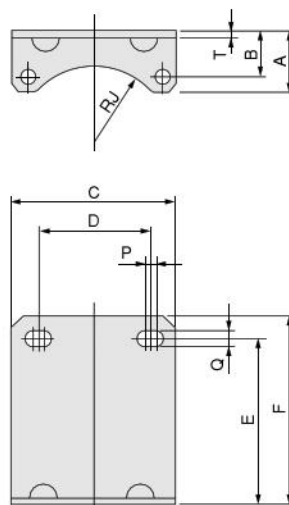
Note: Pipe supporting type brackets (8-65B) are sold in a set of two brackets.

Dimensions of Brackets (mm)

■ For air filters, mist filters, micro mist filters, and lubricators

● 8-80A

● 8-90A



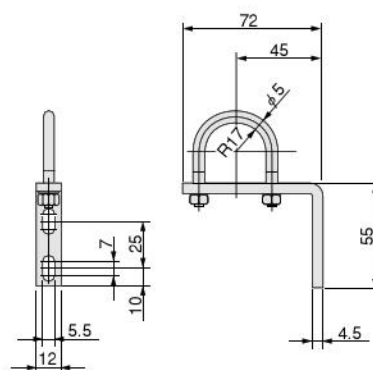
Model	A	B	C	D	E	F	RJ	P	Q	T	Applicable model
8-80A	50	32	108	80	70	80	47	5	8.5	3.2	MF800, MF1000, MMF600, MMF800
8-90A	31	23	88	62	90	100	42	5	8.5	3.2	FN900, FN901, LN900, LN901, LN902

■ For air filters and lubricators

● 8-65B Note



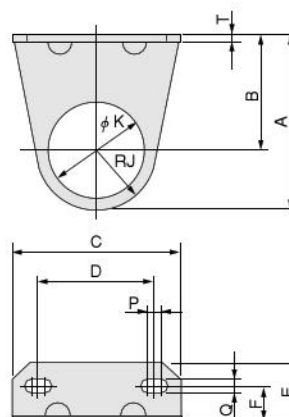
Note: Pipe supporting type brackets (8-65B) are sold in a set of two brackets.



■ For regulators

● 8-65

● 8-90



Model	A	B	C	D	E	F	RJ	ϕK	P	Q	T	Applicable model
8-65	72.5	45	70	45	30	20	27.5	45	5	8.5	3.2	RN650, RN651, RN652
8-90	91	60	86	60	30	20	31	52.5	5	8.5	3.2	RN900, RN902

Handling Instructions and Precautions



F.R.L. Combinations

Installation location

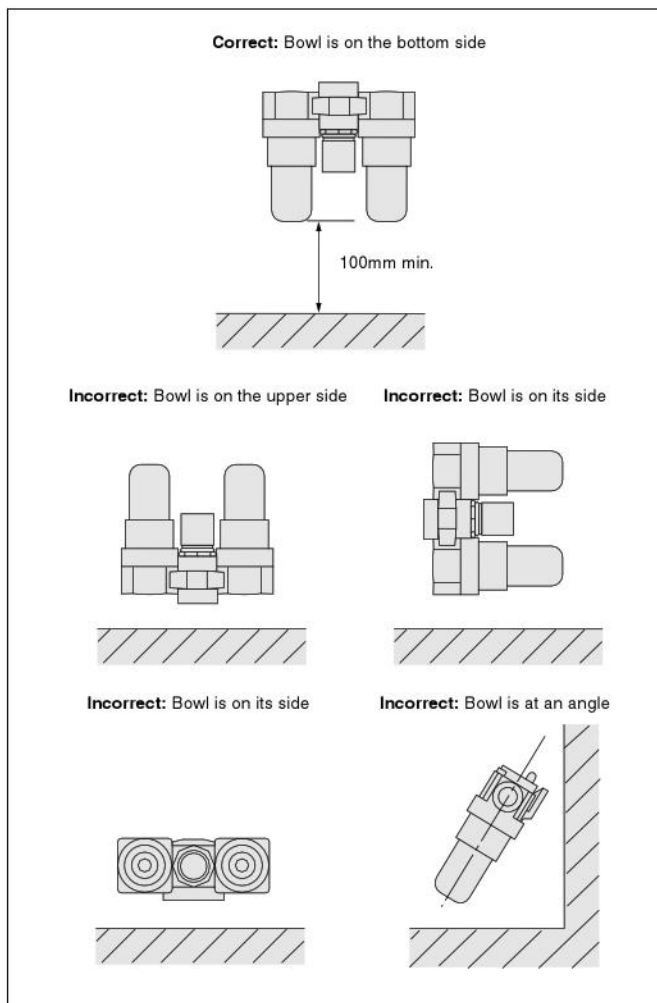
1. Install in locations where the ambient temperature is between 5 ~ 60°C [41 ~ 140°F].
2. The product cannot be used when the media or the ambient atmosphere contains any of the substances listed below.
Organic solvents, phosphate ester type hydraulic oil, sulphur dioxide, chlorine gas, acids, or alkali, etc.
3. Avoid installation in locations subject to vibrations greater than 9.8m/s² [1G].

Mounting method

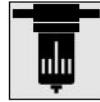
Mount in a vertical position, with the piping connections on the top and the bowl on the bottom.

(If using regulators as single units, any mounting direction is acceptable.)

Leave enough space underneath the bowl to allow easy access for draining collected liquid, and replacement of the filter element.



- Notes:
1. Do not perform any machining on the body of the unit before or during mounting work. Its functions could be damaged.
 2. Use air for the media.
 3. Do not allow operating pressure to exceed a maximum of 0.97MPa [141psi].
 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.



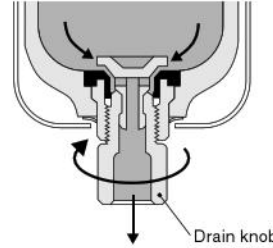
Air Filter and Lubricator

Drain cock

● Screw type

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

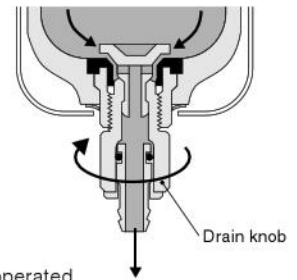
Rotating the drain knob to the left opens the drain port, and the collected liquid is expelled.



● With fitting

(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.

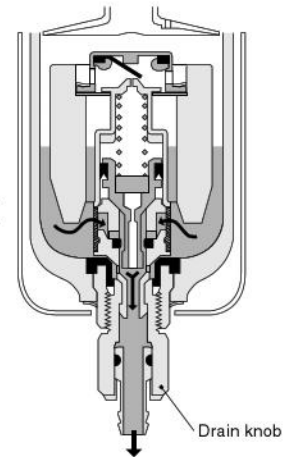


Caution: The drain knob should be operated using fingertips.

● Auto drain type

(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.



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.)
2. The drain knob should be operated using fingertips.
3. If attaching a tube to the fitting, use a nylon tube with inner diameter of 6mm [0.236in.]. Do not let the tube bend in the area near the fitting connection.
4. 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.

When placing orders for replacement of pressure gauges, see the table below.

Model	Optional order code	Sold separately	Module sold separately
650 750	G1A	G1-40	—
	GS1A	GS1-50-DL	
	GS1B	GS1-50-AL	
	GS1C	GS1-50-DL-T	
900	GS1D	GS1-50-AL-T	8-90M (with bolt)
	G1A	G1-40	
	GS1A	GS1-50-DL	
	GS1B	GS1-50-AL	
	GS1C	GS1-50-DL-T	
	GS1D	GSS1-50-AL-T	

Remark: If switching between G1A and GS1□, module (8-90M) is not required.