FRZ Series

With moisture and
fluid removal functions

FRZB Filter Regulator

Easy-to-use moisture and fluid removal functions in a compact design!

Specialized **30 series**
for standalone applications

FRZB30

The **40 and 50 series**
can be used in combinations

FRZB40

FRZB50

Downsizing
Improved flow rate characteristics allow a smaller configuration (close side-by-side spacing possible).

Improved operability and maintainability
Handle operability improved and bowl is easy to attach/remove.

Pressure gauge, pressure switch
Compatible with □30 [1.181] integrated pressure gauge, other types of pressure gauges, and pressure switches.

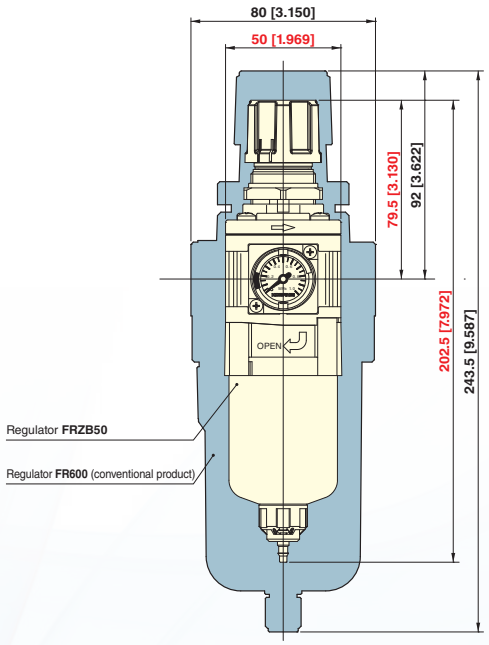
Compatible in a wide range of environments
Specifications for ozone resistance, NCU specifications (copper free) Note compatible as standard.
Note: Excluding pressure switch and pressure gauge options.

CAUTION Read the safety precautions on page 9 before using this product.

Compact design

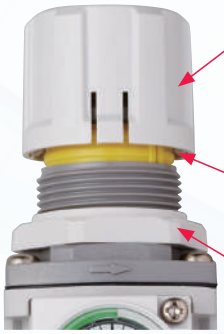
Improved flow rate characteristics allow a smaller configuration.

* Comparison between our filter regulators **FR600** and **FRZB50**.



Improved handle operability

- The shape and size of the easy-to-operate handle make it light and smooth to turn. In addition, improving the resolution of the handle lock has reduced fluctuations in the set pressure when the handle is locked.
- The caution ring (yellow) allows you to check the state of the handle's lock as it is released.



Handle
The handle can be removed by using the mounting ring. This is useful for preventing the handle from being operated.

Yellow caution ring
Exposed as handle is unlocked

Mounting ring

Drain cock specifications

Drain cock with fitting or auto drain types can be selected for the drain cock specifications.

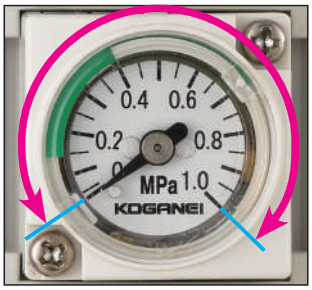
Auto drain type
NO (Normally open)
NC (Normally closed)

Drain cock with fitting

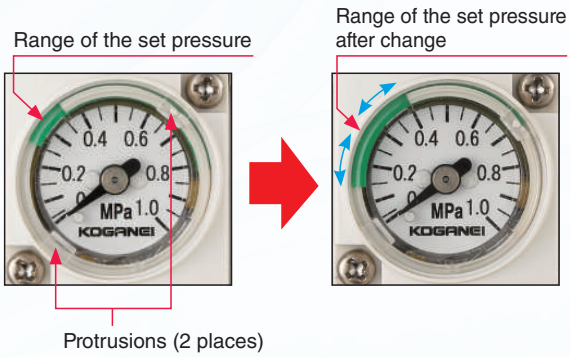
□30 [1.181] integrated pressure gauge

- □30 [1.181] integrated pressure gauge is compact with minimal protrusions. Plus, the easy-to-read display angle of 270° improves visibility.

Swing angle 270°



- The set pressure range (green area) can be changed as desired. The upper and lower limits of the setting range can be freely changed without removing the front cover (transparent resin part) or using tools.



By rotating the protrusions (two locations) clockwise or counterclockwise, the display of the set pressure range can be changed as desired.

* Other pressure gauges and pressure switches are also available.
For details, see the next page.

Bowl guard (option)

Bowl guard option is available.

Pressure gauge, pressure switch

Various pressure gauges and pressure switches can be selected in addition to the □30 [1.181] integrated pressure gauge.

ϕ40 [1.575] pressure gauge
(1 MPa [145 psi] specifications)

ϕ40 [1.575] pressure gauge
(0.3 MPa [44 psi] specifications)

ϕ40 [1.575] stainless steel
bourdon tube pressure gauge
(1 MPa [145 psi] specifications)

ϕ40 [1.575] stainless steel
bourdon tube pressure gauge
(0.3 MPa [44 psi] specifications)

Digital pressure switch
GS620
(1 MPa [145 psi] specifications)

Pressure gauge with
built-in switch
(1 MPa [145 psi] specifications)

Bracket

The brackets can be used with all sizes of the FRZB filter regulators.
Also, brackets can be used with the iB-Cyclone and others in the FRZ series.

Panel mount installation

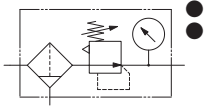
The hole diameter for a panel mount is standardized at 28.5 mm [1.122 in.] for all sizes of the FRZB filter regulators.

Note: There are restrictions on the installation (mounting) orientation of the FRZB filter regulator.

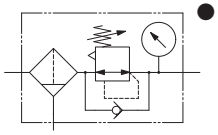
Filter regulator

FRZB30·FRZB31·FRZB32
FRZB40·FRZB41
FRZB50·FRZB51

Symbols



● Standard
● For low pressure



● Built-in check mechanism

Specifications

Item \ Model		FRZB30	FRZB40	FRZB50
	Standard	FRZB30	FRZB40	FRZB50
	For low pressure	FRZB31	FRZB41	FRZB51
	Built-in check mechanism	FRZB32	-	-
Media		Air		
Port size		M5×0.8, Rc1/8, Rc1/4	Rc1/8, Rc1/4, Rc3/8	Rc1/4, Rc3/8, Rc1/2
Maximum operating pressure	MPa [psi]	1.0 [145]		
Proof pressure	MPa [psi]	1.5 [218]		
Operating temperature range (atmospheric and medium)	°C [°F]	5 to 60 [41 to 140] (non-condensation)		
Filtration	μm	5		
Pressure regulating system		Direct acting/relief type	Internal pilot/relief type	
Set pressure range MPa [psi]	Standard/Built-in check mechanism	0.05 to 0.85 [7 to 123]		
	For low pressure	0.05 to 0.40 [7 to 58]		
Relief starting pressure	MPa [psi]	Set pressure +0.05 [7] or less		
Water collection volume (for **-N**)	mℓ [in³]	13 [0.793]	16 [0.976]	27 [1.648]
Major Parts and Materials	Main unit	Die cast aluminum alloy		
	Bonnet & adapter	Polyacetal		
	Diaphragm	Base fabric + synthetic rubber		
	Bowl	PC (polycarbonate)/PCT (Polycyclohexylene-dimethylene terephthalate) Note 3		
	Filter element	Nonwoven fabrics		
	Bracket	Steel plate (electroless nickel plated)		
Weight (for standard specifications and maximum port size)	kg [lb]	0.20 [0.441] (0.21 [0.463]) Note 4	0.24 [0.529] (0.25 [0.551]) Note 4	0.33 [0.728] (0.34 [0.750]) Note 4
Standard equipment		Mounting ring		
Options Note 1, Note 2		Auto drain (NO and NC), bowl guard (plastic and combined) □30 [1.181] integrated pressure gauge (combined), various other pressure gauges (included parts), bracket (included parts)		

Note 1: If auto drain is selected as an option, ensure that the supply pressure is above 0.15 MPa [22 psi] (supply pressure is necessary for auto drain operations).
2: See page 151 and onward for individual product specifications or the order code column for details about each option.
3: Use a PCT resin bowl when using products in a location with a poor atmosphere (places with a risk of exposure to cutting oil, machine oil, etc.).
4: Weights in ( ) parentheses are the weights with a bowl.

Remarks: **FRZB4**□ and **FRZB5**□ are internal pilot types, so the secondary side consumes a small amount of air to adjust pressure.

Order Codes

FRZB □ — □ — □ — □ — □ — □ — □

FRZB Filter Regulator

Main unit / Port size

Model	M5	Rc1/8	Rc1/4	Rc3/8	Rc1/2	
30	M5	01	02			Standard
40		01	02	03		Standard
50			02	03	04	Standard
31	M5	01	02			For low pressure
41		01	02	03		For low pressure
51			02	03	04	For low pressure
32	M5	01	02			Built-in check mechanism

Bowl specifications
Blank — Standard specifications (polycarbonate)
P — PCT resin bowl Note
Note: Use a PCT resin bowl when using products in a location with a poor atmosphere (places with a risk of exposure to cutting oil, machine oil, etc.).

Bowl guard specifications
Blank — No bowl guard
PG — With bowl guard

Drain cock specifications
A — Auto drain type drain cock NO type
C — Auto drain type drain cock NC type
N — Drain cock with fitting

Bracket
Blank — No bracket
B — With bracket

Pressure gauge specifications
Blank — No pressure gauge (with pressure gauge connection port, Rc1/4)
GP1 — No pressure gauge (with pressure gauge connection port, Rc1/8)
GN — No pressure gauge (no pressure gauge connection port)
G1C — 1 MPa [145 psi] specifications, □30 [1.181] integrated pressure gauge
G4C — 0.4 MPa [58 psi] specifications, □30 [1.181] integrated pressure gauge
G1 — 1 MPa [145 psi] specifications, ϕ40 [1.575] pressure gauge
G3 — 0.3 MPa [44 psi] specifications, ϕ40 [1.575] pressure gauge
G1S — 1 MPa [145 psi] specifications, ϕ40 [1.575] stainless steel bourdon tube pressure gauge
G3S — 0.3 MPa [44 psi] specifications, ϕ40 [1.575] stainless steel bourdon tube pressure gauge
GS6 — 1 MPa [145 psi] specifications, digital pressure switch
GS1A — 1 MPa [145 psi] specifications □50 [1.969] pressure gauge with built-in switch Lead wire system for 24 VDC
GS1B — 1 MPa [145 psi] specifications □50 [1.969] pressure gauge with built-in switch Lead wire system for 100 VAC, 200 VAC
GS1C — 1 MPa [145 psi] specifications □50 [1.969] pressure gauge with built-in switch With DIN type connector for 24 VDC
GS1D — 1 MPa [145 psi] specifications □50 [1.969] pressure gauge with built-in switch With DIN type connector for 100 VAC, 200 VAC

Note: For specifications of pressure gauges, digital pressure switches, and pressure gauges with switches built in, order codes for individual purchases, and dimensions, see pages 154 to 161.

Order Codes

● Order codes for brackets only

8Z-BK

* Compatible brackets (to replace multi-series **FR15□·FR30□·FR60□** filter regulators)

* For details, refer to pages 151 to 153.

8Z-BK□

Body size
30 —— **FR15□** → replaced by **FRZB3□**
40 —— **FR30□** → replaced by **FRZB4□**
50 —— **FR60□** → replaced by **FRZB5□**

● Maintenance parts

● Bowl assembly

BA-FRZB□-□-□-□

Bowl specifications
Blank —— Standard specifications (polycarbonate)
P ——— PCT resin bowl

Body size
30 —— for **FRZB3□**
40 —— for **FRZB4□**
50 —— for **FRZB5□**

Drain cock specifications
A —— NO type auto drain drain cock
C —— NC type auto drain drain cock
N —— Drain cock with fitting

Auto drain type
NO type
NC type

With fitting
Drain cock

Bowl guard specifications
Blank —— No bowl guard
PG —— With bowl guard

With bowl guard

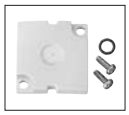
● Element

E-□ZB

Body size
30 — for **FRZB3□**
40 — for **FRZB4□**
50 — for **FRZB5□**

● Pressure port plate

P-FRZ (no pressure gauge connection port)



With 1 O-ring and
2 small screws

GP-FRZ□ (with pressure gauge connection port)

Port size
Blank —— Rc1/4
1 —— Rc1/8

With 1 O-ring and
2 small screws

● Seal kit (various O-rings, 1 valve assembly, 1 diaphragm assembly)

SRK-FRZ□

Body size
30 —— for **FRZ3□**
40 —— for **FRZ4□**
50 —— for **FRZ5□**

Refer to "Replacing the seal kit, element, and bowl assembly" on page 115 regarding the component parts of the seal kits.

● Handle

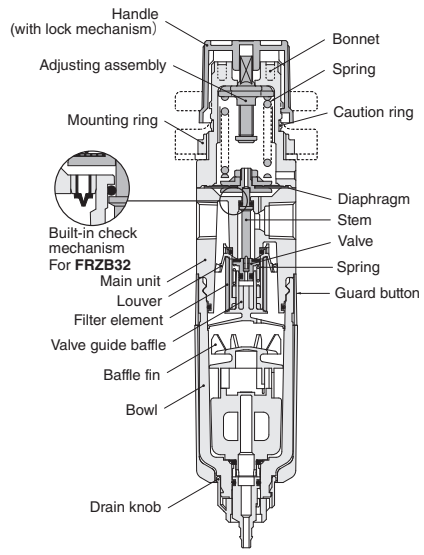
H-FRZ

● Mounting ring

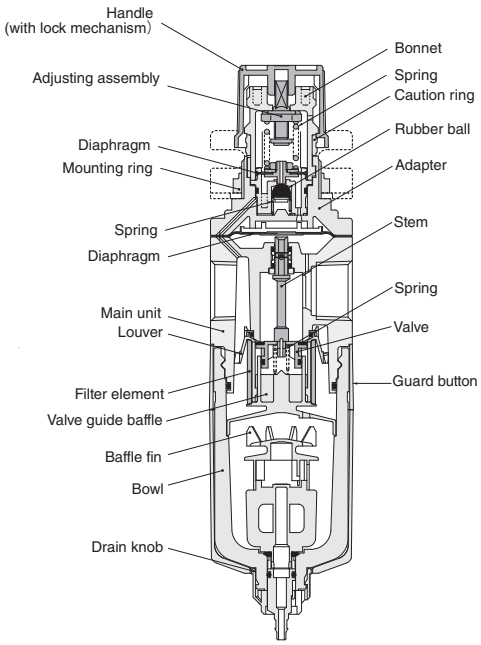
R-FRZ

Inner construction

FRZB3□



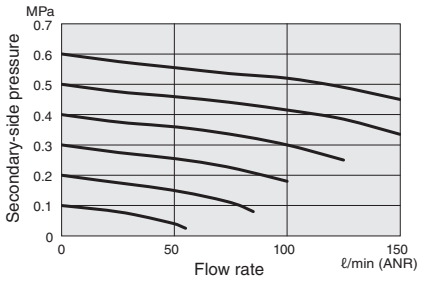
FRZB4□·FRZB5□



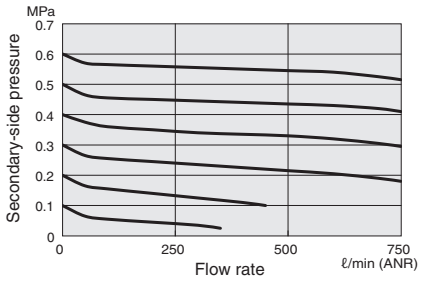
Flow rate characteristics

● Standard/Built-in check mechanism

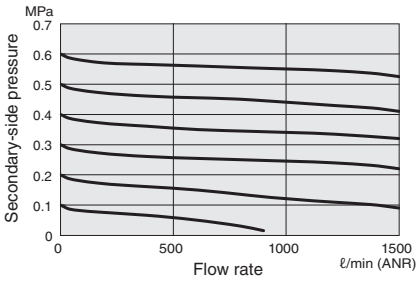
FRZB30-M5
FRZB32-M5



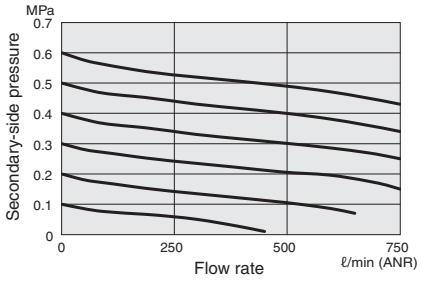
FRZB40-01



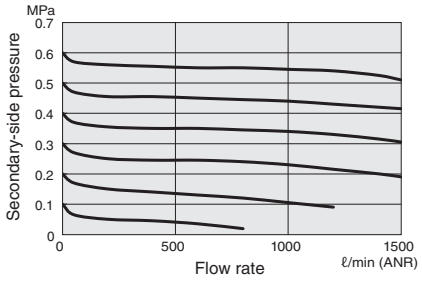
FRZB50-02



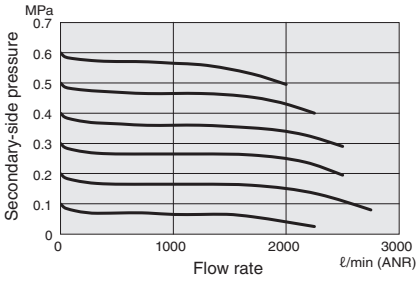
FRZB30-01
FRZB32-01



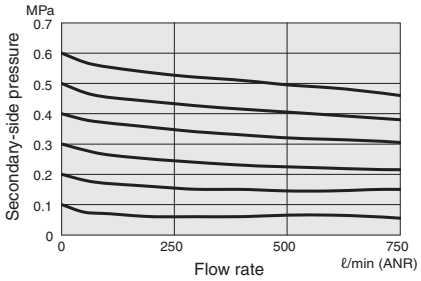
FRZB40-02



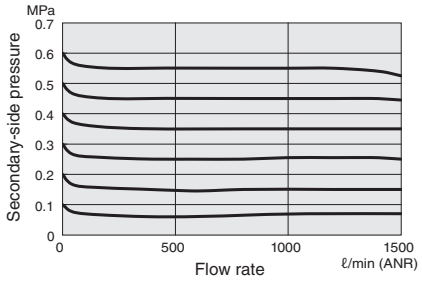
FRZB50-03



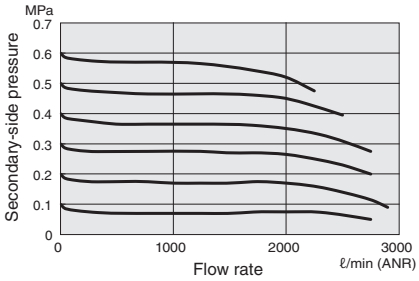
FRZB30-02
FRZB32-02



FRZB40-03



FRZB50-04

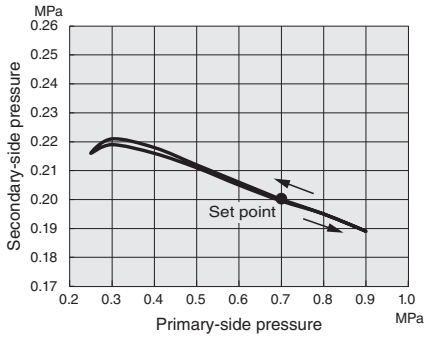


Remarks: Graphs show flow rate characteristics at constant primary-side pressure of 0.7 MPa [102 psi].

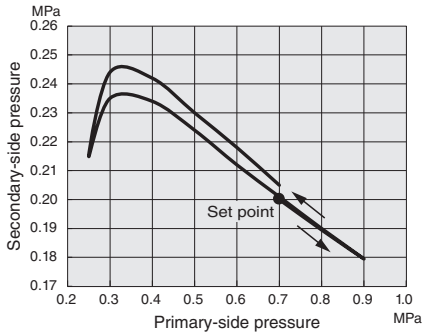
Pressure characteristics

● Standard/Built-in check mechanism

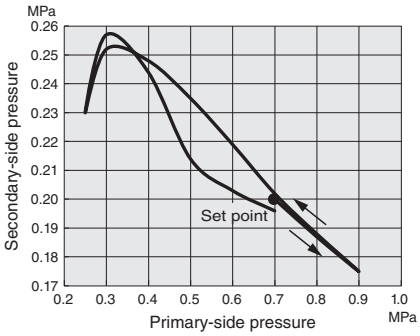
FRZB30
FRZB32



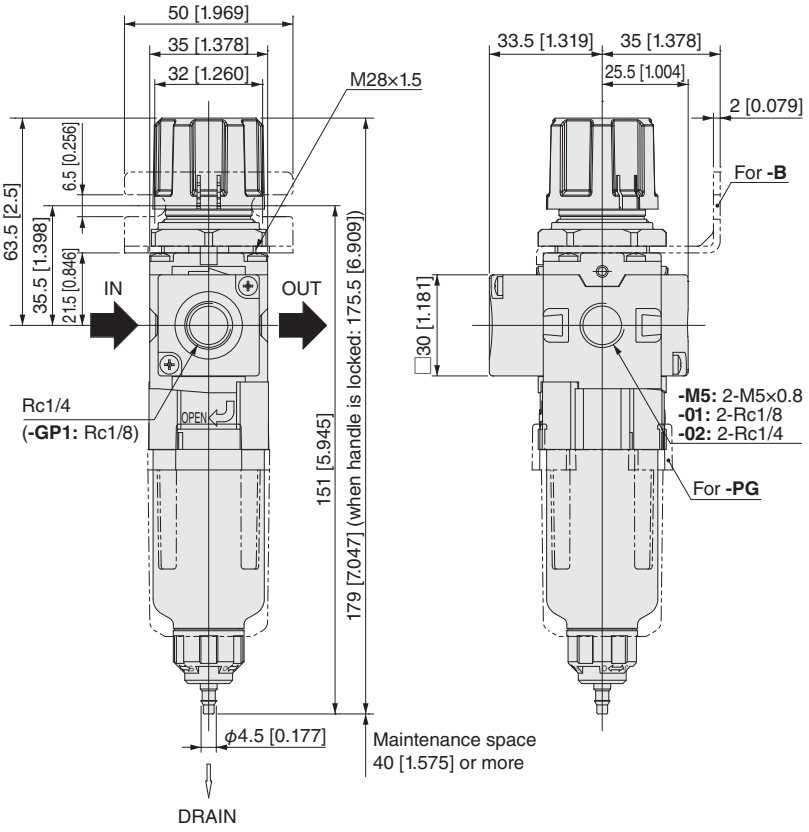
FRZB40



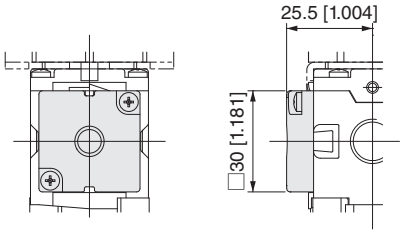
FRZB50



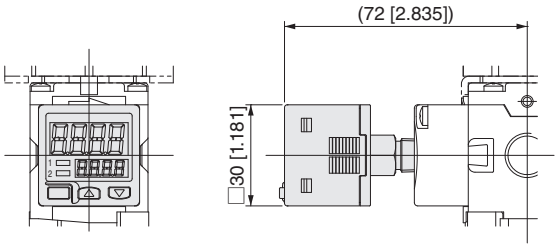
● **FRZB30**
● **FRZB31**
● **FRZB32**



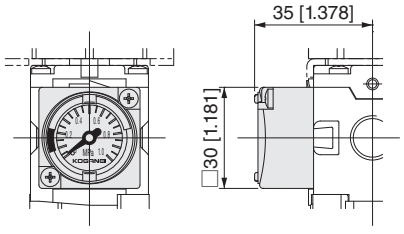
● Pressure gauge option



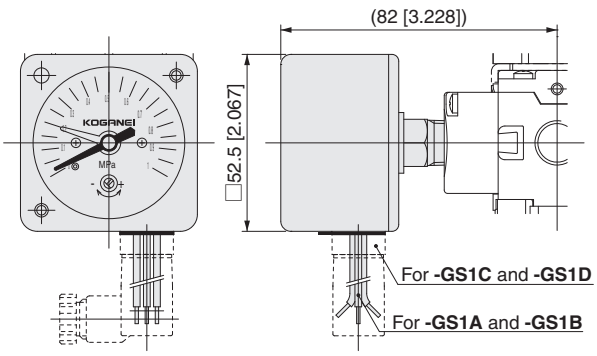
For **-GN**



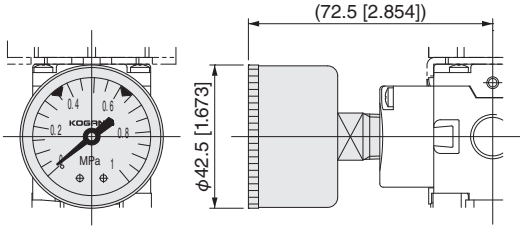
For **-GS6**



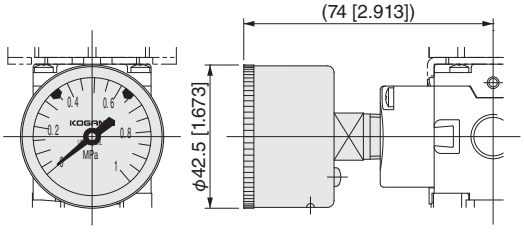
For **-G1C**, **-G4C**



For **-GS1A**, **-GS1B**, **-GS1C** and **-GS1D**

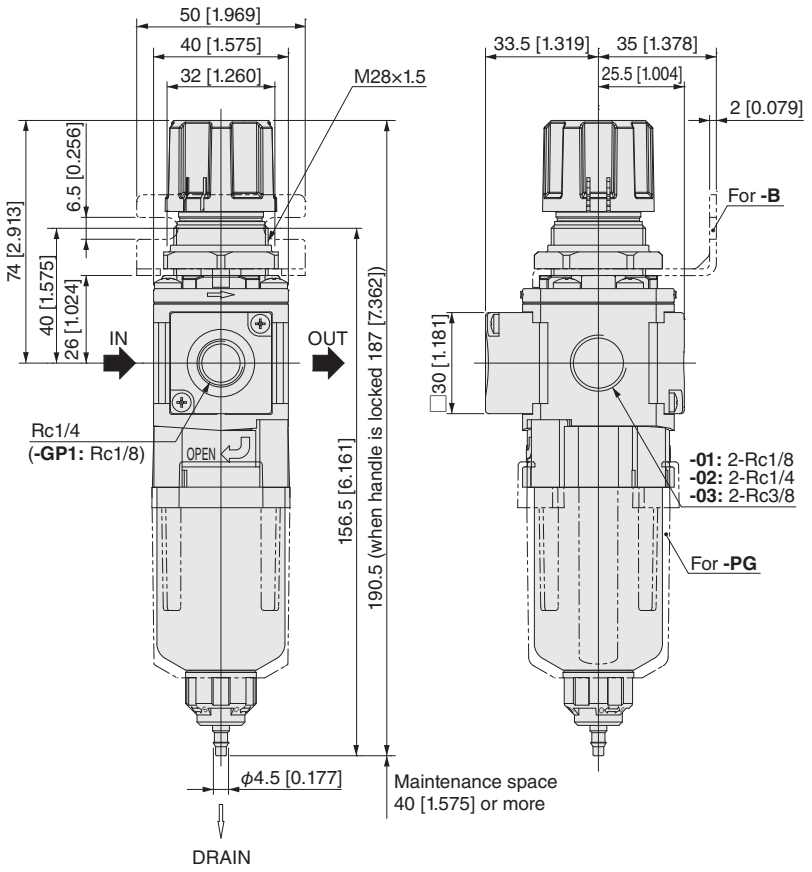


For **-G1**, **-G3**

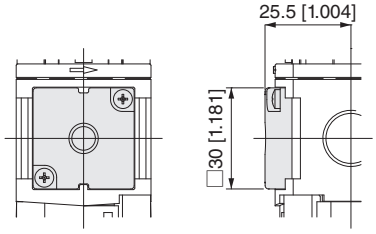


For **-G1S**, **-G3S**

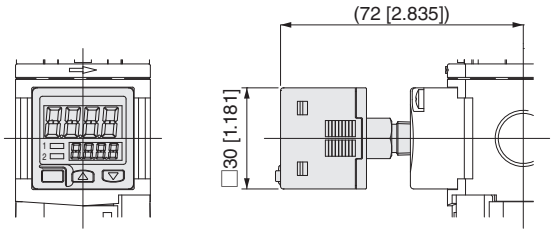
● FRZB40
● FRZB41



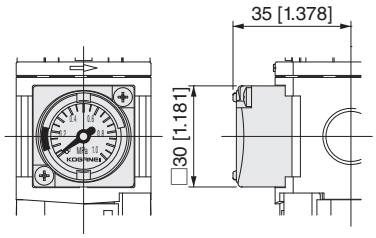
● Pressure gauge option



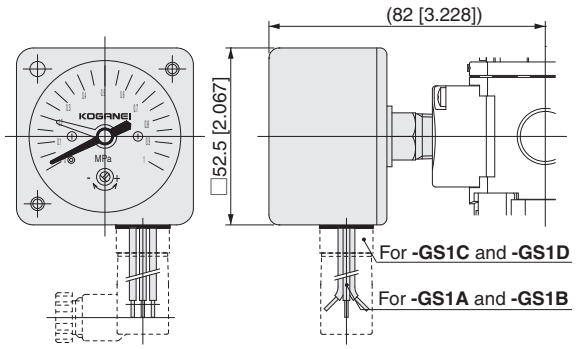
For **-GN**



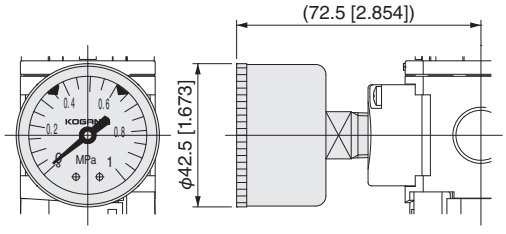
For **-GS6**



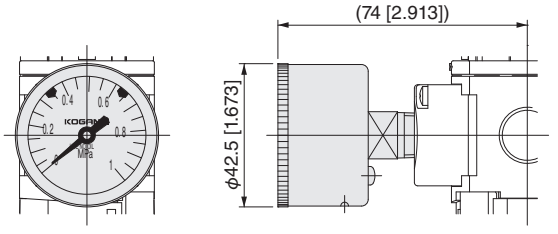
For **-G1C**, **-G4C**



For **-GS1A**, **-GS1B**, **-GS1C** and **-G1S**

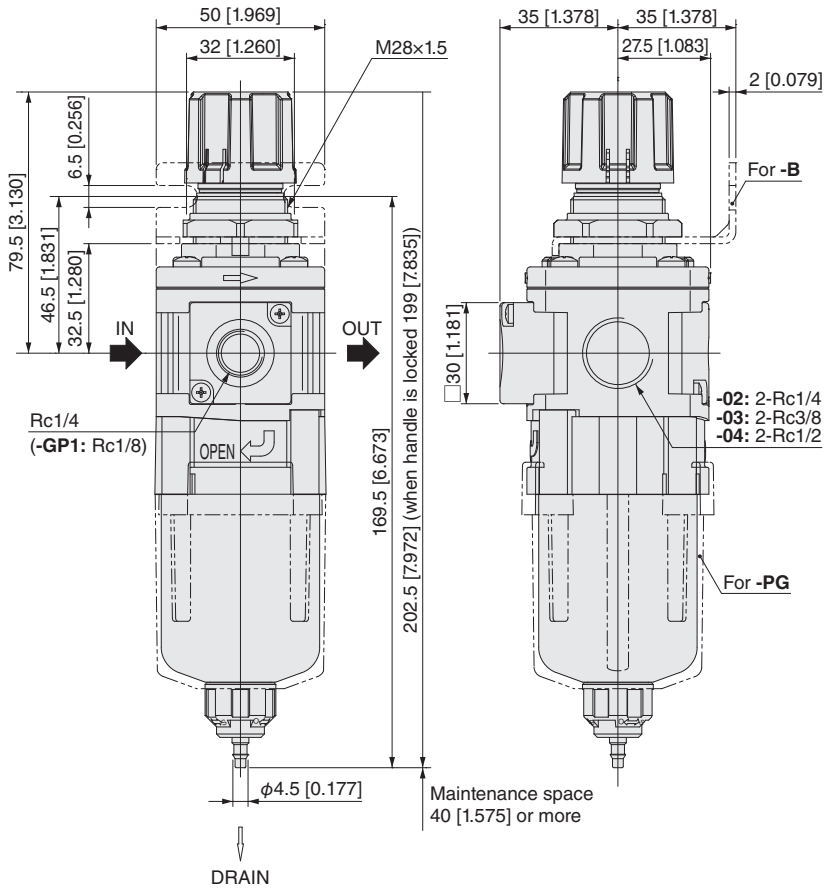


For **-G1**, **-G3**

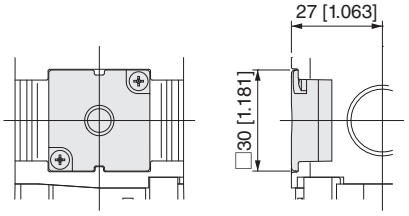


For **-G1S**, **-G3S**

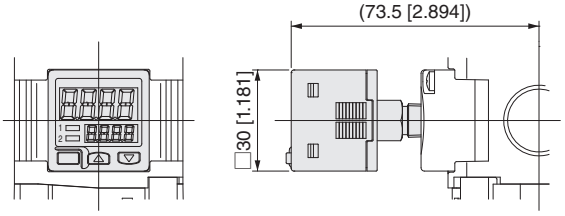
● FRZB50
● FRZB51



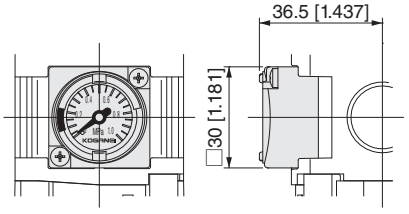
● Pressure gauge option



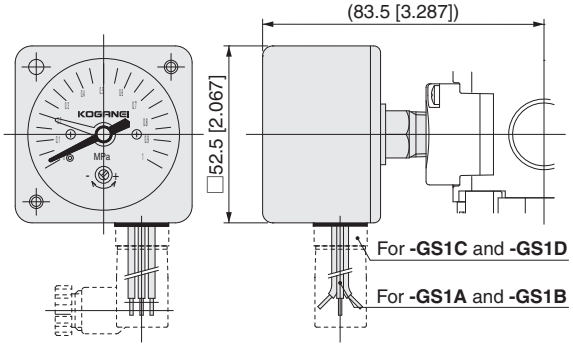
For **-GN**



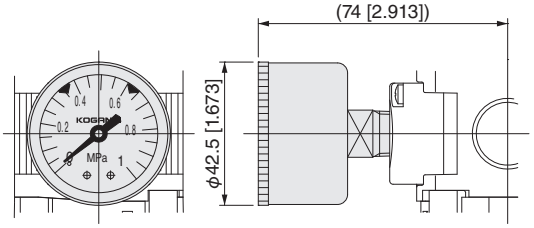
For **-GS6**



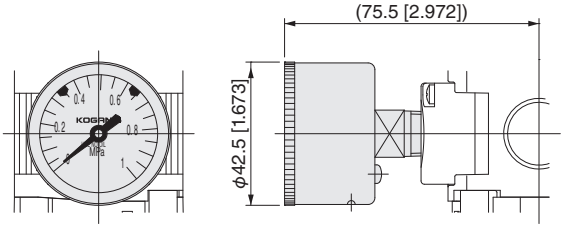
For **-G1C**, **-G4C**



For **-GS1A**, **-GS1B**, **-GS1C** and **-GS1D**



For **-G1**, **-G3**



For **-G1S**, **-G3S**

Design and selection

● Selection

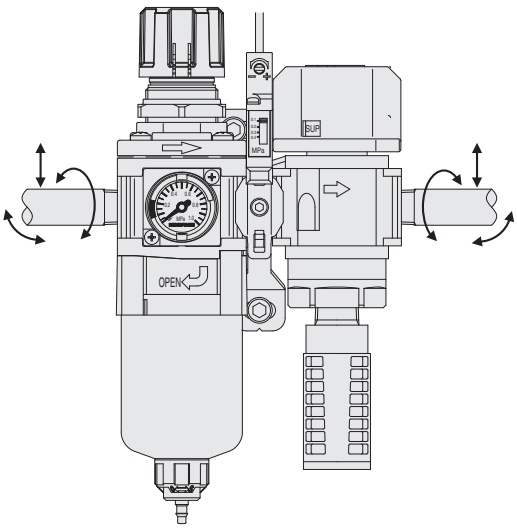
See the Handling Instructions and Precautions, Specifications, Various Characteristics, Dimensions, and other technical materials for each product to make the correct decision.

Mounting (installation) and piping

● Mounting (installation) direction, support, and securing

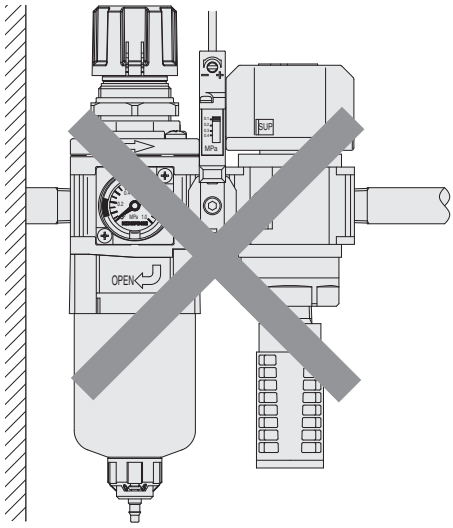
1. The products cannot be mounted (installed) if a bending moment or twisting moment is applied to the product or piping.

NOTE Applying bending moment or twisting moment may damage the product.



2. Do not attach piping so that just one side is fixed as shown in the following diagram. Support external piping separately.

NOTE The moment caused by the OUT (secondary) side pipes may damage the product's piping connections.



3. Use the brackets to install the products.

4. When mounting (installing) products, always make sure they are secured and sufficiently supported.

NOTE If a product is not securely fixed in place, it may fall over, be dropped, or operate abnormally and cause an injury.

● Maintenance space requirements

Assure there is sufficient space for maintenance inspections and maintenance work.
See the dimension diagram for each of the products regarding the maintenance space.

NOTE If there is not enough allowance for maintenance space, it is impossible to remove the bowl assembly and replace the filter. Also, it is impossible to do maintenance inspections so the equipment may stop or the product may be damaged.

● Attaching steel pipes and fittings

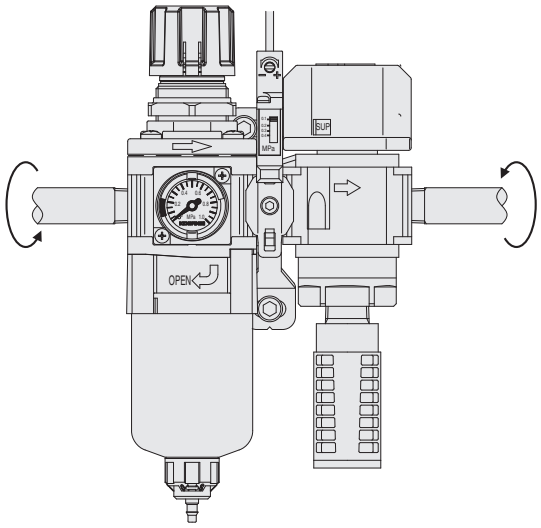
If steel pipes and fittings are attached to the threaded sections of the aluminum die-cast parts of the product, tighten them to the torque recommended in our standards.

NOTE Tightening with excess torque may damage the product or injure workers or operators.

Recommended tightening torque N·m [ft·lbf]

Connecting thread	M5	1/8	1/4	3/8	1/2
Torque	1 to 1.5 [0.738 to 1.106]	4.5 to 6.5 [3.319 to 4.794]	7 to 9 [5.163 to 6.638]	12.5 to 14.5 [9.220 to 10.695]	20 to 22 [14.752 to 16.227]

NOTE When mounting the various pressure gauges to a pressure port plate with Rc1/8 or Rc1/4, tighten them to 3.0 to 5.0 N·m [2.213 to 3.688 ft·lbf].



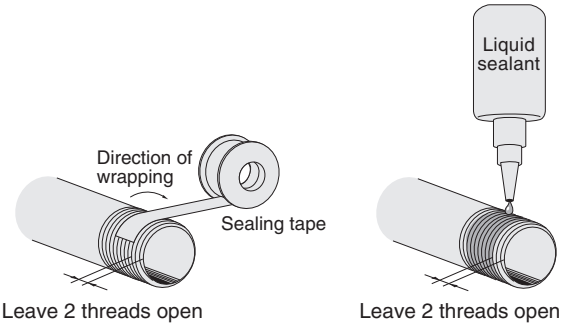
● Preventing contamination by foreign matter

1. Remove all foreign matter, such as metal chips, cutting oil, or dirt, from inside pipes with an air blower (flushing) and thorough washing before fitting the pipes.

2. Do not allow foreign matter, such as metal chips, or sealing tape from the piping threads, to get into the pipes when fitting the pipes.

NOTE Foreign matter entering the piping may damage the product or reduce its performance and service life.

3. Wrap the sealing tape in the direction as shown in the diagram below leaving 1.5 to 2 threads uncovered. When using liquid sealant, apply a suitable amount and in the same way leave 1.5 to 2 threads uncovered.



NOTE When fitting the pipes, if there is sealing tape or liquid sealant on the end cap of the steel pipes or fittings, the fragments may get into the pipes and cause an air leak.

4. If you are using liquid sealant, do not get it on the bowl of the filter regulator or the front cover of the pressure gauge.

NOTE If liquid sealant gets on the parts, it may damage them.

Medium and operating environment

● Usable medium

1. Use cleaned air (using a filter of 40 μm or less) for the medium. Contact the nearest Koganei sales office or overseas department if you are considering using something other than cleaned air.

NOTE Contact a Koganei sales office or overseas department if you are considering using something other than air.

2. Avoid using air that contains too much moisture and fluid.

NOTE Using air that contains too much moisture and fluids will cause the product's functions to stop after a short period and will reduce the product performance and service life.

3. If air that contains moisture and fluids is used, or if it is possible that they may be mixed in with the air being used, we recommend using the iB-Cyclone to reliably remove moisture and fluids.

NOTE When using an iB-Cyclone, install an FRZ series filter regulator (without moisture and fluid removal function) on the secondary side.

4. Do not use the product if the media being used is prone to extreme pulsating or surging.

NOTE Medium prone to extreme pulsating or surging will cause the product's functions to stop after a short period and will reduce the product performance and service life.

● Operating environment

1. Do not use the product in locations that are subject to direct sunlight (ultraviolet rays); locations with high humidity and temperature, dust, salt, or iron powder.
2. Cover the unit when using it in locations where it might be subject to excessive dust, dripping water, dripping oil, etc.
3. Do not use the product in environments subject to external vibration or impact.

NOTE External vibrations or shocks may result in damage to component parts.

4. Avoid piping that is rigid, such as steel piping, if vibrations are transmitted. Use flexible tubes so that the product is not subject to the vibrations.

● Medium and operating environment

1. The temperature of the medium and the ambient environment must be within the range in the specifications.

NOTE Using the product in an environment that is outside the specified temperature or with media that is outside the specified temperature will cause the product's functions to stop after a short period and will reduce the product performance and service life.

2. Use a device, such as a freeze-type air dryer or after cooler, to lower the dew-point temperature of the medium to below the ambient temperature so condensation or frost does not occur in the secondary pipes.

NOTE If condensation or frost forms in the product, it may get into the secondary side.

3. Do not use media in the product or use the product in an environment that includes corrosive components such as organic solvents, phosphate ester type hydraulic oil, sulfur dioxide, chlorine gas, Freon gas, ozone, acids, alkaline, or in atmospheres or locations where there is screw lock agents, leak detection fluids, or hot water, or direct exposure to ultraviolet rays. See the reference materials on page 162 for details.

NOTE Using the product in an environment or with media that is specified in the above item 3 will cause the product's functions to stop after a short period and will reduce the product performance and service life.

Operation and maintenance inspections

● Method of use

Read the Handling Instructions and Precautions for each product for instructions on correct usage (filter regulators on page 110 to 116, □30 [1.181] integrated pressure gauge on page 116).

● Maintenance (maintenance inspection)

1. Performance and functions may decrease as the pneumatic equipment ages. Always conduct daily inspections of the pneumatic equipment, and confirm that all requisite system functions are satisfied, to prevent accidents from happening.
2. Read the Handling Instructions and Precautions for instructions on maintenance and replacing maintenance parts (filter regulators on pages 115 to 116).
3. The product must be disassembled and reassembled to use the seal kit.

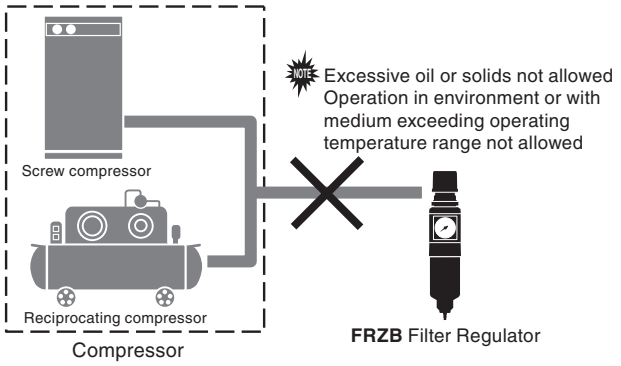
NOTE The product is no longer under warranty if it is disassembled and reassembled.

Design and selection

● Installed directly on compressor

Do not install the product directly on a compressor. If you do, provide sufficient countermeasures for temperature control, and removing oils and solids.

NOTE Not using countermeasures may cause the product's functions to stop after a short period and may reduce the product performance and service life.



● Moisture and fluid removal functions

1. The moisture and fluid removal function built into the FRZB filter regulator is a simple function. The moisture and fluid removal and separation rates vary depending on conditions.

   NOTE Use an iB-Cyclone to effectively remove moisture and fluid.

2. For the principles of the moisture and fluid removal by the FRZB filter regulator, refer to “Principles of moisture and fluid removal” on page 118.

● Dehumidification and oil mist removal

1. A filter regulator cannot be used to dehumidify.

   NOTE Install a film air dryer or something on the secondary side if dehumidifying is needed.

2. A filter regulator cannot be used to remove oil mist.

   NOTE Install an oil mist filter or something on the secondary side if oil mist removal is needed.

● Pressure settings

1. If the pressure being applied exceeds the set pressure value of the device or equipment that is installed on the OUT port (secondary) side of the filter regulator, such that it may damage the device or equipment or cause malfunctions, then be sure to install a safety device.
2. We recommended that the OUT port (secondary) side pressure setting be 85% or less of the IN port (primary) side supply pressure.

   NOTE If the pressure is set to a value exceeding 85%, the pressure on the IN port (primary) side and the flow rate used will be easily affected, causing the pressure on the OUT port (secondary) side to become unstable.

3. It is not possible to use an internal pilot type filter regulator (FRZB4□/FRZB5□) with a valve installed on the IN port (primary) side to repeatedly switch the IN port (primary) side pressure.

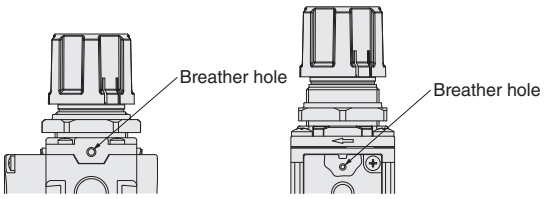
   NOTE The OUT port (secondary) side set pressure may fluctuate due to switching of the IN port (primary) side pressure.

4. If air is not consumed for a long time, or if a sealed circuit or balance circuit is used, the pressure on the OUT port (secondary) side may fluctuate. Contact a Koganei sales office or overseas department.
5. Contact a Koganei sales office or overseas department if you intend to use the product in a circuit that requires high-precision pressure adjustment.

● OUT port (secondary) side pressure exhaust and breather hole

1. When reducing the OUT port (secondary) side pressure by turning the handle on the filter regulator, or when exhausting OUT port (secondary) side pressure when it has risen above the set pressure, the pressure is exhausted to the outside through the breather hole shown in the figure below.

   NOTE There may be some vibration and noise during exhaust.



2. If sudden pressure increases occur on the OUT port (secondary) side of the filter regulator, such as are caused by external forces applied to the actuator, then install a separate exhaust mechanism on the OUT port (secondary) side of the filter regulator.

   NOTE The relief port is smaller than the piping bore, so it may not be able to handle a sudden pressure increase on the OUT port (secondary) side.

● Backflow (residual pressure exhaust) from the OUT port (secondary) to the IN port (primary)

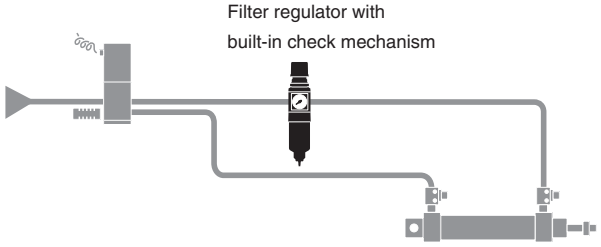
1. To release the pressure from the IN port (primary) of a direct-acting filter regulator (applicable models FRZB30/FRZB31) and process the residual pressure from the OUT port (secondary), select a filter regulator with a built-in check valve (applicable model FRZB32).

   NOTE Depending on the conditions of use, etc., processing residual pressure on the secondary-side may not be possible for the standard and low-pressure specifications.

2. For internal pilot type filter regulators (applicable models FRZB4□ and FRZB5□), when the pressure on the IN port (primary) side is released, the residual pressure on the OUT port (secondary) side is processed through the relief port.

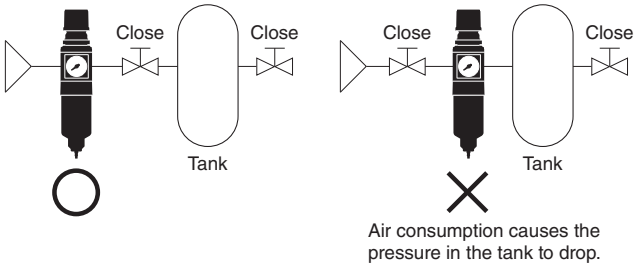
   NOTE If the volume of the OUT port (secondary) side flow passage is large, exhausting it will take time, so install a residual pressure exhaust valve on the OUT port (secondary) side of the product.

3. If you are using a filter regulator with a built-in check mechanism (applicable model FRZB32) installed after the valve to adjust the actuator thrust, make sure that the pressure on the OUT port (secondary) side of the filter regulator with a built-in check mechanism does not rise above the set pressure due to the back pressure of the actuator (as a guide, use an actuator with a difference in pressure of 0.3 MPa [44 psi] or less between the push side and pull side).



● Air consumption

1. Internal pilot type filter regulators (applicable models FRZB4□ and FRZB5□) consume air while regulating the OUT port (secondary) side pressure.
2. Air consumption varies depending on the relationship between the pressure on the IN port (primary) side and the pressure on the OUT port (secondary) side.
3. Internal pilot type filter regulators (FRZB4□/FRZB5□) if the IN port (primary) side and OUT port (secondary) side are sealed, the pressure will drop due to air consumption.



Mounting (installation) and piping

● Mounting (installation) direction

Mount (install) the FRZB Filter Regulator vertically so the handle is on top and the drain outlet is down.

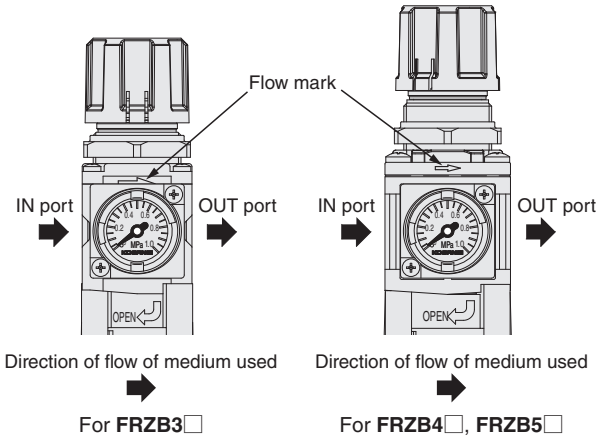
● Direction of flow

1. Connect the filter regulator so that the medium flows in the IN port (primary) side and out the OUT port (secondary) side.
2. Use the flow marks on the products to identify the primary port and secondary port of the filter regulators.

   NOTE Reversing the IN port (primary) side and the OUT port (secondary) side connections damages the product and causes it to stop functioning.

● Flow mark

The following diagram shows the relationship of the direction of flow of the medium and the flow mark on filter regulators.



● Piping work

Connect steel pipes and fittings to the filter regulator IN ports and OUT ports so that the weight and torque of the pipes do not affect the product. When tightening the piping, hold the main unit and tighten it to the torque recommended on page 108.

NOTE Applying unnecessary force or impact to the handle, bowl assembly, or pressure gauge may damage component parts.

● Installing brackets

To install brackets, do it in the following order.

1. Remove the handle.
   (See "Removing the Handle" on page 113 for instructions on how to remove the handle.)
2. Install the bracket.
3. Screw on the mounting ring.

   NOTE Tighten the mounting ring to 5.0 N·m [3.688 ft·lbf] or less.

4. Install the handle.
   (See “Installing the Handle” on page 113 for instructions on how to install the handle.)

● Panel mount

1. The diameter of the mounting hole in the panel for all sizes of filter regulator is ϕ28.5 mm [1.122 in.].
2. See the following table for the thicknesses of the panels.

mm [in.]

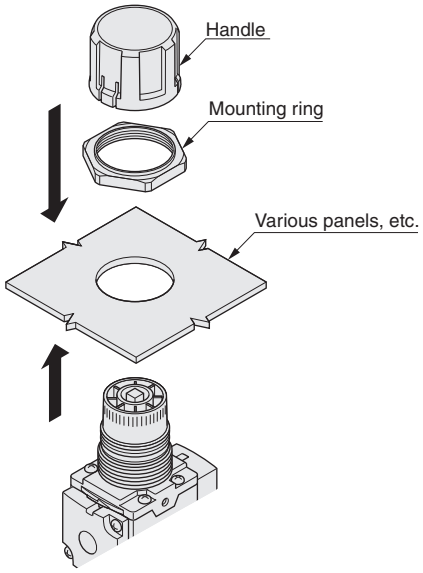
Model	FRZB3□	FRZB4□	FRZB5□
Thickness	3 [0.118] or less	7 [0.276] or less	

NOTE Using panels that are thicker than specified will cause panels to not be securely fastened with the mounting rings or reduce the visibility of the yellow caution ring.

3. To install panel mounts, do it in the following order.
   1. Remove the handle.
      (See "Removing the Handle" on page 113 for instructions on how to remove the handle.)
   2. Install the filter regulator to the panel.
   3. Screw on the mounting ring.

NOTE Tighten the mounting ring to 5.0 N·m [3.688 ft·lbf] or less.

   4. Install the handle.
      (See "Installing the Handle" on page 113 for instructions on how to install the handle.)



● Mounting ring

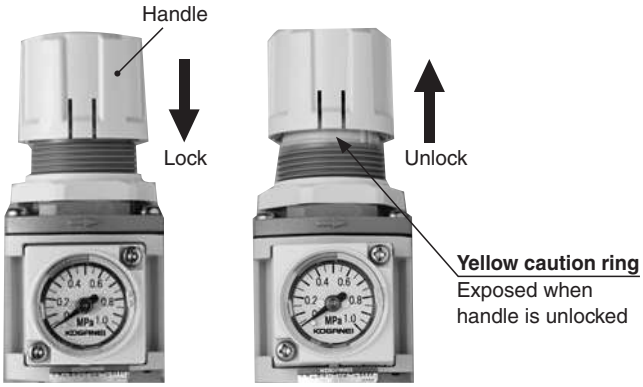
1. Tighten the mounting ring to 5.0 N·m [3.688 ft·lbf] or less.
2. If you use a tool to tighten the mounting ring, be sure to firmly grip the opposite edges of the mounting ring.

NOTE If the mounting ring is not firmly gripped or too much torque is applied to it, component parts may be damaged.

Operation and maintenance inspections

● Locking and unlocking the handle

1. The handles on the filter regulators have a push-lock mechanism.
   Use the procedure shown in the diagram below to lock and unlock the handle.



2. The handle must be unlocked to adjust the pressure.

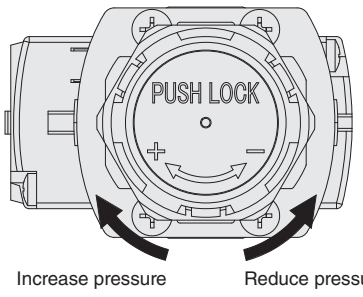
NOTE Turning the handle while it is locked may cause damage to component parts.

3. After adjusting the pressure, lock the handle.

● Pressure adjustment

1. To adjust the pressure, turn the handle in the "+" direction as indicated on the bottom of the handle as shown in the diagram below to increase pressure, and turn the handle in the "-" direction to decrease pressure.

NOTE If you turn the handle too far, it may cause damage to internal parts or cause them to stick, making the handle harder to turn.
Be careful not to turn it too far.



2. When adjusting the pressure, start from the low pressure side and adjust to the desired setting pressure.If you exceed the desired pressure, lower the pressure and then adjust to the desired setting pressure again from the low pressure side.

NOTE If you adjust the pressure to the desired setting from the high pressure side, it may cause the pressure on the OUT port (secondary) side to become unstable.

3. When adjusting the pressure, check the pressure on the IN port (primary) side and OUT port (secondary) side using a pressure gauge or other device.
4. Even though the handle can be turned to the “+” side maximum value, which increases the pressure beyond the upper limit of the operating pressure range, you need to keep the pressure within the operating pressure range while you adjust it.

● Removing the handle

To remove the handle, do it in the following order.

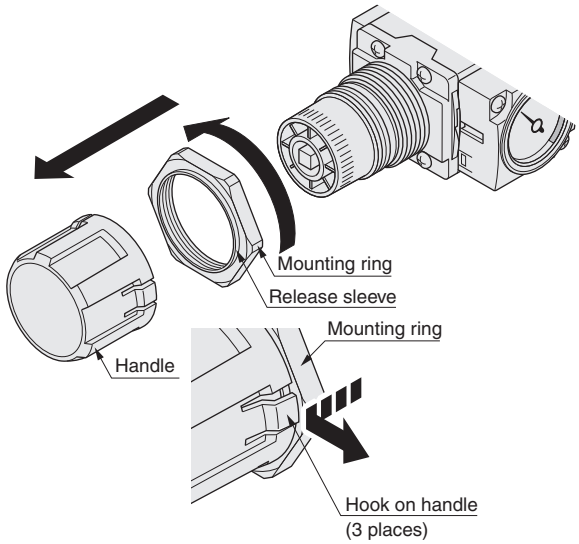
1. Unlock the handle.
   (See "Locking and unlocking the handle" on page 112 for instructions on how to lock/unlock the handle.)
2. Turn the mounting ring counterclockwise (in the direction of the arrow in the figure below).

NOTE Turn the mounting ring until it comes off the threads.

3. Pull the mounting ring towards the handle.

NOTE Pull the release sleeve of the mounting ring until it pushes open the claws (3 positions) on the handle.

4. Pull off the handle and mounting ring together.



● Installing the handle

1. To install the handle, do it in the following order.

1. Release the pressure on the IN port (primary) side to atmosphere.
2. Screw on the mounting ring.

NOTE Installing the handle before screwing in the mounting ring will cause the mounting ring to become unattachable or the handle to become difficult to remove.

3. Push the handle in until the yellow caution ring is no longer visible.

NOTE Before pushing the handle in, align the □ shape on the adjusting assembly (see exploded view on page 116) with the □ hole shape on the bottom of the handle.

2. If the handle is attached while pressure is supplied to the IN port (primary) side of the filter regulator, the OUT port (secondary) side pressure may temporarily increase.
If a temporary increase in the OUT port (secondary) side pressure can cause damage or malfunction of the OUT port (secondary) side equipment or devices, be sure to release the IN port (primary) side pressure to the atmosphere before attaching the handle.

NOTE Doing so can damage the product or injure workers or operators.

3. Before attaching the handle, check that the temporary increase in pressure on the OUT port (secondary) side will not affect equipment and devices downline if the pressure on the IN port (primary) side cannot be released to the atmosphere.

● Replacing the □30 [1.181] integrated pressure gauge and pressure port plate

1. When interchanging a □30 [1.181] integrated pressure gauge or pressure port plate, be sure to release the pressure inside the product before you start.

2. When interchanging a □30 [1.181] integrated pressure gauge or a pressure port plate, do it in the following order.

1. Remove the two small retaining screws.
2. Remove any metal chips from the female threads, such as by using an air blower.

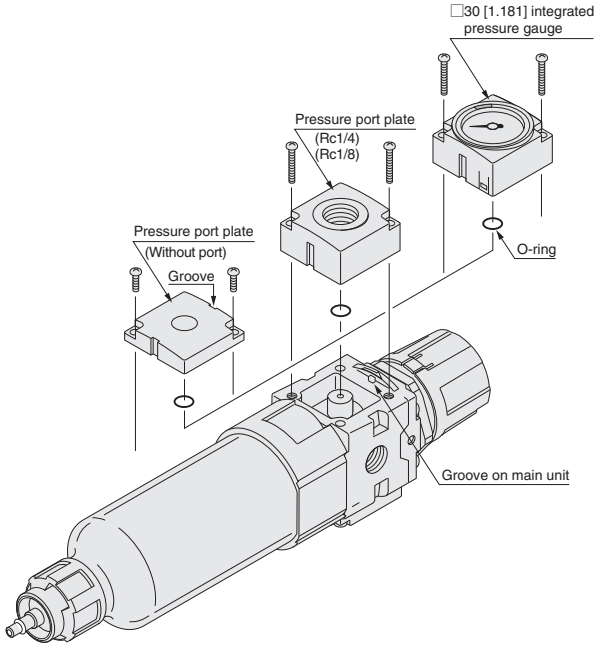
NOTE If there are any metal chips left, they can damage the screw threads or the metal chips might stick to the O-ring, causing air to leak.

3. Install the O-ring on the □30 [1.181] integrated pressure gauge or pressure port plate.

NOTE Not assembling the O-ring will result in air leaks.

4. Align the notches on the □30 [1.181] integrated pressure gauge or the pressure gauge port plate with the protrusions on the main unit to assemble them.
5. Tighten the two small retaining screws to a torque of 0.9 to 1.1 N·m [7.966 to 9.736 in·lbf].

NOTE Tightening to a torque that exceeds the specified value can cause the screw head or bit to break or damage the component parts. Tightening to a torque that is less than the specified value might allow the screws to loosen and let air leak out.



● Drain cock operation

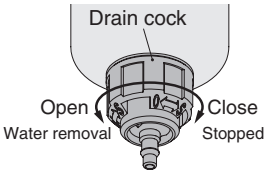
1. Turn the drain cock with your hand.

2. Use the following procedure to operate the drain cock.

1. Turn the drain cock in the direction of [O].
2. After the moisture and fluid have drained out, turn the drain cock in the direction of [S] until it clicks and locks.

3. Do not turn the drain cock more than 100° from the closed position, when you open it.

NOTE Turning the drain cock more than 100° may damage it.



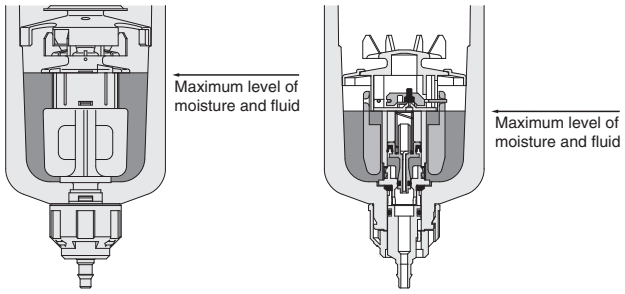
● Processing moisture and fluid

1. If the regulator you are using has no auto drain (**-N**), be sure to drain the moisture and fluid before the water volume reaches the level shown in the left side diagram below.

NOTE If the volume of moisture and fluid is greater than that shown in the left side diagram below, the moisture and fluid removal function will be greatly reduced.

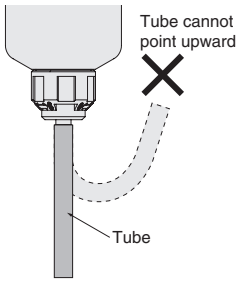
2. If the regulator you are using has an auto drain (**-A** or **-C**), the moisture and fluid that collects on the primary side is flushed all at once, do not let it exceed the maximum level as shown in the right-side diagram below.

NOTE The auto drain may malfunction if the volume of moisture and fluid exceeds the maximum level as shown in the right-side diagram below.



3. See page 117 "Principles of auto drain operation" regarding the auto drain operation principles.
4. A tube with an inner diameter of ϕ4 mm [0.157 in.] can be attached to the barbed fitting of the drain cock. Make sure the drain cock is closed (locked) before attaching the tube.
5. Cut the end of the tube to be connected to the barbed fitting of the drain cock straight across, and the barbed fitting must be inserted completely as shown in the diagram.
   Also, after installing the tube, lightly pull on it to check that it does not come off.
6. Do not allow the tube on the barbed fitting of the drain cock to become severely bent or twisted close to the fitting.

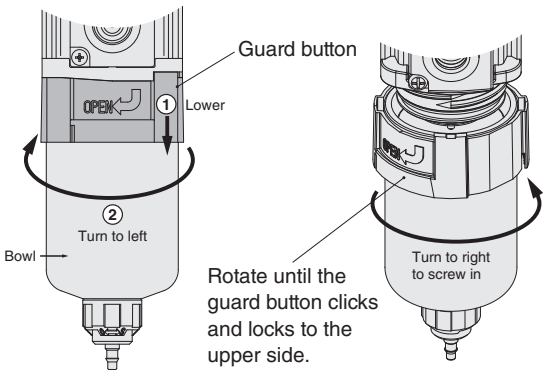
NOTE Lateral force may damage the barbed fitting.



● Attaching and removing the bowl assembly

1. Be sure to release any pressure in the system before attaching (or removing) the bowl assembly.
2. Use the procedure shown in the diagram above on the right to attach (or remove) the bowl assembly.
3. Squeeze the guard button to attach or remove the bowl assembly.

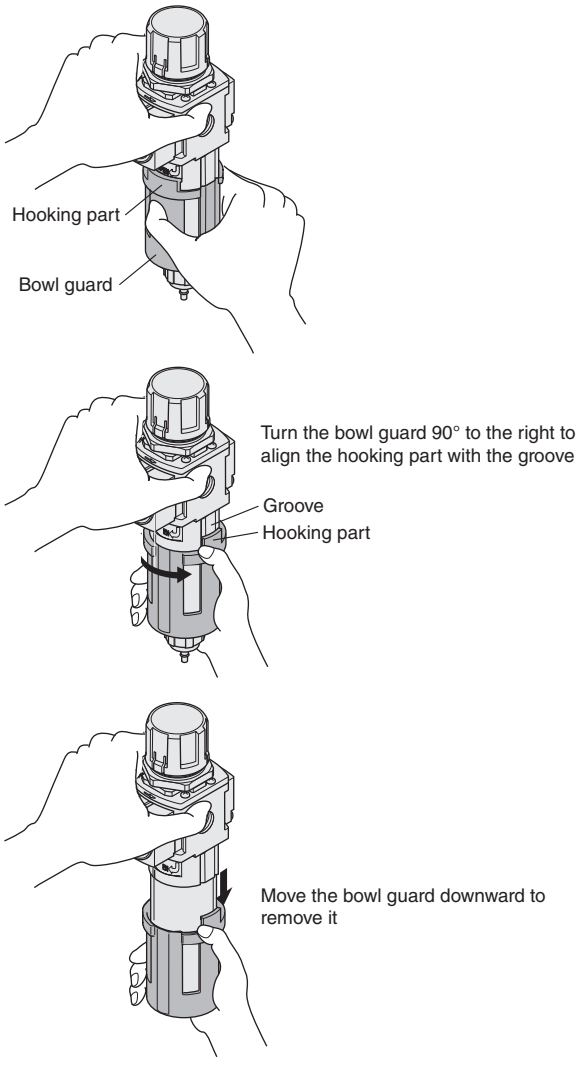
NOTE If there is a bowl guard, it may fall off when you squeeze it.



4. When attaching or removing the bowl assembly, move it vertically so you do not touch the internal component parts.

● Attaching and removing the bowl guard

1. Be sure to release any pressure in the system before attaching or removing the bowl guard.
2. Use the procedure shown in the diagram below to attach (or remove) the bowl guard.

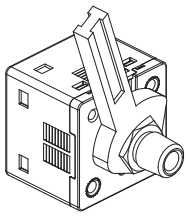


3. Use the reverse of the procedure shown in the diagram above to attach the bowl guard.

● Installing included options

1. Be sure to release any pressure in the system before attaching (or removing) the various pressure gauges and other things.
2. When attaching the various pressure gauges and other things, be sure to tighten them by using a tightening tool on the square or hexagonal parts of the ports.

NOTE Holding the main body of the various pressure gauges as you tighten them can cause damage to their component parts.



3. When mounting the various pressure gauges to a pressure port plate with Rc1/8 or Rc1/4, tighten them to 3.0 to 5.0 N·m [2.213 to 3.688 ft·lbf].

NOTE Tightening to a torque that exceeds the specified value can cause damage to the component parts. Tightening to a torque that is less than the specified value might allow the screws to loosen and let air leak out.

4. The female threaded part of the pressure port plate with Rc1/8 or Rc1/4 has a stopper.

NOTE Tightening it more after it hits the stopper, can cause damage to the component parts.

● Replacing the pressure port plate, handle, mounting ring

1. To replace the pressure port plate, see "Replacing the □30 [1.181] integrated pressure gauge and pressure port plate" on page 113.
2. To replace the handle and mounting ring, see "Removing the handle" and "Installing the handle" on page 113.

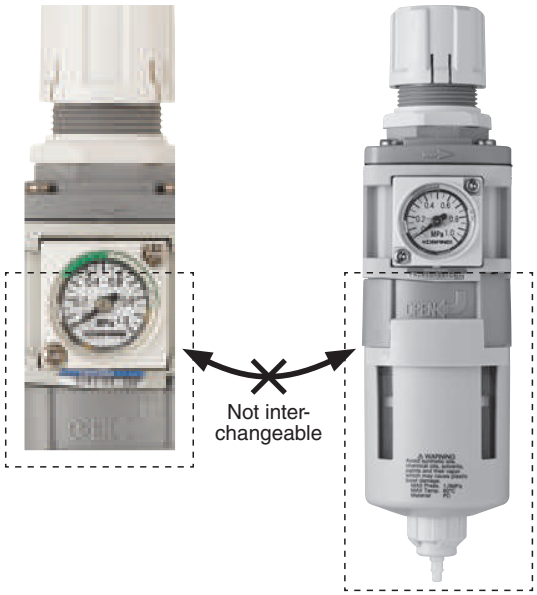
● Replacing the seal kit, element, and bowl assembly

1. To replace the seal kit, element, and bowl assembly, remove the filter regulator and do the work on a work table.
2. Apply grease to the seal materials, such as the O-rings (but not the diaphragm) that are used on the filter regulator.
3. Contact the nearest Koganei sales office or overseas department if you are considering re-applying grease to the O-rings. Recommended grease: Lithium soap base No. 2 equivalent
4. Periodically replace the element of the filter regulator.

NOTE The service life of the element varies depending on the quality of air supplied to the IN port (primary) side. If the air supplied to the IN port (primary) side is highly contaminated with foreign matter, install a prefilter on the IN port (primary) side or change the air filter frequently. As a guideline, the replacement time for the element is one year after starting to use it.

5. The bowl assembly for the FRZB filter regulator (with moisture and fluid removal functions) and the bowl assembly for the FRZ filter regulator (without moisture and fluid removal functions) cannot be interchanged.

NOTE The internal components differ, so the product specifications are not compliant.



FRZ
Filter regulator
(**FRZ3□·FRZ4□·FRZ5□**)

FRZB
Filter regulator
(**FRZB3□·FRZB4□·FRZB5□**)

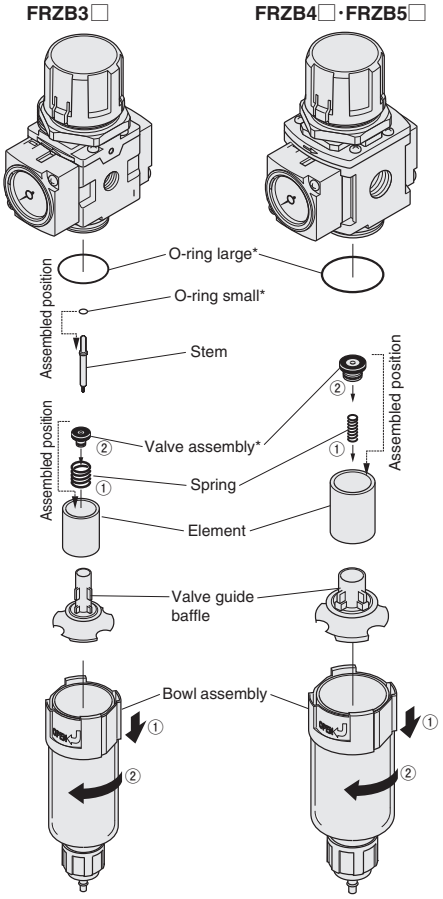
6. Do periodic inspections to look for cracks, scratches, or other deterioration in the clear plastic parts of the bowl assembly. If you detect any cracks, scratches, or other deterioration, immediately stop operations and replace the bowl assembly with a new one.

NOTE Cracks, scratches, or other deterioration may cause the bowl to break.

7. Replace the bowl assembly with a new one if it becomes dirty or the transparency is reduced. To wash the bowl, use diluted household cleaner to wash it and then rinse it off with water. See the reference materials on page 162 for details about the chemical resistance of the bowl material.
8. When replacing the seal kit, element, and bowl assembly, be careful not to lose component parts.
9. See page 116 to replace the seal kit, element, and bowl assembly.

NOTE Always assemble the component parts correctly.

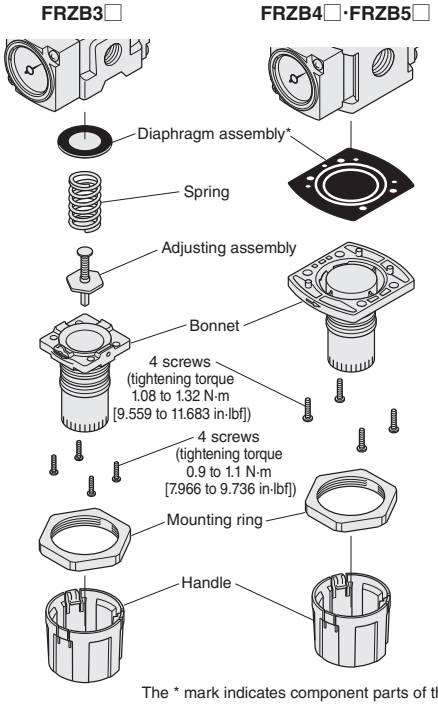
Bowl side of filter regulator (with moisture removal function)



The * mark indicates component parts of the seal kit.

- Products that have been disassembled and reassembled are not covered by the warranty.
- Regarding the oil rings in the seal kit, FRZB3□ uses only O-ring (large) and (small), while FRZB4□ and FRZB5□ use only O-ring (large); the remaining O-ring is not used.

Handle side of filter regulator



The * mark indicates component parts of the seal kit.

Products that have been disassembled and reassembled are not covered by the warranty.

□30 [1.181] integrated pressure gauge

Mounting (installation) and piping

● Mounting (installation)

When installing the □30 [1.181] integrated pressure gauge to a filter regulator, refer to "Replacing the □30 [1.181] integrated pressure gauge and pressure port plate" on page 113.

Medium and operating environment

● Pulsation, vibration, impact

The □30 [1.181] integrated pressure gauge is a precision device. It cannot be used if the fluid being used pulsates or if it is subject to vibration or impact from outside.

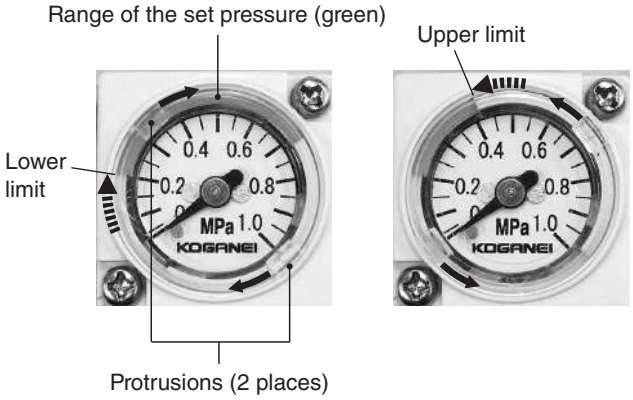
Pulsating of the fluid being used, or external vibrations or impacts may result in damage to component parts.

Operation and maintenance inspections

● Adjusting the range of the set pressure

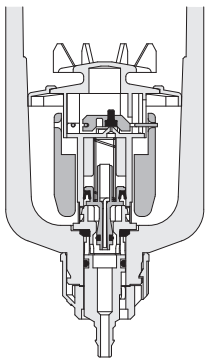
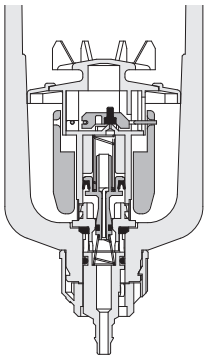
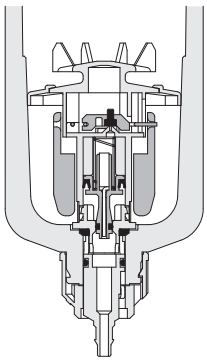
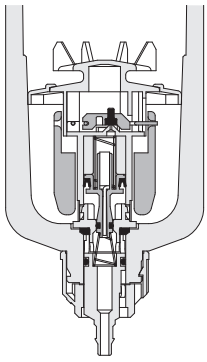
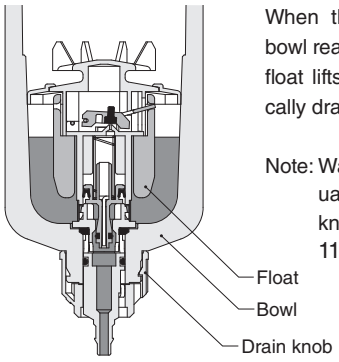
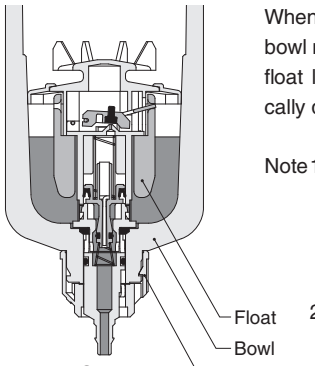
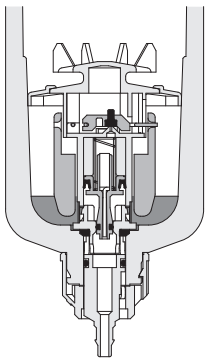
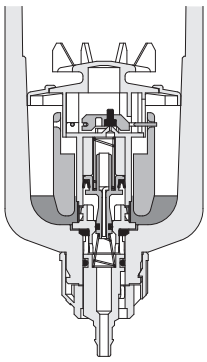
1. Adjust the range of the set pressure (green area) in the following order.
1. Adjust the lower limit of the set pressure range by rotating the protrusions (2 places) clockwise by hand.
2. Adjust the upper limit of the set pressure range by rotating the protrusions (2 places) counterclockwise by hand.

Adjusting the set pressure range with tools, etc. can damage the component parts.

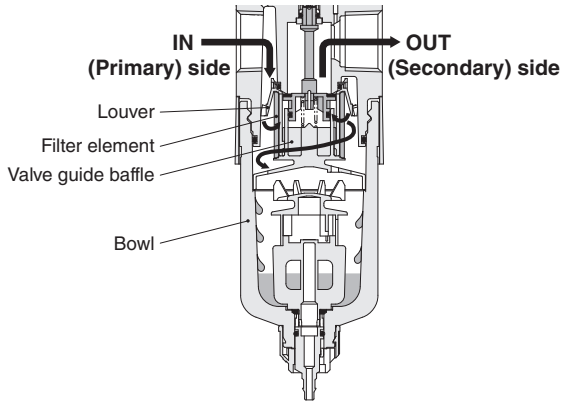


See page 154 for the specifications and dimension diagrams for the □30 [1.181] integrated pressure gauge.

● Explanation of operation of auto drain system

State \ Type	NO type	NC type
Not pressurized	 Open When unpressurized, the water outlet opens and the water drains naturally.	 Close When unpressurized, the water outlet closes and the water cannot drain. Note: Water does not drain when unpressurized, if there is a lot of water even in an unpressurized (low pressure) condition, it may be necessary to drain the water by hand.
Pressurized	 Close Air and water are periodically discharged from the water outlet until the minimum operating pressure (0.15 MPa [22 psi]) or higher is reached. The air and water will stop after the minimum operating pressure or more is reached. Note: A compressor with a small output may not reach full pressure, and there may be air output until the minimum operating pressure or higher is reached.	 Close In the same way, when unpressurized, the water outlet closes and the water cannot drain.
Draining water	 Open When the level of water in the bowl reaches a specified level, the float lifts and the water automatically drains. Note: Water can be drained manually by turning the drain knob to the left. See page 113 for details.	 Open When the level of water in the bowl reaches a specified level, the float lifts and the water automatically drains. Note 1: Supply pressure is needed to operate the auto drain. Ensure that the supply pressure is 0.15 MPa [22 psi] or more. 2: Water can be drained manually by turning the drain knob to the left. See page 113 for details.
Draining water completed	 Close When the water drains, the float lowers and the water outlet closes, and water stops draining.	 Close When the water drains, the float lowers and the water outlet closes, and water stops draining.

● Principles of moisture and fluid removal



1. The swirling flow generated by the louvers separates moisture and fluid from the air supplied from the IN port (primary) side.
2. The separated moisture and fluid pass through the gap in the valve guide baffle and collect in the bowl.
3. The air, from which the moisture and fluid have been separated, passes through the filter element to the OUT port (secondary).

FRZ Series
Filter regulator, regulator

Perfect on lines following the removal of moisture and fluids!

Specialized **30 series** for standalone applications

Regulator RZ30 | Filter regulator FRZ30

The **40 and 50 series** can be used in combinations

Regulator RZ40 | Filter regulator FRZ40 | Regulator RZ50 | Filter regulator FRZ50

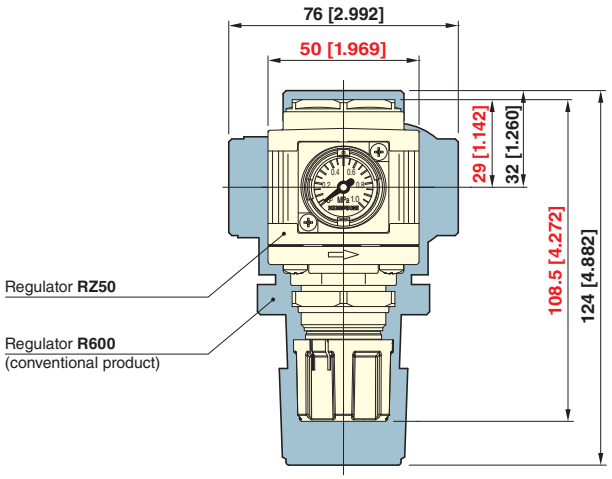
Downsizing	Improved flow rate characteristics allow a smaller configuration (close side-by-side spacing possible).
Mounts in any direction	Elimination of fluid removal function for greater mounting direction freedom.
Improved operability and maintainability	Handle operability improved and bowl is easy to attach/remove.
Pressure gauge, pressure switch	Compatible with □30 [1.181] integrated pressure gauge, other types of pressure gauges, and pressure switches.
Compatible in a wide range of environments	Specifications for ozone resistance, NCU specifications (copper free)[Note] compatible as standard.

Note: Excluding pressure switch and pressure gauge options.

Compact design

Improved flow rate characteristics allow a smaller configuration.

* Comparison between our regulators **R600** and **RZ50**.



Improved handle operability

- The shape and size of the easy-to-operate handle make it light and smooth to turn. In addition, improving the resolution of the handle lock has reduced fluctuations in the set pressure when the handle is locked.
- The caution ring (yellow) allows you to check the state of the handle's lock as it is released.

Improved maintainability

- The bowl can be removed and attached in two easy steps. Filter elements can be easily replaced even in restricted maintenance spaces.
- Filter elements are nonwoven fabric filter elements. Increased porosity and circumferential area increase service life.

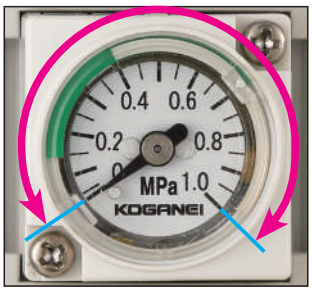
Improved freedom in mounting direction

Eliminated moisture and fluid removal function for greater mounting direction freedom. Mounting with the bowl part on the top or side is also possible.

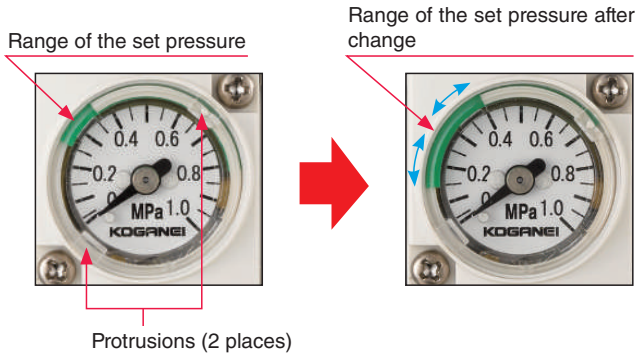
□30 [1.181] integrated pressure gauge

- □30 [1.181] integrated pressure gauge is compact with minimal protrusions. Plus, the easy-to-read display angle of 270° improves visibility.

Swing angle 270°



- The set pressure range (green area) can be changed as desired. The upper and lower limits of the setting range can be freely changed without removing the front cover (transparent resin part) or using tools.



By rotating the protrusions (two locations) clockwise or counterclockwise, the display of the set pressure range can be changed as desired.

* Other pressure gauges and pressure switches are also available. For details, see the next page.

Pressure gauge, pressure switch

Various pressure gauges and pressure switches can be selected in addition to the □30 [1.181] integrated pressure gauge.

ϕ40 [1.575] pressure gauge
(1 MPa [145 psi] specifications)

ϕ40 [1.575] pressure gauge
(0.3 MPa [44 psi] specifications)

ϕ40 [1.575] stainless steel bourdon tube pressure gauge
(1 MPa [145 psi] specifications)

ϕ40 [1.575] stainless steel bourdon tube pressure gauge
(0.3 MPa [44 psi] specifications)

Digital pressure switch
GS620
(1 MPa [145 psi] specifications)

Pressure gauge with built-in switch
(1 MPa [145 psi] specifications)

Pressure switch module

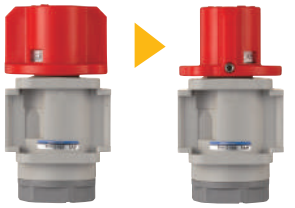
Easily detect line pressure with this compact pressure switch with integrated connection fitting. Plus, the set pressure can be adjusted from the front. For details, refer to page 144.

Note: Cannot be assembled to body size 30 series.

Residual pressure exhaust valve

Pressure in line can be exhausted by using a 3-port valve. The structure allows you to lock (with a keyhole) the valve in the residual pressure exhaust state, improving safety. In addition, the operation handle is a highly visible red handle. For details, refer to page 141.

Note: Cannot be assembled to body size 30 series.



Supplying air　Exhausting air

Module or adapter

Common to both the 40 and 50 series body sizes, these devices are used for connecting individual products, branch piping, and for variations in pipe sizes.

For details, refer to page 147.

Note: Cannot be assembled to body size 30 series.

F module
(For connector)

D module
(For connecting (with bracket)

T module
(For branch)

DT module
For branching (with bracket)

S adapter
(For pipe size conversion)

DS adapter
(For pipe size conversion, with bracket)

Module bracket
(For various modules and adapters)

Connector plate
(Replacement part)

Bracket

The brackets can be used with all sizes of the filter regulators and regulators.

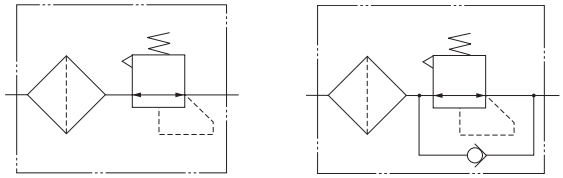
Panel mount installation

The hole diameter for a panel mount is standardized at ϕ28.5 mm [1.122 in.] for all sizes of filter regulators and regulators.

Filter regulator

FRZ30·FRZ31·FRZ32
FRZ40·FRZ41
FRZ50·FRZ51

Symbols



● Standard
● For low pressure

● Built-in check mechanism

Specifications

Item \ Model		FRZ30	FRZ40	FRZ50
	Standard	FRZ30	FRZ40	FRZ50
	For low pressure	FRZ31	FRZ41	FRZ51
	Built-in check mechanism	FRZ32	-	-
Media		Air		
Port size		M5×0.8, Rc1/8, Rc1/4	Rc1/8, Rc1/4, Rc3/8	Rc1/4, Rc3/8, Rc1/2
Maximum operating pressure MPa [psi]		1.0 [145]		
Proof pressure MPa [psi]		1.5 [218]		
Operating temperature range (atmospheric and medium) °C [°F]		5 to 60 [41 to 140] (non-condensation)		
Filtration μm		5		
Pressure regulating system		Direct acting/relief type	Internal pilot/relief type	
Set pressure range MPa [psi]	Standard/Built-in check mechanism	0.05 to 0.85 [7 to 123]		
	For low pressure	0.05 to 0.40 [7 to 58]		
Relief starting pressure MPa [psi]		Set pressure +0.05 [7] or less		
Materials used in major parts	Main unit	Die cast aluminum alloy		
	Bonnet & adapter	Polyacetal		
	Diaphragm	Base fabric + synthetic rubber		
	Bowl	Polycarbonate		
	Filter element	Nonwoven fabrics		
	Bracket	Steel plate (electroless nickel plated)		
Weight (for standard specifications and maximum port size) kg [lb]		0.16 [0.353]	0.20 [0.441]	0.29 [0.639]
Standard equipment		Mounting ring		
Options[Note]		□30 [1.181] integrated pressure gauge (combined), various other pressure gauges (included parts), bracket (included parts)		

Note: See page 151 and onward for individual product specifications or the order code column for details about each option.
Remarks: **FRZ4**□ and **FRZ5**□ are internal pilot types, so the secondary side consumes a small amount of air to adjust pressure.

Order Codes

FRZ □ – □ – □ – □

Filter regulator

Model	Main unit Port size M5	Rc1/8	Rc1/4	Rc3/8	Rc1/2	
30	M5	01	02			Standard
40		01	02	03		
50			02	03	04	
31	M5	01	02			For low pressure
41		01	02	03		
51			02	03	04	
32	M5	01	02			Built-in check mechanism

Bracket
Blank — No bracket
B — With bracket

Pressure gauge specifications
Blank — No pressure gauge (with pressure gauge connection port, Rc1/4)
GP1 — No pressure gauge (with pressure gauge connection port, Rc1/8)
GN — No pressure gauge (no pressure gauge connection port)
G1C — 1 MPa [145 psi] specifications, □30 [1.181] integrated pressure gauge
G4C — 0.4 MPa [58 psi] specifications, □30 [1.181] integrated pressure gauge
G1 — 1 MPa [145 psi] specifications, ϕ40 [1.575] pressure gauge
G3 — 0.3 MPa [44 psi] specifications, ϕ40 [1.575] pressure gauge
G1S — 1 MPa [145 psi] specifications, ϕ40 [1.575] stainless steel bourdon tube pressure gauge
G3S — 0.3 MPa [44 psi] specifications, ϕ40 [1.575] stainless steel bourdon tube pressure gauge
GS6 — 1 MPa [145 psi] specifications, digital pressure switch
GS1A — 1 MPa [145 psi] specifications □50 [1.969] pressure gauge with built-in switch, lead wire system, for 24 VDC
GS1B — 1 MPa [145 psi] specifications □50 [1.969] pressure gauge with built-in switch, lead wire system, for 100 VAC, 200 VAC
GS1C — 1 MPa [145 psi] specifications □50 [1.969] pressure gauge with built-in switch, with DIN system contacts, for 24 VDC
GS1D — 1 MPa [145 psi] specifications □50 [1.969] pressure gauge with built-in switch, DIN system contacts, for 100 VAC, 200 VAC

Note: For specifications of pressure gauges, digital pressure switches, and pressure gauges with switches built in, order codes for individual purchases, and dimensions, see pages 154 to 161.

● Order codes for brackets only

8Z-BK

Order Codes

● Maintenance parts

● Bowl assembly

BA-FRZ□

Body size
30 — for **FRZ3□**
40 — for **FRZ4□**
50 — for **FRZ5□**

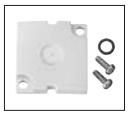
● Element

E-□Z

Body size
30 — for **FRZ3□**
40 — for **FRZ4□**
50 — for **FRZ5□**

● Pressure port plate

P-FRZ (no pressure gauge connection port)



With 1 O-ring and
2 small screws

GP-FRZ□ (with pressure gauge connection port)

Port size
Blank — Rc1/4
1 — Rc1/8

With 1 O-ring and
2 small screws

● Seal kit (various O-rings, 1 valve assembly, 1 diaphragm assembly)

SRK-FRZ□

Body size
30 — for **FRZ3□**
40 — for **FRZ4□**
50 — for **FRZ5□**

Refer to "Replacing the seal kit, element, and bowl assembly" on page 139 regarding the component parts of the seal kits.

● Handle

H-FRZ

● Mounting ring

R-FRZ

* Compatible brackets (to replace multi-series **FR15□·FR30□·FR60□** filter regulators)

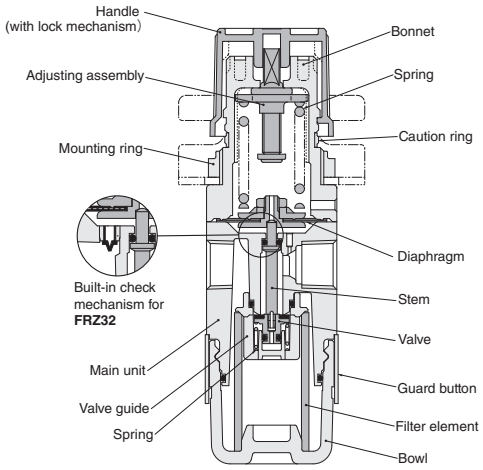
* For details, refer to pages 151 to 153.

8Z-BK□

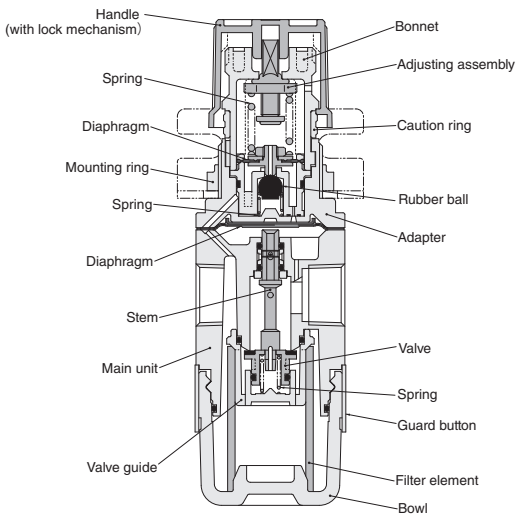
Body size
30 — **FR15□** → replaced by **FRZ3□**
40 — **FR30□** → replaced by **FRZ4□**
50 — **FR60□** → replaced by **FRZ5□**

Inner construction

FRZ3□



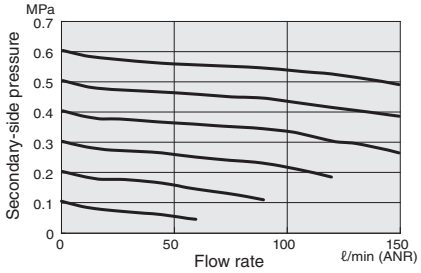
FRZ4□·FRZ5□



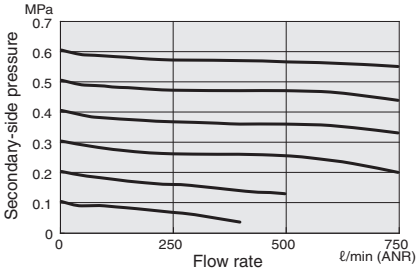
Flow rate characteristics

● Standard/Built-in check mechanism

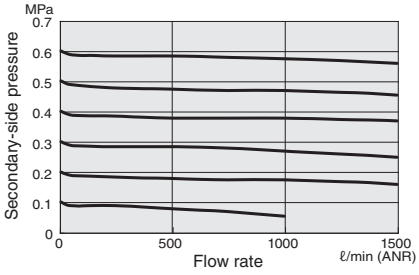
FRZ30-M5
FRZ32-M5



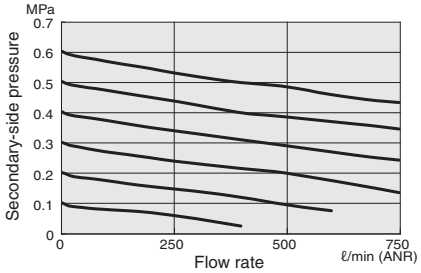
FRZ40-01



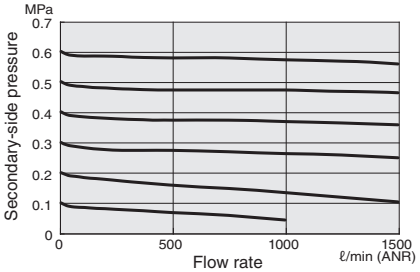
FRZ50-02



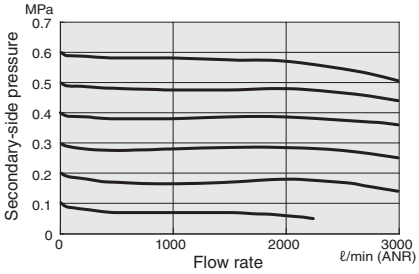
FRZ30-01
FRZ32-01



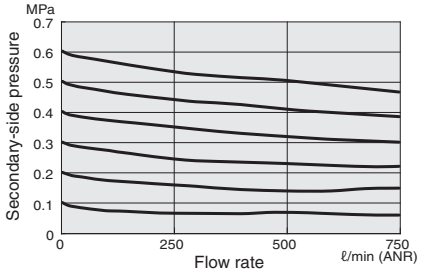
FRZ40-02



FRZ50-03



FRZ30-02
FRZ32-02



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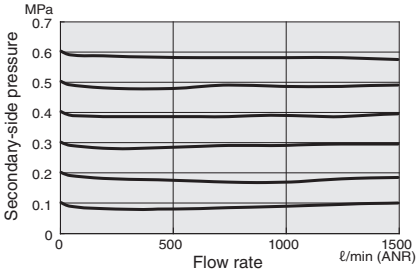
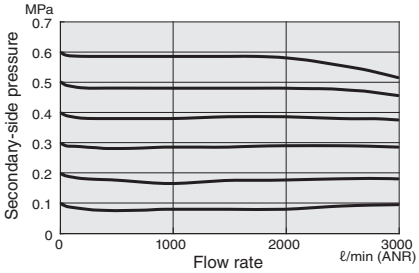


FRZ50-04

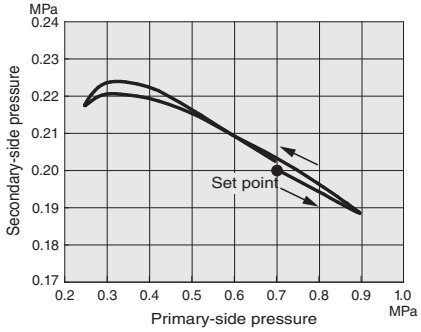


Remarks: Graphs show flow rate characteristics at constant primary-side pressure of 0.7 MPa [102 psi].

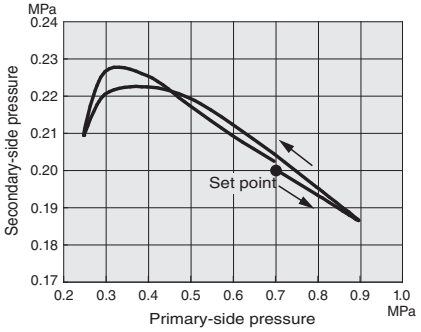
Pressure characteristics

● Standard/Built-in check mechanism

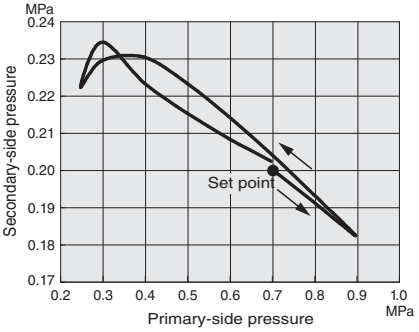
FRZ30
FRZ32



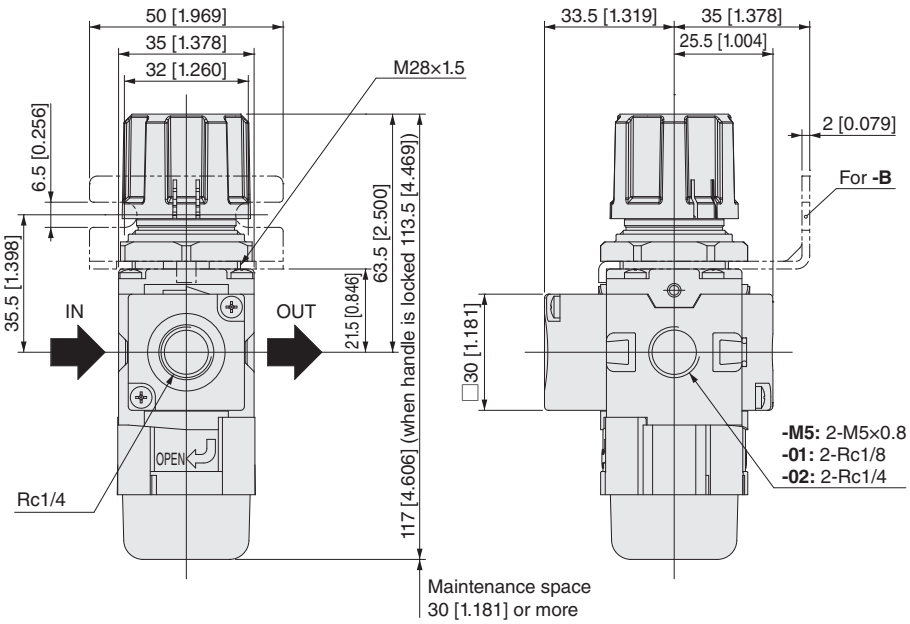
FRZ40



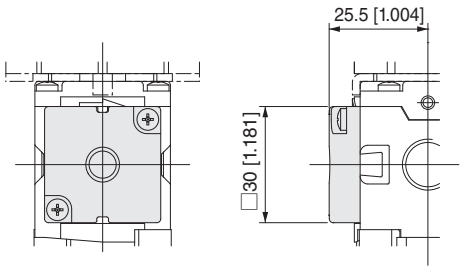
FRZ50



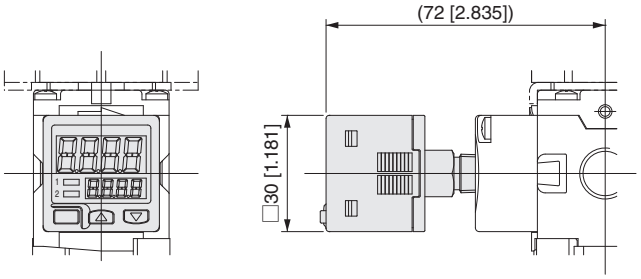
● **FRZ30**
● **FRZ31**
● **FRZ32**



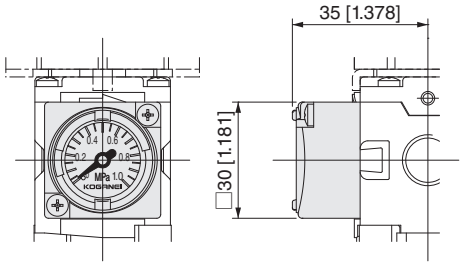
● Pressure gauge option



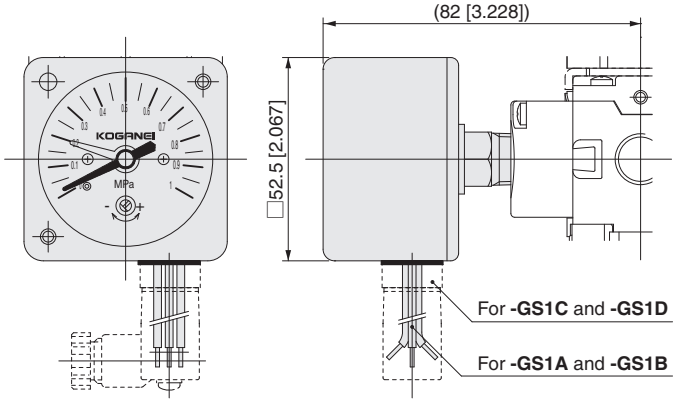
For **-GN**



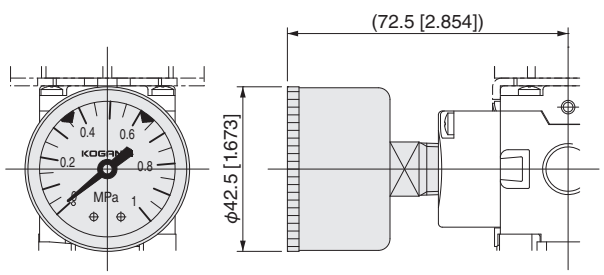
For **-GS6**



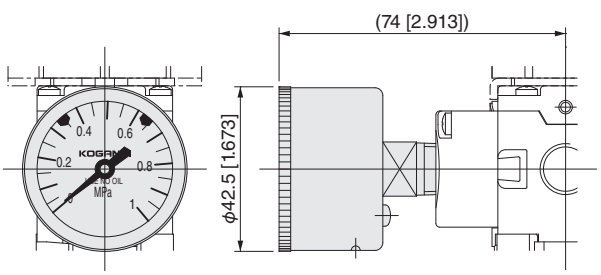
For **-G1C, -G4C**



For **-GS1A, -GS1B, -GS1C** and **-GS1D**

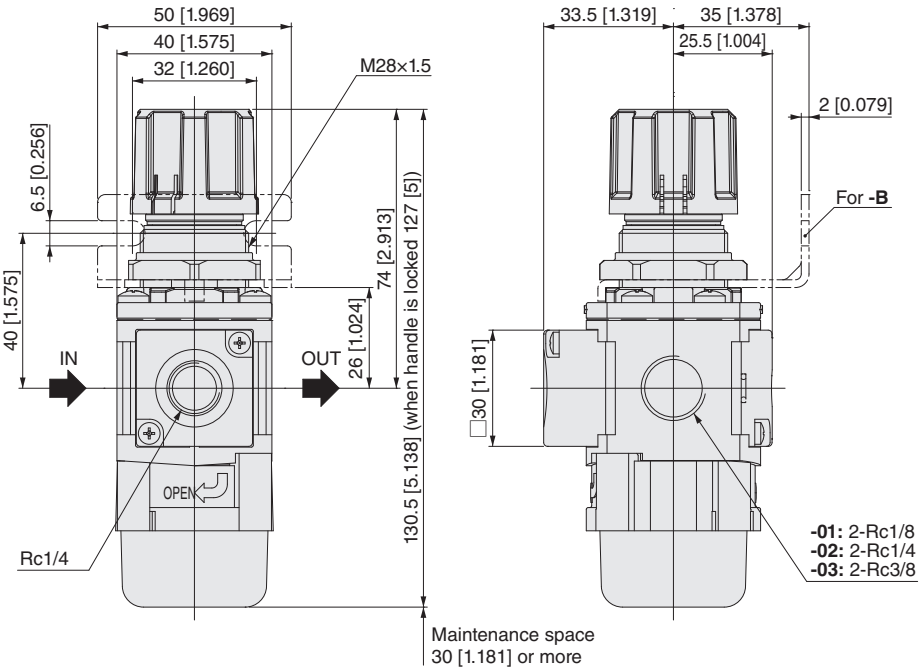


For **-G1, -G3**

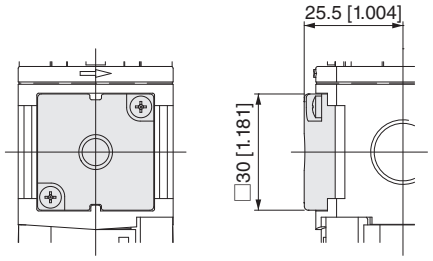


For **-G1S, -G3S**

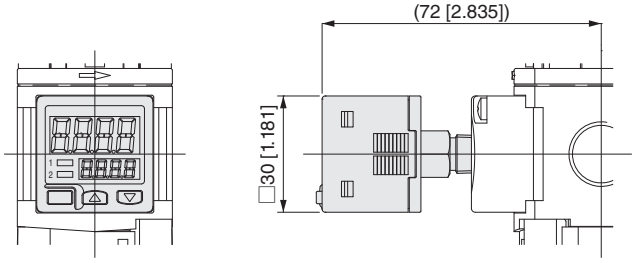
● FRZ40
● FRZ41



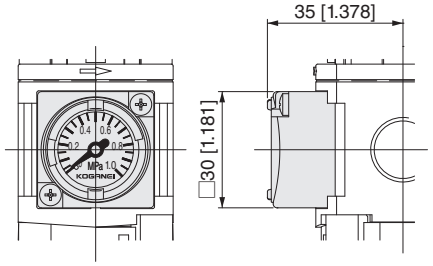
● Pressure gauge option



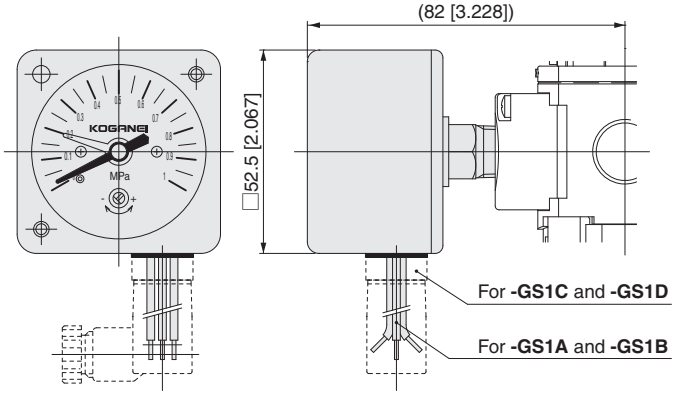
For **-GN**



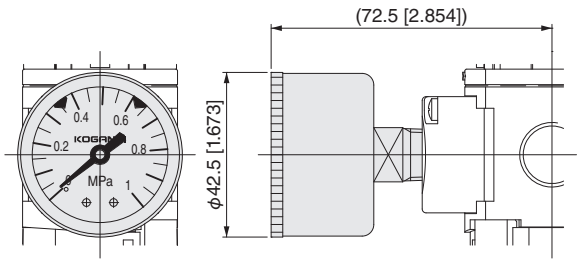
For **-GS6**



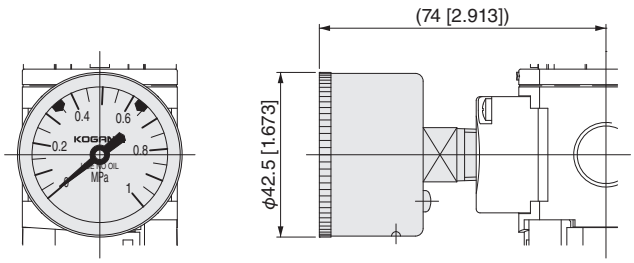
For **-G1C, -G4C**



For **-GS1A, -GS1B, -GS1C** and **-GS1D**

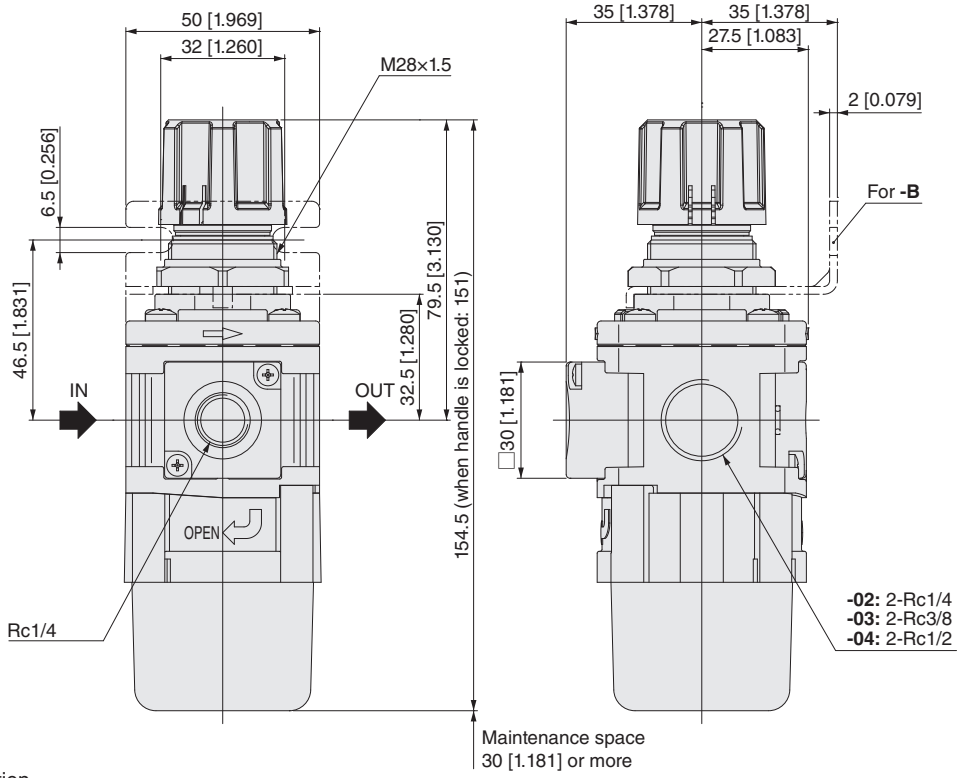


For **-G1, -G3**

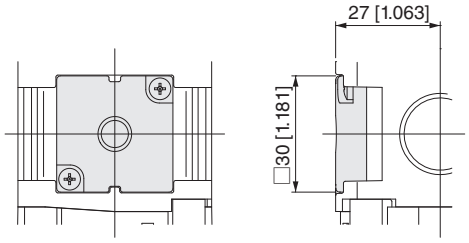


For **-G1S, -G3S**

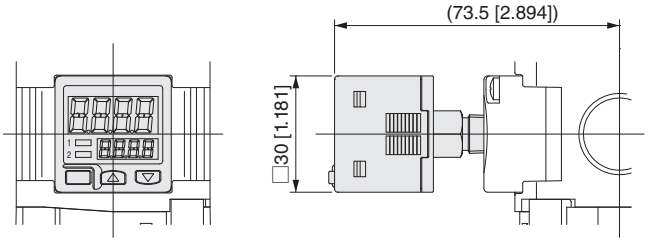
● FRZ50
● FRZ51



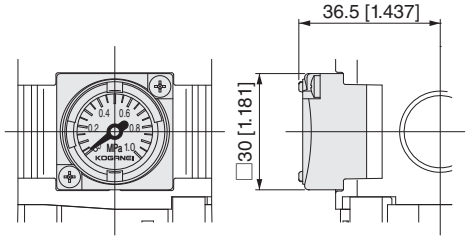
● Pressure gauge option



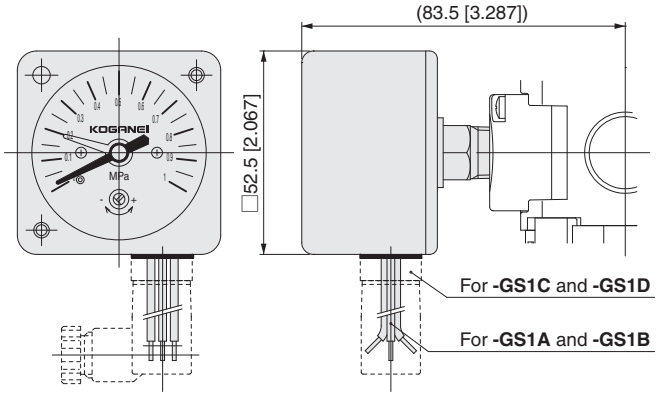
For **-GN**



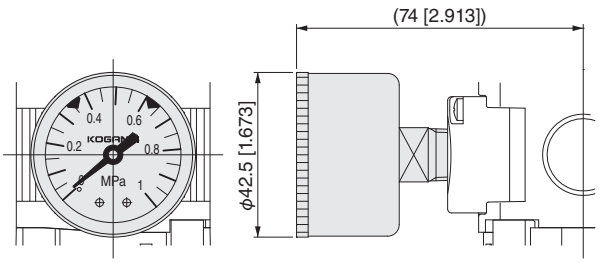
For **-GS6**



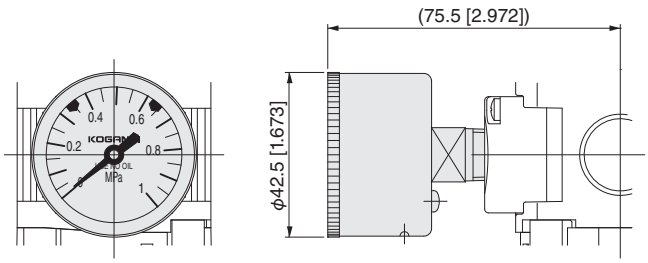
For **-G1C, -G4C**



For **-GS1A, -GS1B, -GS1C** and **-GS1D**



For **-G1, -G3**

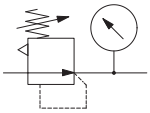


For **-G1S, -G3S**

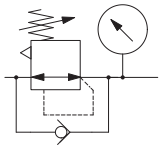
Regulator

RZ30·RZ31·RZ32
RZ40·RZ41
RZ50·RZ51

Symbols



● Standard
● For low pressure



● Built-in check mechanism

Specifications

Item \ Model		RZ30	RZ40	RZ50
	Standard	RZ30	RZ40	RZ50
	For low pressure	RZ31	RZ41	RZ51
	Built-in check mechanism	RZ32	-	-
Media		Air		
Port size		M5×0.8, Rc1/8, Rc1/4	Rc1/8, Rc1/4, Rc3/8	Rc1/4, Rc3/8, Rc1/2
Maximum operating pressure MPa [psi]		1.0 [145]		
Proof pressure MPa [psi]		1.5 [218]		
Operating temperature range (atmospheric and medium) °C [°F]		5 to 60 [41 to 140] (non-condensation)		
Pressure regulating system		Direct acting/relief type	Internal pilot/relief type	
Set pressure range MPa [psi]	Standard/Built-in check mechanism	0.05 to 0.85 [7 to 123]		
	For low pressure	0.05 to 0.40 [7 to 58]		
Relief starting pressure MPa [psi]		Set pressure +0.05 [7] or less		
Materials used in major parts	Main unit	Die cast aluminum alloy		
	Bonnet & adapter	Polyacetal		
	Diaphragm	Base fabric + synthetic rubber		
	Bracket	Steel plate (electroless nickel plated)		
Weight (for standard specifications and maximum port size) kg [lb]		0.13 [0.287]	0.17 [0.375]	0.24 [0.529]
Standard equipment		Mounting ring		
Options[Note]		□30 [1.181] integrated pressure gauge (combined), various other pressure gauges (included parts), bracket (included parts)		

Note: See page 151 and onward for individual product specifications or the order code column for details about each option.
Remarks: **RZ4**□ and **RZ5**□ are internal pilot types, so the secondary side consumes a small amount of air to adjust pressure.

Order Codes

RZ □ – □ – □ – □

Regulator

Main unit / Port size

Model	M5	Rc1/8	Rc1/4	Rc3/8	Rc1/2	
30	**M5**	**01**	**02**			Standard
40		**01**	**02**	**03**		Standard
50			**02**	**03**	**04**	Standard
31	**M5**	**01**	**02**			For low pressure
41		**01**	**02**	**03**		For low pressure
51			**02**	**03**	**04**	For low pressure
32	**M5**	**01**	**02**			Built-in check mechanism

Bracket
Blank — No bracket
B — With bracket

Pressure gauge specifications
Blank — No pressure gauge (with pressure gauge connection port, Rc1/4)
GP1 — No pressure gauge (with pressure gauge connection port, Rc1/8)
GN — No pressure gauge (no pressure gauge connection port)
G1C — 1 MPa [145 psi] specifications, □30 [1.181] integrated pressure gauge
G4C — 0.4 MPa [58 psi] specifications, □30 [1.181] integrated pressure gauge
G1 — 1 MPa [145 psi] specifications, ϕ40 [1.575] pressure gauge
G3 — 0.3 MPa [44 psi] specifications, ϕ40 [1.575] pressure gauge
G1S — 1 MPa [145 psi] specifications, ϕ40 [1.575] stainless steel bourdon tube pressure gauge
G3S — 0.3 MPa [44 psi] specifications, ϕ40 [1.575] stainless steel bourdon tube pressure gauge
GS6 — 1 MPa [145 psi] specifications, digital pressure switch
GS1A — 1 MPa [145 psi] specifications □50 [1.969] pressure gauge with built-in switch, lead wire system, for 24 VDC
GS1B — 1 MPa [145 psi] specifications □50 [1.969] pressure gauge with built-in switch, lead wire system, for 100 VAC, 200 VAC
GS1C — 1 MPa [145 psi] specifications □50 [1.969] pressure gauge with built-in switch, with DIN system contacts, for 24 VDC
GS1D — 1 MPa [145 psi] specifications □50 [1.969] pressure gauge with built-in switch, DIN system contacts, for 100 VAC, 200 VAC

Note: For specifications of pressure gauges, digital pressure switches, and pressure gauges with switches built in, order codes for individual purchases, and dimensions, see pages 154 to 161.

● Order codes for brackets only

8Z-BK

Order Codes

● Maintenance parts

● Seal kit (various O-rings, 1 valve assembly, 1 diaphragm assembly)

SRK-RZ□

Body size
30 —— for **RZ3□**
40 —— for **RZ4□**
50 —— for **RZ5□**

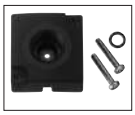
Refer to "Replacing the seal kit, element, and bowl assembly" on page 139 regarding the component parts of the seal kits.

● Pressure port plate

P-FRZ (no pressure gauge connection port)

With 1 O-ring and
2 small screws

GP-FRZ□ (with pressure gauge connection port)

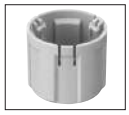


Port size
Blank —— Rc1/4
1 —— Rc1/8

With 1 O-ring and
2 small screws

● Handle

H-FRZ



● Mounting ring

R-FRZ

* Compatible brackets (to replace multi-series **R15□·R30□·R60□** regulators)

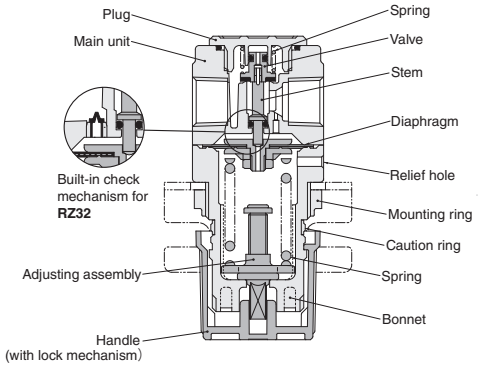
* For details, refer to pages 151 to 153.

8Z-BK□

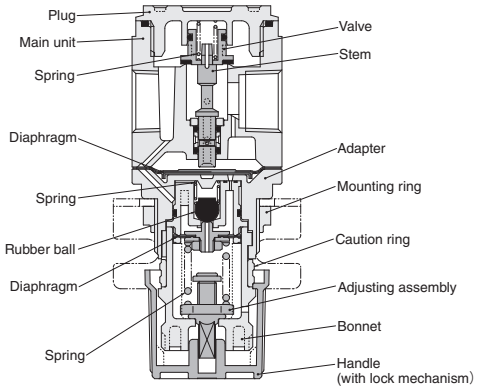
Body size
30 —— **R15□** → replaced by **RZ3□**
40 —— **R30□** → replaced by **RZ4□**
50 —— **R60□** → replaced by **RZ5□**

Inner construction

RZ3□



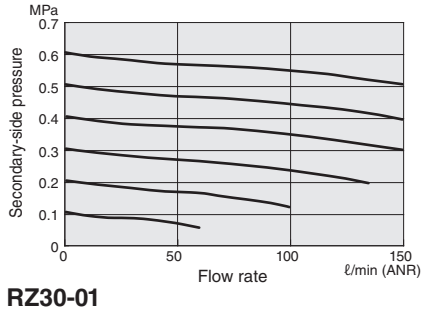
RZ4□·RZ5□



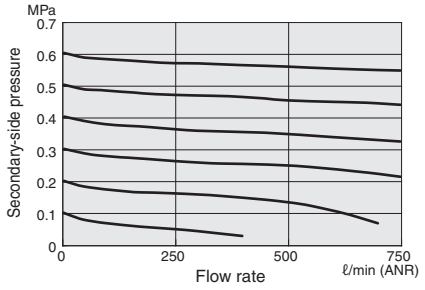
Flow rate characteristics

● Standard/Built-in check mechanism

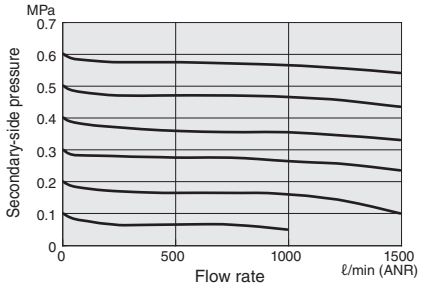
RZ30-M5
RZ32-M5



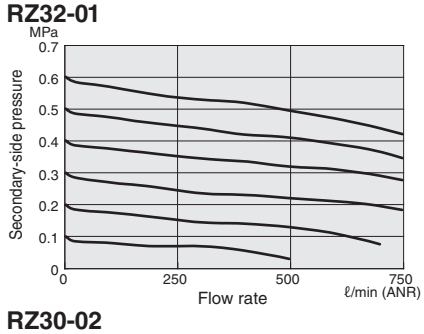
RZ40-01



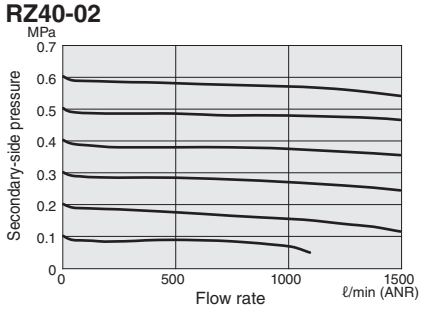
RZ50-02



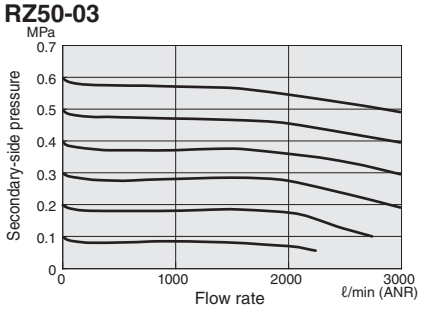
RZ30-01
RZ32-01



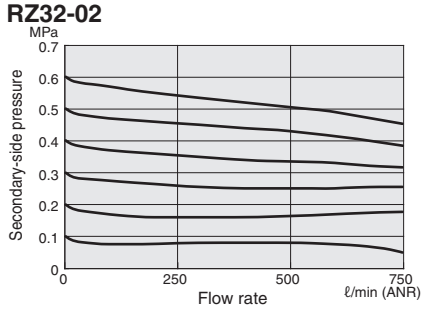
RZ40-02



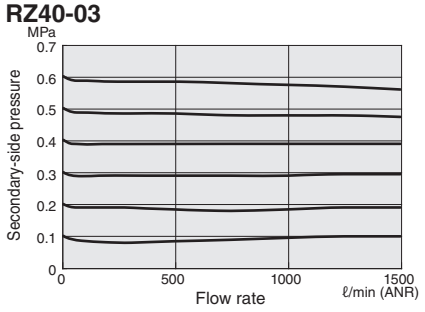
RZ50-03



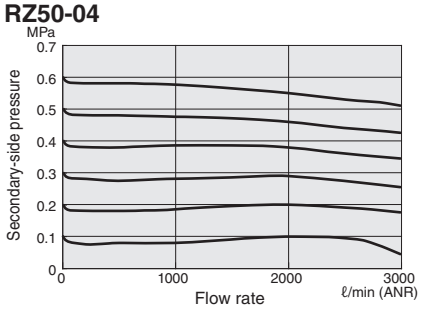
RZ30-02
RZ32-02



RZ40-03



RZ50-04

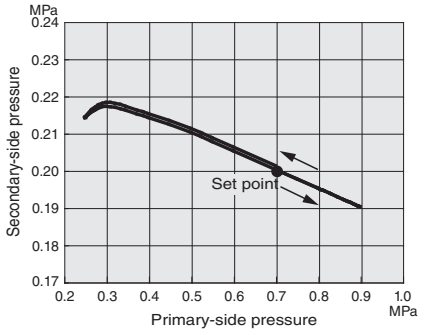


Remarks: Graphs show flow rate characteristics at constant primary-side pressure of 0.7 MPa [102 psi].

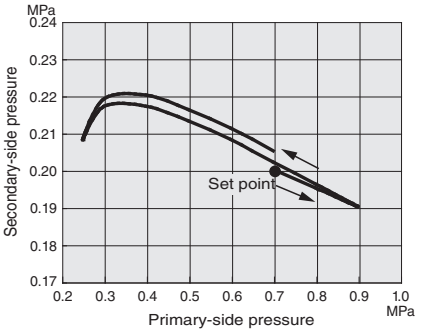
Pressure characteristics

● Standard/Built-in check mechanism

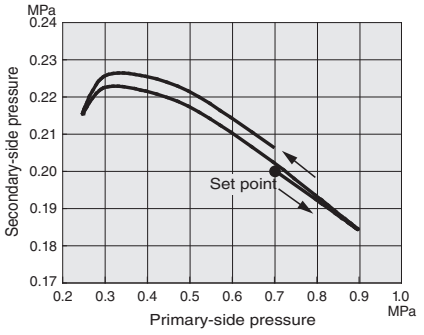
RZ30
RZ32



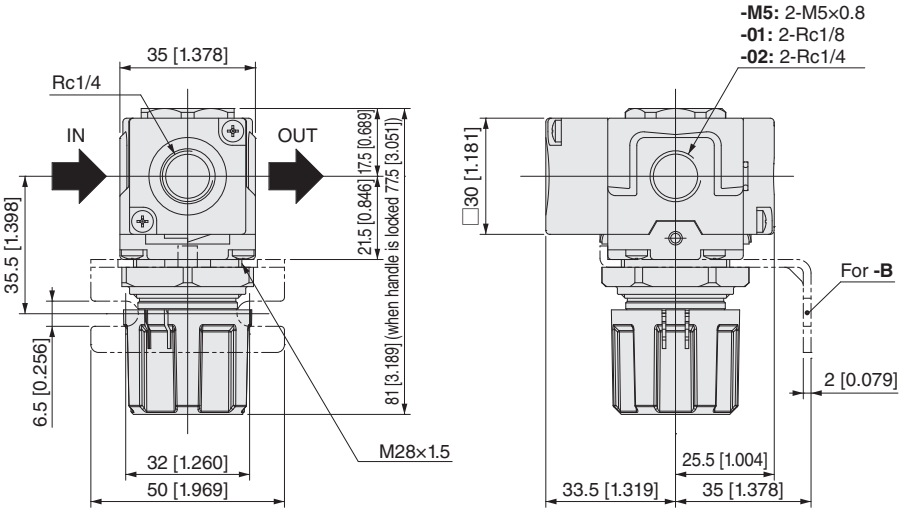
RZ40



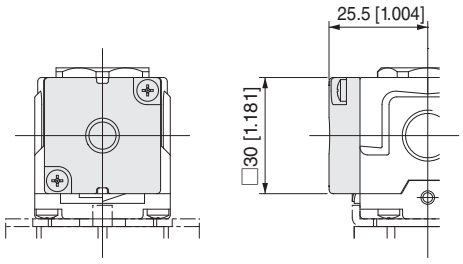
RZ50



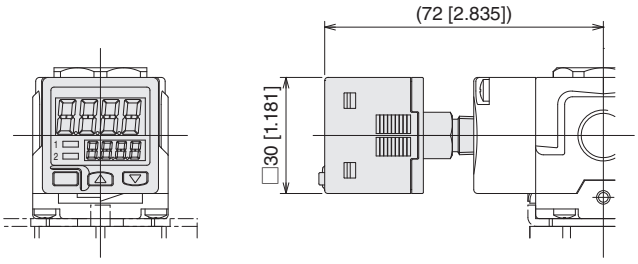
● RZ30
● RZ31
● RZ32



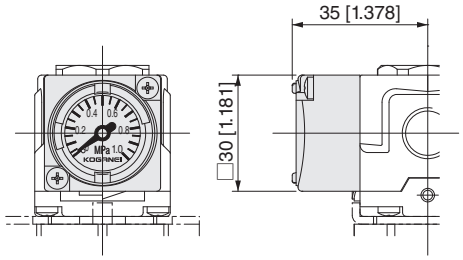
● Pressure gauge option



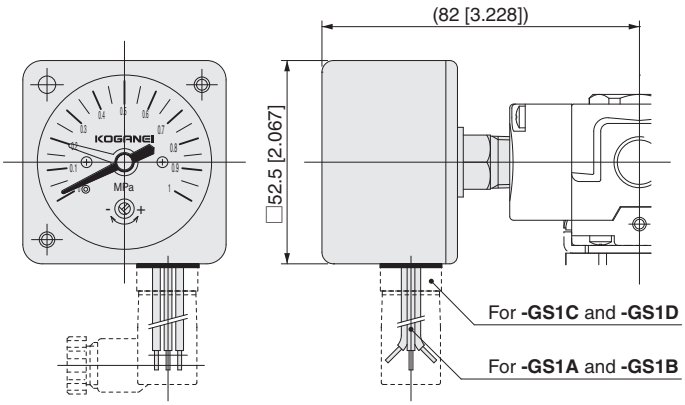
For **-GN**



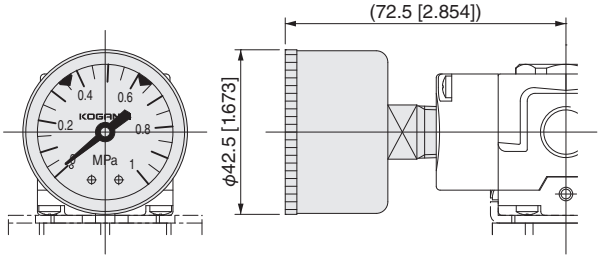
For **-GS6**



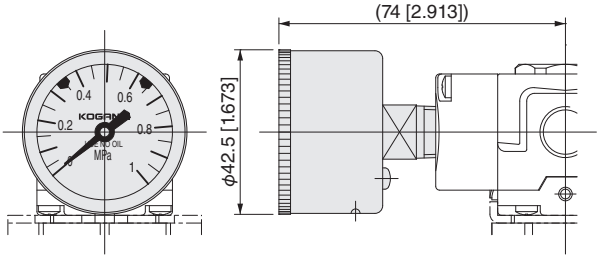
For **-G1C, -G4C**



For **-GS1A, -GS1B, -GS1C** and **-GS1D**

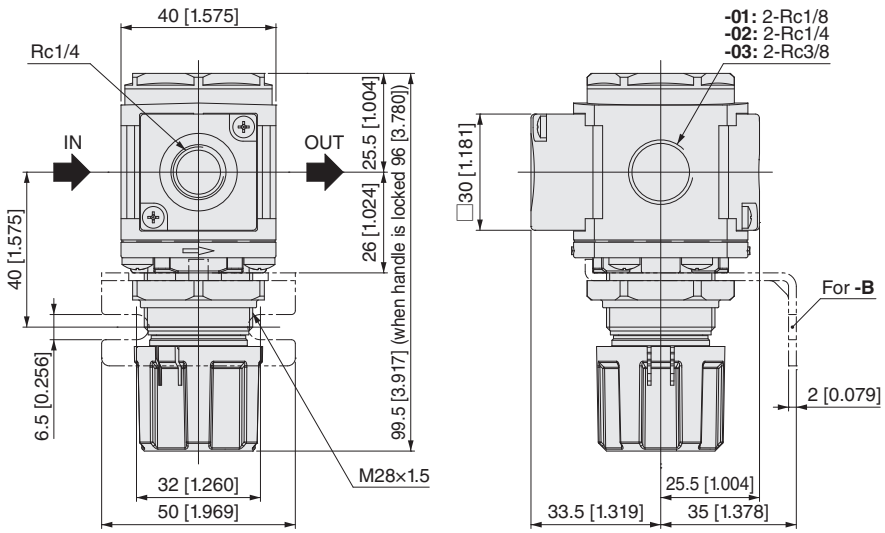


For **-G1, -G3**

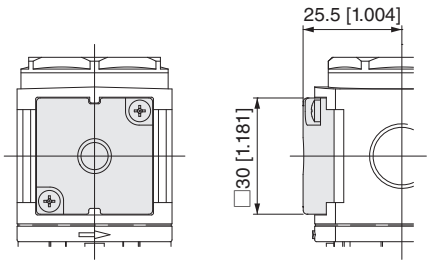


For **-G1S, -G3S**

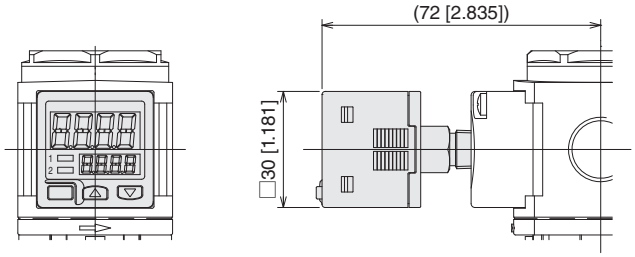
● RZ40
● RZ41



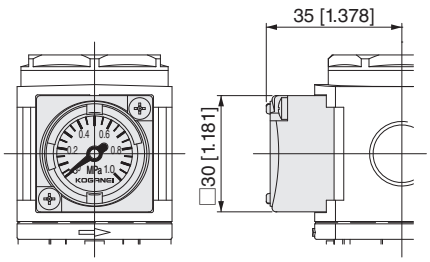
● Pressure gauge option



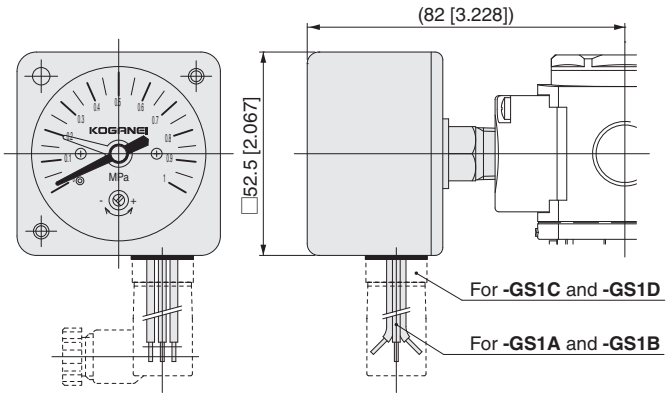
For **-GN**



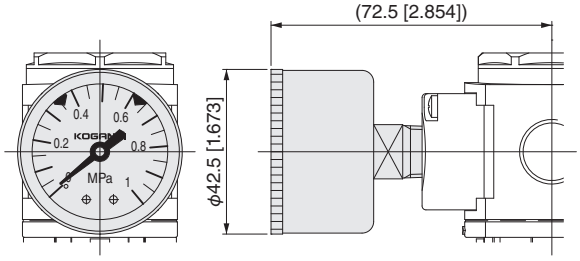
For **-GS6**



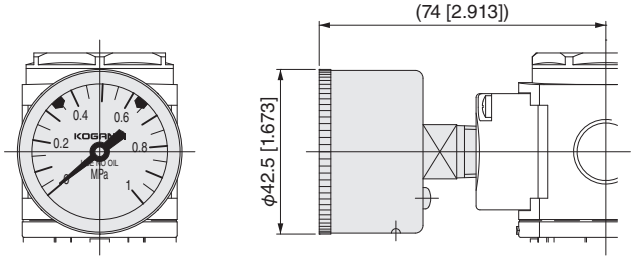
For **-G1C, -G4C**



For **-GS1A, -GS1B, -GS1C** and **-GS1D**



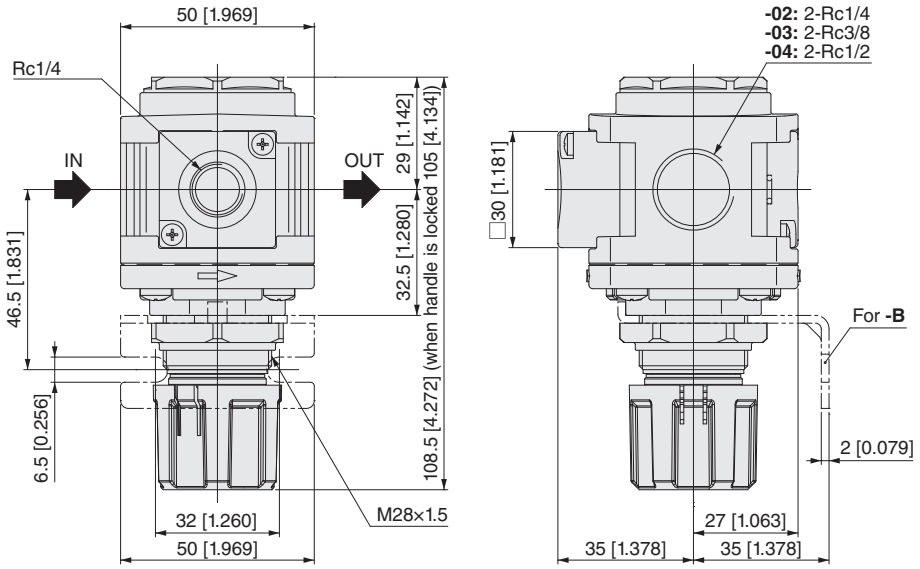
For **-G1, -G3**



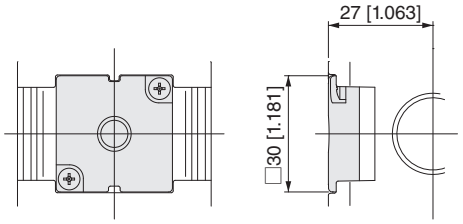
For **-G1S, -G3S**

Filter regulator dimensions (mm [in.])

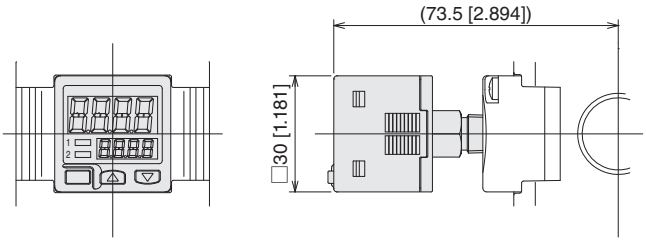
● **RZ50**
● **RZ51**



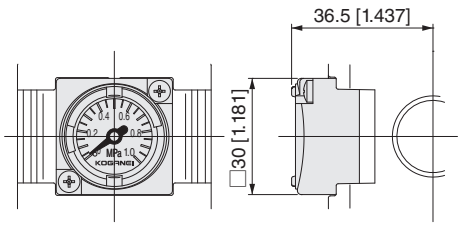
● Pressure gauge option



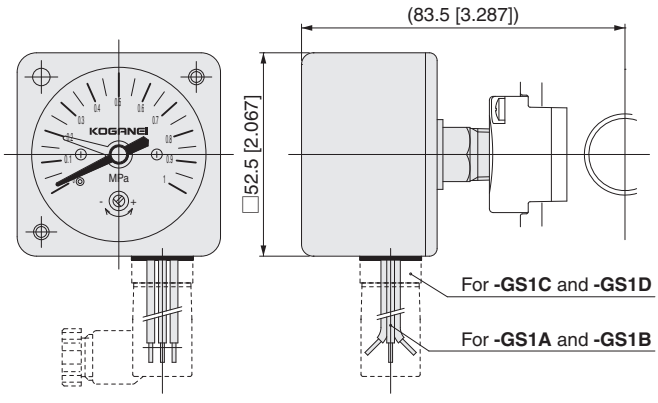
For **-GN**



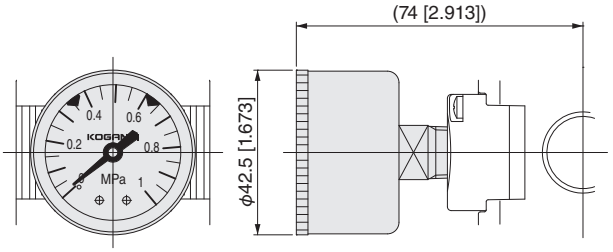
For **-GS6**



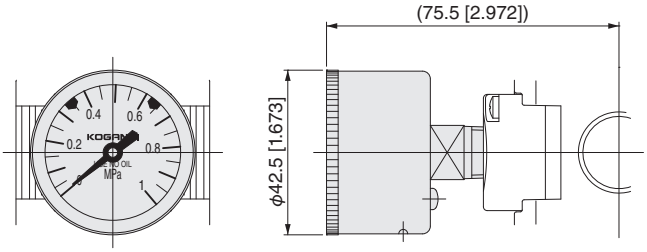
For **-G1C, -G4C**



For **-GS1A, -GS1B, -GS1C** and **-GS1D**



For **-G1, -G3**



For **-G1S, -G3S**

Design and selection

● Selection

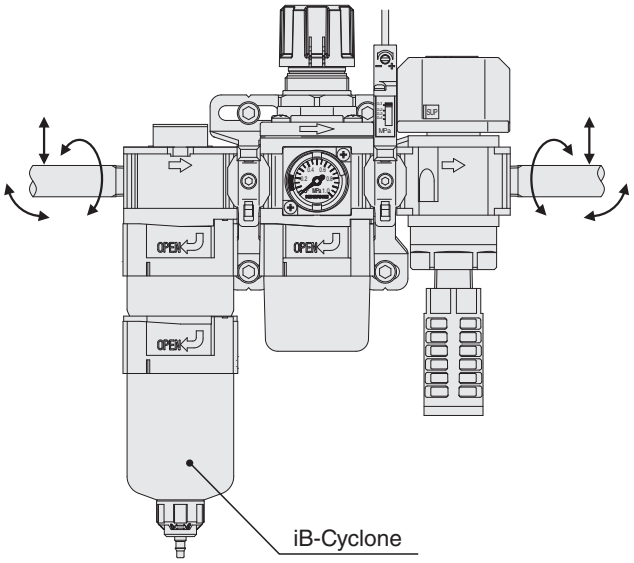
See the Handling Instructions and Precautions, Specifications, Various Characteristics, Dimensions, and other technical materials for each product to make the correct decision.

Mounting (installation) and piping

● Mounting (installation) direction, support, and securing

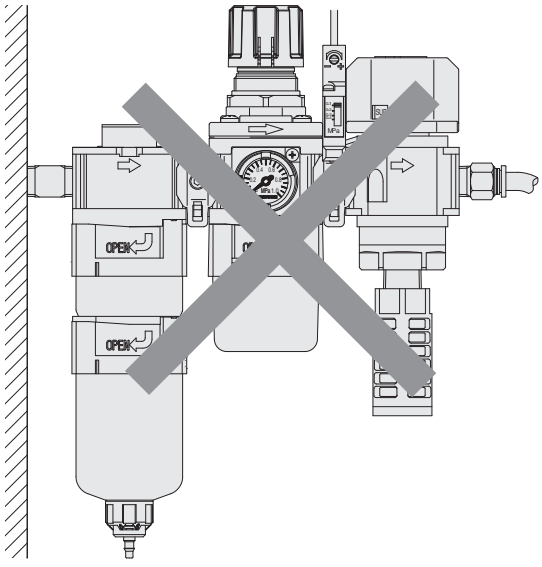
1. The products cannot be mounted (installed) if a bending moment or twisting moment is applied to the product or piping.

NOTE Applying bending moment or twisting moment may damage the product.



2. Do not attach piping so that just one side is fixed as shown in the following diagram. Support external piping separately.

NOTE The moment caused by the OUT (secondary) side pipes may damage the product's piping connections.



3. Use the D modules, brackets, etc. to install the products.
4. The product can be mounted (installed) in any direction. It is also possible to install it with the bowl of the filter on top.

5. When mounting (installing) a product, always make sure it is secured and sufficiently supported.

NOTE If a product is not securely fixed in place, it can fall over, be dropped, or operate abnormally and cause an injury.

● Maintenance space requirements

Assure there is sufficient space for maintenance inspections and maintenance work. See the dimension diagram for each of the products regarding the maintenance space.

NOTE If there is not enough allowance for maintenance space, it will be impossible to remove the bowl assembly and replace the element.

NOTE If there is not enough allowance for maintenance space, it will be impossible to do maintenance inspections and maintenance work so the equipment may stop or the product may be damaged.

● Direction of flow

1. Connect the filter regulator or regulator so that the medium flows in the IN port (primary) side and out the OUT port (secondary) side.
2. For filter regulators and regulators, identify the direction of flow of the medium being used by the flow marks on each product. See the "Handling Instructions and Precautions (Filter Regulators, Regulators on page 136) for the relationship of the direction of flow of the medium and the flow marks.

NOTE Connecting a product so that the flow of the medium is reversed can damage the product or cause it to stop functioning.

● Attaching steel pipes and fittings

If steel pipes and fittings are attached to the threaded sections of the aluminum die-cast parts of the product, tighten them to the torque recommended in our standards.

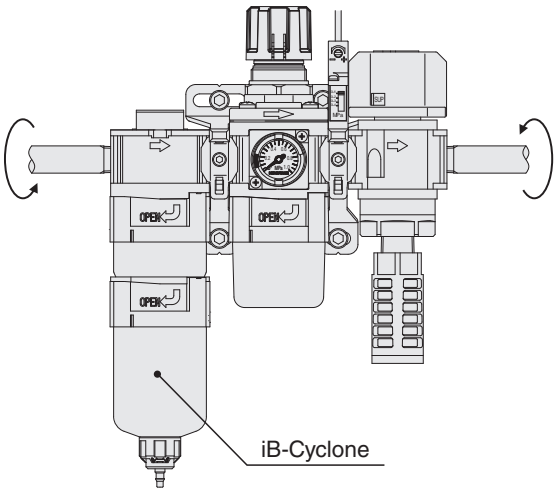
NOTE Tightening with excess torque may damage the product or injure workers or operators.

Recommended tightening torque N·m [ft·lbf]

Connecting thread	M5	1/8	1/4	3/8	1/2
Torque	1 to 1.5 [0.738 to 1.106]	4.5 to 6.5 [3.319 to 4.794]	7 to 9 [5.163 to 6.638]	12.5 to 14.5 [9.220 to 10.695]	20 to 22 [14.752 to 16.227]

NOTE When mounting the various pressure gauges to a pressure port plate with Rc1/8 or Rc1/4, tighten them to 3.0 to 5.0 N·m [2.213 to 3.688 ft·lbf].

NOTE When mounting something, such as a muffler, to the 3(R) port of a residual pressure exhaust valve, tighten it to 1.8 to 2.2 N·m [1.328 to 1.623 ft·lbf].

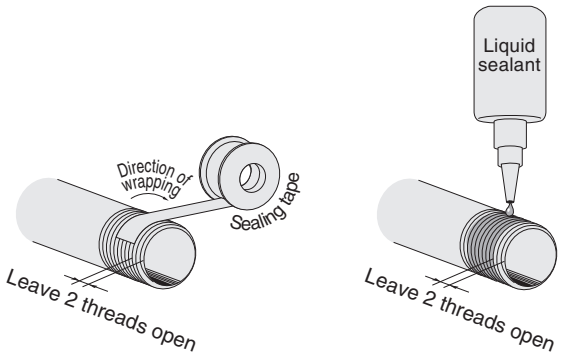


● Preventing contamination by foreign matter

1. Remove all foreign matter, such as metal chips, cutting oil, or dirt, from inside pipes with an air blower (flushing) and thorough washing before fitting the pipes.
2. Do not allow foreign matter, such as metal chips, or sealing tape from the piping threads, to get into the pipes when fitting the pipes.

NOTE Foreign matter entering the piping may damage the product or reduce its performance and service life.

3. Wrap the sealing tape in the direction as shown in the diagram below leaving 1.5 to 2 threads uncovered. When using liquid sealant, apply a suitable amount and also leave 1.5 to 2 threads uncovered.



NOTE When fitting the pipes, if there is sealing tape or liquid sealant on the end cap of the steel pipes or fittings, the fragments may get into the pipes and cause an air leak.

4. If you are using liquid sealant, do not get it on the bowl of the filter regulator or the front cover of the pressure gauge.

NOTE If liquid sealant gets on the parts, it may damage them.

Medium and operating environment

● Usable medium

1. Use cleaned air (using a filter of 5 μm or less) for the medium. Contact the nearest Koganei sales office or overseas department if you are considering using something other than cleaned air.
2. Do not use air that contains moisture or fluids.

NOTE Using air that contains moisture and fluids will cause the product's functions to stop after a short period and will reduce the product performance and service life.

3. If air that contains moisture and fluids is used, or if it is possible that they may be mixed in with the air being used, then be sure to install a moisture and fluid removal device (such as iB-Cyclone) on the primary side to reliably remove moisture and fluids.
4. Avoid using media that is prone to extreme pulsating or surging.

NOTE Medium prone to extreme pulsating or surging will cause the product's functions to stop after a short period and will reduce the product performance and service life.

● Operating environment

1. Do not use equipment in locations that are subject to direct sunlight (ultraviolet rays); locations with high humidity and temperature, dust, salt, or iron powder.
2. Cover the unit when using it in locations where it might be subject to excessive dust, dripping water, dripping oil, etc.
3. Do not use equipment in environments subject to external vibration or impact.

NOTE External vibrations or shocks may result in damage to component parts.

4. Avoid piping that is rigid, such as steel piping, if vibrations are transmitted. Use flexible tubes so that the product is not subject to the vibrations.

● Medium and operating environment

1. The temperature of the medium and the ambient environment must be within the range in the specifications.

NOTE Using the product in an environment that is outside the specified temperature or with media that is outside the specified temperature will cause the product's functions to stop after a short period and will reduce the product performance and service life.

2. Do not use media in the product or use the product in an environment that includes corrosive components such as organic solvents, phosphate ester type hydraulic oil, sulfur dioxide, chlorine gas, Freon gas, ozone, acids, alkaline, or in atmospheres or locations with screw lock agents, leak detection fluids, or hot water, or direct exposure to ultraviolet rays. See the reference materials on page 162 for details.

NOTE Using the product in an environment or with media that is specified in the above item 2 will cause the product's functions to stop after a short period and will reduce the product performance and service life.

Operation and maintenance inspections

● Method of use

Read the Handling Instructions and Precautions for how to use each product for instructions on correct usage (filter regulators, regulators on page 136 to 140, □30 [1.181] integrated pressure gauge on page 140).

● Maintenance (maintenance inspection)

1. Performance and functions may decrease as the pneumatic equipment ages. Always conduct daily inspections of the pneumatic equipment, and confirm that all requisite system functions are satisfied, to prevent accidents from happening.
2. Read the Handling Instructions and Precautions for instructions on the correct way to do maintenance and replace maintenance parts (filter regulators and regulators on pages 139 to 140).
3. The product must be disassembled and reassembled to use the seal kit.

NOTE Products that have been disassembled and reassembled are not covered by the warranty.

Design and selection

● Pressure settings

1. If the pressure being applied exceeds the set pressure value of the device or equipment that is installed on the OUT port (secondary) side of the filter regulator or regulator, such that it may damage the device or equipment or cause malfunctions, then be sure to install a safety device.
2. We recommend that the OUT port (secondary) side pressure setting be 85% or less of the IN port (primary) side supply pressure.

   NOTE If the pressure is set to a value exceeding 85%, the pressure on the IN port (primary) side and the flow rate used will be easily affected, causing the pressure on the OUT port (secondary) side to become unstable.
3. It is not possible to use an internal pilot type filter regulator or regulator (applicable models FRZ4□, FRZ5□, RZ4□, RZ5□) with a valve installed on the IN port (primary) side to repeatedly switch the IN port (primary) side pressure.

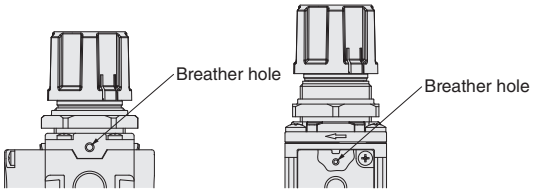
   NOTE The OUT port (secondary) side set pressure may fluctuate due to switching of the IN port (primary) side pressure.
4. If air is not consumed for a long time, or if a sealed circuit or balance circuit is used, the pressure on the OUT port (secondary) side may fluctuate. Contact the nearest Koganei sales office or overseas department.
5. Contact the nearest Koganei sales office or overseas department if you intend to use the product in a circuit that requires high-precision pressure adjustment.

● OUT port (secondary) side pressure exhaust and breather hole

1. When reducing the OUT port (secondary) side pressure by turning the handle on the filter regulator or regulator, or when exhausting OUT port (secondary) side pressure when it has risen above the set pressure, the pressure is exhausted to the outside through the breather hole shown in the figure below.

   NOTE There may be some vibration and noise during exhaust.
2. If sudden pressure increases occur on the OUT port (secondary) side of the filter regulator or regulator, such as are caused by external forces applied to the actuator, then install a separate exhaust mechanism on the OUT port (secondary) side of the filter regulator.

   NOTE The relief port is smaller than the piping bore, so it may not be able to handle a sudden pressure increase on the OUT port (secondary) side.



For **FRZ3□, RZ3□** For **FRZ4, RZ4, FRZ5,** and **RZ5**

● Backflow (residual pressure exhaust) from the OUT port (secondary) to the IN port (primary)

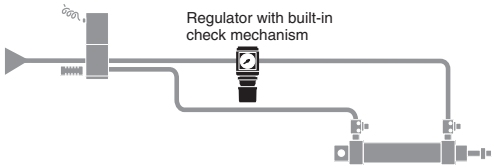
1. To release the pressure from the IN port (primary) of a direct-acting filter regulator or regulator (applicable models FRZ3/RZ3) and process the residual pressure from the OUT port (secondary), select a filter regulator or regulator with a built-in check mechanism (applicable model FRZ32, RZ32).

   NOTE Depending on the conditions of use, etc., processing residual pressure on the OUT port (secondary) side may not be possible for the standard and low-pressure specifications.
2. For internal pilot type filter regulators and regulators (applicable models FRZ4□, FRZ5□, RZ4□, RZ5□), when the pressure on the IN port (primary) side is released, the residual pressure on the OUT port (secondary) side is processed through the relief port.

   NOTE If the volume of the OUT (secondary) side flow path is large, exhaust may take time.
3. If you are using a filter regulator or regulator with a built-in check mechanism (applicable models FRZ32 and RZ32) installed after the valve to adjust the actuator thrust, make sure that the pressure on the OUT port (secondary) side of the filter regulator or regulator with a built-in check mechanism does not rise above the set pressure due to the back pressure of the actuator (as a guide, use an actuator with a difference in pressure of 0.3 MPa [44 psi] or less between the push side and pull side).

<Reference> System upgrade with filter regulator or regulator with built-in check mechanism

Filter regulators and regulators with a built-in check mechanism open the built-in check valve when the IN port (primary) side pressure is lost, thereby disrupting the pressure balance, and the main valve opens instantly to release the OUT port (secondary) side pressure to the IN port (primary) side. Since the thrust force on the push and pull sides of the actuator can be easily changed, air consumption can be reduced by operating the side that does not require thrust force at a lower pressure.

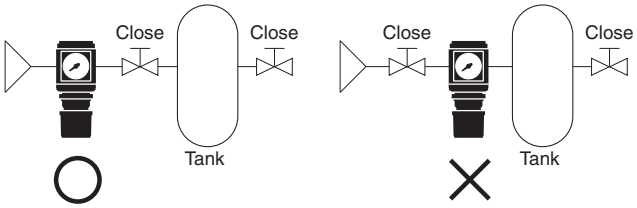


● Moisture and fluid removal

The filter regulator has no function to remove moisture or fluid.

● Air consumption

1. Internal pilot type filter regulators and regulators (applicable models FRZ4□,FRZ5□, RZ4□, RZ5□) consume air while regulating the OUT port (secondary) side pressure.
2. Air consumption varies depending on the relationship between the pressure on the IN port (primary) side and the pressure on the OUT port (secondary) side.
3. Internal pilot type filter regulators and regulators (FRZ4□, FRZ5□, RZ4□, RZ5□) if the IN port (primary) side and OUT port (secondary) side are sealed, the pressure will drop due to air consumption.

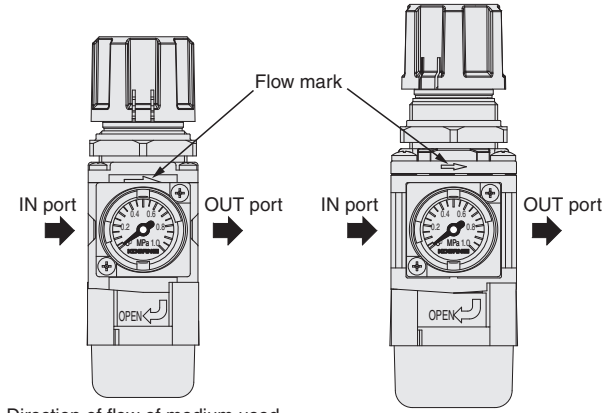


Air consumption causes the pressure in the tank to drop.

Mounting (installation) and piping

● Flow mark

The following diagram shows the relationship of the direction of flow of the medium and the flow mark on filter regulators and regulators.



Direction of flow of medium used

For **FRZ3□, RZ3□**

Direction of flow of medium used

For **FRZ4□, FRZ5□, RZ4□, RZ5□**

● Piping work

Connect pipes and fittings to the filter regulator or regulator IN ports and OUT ports so that the weight and torque of the pipes do not affect the product. When tightening the piping, hold the main unit and tighten it to the torque recommended on page 135.

NOTE Applying unnecessary force or impact to the handle, bowl assembly, or pressure gauge may damage component parts.

● Installing brackets

To install brackets, do it in the following order.

1. Remove the handle.
   (See "Removing the Handle" on page 138 for instructions on how to remove the handle.)
2. Install the bracket.
3. Screw on the mounting ring.

NOTE Tighten the mounting ring to 5.0 N·m [3.688 ft·lbf] or less.

4. Install the handle.
   (See "Installing the Handle" on page 138 for instructions on how to install the handle.)

● Panel mount

1. The diameter of the mounting hole in the panel for all sizes of filter regulators and regulators is ϕ28.5 mm [1.122 in.].

2. See the following table for the thicknesses of the panels.

mm [in.]

Model	FRZ3□ RZ3□	FRZ4□ RZ4□	FRZ5□ RZ5□
Thickness	3 [0.118] or less	7 [0.276] or less	

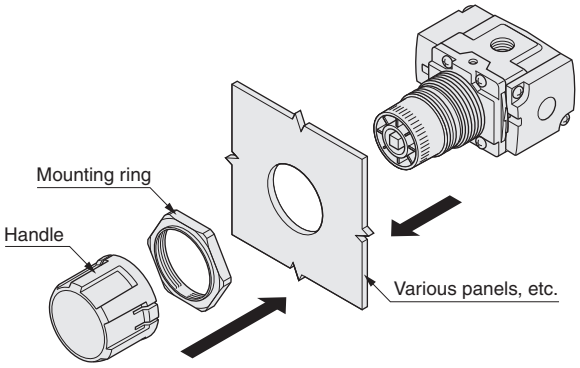
NOTE Using panels that are thicker than specified will cause panels to not be securely fastened with the mounting rings or reduce the visibility of the yellow caution ring.

3. To install panel mounts, do it in the following order.

1. Remove the handle.
   (See "Removing the Handle" on page 138 for instructions on how to remove the handle.)
2. Install the filter regulator or regulator to the panel.
3. Screw on the mounting ring.

NOTE Tighten the mounting ring to 5.0 N·m [3.688 ft·lbf] or less.

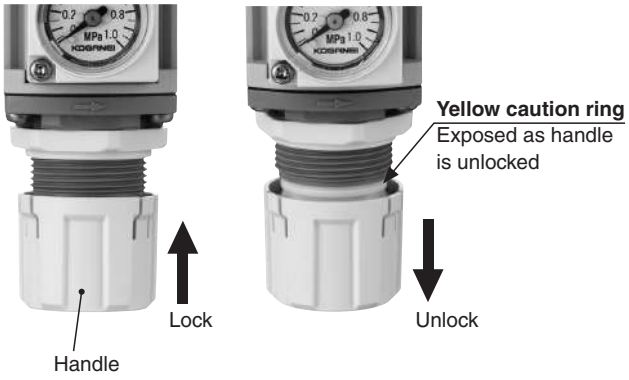
4. Install the handle.
   (See "Installing the Handle" on page 138 for instructions on how to install the handle.)



Operation and maintenance inspections

● Locking and unlocking the handle

1. The handles on the filter regulators and regulators have a push-lock mechanism.
Use the procedure shown below to lock and unlock the handle.



2. The handle must be unlocked to adjust the pressure.

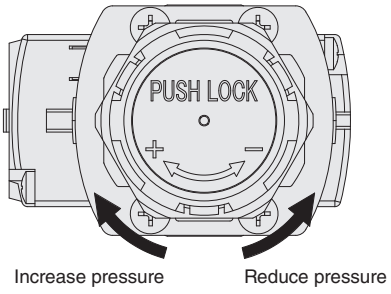
NOTE Turning the handle while it is locked may cause damage to component parts.

3. After adjusting the pressure, lock the handle.

● Pressure adjustment

1. To adjust the pressure, turn the handle in the "+" direction as indicated on the bottom of the handle as shown in the diagram below to increase pressure, and turn the handle in the "-" direction to decrease pressure.

NOTE If you turn the handle too far, it may cause damage to internal parts or cause them to stick, making the handle harder to turn.
Be careful not to turn it too far.



2. When adjusting the pressure, start from the low pressure side and adjust to the desired setting pressure.If you exceed the desired pressure, lower the pressure and then adjust to the desired setting pressure again from the low pressure side.

NOTE If you adjust the pressure to the desired setting from the high pressure side, it may cause the pressure on the OUT port (secondary) side to become unstable.

3. When adjusting the pressure, check the pressure on the IN port (primary) side and OUT port (secondary) side by using a pressure gauge or other device.

4. Even though the handle can be turned to the “+” side maximum value, which increases the pressure beyond the upper limit of the set pressure range, you need to keep the pressure within the set pressure range while you adjust it.

● Removing the handle

To remove the handle, do it in the following order.

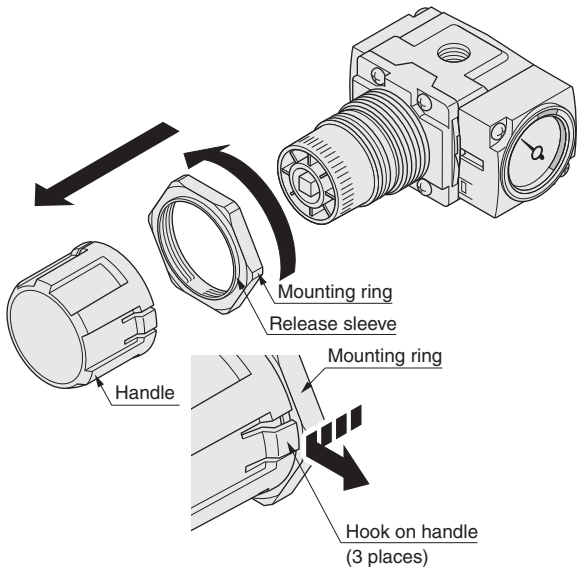
1. Unlock the handle.
   (See "Locking and unlocking the handle" on page 137 for instructions on how to lock/unlock the handle.)
2. Turn the mounting ring counterclockwise (in the direction of the arrow in the figure below).

NOTE Turn the mounting ring until it comes off the threads.

3. Pull the mounting ring towards the handle.

NOTE Pull the release sleeve of the mounting ring until it pushes open the claws (3 positions) on the handle.

4. Pull off the handle and mounting ring together.



● Installing the handle

1. To install the handle, do it in the following order.

1. Release the pressure on the IN port (primary) side to atmosphere.
2. Screw on the mounting ring.

NOTE Installing the handle before screwing in the mounting ring will cause the mounting ring to become unattachable or the handle to become difficult to remove.

3. Push the handle in until the yellow caution ring is no longer visible.

NOTE Before pushing the handle in, align the □ shape on the adjusting assembly (see exploded view on page 139) with the □ hole shape on the bottom of the handle.

2. If the handle is attached while pressure is supplied to the IN port (primary) side of the filter regulator or regulator, the OUT port (secondary) side pressure may temporarily increase.
If a temporary increase in the OUT port (secondary) side pressure can cause damage or malfunction of the OUT port (secondary) side equipment or devices, be sure to release the IN port (primary) side pressure to the atmosphere before attaching the handle.

NOTE Doing so can damage the product or injure workers or operators.

3. Before attaching the handle, check that the temporary increase in pressure on the OUT port (secondary) side will not affect equipment and devices downline if the pressure on the IN port (primary) side cannot be released to the atmosphere.

● Interchangeable □30 [1.181] integrated pressure gauge and pressure port plate

When rotating the □30 [1.181] integrated pressure gauge 180° or when interchanging a □30 [1.181] integrated pressure gauge or a pressure port plate, do it in the following order.

1. Remove the two small retaining screws.
2. Remove any metal chips from the female threads, such as by using an air blower.

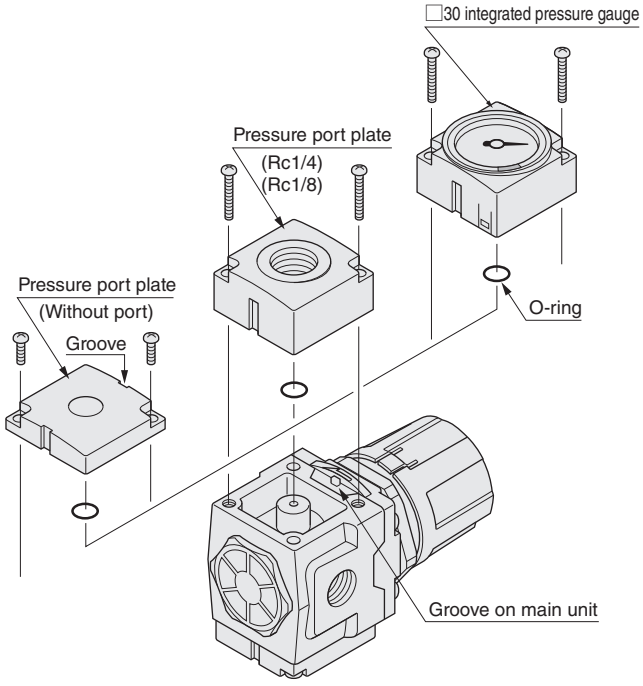
NOTE If there are any metal chips left, they can damage the screw threads or the metal chips might stick to the O-ring, causing air to leak.

3. Install the O-ring on the □30 [1.181] integrated pressure gauge or pressure port plate.

NOTE Not assembling the O-ring will result in air leaks.

4. Align the notches on the □30 [1.181] integrated pressure gauge or the pressure gauge port plate with the protrusions on the main unit to assemble them.
5. Tighten the two small retaining screws to a torque of 0.9 to 1.1 N·m [7.966 to 9.736 in·lbf].

NOTE Tightening to a torque that exceeds the specified value can cause the screw head or bit to break or damage the component parts. Tightening to a torque that is less than the specified value might allow the screws to loosen and let air leak out.

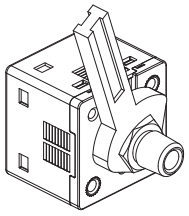


Filter regulator
Regulator

● Installing included options

1. When attaching the various pressure gauges and other things, be sure to tighten them by using a tightening tool on the square or hexagonal parts of the ports.

NOTE Holding the main body of the various pressure gauges as you tighten them can cause damage to their component parts.



2. When mounting the various pressure gauges to a pressure port plate with Rc1/8 or Rc1/4, tighten them to 3.0 to 5.0 N·m [2.213 to 3.688 ft·lbf].

NOTE Tightening to a torque that exceeds the specified value can cause damage to the component parts. Tightening to a torque that is less than the specified value might allow the screws to loosen and let air leak out.

3. The female threaded part of the pressure port plate with Rc1/8 or Rc1/4 has a stopper.

NOTE Tightening it more after it hits the stopper, can cause damage to the component parts.

● Replacing the pressure port plate, handle, mounting ring

1. To replace the pressure port plate, see "Replacing the □30 [1.181] integrated pressure gauge and pressure port plate" on page 138.

2. To replace the handle and mounting ring, see "Removing the handle" and "Installing the handle" on page 138.

● Replacing the seal kit, element, and bowl assembly

1. To replace the seal kit, element, and bowl assembly, remove the filter regulator or regulator and do the work on a work table.

2. Apply grease to the seal materials, such as the O-rings (but not the diaphragm) that are used on the filter regulator or regulator.

3. Contact the nearest Koganei sales office or overseas department if you are considering re-applying grease to the O-rings.
Recommended grease: Lithium soap base No. 2 equivalent

4. Periodically replace the element of the filter regulator.

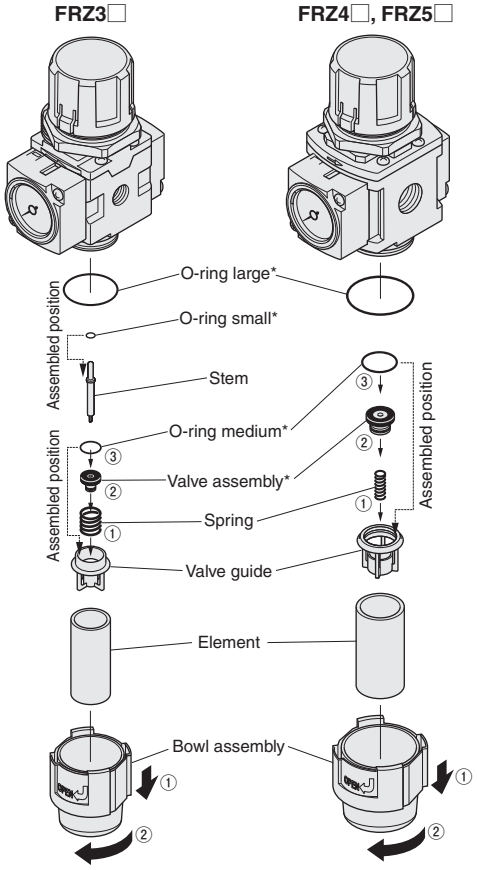
NOTE The service life of the element varies depending on the quality of air supplied to the IN port (primary) side. If the air supplied to the IN port (primary) side is highly contaminated with foreign matter, install a prefilter on the IN port (primary) side or change the air filter frequently. As a guideline, the replacement time for the element is one year after starting to use it.

5. When replacing the seal kit, element, and bowl assembly, be careful not to lose component parts.

6. See the diagram at right to replace the seal kit, element, and bowl assembly.

NOTE Always assemble the component parts correctly.

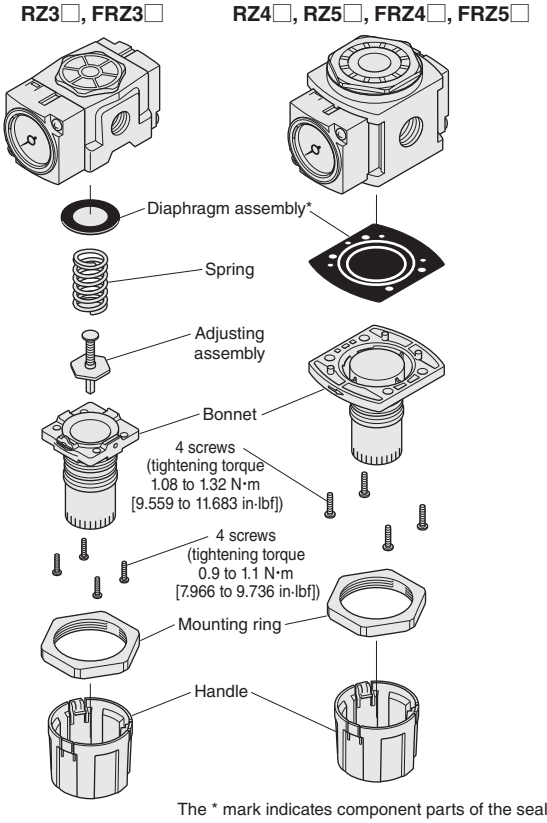
Bowl side of filter regulator



The * mark indicates component parts of the seal kit.

NOTE Products that have been disassembled and reassembled are not covered by the warranty.

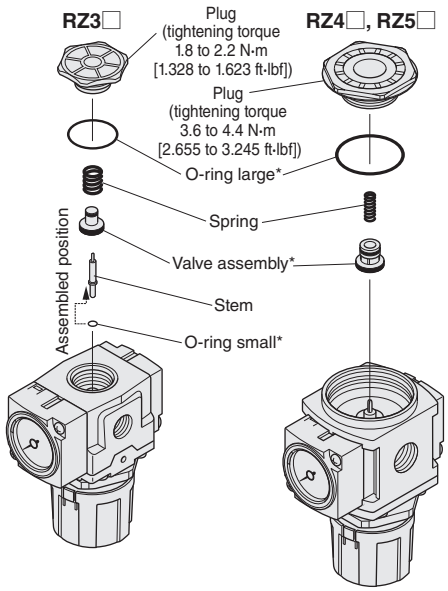
Handle side of regulator, filter regulator



The * mark indicates component parts of the seal kit.

NOTE Products that have been disassembled and reassembled are not covered by the warranty.

Plug side of regulator



The * mark indicates component parts of the seal kit.

NOTE Products that have been disassembled and reassembled are not covered by the warranty.

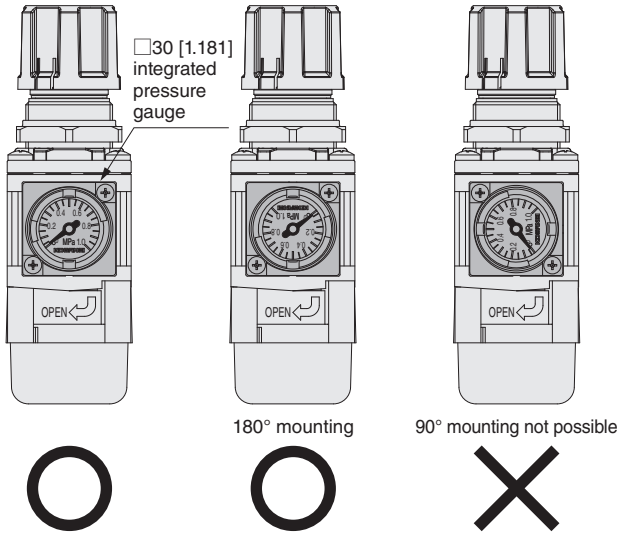
□30 [1.181] integrated pressure gauge

Mounting (installation) and piping

● Mounting (installation)

1. When installing the □30 [1.181] integrated pressure gauge to a filter regulator, refer to "Replacing the □30 [1.181] integrated pressure gauge and pressure port plate" on page 113.
2. When installing the □30 [1.181] integrated pressure gauge to a filter regulator or regulator, install it in the orientation shown in the diagram below.

NOTE The □30 [1.181] integrated pressure gauges can be installed by rotating them to a 180° orientation, but they cannot be installed by rotating them to a90° orientation.



Medium and operating environment

● Pulsation, vibration, impact

The □30 [1.181] integrated pressure gauge is a precision device. It cannot be used if the medium being used pulsates or if it is subject to vibration or impact from outside.

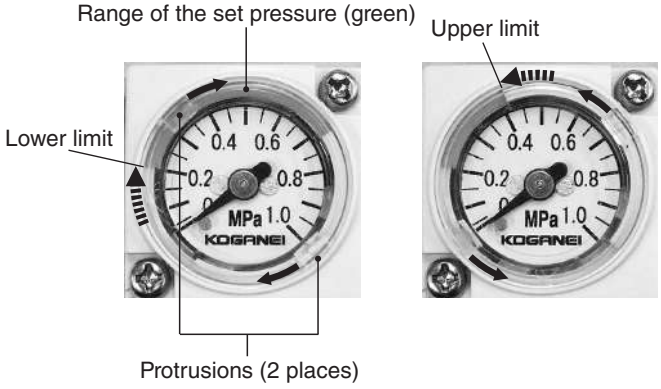
NOTE Pulsating of the medium being used, or external vibrations or impacts may result in damage to component parts.

Operation and maintenance inspections

● Adjusting the range of the set pressure

1. Adjust the range of the set pressure (green area) in the following order.
   1. Adjust the lower limit of the set pressure range by rotating the protrusions (2 places) clockwise by hand.
   2. Adjust the upper limit of the set pressure range by rotating the protrusions (2 places) counterclockwise by hand.

NOTE Adjusting the set pressure range with tools, etc. can damage the component parts.

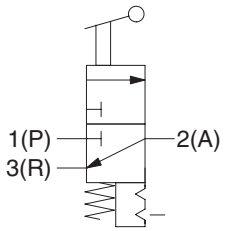


See page 154 for the specifications and dimension diagrams for the □30 [1.181] integrated pressure gauge.

Residual pressure exhaust valve

50VZ

Symbols



Specifications

Item \ Model				50VZ-01	50VZ-02	50VZ-03	50VZ-04
Media				Air			
Port size Rc	1 (P) · 2 (A)			1/8	1/4	3/8	1/2
	3 (R)			3/8			
Maximum operating pressure			MPa [psi]	1.0 [145]			
Proof pressure			MPa [psi]	1.5 [218]			
Operating temperature range (atmospheric and medium)			°C [°F]	5 to 60 [41 to 140]			
Operation method				Manual knob			
Number of positions/number of ports				2 positions/3 ports			
Force to operate knob			N·m [ft·lbf]	1.0 [0.738]			
Angle to operate knob				90°			
Flow rate characteristics	1 (P) → 2 (A)	Sonic conductance C	dm^3 (s·bar)	4.28	8.60	12.46	13.36
		Critical pressure ratio	b	0.23	0.38	0.21	0.31
		Effective cross section area 〔Cv value〕Note	mm^2 [Cv]	21.38 [394.5] 〔1.19 [21.956]〕	43.01 [793.5] 〔2.39 [44.096]〕	62.28 [1149] 〔3.46 [63.837]〕	66.81 [1233] 〔3.71 [68.450]〕
	2 (A) → 3 (R)	Sonic conductance C	dm^3 (s·bar)	7.87	11.00		
		Critical pressure ratio	b	0.89	0.32		
		Effective cross section area 〔Cv value〕Note	mm^2 [Cv]	39.36 [726.2] 〔2.19 [40.406]〕	54.99 [1015] 〔3.06 [56.457]〕		
Materials used in major parts	Main unit			Die cast aluminum alloy			
	Knob			Polyacetal			
Weight			kg [lb]	0.22 [0.485]	0.22 [0.485]	0.21 [0.463]	0.20 [0.441]
Options				Bracket <Steel plate (electroless nickel plated)>			

Notes: The effective cross section values are calculated values, and are not measured values.

Remarks 1: Specification values are based on Koganei test standards.

2: Equipped with a hole for a padlock during exhaust. Compliant with OSHA (Occupational Safety and Health Administration: standards for worker safety)

Order Codes

50 VZ – □ – □

Bracket
Blank — No bracket
B — With bracket

Port size

Rc1/8	Rc1/4	Rc3/8	Rc1/2
01	**02**	**03**	**04**

Residual pressure exhaust valve

● Order codes for brackets only

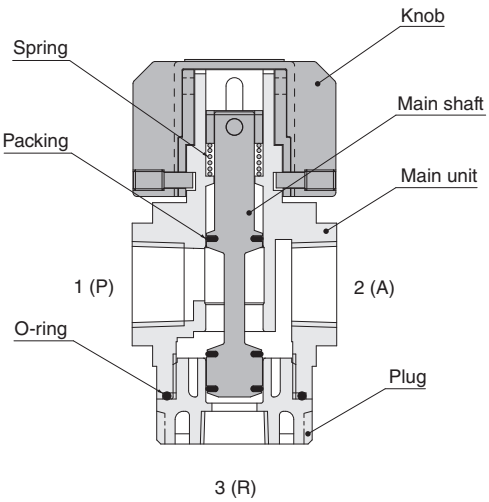
8Z-BV

* Compatible brackets
(For replacement of residual pressure exhaust valves in multi series 300V, 600V)

8Z-BV □

300 — for 300V
600 — for 600V

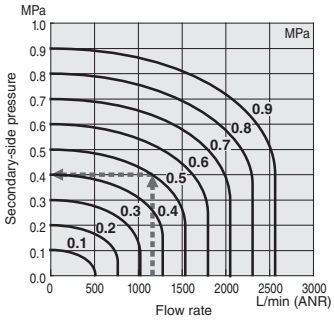
Inner construction



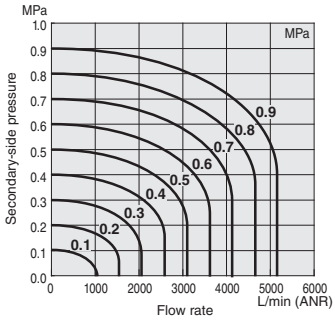
Flow rate characteristics

● Air supply flow rate

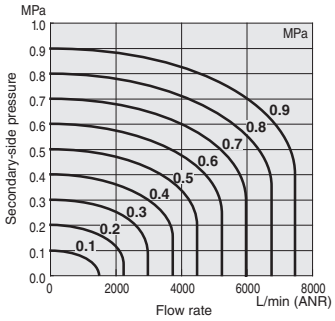
50VZ-01



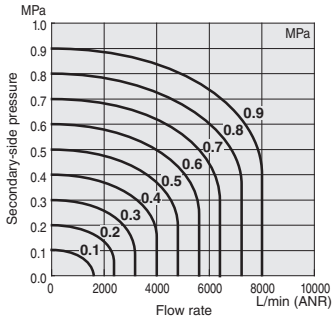
50VZ-02



50VZ-03



50VZ-04

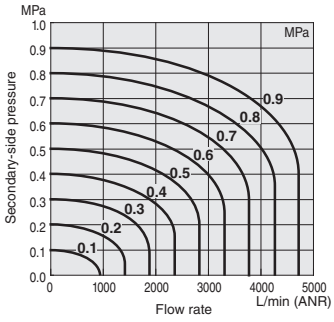


Interpreting the graphs

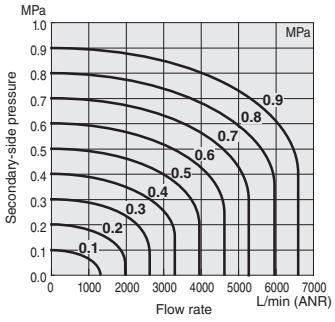
When the supply pressure is 0.5 MPa [73 psi] and the flow rate is 1150 L/min (ANR) [40.618 ft³/min (SCFM)], the valve outlet pressure is 0.4 MPa [58 psi].

● Exhaust flow rate

50VZ-01

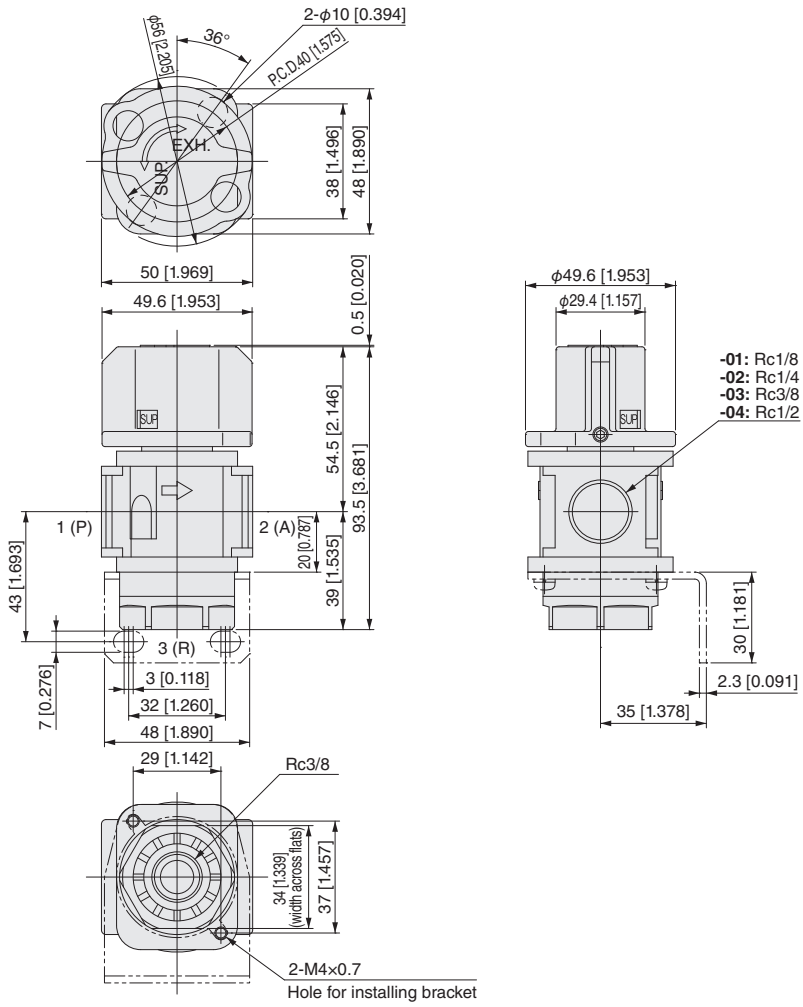


50VZ-02, -03, -04



Residual pressure exhaust valve dimensions (mm [in.])

● 50VZ



Residual pressure exhaust valve

Design and selection

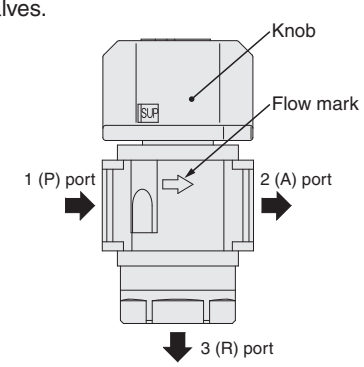
Install the residual pressure exhaust valve on the OUT port (secondary) side of the standard specification and low pressure specification filter regulator and regulator.

NOTE If the residual pressure exhaust valve is installed on the IN port (primary) side of the standard and low-pressure specification filter regulators and regulators, processing residual pressure on the OUT port (secondary) side may not be possible depending on operating conditions.

Mounting (installation) and piping

● Flow mark

The following diagram shows the relationship of the direction of flow of the medium and the flow mark on residual pressure exhaust valves.



● Piping work

1. Connect pipes and fittings to the residual pressure exhaust valve 1 (P) port and 2 (A) port so that the weight and torque of the pipes do not affect the product. When tightening the piping, hold the main unit and tighten it to the torque recommended on page 135.

NOTE Applying unnecessary force or impact to the knob may damage component parts.

2. When mounting something, such as a muffler, to the 3(R) port of a residual pressure exhaust valve, tighten it to 1.8 to 2.2 N·m [1.328 to 1.623 ft·lbf].

NOTE Tightening to a torque that exceeds the specified value can cause damage to the component parts. In addition, tightening to a torque that is less than the specified value might allow the screws to loosen.

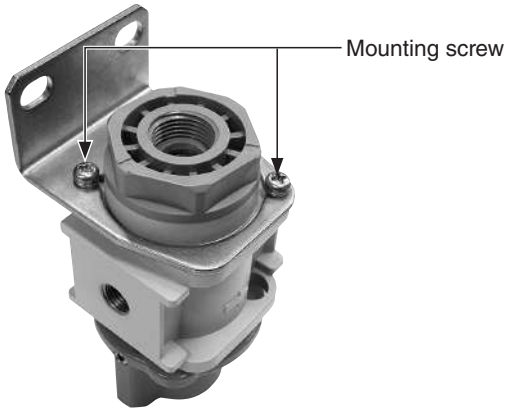
● Installing brackets

To install brackets, use the following procedure.

① Install the bracket.

② Tighten the two small retaining screws to a torque of 1.24 to 1.5 N·m [0.915 to 1.106 ft·lbf].

NOTE Tightening to a torque that exceeds the specified value can cause the screw head or bit to break or damage the component parts. Tightening to a torque that is less than the specified value might allow the screws to loosen and let air leak out.



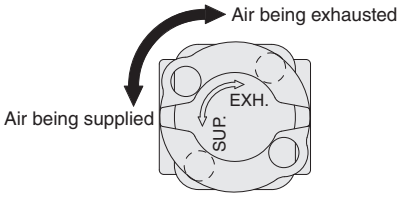
Operation and maintenance inspections

● Air supply and exhaust states

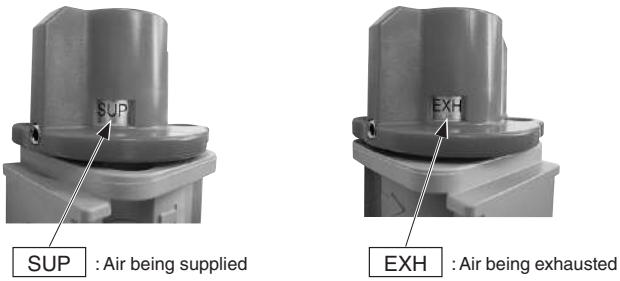
1. In the air intake state, the 1 (P) port (primary) side and the 2 (A) port (secondary) side are connected, and the 3 (R) port is closed.
2. In the exhaust state, the 2 (A) port (secondary) side and the 3 (R) port are connected, and the 1 (P) port (primary) side is closed.

● Switching the air supply and exhaust states

1. To switch between supply and exhaust states, rotate the knob 90° in the direction of “SUP” as indicated on the bottom of the knob in the figure below to switch to supply state, and rotate the knob 90° in the direction of “EXH” to switch to exhaust state.



2. Check the state of the residual pressure exhaust valve by looking through the inspection window shown in the figure below. When “SUP” is displayed, the valve is in the supply state, and when “EXH” is displayed, the valve is in the exhaust state.



3. When gradually supplying or exhausting air, operate the knob slowly.

NOTE The air from 1 (P) port (primary) does not flow simultaneously to 2 (A) port (secondary) and 3 (R) port.

● Used as a 2-point valve

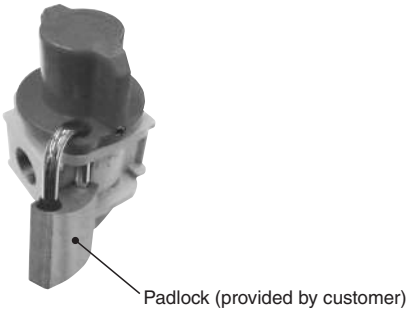
When using a residual pressure exhaust valve as a 2-point valve, block the 3 (R) port with a R3/8 plug.

● Using the padlock hole

1. The padlock hole on the residual pressure exhaust valve should be used to secure the valve in the exhaust position with a padlock or similar device to prevent it from being switched to the intake position.

NOTE The padlock hole cannot be used in the intake position.

2. The diameter of the padlock hole is ϕ10 mm [0.394 in.].
3. The padlock or similar device must be arranged separately.



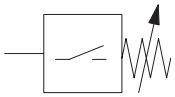
● Reduced exhaust noise

To reduce exhaust noise, install a muffler or similar device on the 3(R) port.

Recommended muffler: Model KM-31

Pressure switch module

Symbols



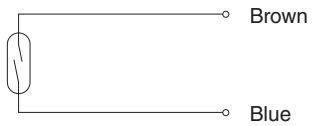
Specifications

Item \ Model		8Z-PS□□	8Z-DPS□□
Media		Air	
Connection type		**FRZ** Series For module mounting only	
Maximum operating pressure	MPa [psi]	1.0 [145]	
Proof pressure	MPa [psi]	1.5 [218]	
Operating temperature range (atmospheric and medium)	°C [°F]	5 to 60 [41 to 140] (non-condensation)	
Set pressure range	MPa [psi]	0.1 to 0.4 [15 to 58]	
Response differential	MPa [psi]	0.08 [12] or less	
Contact method		Contact a contact (NO)	
Electrical Specifications	Wiring type	2-lead wire type	
	Load voltage	5 to 28 VDC, 85 to 115 VAC	
	Load current	40 mA DC MAX., 20 mA AC MAX.	
	Internal voltage drop Note 1	0.1 V MAX. (at load current 40 mA DC)	
	Leakage current	0 mA	
	Response time	1 ms MAX.	
	Insulation resistance	100 MΩ MIN. (using 500 VDC megger, between case and lead wire)	
	Dielectric strength	1500 VAC (50/60 Hz) 1 minute (between case and lead wire terminal)	
	Shock resistance Note 2 m/s² [G]	294 [30] (not repetitive)	
	Vibration resistance Note 2 m/s² [G]	88.3 [9] (double amplitude 1.5 mm [0.059 in.]·10 to 55 Hz) Resonance frequency 2750 ±250 Hz	
	Lead wire Note 3	PCCV0.2SQ×2-lead (brown and blue) ×ℓ	
	Contact protection measure Note 4	Required	
Weight	Without piping adapter	60 g [2.12 oz] (when lead wire length A: 1000 mm [39.370 in.])	85 g [3.00 oz] (when lead wire length A: 1000 mm [39.370 in.])
	With piping adapter	84 g [2.96 oz] (when lead wire length A: 1000 mm [39.370 in.])	109 g [3.84 oz] (when lead wire length A: 1000 mm [39.370 in.])

Note 1: Internal voltage drop changes with the load current.
2: Measured by Koganei test standard.
3: Lead wire length ℓ: A; 1000 mm [39.370 in.], B; 3000 mm [118.1 in.]
4: Refer to page 146 for information about contact protection measures.

Caution: The pressure switch module cannot be assembled to any of the body sizes in the 30 series.
The 30 series body size is for standalone use only.

Internal circuit



Order Codes

● Pressure switch module

8Z – PS □ □

Lead wire length
A —— 1000 mm [39.370 in.]
B —— 3000 mm [118.1 in.]

Piping adapter
Blank —— Without piping adapter
S1 —— Rc1/8 With piping adapter
S2 —— Rc1/4 With piping adapter
S3 —— Rc3/8 With piping adapter
S4 —— Rc1/2 With piping adapter

● Pressure switch module (with bracket)

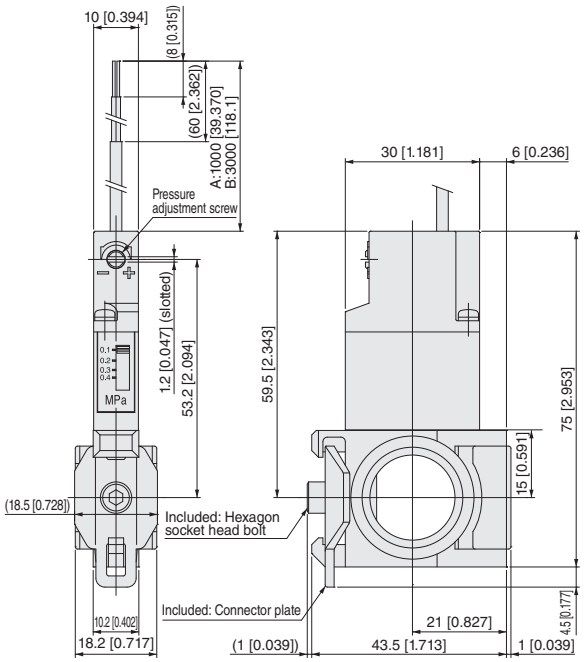
8Z – DPS □ □

Lead wire length
A —— 1000 mm [39.370 in.]
B —— 3000 mm [118.1 in.]

Piping adapter
Blank —— Without piping adapter
S1 —— Rc1/8 With piping adapter
S2 —— Rc1/4 With piping adapter
S3 —— Rc3/8 With piping adapter
S4 —— Rc1/2 With piping adapter

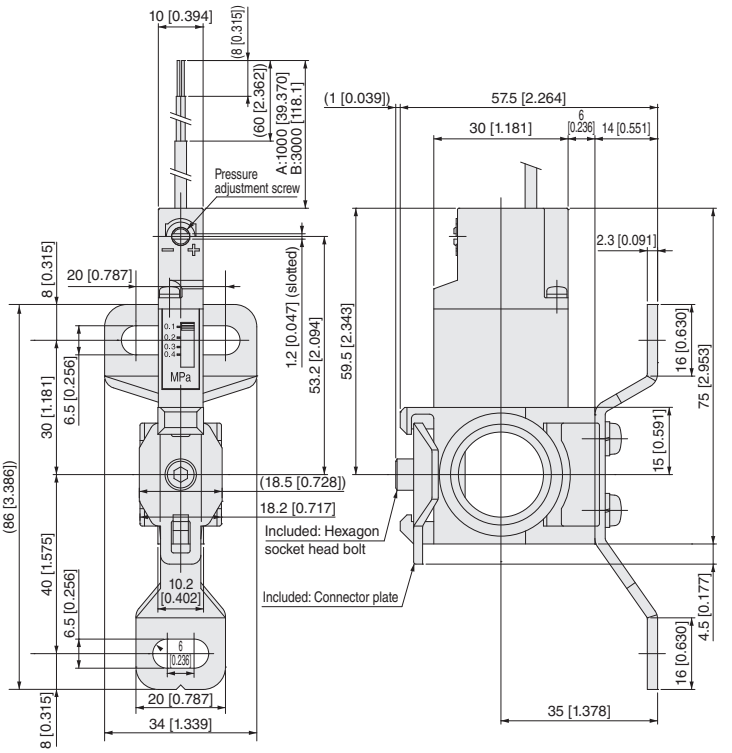
Pressure switch module dimensions (mm [in.])

●8Z-PS□



1 connector plate, 1 hexagon socket head bolt, 2 O-rings included

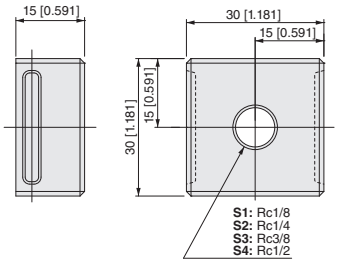
●8Z-DPS□



1 connector plate, 1 hexagon socket head bolt, 2 O-rings included

When an S1 to S4 piping adapter is selected

Piping adapter



With 1 piping adapter

Pressure switch module

Mounting (installation) and piping

● Mounting (installation)

1. The mounting method for the pressure switch module is the same as for the various modules and adapters. See "Handling Instructions and Precautions" for modules and adapters.
2. Do not pull too strongly on the lead wires or bend them excessively. Also, when handling the product, wait for the pressure switch module side and do not apply excessive force to the lead wires.
3. Handle the pressure switch module with care, as strong shocks may cause damage or malfunctions.

● Contact capacity

Use within the specified load voltage and load current.

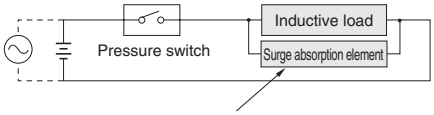
NOTE Using the product outside the specified range for the load voltage or load current can cause contact welding or other problems.

● Contact protection measures

The pressure switch module uses a contact sensor switch. Take the contact protection measures shown in the figure below.

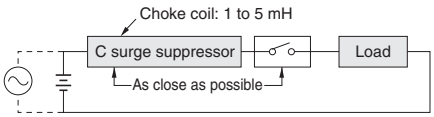
NOTE Failure to take contact protection measures may result in contact welding, or other issues.

For connecting an inductive load (electromagnetic relay)



For DC: … Diode or CR, etc.
For AC: … CR etc.
Diode : Forward current should be more than the circuit current and the reverse voltage should be 10 times greater or more than the circuit voltage.
CR : C = 0.01 to 0.1 μF
R = 1 to 4 kΩ

Capacitive surges occur (lead length exceeds 10 m [32.800 ft])



Medium and operating environment

● Operating environment

The pressure switch modules use magnetic sensor switches. Avoid using them in locations subject to strong external magnetic fields and do not bring them in close proximity to power lines and other sources of high electric currents.

NOTE Use in areas with strong external magnetic fields or proximity to high currents can cause the pressure switch module to malfunction.

Operation and maintenance inspections

● Pressure detection scale

1. Use the pressure detection scale as a reference.

NOTE Check the output of the pressure switch module by using a tester or similar device.

NOTE To accurately set the detection pressure, use a separate pressure gauge or similar device.

2. The pressure detection scale is the value that is set when the supply pressure drops.
3. The pressure detection scale is the value that is set when the OFF signal is detected.

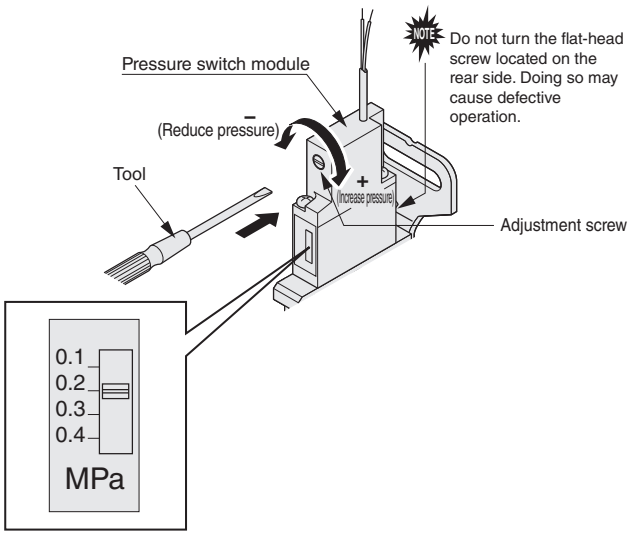
NOTE The ON signal is detected at the pressure set by the pressure detection scale plus the differential.

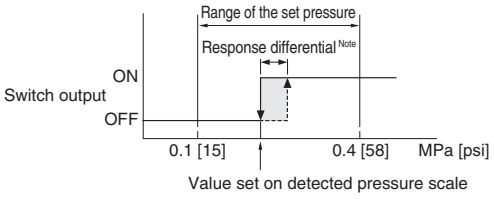
● Setting the detection pressure

1. The detection pressure can be set higher than the detection pressure range in some cases, but be sure to set it within the specified range.

NOTE If it is set to a pressure higher than the range of the detection pressure, it may damage component parts.

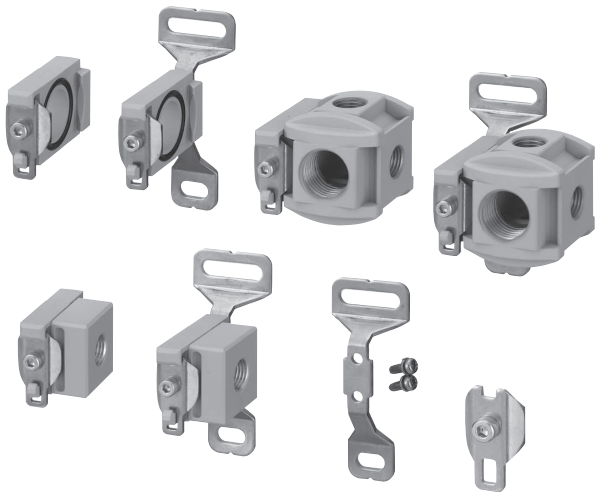
2. To set the detection pressure, use the following procedure.
   ① Turn the adjustment screw in the direction shown by the "+" in the figure below to align the adjustment pointer with the desired detection pressure scale.
   ② Supply pressure and confirm with a tester or similar device that a signal is detected at the set pressure.





Note: Response differential is 0.08 MPa [12 psi] or less

Modules and adapters



Order Codes

8Z – □ □

Port size Note

Rc1/8	Rc1/4	Rc3/8	Rc1/2
1	**2**	**3**	**4**

Modules and adapters

- **F** — Fmodule (for connecting) Note
- **D** — D module (for connecting with bracket) Note
- **T** — T module (for branching)
- **DT** — DT module (for branching (with bracket)
- **S** — S adapter (for pipe size conversion)
- **DS** — DS adapter (for pipe size conversion, with bracket)
- **DP** — Module bracket Note
- **FP** — Connector plate Note
- **TP** — Intermediate extraction block (for branching, standalone fittings)
- **SP** — Piping adapter (for pipe size conversion, standalone fittings)

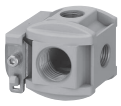
Note: Note that the F module (F), D module (D), module bracket (DP), and connector plate (FP) do not allow selection of connection port sizes.

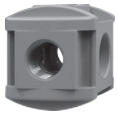
Caution: The module adapters cannot be assembled to any of the body sizes in the 30 series. The 30 series body size is for standalone use only.

List of models

	F module	D module
	For connecting	For connecting (With bracket)
Connecting bracket	**8Z-F**  31 g [1.09 oz]	**8Z-D**  57 g [2.01 oz]

Connector plate	Module bracket
8Z-FP  8 g [0.28 oz]	**8Z-DP**  26 g [0.92 oz]

	T module	DT module	S adapter	DS adapter
	For branching	For branching (With bracket)	For pipe size conversion	For pipe size conversion (With bracket)
Connecting bracket + Adapter	**8Z-T**□  188 g [6.63 oz]	**8Z-DT**□  214 g [7.55 oz]	**8Z-S**□  55 g [1.94 oz]	**8Z-DS**□  81 g [2.86 oz]

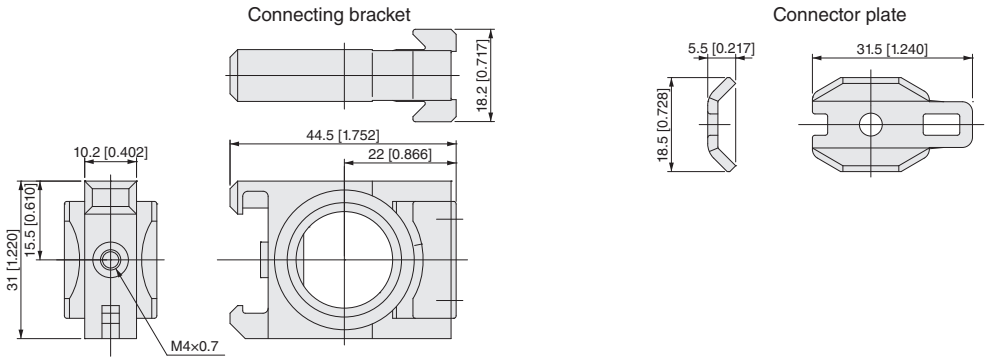
	Intermediate extraction block	Piping adapter
	For branching (Standalone fittings)	For pipe size conversion (Standalone fittings)
Adapters only	**8Z-TP**□  157 g [5.54 oz]	**8Z-SP**□  24 g [0.85 oz]

●Applicable models
iB-Cyclone: **IBCY40**, **IBCY50**
Air filter: **FNZ40**, **FNZ41**, **FNZ50**, **FNZ51**
Oil mist filter: **MFZ40**, **MFZ50**
Micro oil mist filter: **MMFZ40**, **MMFZ50**
Filter regulator: **FRZB40**, **FRZB41**, **FRZB50**, **FRZB51**, **FRZ40**, **FRZ41**, **FRZ50**, **FRZ51**
Regulator: **RZ40**, **RZ41**, **RZ50**, **RZ51**
Residual pressure exhaust valve: **50VZ**

〈Main component materials〉 Connecting fittings, intermediate extraction block, and piping adapter: Die cast aluminum alloy
Module bracket and connecting plate: Steel plate (electroless nickel plating)
Note: Weight is for port size Rc 1/2.

F module dimensions (mm [in.])

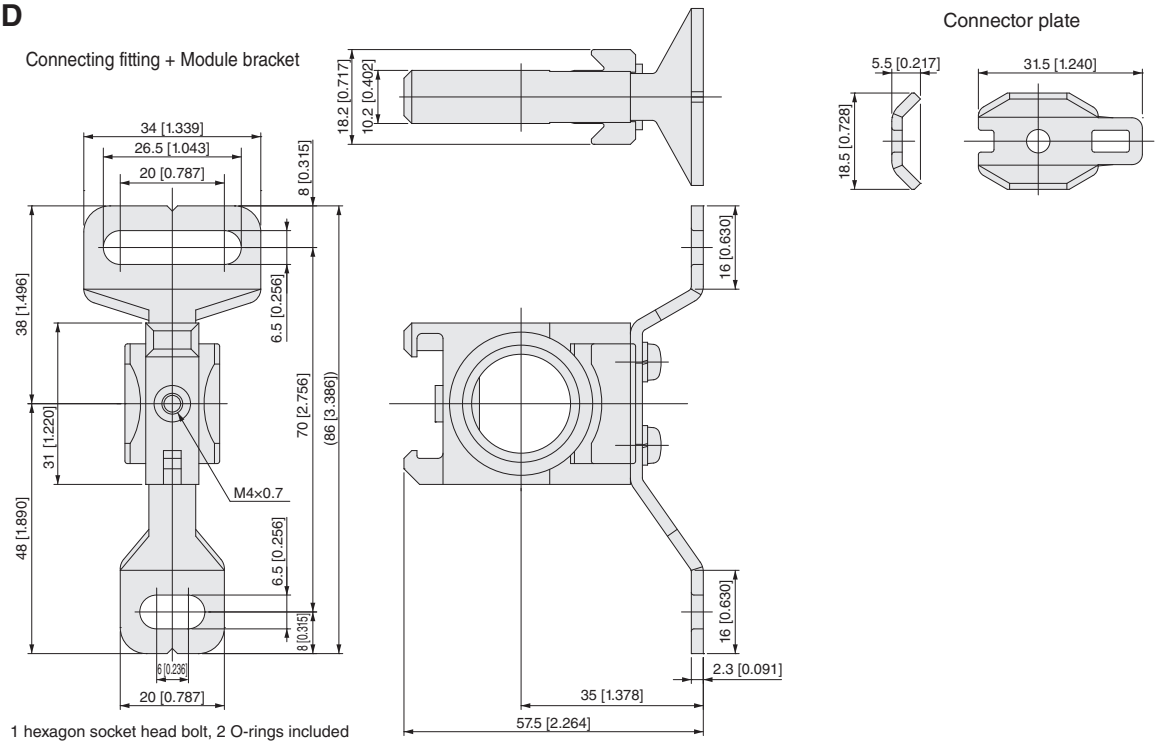
● 8Z-F



1 hexagon socket head bolt, 2 O-rings included

D module dimensions (mm [in.])

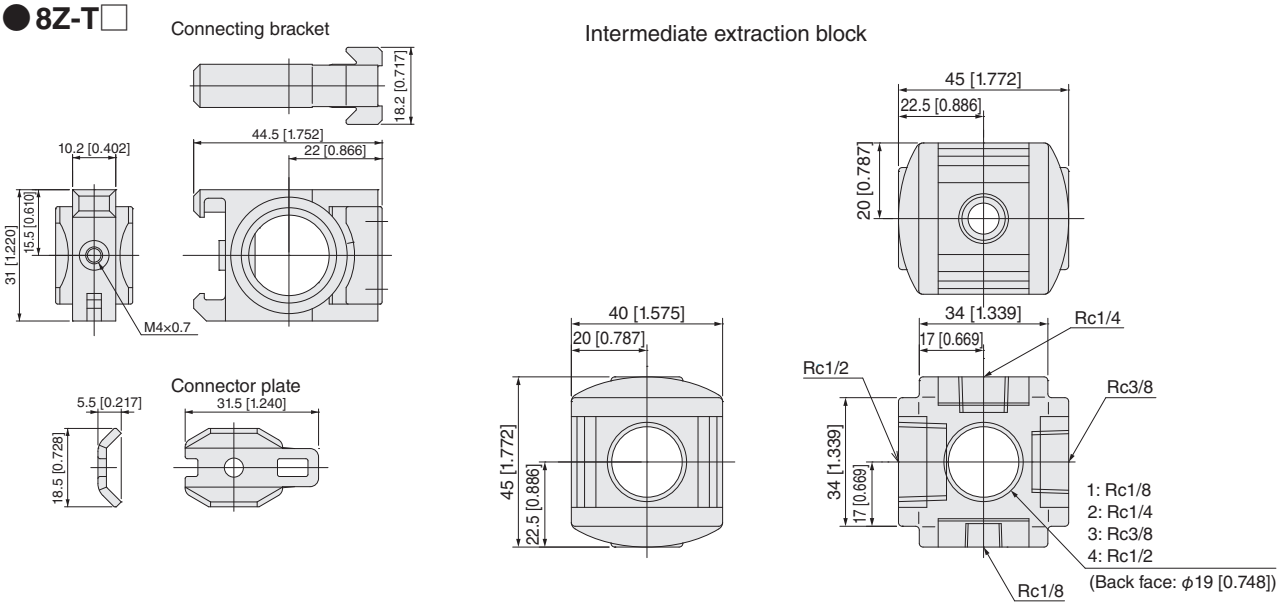
● 8Z-D



1 hexagon socket head bolt, 2 O-rings included

T module dimensions (mm [in.])

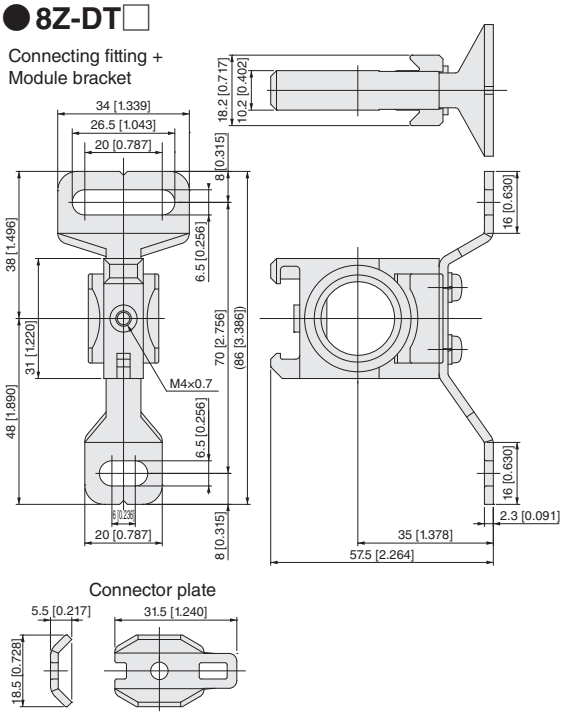
● 8Z-T□

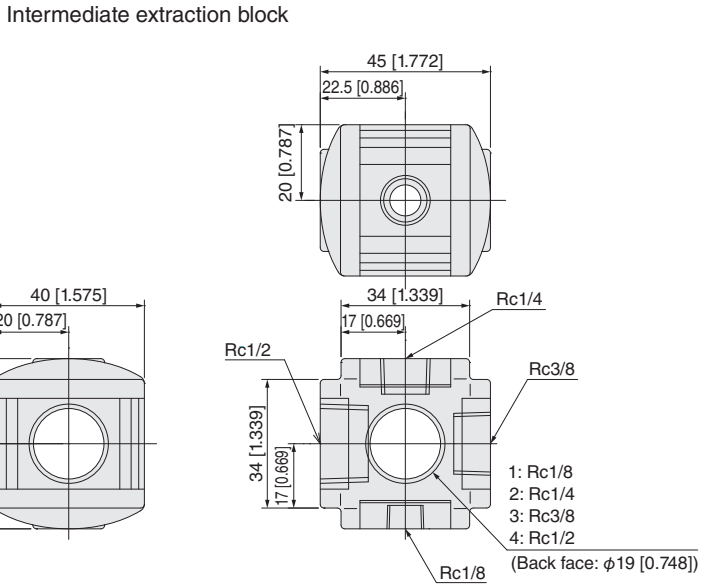


1 hexagon socket head bolt, 2 O-rings included
1 each R1/8, R1/4, R3/8, R1/2 plugs included

DT module dimensions (mm [in.])

● 8Z-DT□

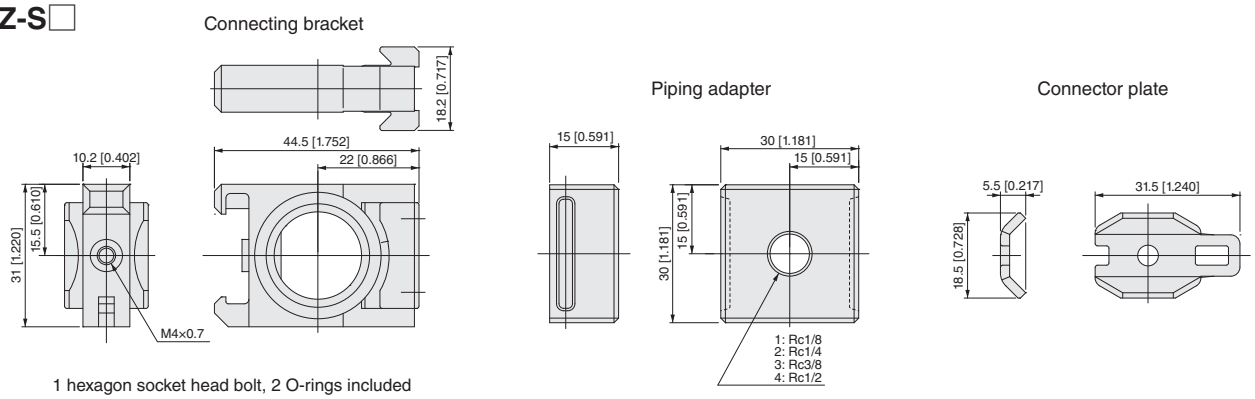




1 hexagon socket head bolt, 2 O-rings included
1 each R1/8, R1/4, R3/8, R1/2 plugs included

S adapter dimensions (mm [in.])

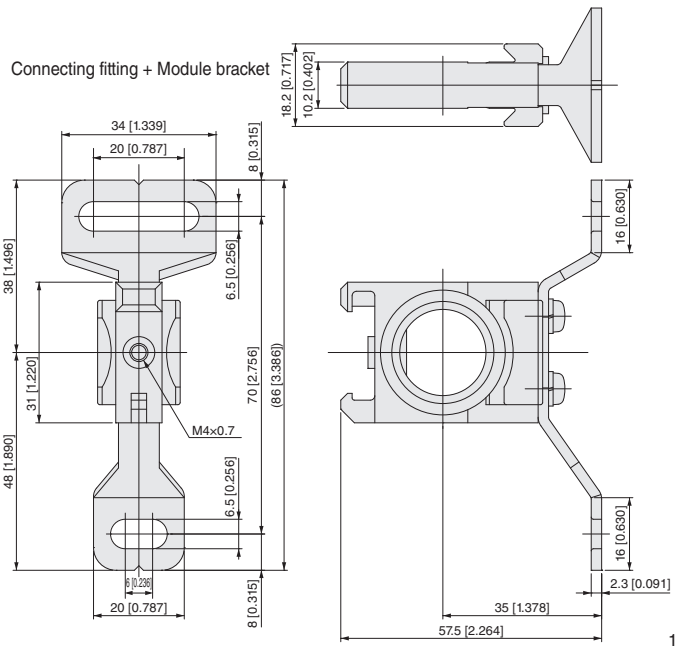
● 8Z-S□

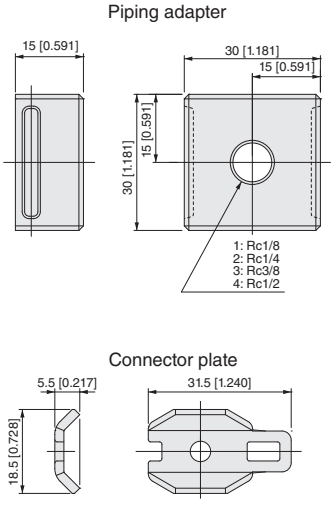


1 hexagon socket head bolt, 2 O-rings included

DS dimensions (mm [in.])

● 8Z-DS□



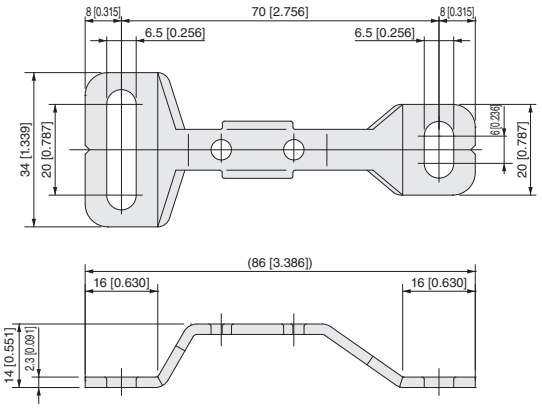


1 hexagon socket head bolt, 2 O-rings included

Module bracket dimensions (mm [in.])

● 8Z-DP

Module bracket

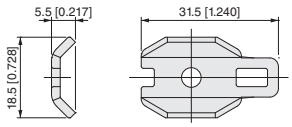


Two cross head tapping screws, 2 washers included

Connector plate dimensions (mm [in.])

● 8Z-FP

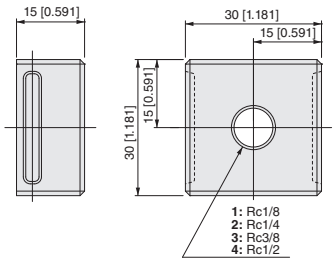
Connector plate



Piping adapter dimensions (mm [in.])

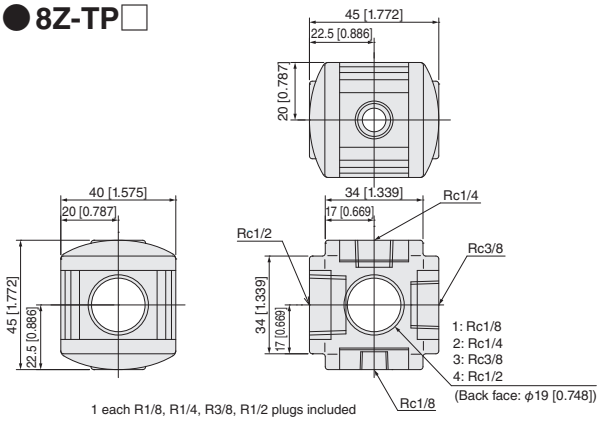
● 8Z-SP□

Piping adapter



Intermediate extraction block dimensions (mm [in])

● 8Z-TP□



1 each R1/8, R1/4, R3/8, R1/2 plugs included

Handling Instructions and Precautions

Modules and adapters

Mounting (installation) and piping

● Mounting (installation)

1. When using the FRZ series models in combination with the corresponding iB-Cyclone models, use various modules and adapters as required.
2. For compatible models, refer to the “List of Models” on page 147 under Modules and adapters.

NOTE Any of the 30 series and the IBCY30 cannot be used in combinations.

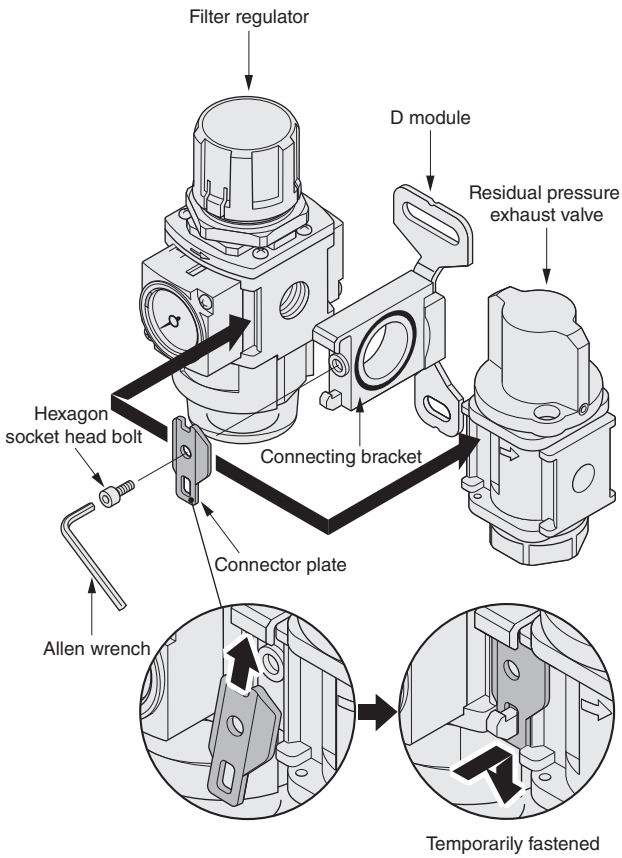
3. When using products in combinations, check the flow mark of each product and align the direction of flow of the medium. See the "Handling Instructions and Precautions" for the relationship of the direction of flow of the medium and the flow marks.
4. To assemble the various modules and adapters to the various products, use the following procedure.
   ① Install O-rings on the connecting hardware (2 locations).

NOTE Not assembling the O-ring will result in air leaks.

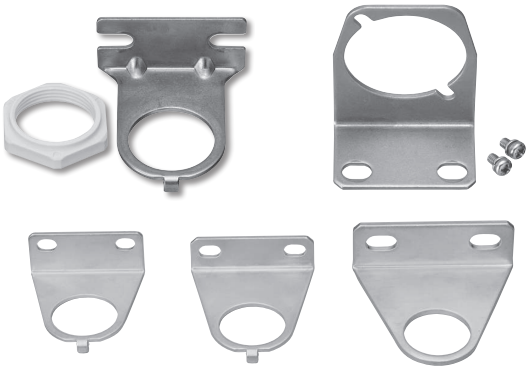
   ② Temporarily secure each product with the connecting plate.
   ③ Tighten the hexagon socket bolts with a torque of 0.9 to 1.1 N·m [7.966 to 9.736 in·lbf].

NOTE Tightening to a torque that exceeds the specified value can cause damage to the component parts. In addition, tightening to a torque that is less than the specified value might allow the screws to loosen.

<Examples of combinations>



Bracket



Bracket model and applicable equipment

Equipment model		Bracket model	Remarks
iB-Cyclone	**IBCY30**, **IBCY40**, **IBCY50**	**8Z-CBK** (with mounting ring) **36 g [1.27 oz]**	Main unit support and options
Air filter	**FNZ3**□, **FNZ4**□, **FNZ5**□		
Oil mist filter	**MFZ30**, **MFZ40**, **MFZ50**		
Micro oil mist filter	**MMFZ30**, **MMFZ40**, **MMFZ50**		

[Materials used in major parts] Steel plate (electroless nickel plated)

■ For filter regulators and regulators

Equipment model		Bracket model	Remarks
Filter regulator (with drain cock)	**FRZB3**□, **FRZB4**□, **FRZB5**□	**8Z-BK** **32 g [1.13 oz]**	Main unit support and options
Filter regulator (no drain cock)	**FRZ3**□, **FRZ4**□, **FRZ5**□		
Regulator	**RZ3**□, **RZ4**□, **RZ5**□		

[Materials used in major parts] Steel plate (electroless nickel plated)

■ For residual pressure exhaust valve

Equipment model		Bracket model	Remarks
Residual pressure exhaust valve	**50VZ**	**8Z-BV** **48 g [1.69 oz]**	Main unit support and options

[Materials used in major parts] Steel plate (electroless nickel plated)

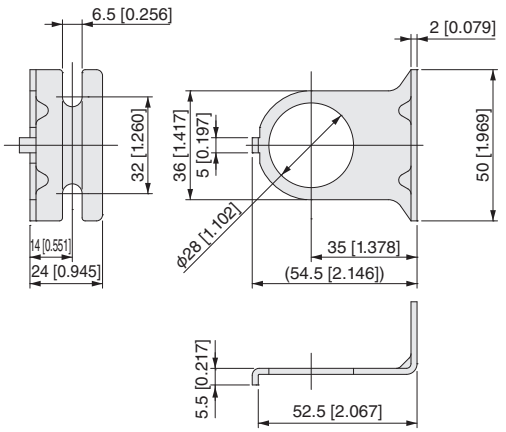
■ Compatible brackets

Compatible equipment model		Bracket model	Remarks
FRZ series	Multi series		
FRZB3□, **FRZ3**□	**FR15**□	**8Z-BK30** **34 g [1.20 oz]**	Main unit support types, sold individually
FRZB4□, **FRZ4**□	**FR30**□	**8Z-BK40** **43 g [1.52 oz]**	
FRZB5□, **FRZ5**□	**FR60**□	**8Z-BK50** **91 g [3.21 oz]**	
RZ3□	**R15**□	**8Z-BK30** **34 g [1.20 oz]**	
RZ4□	**R30**□	**8Z-BK40** **43 g [1.52 oz]**	
RZ5□	**R60**□	**8Z-BK50** **91 g [3.21 oz]**	
FNZ3□, **MFZ30**, **MMFZ30**	**F150**	**8Z-ABK30** Note **34 g [1.20 oz]**	
FNZ4□, **MFZ40**, **MMFZ40**	**F300**, **MF300**, **MMF150**	**8Z-ABK40** Note **51 g [1.80 oz]**	
FNZ5□, **MFZ50**, **MMFZ50**	**F600**, **MF400**, **MF600**, **MMF300**, **MMF600**	–	Multi series **8-60B** can be used as is.
50VZ	**300V**	**8Z-BV300** **41 g [1.45 oz]**	Main unit support types, sold individually
50VZ	**600V**	**8Z-BV600** **41 g [1.45 oz]**	

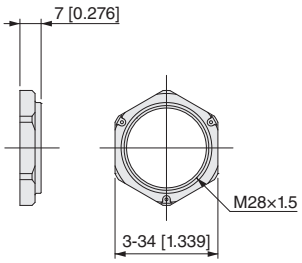
Note: To mount the 8Z-ABK□ to the product, purchase the mounting ring R-FRZ separately.

● 8Z-CBK

Bracket



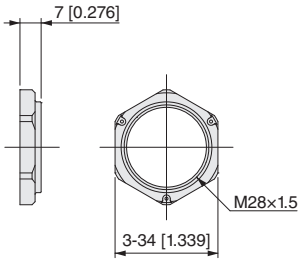
Mounting ring



■ Mounting ring only

● R-FRZ

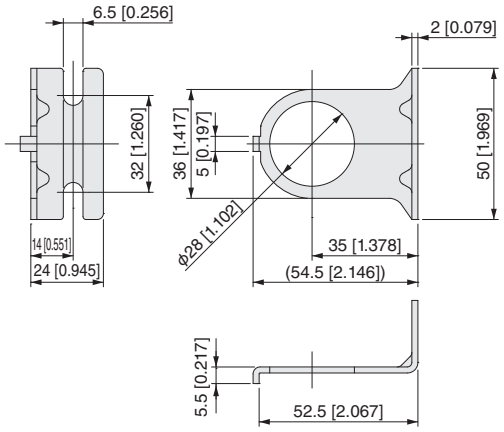
Mounting ring



■ For filter regulators and regulators

● 8Z-BK

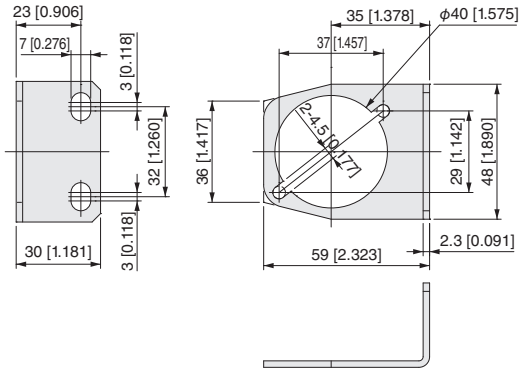
Bracket



■ For residual pressure exhaust valve

● 8Z-BV

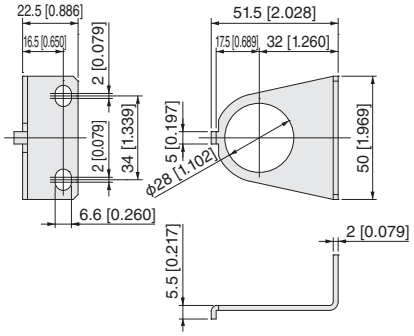
Bracket



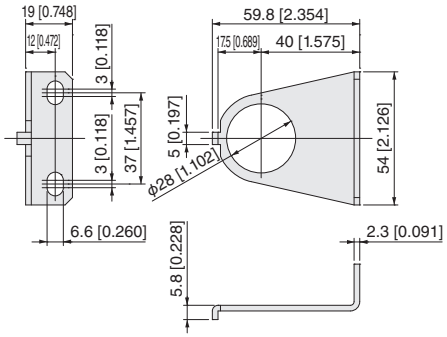
2 small cross head pan screws included

■ Compatible brackets

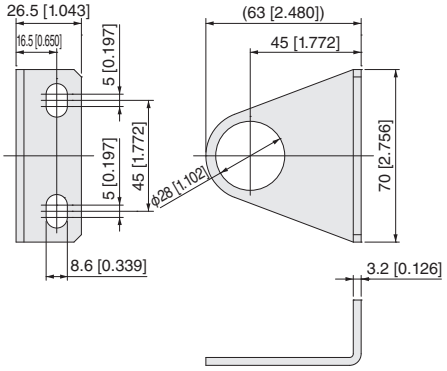
● 8Z-BK30



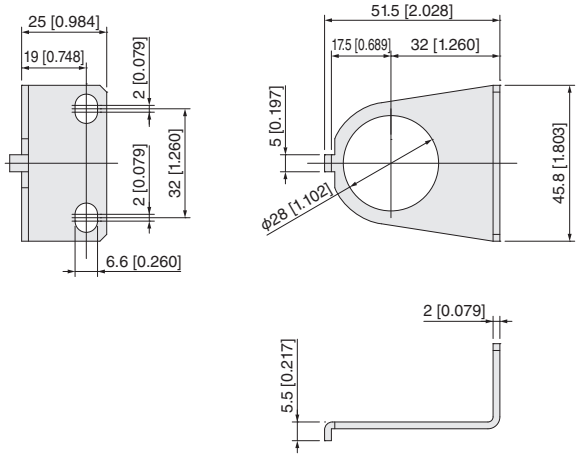
● 8Z-BK40



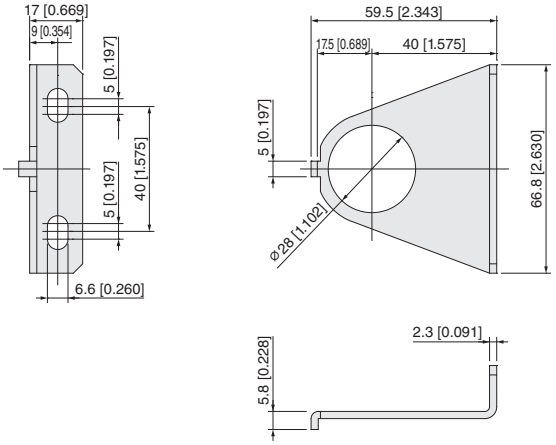
● 8Z-BK50



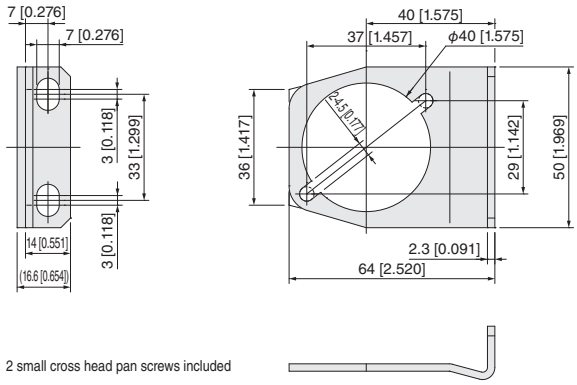
● 8Z-ABK30



● 8Z-ABK40

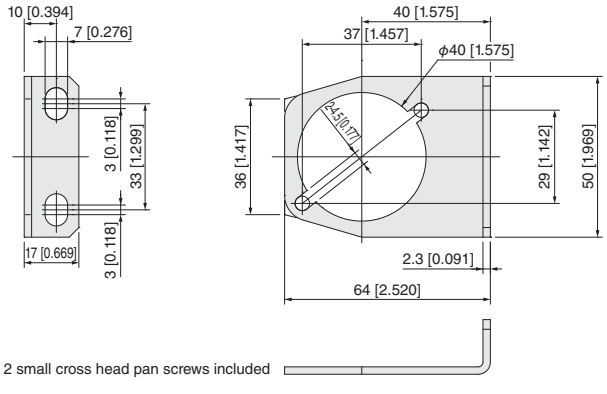


● 8Z-BV300



2 small cross head pan screws included

● 8Z-BV600



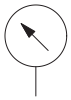
2 small cross head pan screws included

□30 [1.181] integrated pressure gauge

G1C-30·G4C-30

● This is a □30 [1.181] integrated pressure gauge exclusively for the FRZ series.

Symbols



Order Codes

G □ C – 30

Outer diameter
30 —— Outer diameter □30 mm [1.181 in.]

Range of pressure display
1 —— Standard specifications 1 MPa [145 psi]
4 —— Low pressure specifications 0.4 MPa [58 psi]

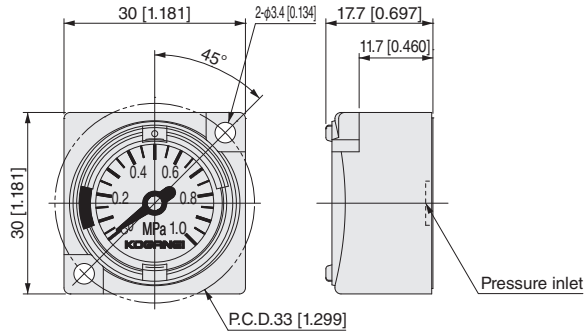
Pressure gauge

Specifications

Item \ Model		G1C-30	G4C-30
Media		Air	
Connection type		O-ring seal, M3×0.5 (2 retaining screws)	
Maximum operating pressure	MPa [psi]	1.0 [145]	0.4 [58]
Operating temperature range (atmospheric and medium)	°C [°F]	5 to 60 [41 to 140] (non-condensation)	
Range of pressure display	MPa [psi]	0 to 1.0 [0 to 145]	0 to 0.4 [0 to 58]
Range of adjustable display band	MPa [psi]	0 to 1.0 [0 to 145]	0 to 0.4 [0 to 58]
Maximum settable width of display band	MPa [psi]	0.5 [73]	0.2 [29]
Accuracy (atmospheric and medium 5 to 35℃ [41 to 95°F])		F.S. ±4%	F.S. ±6%
Materials used in major parts	Case	Polybutylene terephthalate	
	Front cover	Polycarbonate	
	Bourdon tube	Brass	
Weight	kg [lb]	0.03 [0.066]	
Applicable models		**FRZB3□, FRZB4□, FRZB5□, FRZ3□, FRZ4□, FRZ5□, RZ3□, RZ4□, RZ5□**	

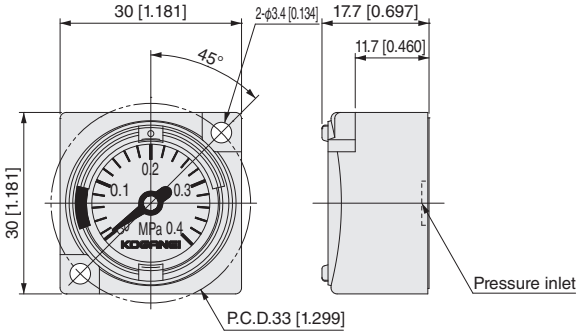
Pressure gauge dimensions (mm [in.])

G1C-30



Two cross head tapping screws, one O-ring included

G4C-30



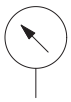
Two cross head tapping screws, one O-ring included

Refer to pages 116 and 140 for the handling instructions and precautions for the □30 [1.181] integrated pressure gauge.

Pressure gauge

G1-40·G3-40

Symbols



Order Codes

G □ – **40**

Outer diameter
40 —— Outer diameter 40 mm [1.575 in.]

Range of pressure display
1 —— Standard specifications 1 MPa [145 psi]
3 —— Low pressure specifications 0.3 MPa [44 psi]

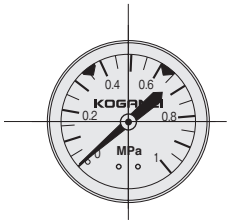
Pressure gauge

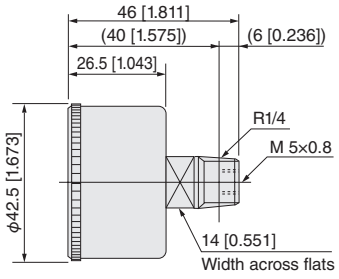
Specifications

Item	Model	G1-40	G3-40
Media		Air	
Port size		R1/4 (M5×0.8)	
Range of pressure display	MPa [psi]	0 to 1.0 [0 to 145]	0 to 0.3 [0 to 44]
Accuracy		F.S. ±3%	
Outer diameter	mm [in.]	40 [1.575]	
Maximum operating pressure	MPa [psi]	0.93 [135]	0.25 [36]
Operating temperature range (atmospheric and medium)	℃ [°F]	5 to 60 [41 to 140] (non-condensation)	
Weight	kg [lb]	0.09 [0.198]	
Material	Case	ABS	
	Stock	Brass	
	Bourdon tube	Brass	

Pressure gauge dimensions (mm [in.])

G1-40
G3-40





Handling Instructions and Precautions

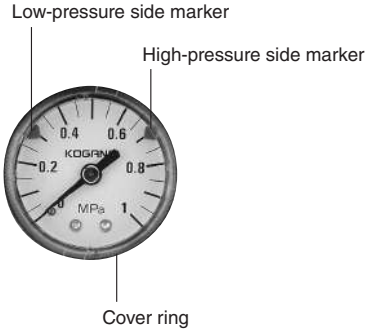
NOTE Pressure gauges are precision devices. Be careful of shock and vibrations.

Mounting and piping

When doing the installation and piping, do not grip the body of the pressure gauge while tightening it. Tightening must be done by placing a wrench on the square section of the pipe connection port. When mounting the pressure gauges to a pressure port plate with Rc1/4, tighten them to 3.0 to 5.0 N·m [2.213 to 3.688 ft·lbf].

Preset marker

The preset markers can be set. Rotate the cover ring to first set the low-pressure side and then to set the high-pressure side.

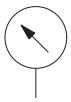


Pressure gauge

G1S-40·G3S-40

● These are the stainless steel specifications for the bourdon tube pressure gauges.

Symbols



Order Codes

G □ S – 40

Outer diameter
40 —— Outer diameter 40 mm [1.575 in.]

Range of pressure display
1 —— Standard specifications 1 MPa [145 psi]
3 —— Low pressure specifications 0.3 MPa [44 psi]

Pressure gauge

Specifications

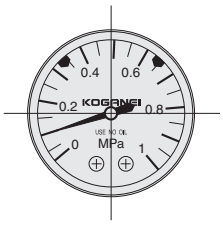
Item \ Model	G1S-40	G3S-40
Media	Air, N_2, O_2, CO_2, He, Ar	
Port size	R1/4	
Range of pressure display MPa [psi]	0 to 1.0 [0 to 145]	0 to 0.3 [0 to 44]
Accuracy	F.S. ±2.5%	
Outer diameter mm [in.]	42.5 [1.673]	
Maximum operating pressure MPa [psi]	0.93 [135]	0.25 [36]
Operating temperature range ℃ [°F]	5 to 60 [41 to 140] (non-condensation)	
Weight kg [lb]	0.091 [0.201]	

Material

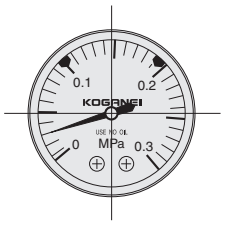
Name	Materials
Case	SPCC (black paint)
Stock	SUS316
Bourdon tube	SUS316
Transparent cover	Plastic (PC)

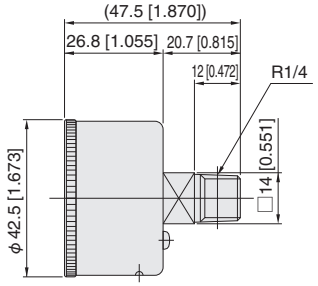
Pressure gauge dimensions (mm [in.])

● G1S-40
Standard specifications
1 MPa [145 psi]



● G3S-40
Low pressure specifications
0.3 MPa [44 psi]





Handling Instructions and Precautions

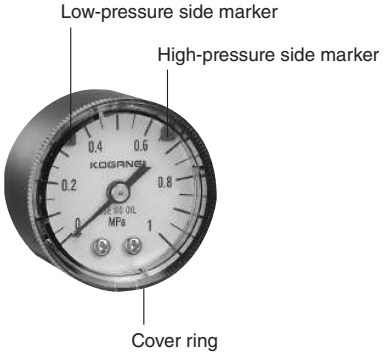
NOTE Pressure gauges are precision devices. Be careful of shock and vibrations.

Mounting and piping

When doing the installation and piping, do not grip the body of the pressure gauge while tightening it. Tightening must be done by placing a wrench on the square section of the pipe connection port. When mounting the pressure gauges to a pressure port plate with Rc1/4, tighten them to 3.0 to 5.0 N·m [2.213 to 3.688 ft·lbf].

Preset marker

The preset markers can be set. Rotate the cover ring to first set the low-pressure side and then to set the high-pressure side.



Digital pressure switch

Specifications

Item \ Type / Model name		Standard / High pressure type / **GS620**
Pressure type		Gauge pressure
Rated pressure range		-0.100 to +1.000 MPa [-15 to +145 psi]
Range of the set pressure		-0.100 to +1.000 MPa [-15 to +145 psi]
Withstand pressure		1.5 MPa [218 psi]
Applicable media		Non-corrosive gas
Power supply voltage		12 to 24V DC±10% Ripple P-P10% or less
Power consumption		Normal: 720 mW or less (30 mA or less consumption current at power supply voltage of 24 V) ECO mode: STD 480 mW or less (20 mA or less consumption current at power supply voltage of 24 V); when FULL, 360 mW or less (15 mA or less consumption current at power supply voltage of 24 V)
Comparative output		NPN transistor, open collector • Maximum inrush current: 100 mA • Applied voltage: 30 V DC or less (between comparative output and 0 V) • Residual voltage: 2 V or less (at inrush current of 100 mA, with cable length within 2 meters [6.560 ft])
	Output operation	NO/NC selection by key operation
	Output mode	EASY mode, hysteresis mode, window comparator mode
	Response differential (hysteresis)	Smallest 1 digit (variable)
	Repeatability	±0.2%F.S. (within ±2digits)
	Response time	2.5 ms, 5 ms, 10 ms, 25 ms, 50 ms, 100 ms, 250 ms, 500 ms, 1000 ms, 5000 ms selectable by key operation
	Short protection	Provided
Display		4-digit + 4-digit 3-color LCD (Display refresh interval: 250 ms, 500 ms, or 1000 ms selectable by key operation)
	Display pressure range	-0.100 to +1.000 MPa [-15 to +145 psi]
Indicator light		Orange LED (Comparative output 1 operation indicator lamp, comparative output 2 operation indicator lamp: Lights when comparative output is ON)
Environmental resistance	Protective construction	IP40 (IEC)
	Operating ambient temperature	-10 to +50°C [14 to 122°F], when in storage: -10 to +60°C [14 to 140°F]
	Operating ambient humidity	35 to 85% RH (Non-condensation, non-freezing); when in storage: 35 to 85% RH
	Dielectric strength	1000 VAC for 1 minute, between entire charger and case
	Insulation resistance	50 MΩ or greater using 500 VDC megger, between entire charger and case
	Vibration resistance	Endurance 10 to 500 Hz, double amplitude 3 mm [0.118 in.], each direction XYZ for 2 hours (when mounted on a panel: endurance 10 to 150 Hz, double amplitude 0.75 mm [0.030 in.], each direction XYZ for 2 hours)
	Shock resistance	Endurance 100 m/s^2 (Approximately 10 G) Each direction (XYZ) 3 times
Temperature characteristics		Within ±1% F.S. (reference value at +20°C [68°F])
Pressure port		M5×0.8 female thread + R1/8 male thread
Material		Case: PBT (glass fiber reinforced), LCD: Acrylic, Pressure port: SUS303, Mounting screws: Brass (nickel plated), Switches: Silicone rubber
Connection type		Connector connection
Wiring length		Up to 100 m [328.0 ft] of 0.3 mm^2 [5.535 Cv] or higher cable
Weight		About 40 g [1.41 oz]
Accessories		2 m [6.560 ft] cable with connector: 1

Note: The following measurement condition applies unless specifically noted otherwise: Operating ambient temperature range = +20°C [68°F].

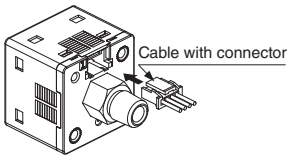
General precautions

Wiring

1. Always turn off power before doing wiring work.
2. Check fluctuation in the power source to confirm it does not exceed ratings before turning on power.
3. When using a power supply with a commercially available switching regulator, be sure to ground the power supply frame ground (F.G.) terminal.
4. When using devices that generate noise (switching regulator, inverter motor, etc.) in the vicinity where a pressure switch is mounted, be sure to connect a frame ground (F.G.) to the devices.
5. Avoid wiring in parallel to or in the same conduit with high-voltage lines and power lines. Such configurations can result in erratic operation due to induction.
6. Incorrect wiring can cause malfunctions.
7. After completing wiring work, check to make sure that all connections are correct.

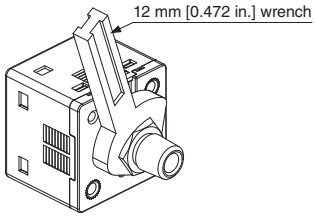
Connections

Do not apply any stress directly to the cable outlet or connectors.



Mounting and piping

When mounting to a pressure port plate with Rc1/8, tighten them to 3.0 to 5.0 N·m [2.213 to 3.688 ft·lbf]. For details, refer to "Installing included options" on pages 115 and 139.



Other

1. The GS-6 series is designed for non-corrosive gases. Do not use with liquids or corrosive gases.
2. Use devices within their rated pressure ranges.
3. Do not apply pressure that exceeds the withstand pressure. Doing so can damage the diaphragm and make proper operation impossible.
4. Avoid use during the transitional state (0.5 seconds) when the power is turned on.
5. Avoid use in areas where there are large amounts of water vapor, dust, etc.
6. Take care to avoid direct contact with thinner and other organic solvents, water, oil, and fats.
7. Do not insert wires or other objects into pressure ports. Doing so can damage the diaphragm and make proper operation impossible.
8. Never use a needle or any other sharp pointed object to perform key operations.

RUN mode

This is the normal operation mode.

Setting item	Description
Threshold value setting	The ON/OFF threshold value can be changed directly by simply using the UP and DOWN keys.
Zero adjust function	When the pressure port is open to atmosphere, the pressure value display is forced to show zero.
Key lock function	Locks out key operations.
Peak/bottom Hold function	Displays fluctuating pressure peak value and bottom value. The peak value is shown on the main display, while the bottom value is shown on the sub-display.

Menu setting mode

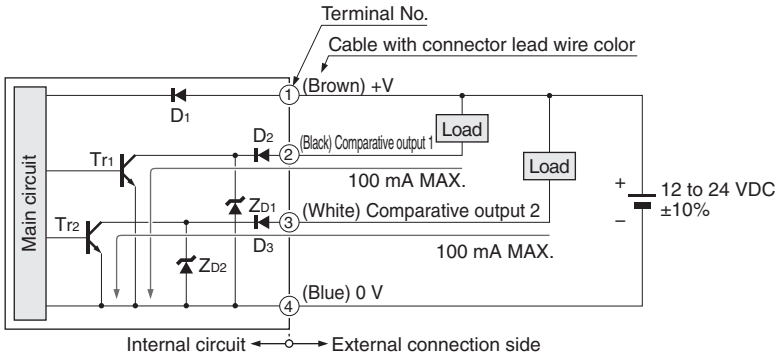
1. Holding down the mode key for two seconds while in the RUN mode changes to the menu setting mode.
2. Holding down the mode key while a setting operation is in progress will change to the RUN mode. At that time, settings of altered items will be applied.

Setting item	Description
Output mode settings for comparative output 1	Specifies the comparative output 1 output mode.
Output mode settings for comparative output 2	Specifies the comparative output 2 output mode.
NO/NC switching	Specifies normal open (NO) or normal close (NC).
Response time setting	Sets the response time. Response time can be selected from 2.5ms, 5ms, 10ms, 25ms, 50ms, 100ms, 250ms, 500ms, 1000ms, and 5000ms.
Main display color switching	Changes the display color of the main display. Either of the following color combinations can be set for output ON/OFF: red/green or green/red. Always red or always green can also be set.
Switching between units (high pressure type only)	Switches the pressure unit (MPa or kPa).

Remarks: For details about each mode, function, and value, refer to the instruction manual that comes with the product.

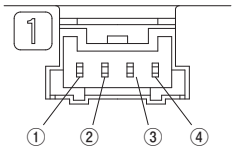
Input/output circuits and connections

Input/output circuit diagrams



Symbols D_1 to D_3 : Power supply reverse connection protection diodes
Z_{D1} and Z_{D2} : Zener diode for absorbing surge voltage
Tr_1 and Tr_2 : NPN output transistor

Terminal layout diagram



Terminal No.	Name
①	+V
②	Comparative output 1
③	Comparative output 2
④	0 V

Order Codes

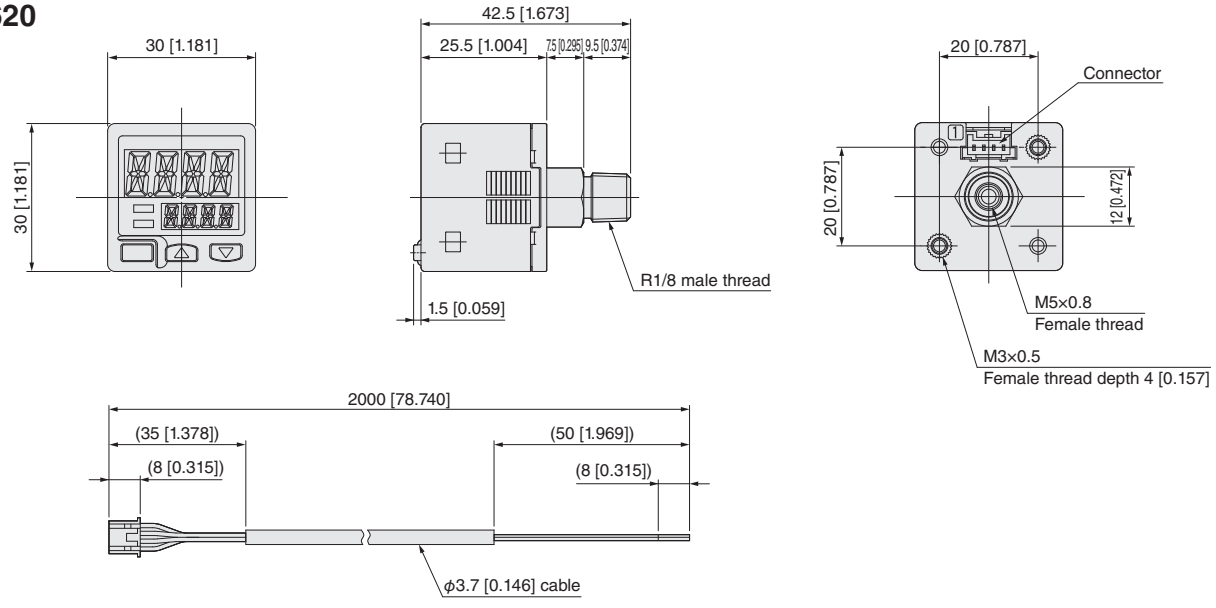
GS6 □

Digital Pressure switch

Operating pressure range
20: High pressure type -0.100 to +1.000 MPa [-15 to +145 psi]

Dimensions (mm [in.])

GS620

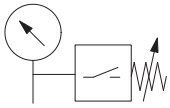


Pressure gauge with built-in switch

GS1-50

- Set pressure and working pressure displayed by a single pressure gauge. Panel mounting is also supported for easy centralized control and management from the control panel.
- Equipped with an indicator as standard, allowing confirmation of switch operation. In addition to the standard grommet (lead wire) type, a DIN connector type is also available as an option.

Symbols



Order Codes

□ - **GS1-50** □ - □

Wiring type
Blank — Lead wire type
T — with DIN type connector

Voltage
AL — for AC100V, AC200V
DL — for DC24V

Pressure gauge with built-in switches
(outer diameter 50 mm [1.969 in.])

Non-ion specifications
Blank — Standard specifications
NCU — Non-ion specifications

Remarks: Products with built-in AC contact protection circuits (external surge absorption elements) can also be manufactured. Consult your nearest Koganei sales office for details.

Specifications

Item			Model: GS1-50
Media			Air
Maximum operating pressure		MPa [psi]	0.83 [120]
Pressure gauge specifications	Operating temperature range (atmospheric and medium)	°C [°F]	5 to 60 [41 to 140]
	Range of pressure display	MPa [psi]	0 to 1.0 [0 to 145]
	Indicator accuracy		F.S. ±3%
Switch specifications	Range of pressure adjustment Note 2	MPa [psi]	0.1 to 0.83 [15 to 120]
	Pressure adjustment pointer error Note 1, Note 3	MPa [psi]	±0.05 [7]
	Repeatability accuracy Note 3	MPa [psi]	±0.05 [7] (5 to 45 °C [41 to 113°F])
	Response differential	MPa [psi]	0.07 [10] or less
	Contact method		Microswitch a contact points (NO)
	Wiring type	Standard	Lead wire type length: About 500 mm [19.685 in.] (UL1007 AWG22)
		Options	DIN type connector
	Indicator		Standard equipment is LED for DC and neon lamps for AC
Shock resistance		m/s² [G]	9.8 m/s² [1]
Mounting direction			Unrestricted
Weight		kg [lb]	0.17 [0.375] (0.19 [0.419] with DIN type connector)
Material		Main unit	Die cast aluminum
		Case	SPCC
		Stock	Brass
		Bourdon tube	Brass

Note 1: Specifications at pressure increase.
2: Set the pressure so that the difference between the set pressure and the supply pressure is 0.1 MPa [15 psi] or more.
3: Pressure adjustment pointer error and repeatability error may accumulate. (Maximum ±0.1 MPa [15 psi]) Be careful when using this.

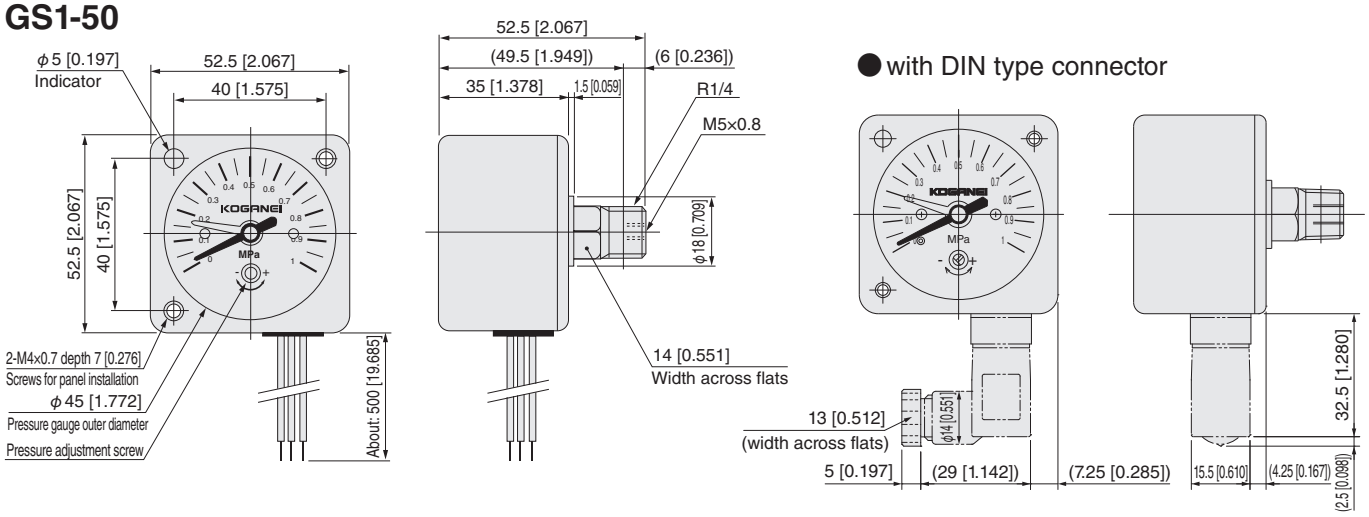
Microswitch rating

A

Operating current range \ Rated voltage		DC30V	AC125V	AC250V
Inductive load	Continuous	0.05 to 0.1	0.01 to 0.1	0.01 to 0.05
	Inrush	0.5 MAX.	0.5 MAX.	0.2 MAX.
Non-inductive load		0.01 to 0.5	0.01 to 0.3	0.01 to 0.2

Dimensions of pressure gauge with built-in switch (mm [in.])

GS1-50



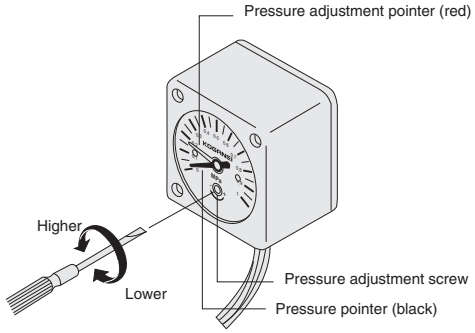
Pressure gauge with built-in switch

Mounting and piping

1. The mounting position is unrestricted. However, when installing the product between a valve and an actuator or in other situations where pressure pulsations are severe, install a throttling mechanism or similar device. If the installation is in a location subject to strong vibrations, consult Koganei.
2. When doing the installation and piping, do not grip the body of the pressure gauge while tightening it. Tightening must be done by placing a wrench on the hex section of the pipe connection port. When mounting the pressure gauges to a pressure port plate with Rc1/4, tighten them to 3.0 to 5.0 N·m [2.213 to 3.688 ft·lbf].

Pressure adjustment

Turn the pressure adjustment screw to set the pressure adjustment pointer (red) to the set pressure. Turning the pressure adjustment screw left (counterclockwise) sets the pressure to the high pressure side, and turning it right (clockwise) sets the pressure to the low pressure side. When the air pressure rises to the set pressure, the switch switches, and when the pressure drops, it returns to a position within 0.07 MPa [10 psi] (response differential) of the position where it switched during the rise.



NOTE

1. To adjust the pressure, insert a precision screwdriver through the slit in the cap without removing the cap, and directly turn the pressure adjustment screw.
2. The pressure adjustment pointer has an indication error of ±0.05 MPa [7 psi]. For fine adjustment, apply compressed air at the set pressure and perform the adjustment while confirming the switch operation.

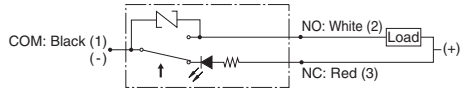
General precautions

1. Use this product for checking the supply pressure. Therefore, if you intend to use it in a precision control circuit, consult your nearest Koganei sales office.
2. If the installation location is subject to temperatures of 45°C [113°F] or higher, or humidity of 50% or higher, the performance of the switch may deteriorate. If you intend to use it in such conditions, consult your nearest Koganei sales office.
3. Since microswitches are used as the contact method, contact failure may occur if silicon gas is present in the atmosphere. If there are silicon products such as silicon oil around this product, use a contact protection circuit (for AC) or remove the source of silicon gas.

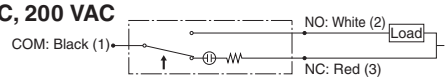
Wiring instructions

Be careful when connecting the NC and NO contacts and lead wires (terminal numbers for connectors). The numbers in ( ) in the figure indicate the terminal numbers, and the ⬆ indicates the direction of pressure increase. The indicator turns off when the pressure exceeds the set pressure and turns on as an alarm when the pressure falls below the set pressure.

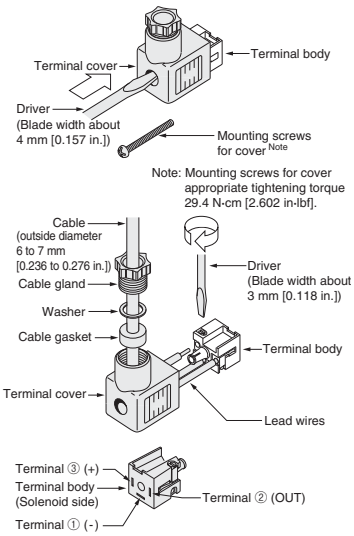
●24 VDC



●100 VAC, 200 VAC



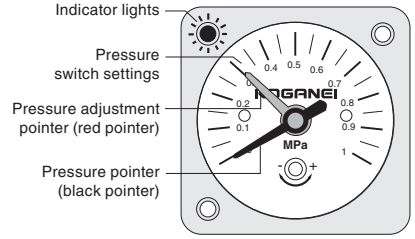
●Wiring instructions for DIN type connectors



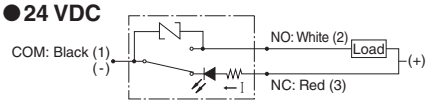
Strip the insulation from the lead wires and insert them into the terminal body connection terminals until they are fully seated. Tighten the screws with a screwdriver to secure the connection. When doing this, gently pull on the lead wires to confirm that they cannot be pulled out.

Switch setting method and operation details

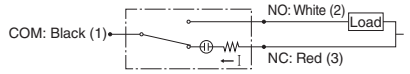
Setting example: You want to switch the switch when the pressure drops to 0.3 MPa [44 psi] or below.



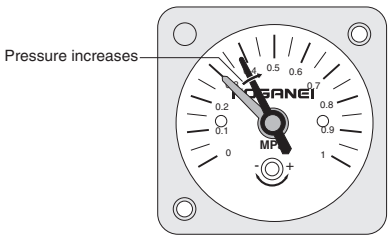
●24 VDC



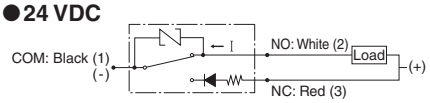
●100 VAC, 200 VAC



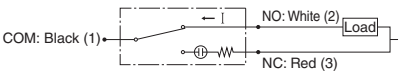
In atmospheric conditions, set the pressure adjustment pointer (red pointer) to 0.3 MPa [44 psi]. At this time, the internal switch is on the NC side as shown in the circuit diagram above, and the indicator lights.



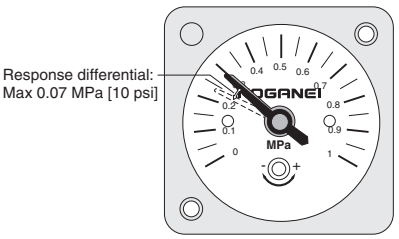
●24 VDC



●100 VAC, 200 VAC



When pressure is supplied and pressure rises, the internal switch switches to the NO side near the pressure regulator indicator (red needle) position, as shown in the circuit diagram above, and the load current flows and the indicator turns off. This position is designated as A. At this switching position A, the pressure gauge pointer error ±0.05 MPa [7 psi] and the repeatability accuracy ±0.05 MPa [7 psi] are accumulated, resulting in a maximum error of ±0.1 MPa [15 psi] relative to the pressure gauge pointer (black needle).



When the pressure drops and the pressure indicator (black needle) drops below position A, the internal switch switches to the NC side within the response differential pressure (maximum 0.07 MPa [10 psi]). Confirm the switching position at this time and adjust the pressure adjustment pointer (red pointer). Note that the NC side cannot be used as a load contact. Control the B-contact by using a relay or similar device activated by the NO side being OFF.

●About chemical resistance

The chemicals in the following table degrade plastic parts. They may damage the various filter bowls, holders, and the front cover of the pressure gauges, and cause an accident.
Do not allow the following chemicals into the compressed air or the environment around the product, do not allow them to contact the product. This does not mean that they are chemically resistant to all chemicals not listed below.

Type	Classification	Chemical name	Application example
Inorganic compound	Acid	Hydrochloric acid, sulfuric acid, nitric acid, fluorine, phosphoric acid, chromic acid	Coating processing, acid degreasing, and pickling of metals
	Alkali	Caustic soda, caustic potash, hydrated lime, ammonia water, sodium carbonate	Alkaline degreasing of metals
	Inorganic salt	Sodium sulfide, potassium nitrate, potassium dichromate, sodium nitrate	Dyes, rust inhibitor
Organic compounds	Aromatic hydrocarbons	Benzene, toluene, xylene, ethylbenzene, styrene	Paint thinner (benzene, toluene, xylene)
	Chlorinated aliphatic hydrocarbons	Methyl chloride, ethylene chloride, methylene chloride, acetylene dichloride, chloroform, trichlene, tetrachloroethylene, carbon tetrachloride	Organic solvents for metal cleaning (trichlene, tetrachloroethylene, carbon tetrachloride)
	Chlorinated aromatic hydrocarbons	Chlorobenzene, dichlorobenzene, benzene hexachloride (BHC)	Agricultural chemicals
	Petroleum components	Solvent naphtha, gasoline	Fuel
	Alcohol	Methyl alcohol, ethyl alcohol, cyclohexanol, benzyl alcohol	Anti-freezing agents
	Phenol	Carbolic acid, cresol, naphthol	Antiseptic solutions
	Ether	Methyl ether, methyl ethyl ether, ethyl ether	Brake fluid additive, detergent
	Ketones	Acetone, methyl ethyl ketone, cyclohexane, acetophenone	Cleaning solutions
	Carboxylic acid	Formic acid, acetic acid, butyl acid, acrylic acid, oxalic acid, phthalic acid	Dyes, aluminum processing solution (oxalic acid), paint base (phthalic acid)
	Phthalic acid ester	Dimethyl phthalate (DMP), diethyl phthalate (DEP), dibutyl phthalate (DBP), dioctyl phthalate (DOP)	Lubricants, synthetic hydraulic fluids, corrosion resistant additives, synthetic resin plasticizer
	Oxyacid	Glycolic acid, lactic acid, malic acid, citric acid, tartaric acid	Food preservatives, acidifiers
	Nitro compounds	Nitromethane, nitroethane, nitroethylene, nitrobenzene	Paint medium, explosives
	Amine	Methylamine, dioctylamine, ethylamine, aniline, acetanilide	Brake fluid additive
	Nitrile	Acetonitrile, acrylonitrile, benzonitrile	Nitrile rubber materials

Bowl material Oil resistance comparison table

Testing Procedure
A dumbbell-shaped multi-purpose test specimen (JIS K 7139: 2009) fixed under a certain bending stress is contacted with a reagent under the same conditions, and the condition of the test specimen is checked after a certain period of time.

Classification	Manufacturer/Reagent Name		PCT (Polycyclohexylene-di-methylene terephthalate)	PA (Nylon)	PC (Polycarbonate)
Alcohol	Isopropyl alcohol		○	×	×
Water-soluble cutting oil (Dilution ratio 10 times)	Nippon Quaker Chemical, Ltd.	Micro Cut 3653-N	○	○	○
		Micro Cut SRK-F	○	○	△
		Micro Cut 700RF	○	○	×
	Neos Corporation	Y1100P	○	○	○
		Y-103F	○	○	△
	Idemitsu Kosan Co., Ltd.	Daphne Alpha Cool EW	○	○	×
	NS Lubricants Co., Ltd.	C-3109HL	○	○	○
		RISCUT SY-64	○	○	×
Non-water-soluble cutting oil	Yushiro Chemical Industry Co., Ltd.	Yushiron Cut Arbus BZ322	○	○	△

The names of reagents in the table are registered trademarks of their respective companies.

PC may experience environmental stress cracking depending on the type of cutting fluid. Both PA and PCT tend to have strong resistance to cutting oils, but PCT is more suitable for environments where alcohol is used.

Note: This is under Koganei measurement conditions and does not guarantee performance.
If you have any questions, please contact our overseas department.

Guideline
○: No cracks (from none to minor effect)
△: Cracks present (small)
Conditions may hasten failure
×: Cracks present (large)
May break down in a short period of time

Limited Warranty

KOGANEI CORP. warrants its products to be free from defects in material and workmanship subject to the following provisions.

Warranty Period The warranty period is 180 days from the date of delivery.

Koganei Responsibility If a defect in material or workmanship is found during the warranty period, KOGANEI CORP. will replace any part proved defective under normal use free of charge and will provide the service necessary to replace such a part.

Limitations

- This warranty is in lieu of all other warranties, expressed or implied, and is limited to the original cost of the product and shall not include any transportation fee, the cost of installation or any liability for direct, indirect or consequential damage or delay resulting from the defects.
- KOGANEI CORP. shall in no way be liable or responsible for injuries or damage to persons or property arising out of the use or operation of the manufacturer's product.
- This warranty shall be void if the engineered safety devices are removed, made inoperative or not periodically checked for proper functioning.
- Any operation beyond the rated capacity, any improper use or application, or any improper installation of the product, or any substitution upon it with parts not furnished or approved by KOGANEI CORP., shall void this warranty.
- This warranty covers only such items supplied by KOGANEI CORP. The products of other manufacturers are covered only by such warranties made by those original manufacturers, even though such items may have been included as the components.

The specifications are subject to change without notice.

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KOGANEI

http://www.koganei.co.jp

Catalog No. BK-E0010

NEW Products

New-generation Filter Regulator

FRZ Series NPT thread specifications

Flexible installation

Water removal function eliminated for more flexible installation

Improved operability

Improved knob operability and simple bowl installation and removal

All products are RoHS compliant

New-generation Filter Regulator

FRZ Series

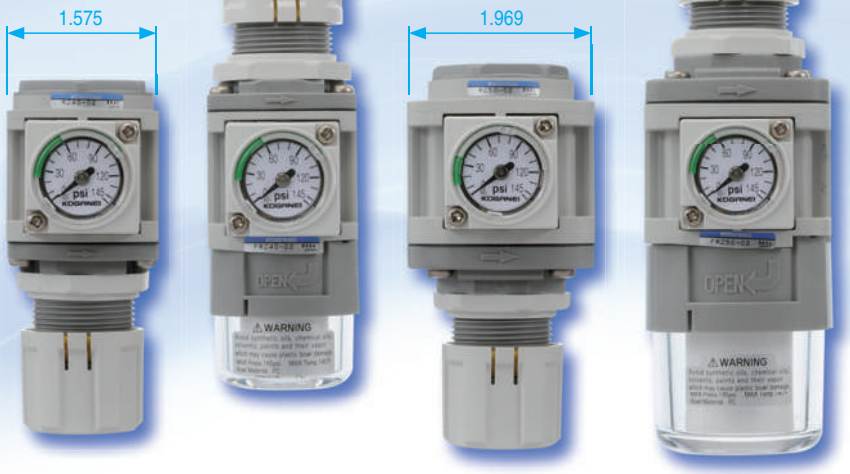
Excellent for air lines with water and fluids already removed.

Specialized **30 series** for standalone application

Regulator RZ30

Filter regulator FRZ30

The **40 and 50 series** can be used in combinations



Regulator RZ40

Filter regulator FRZ40

Regulator RZ50

Filter regulator FRZ50

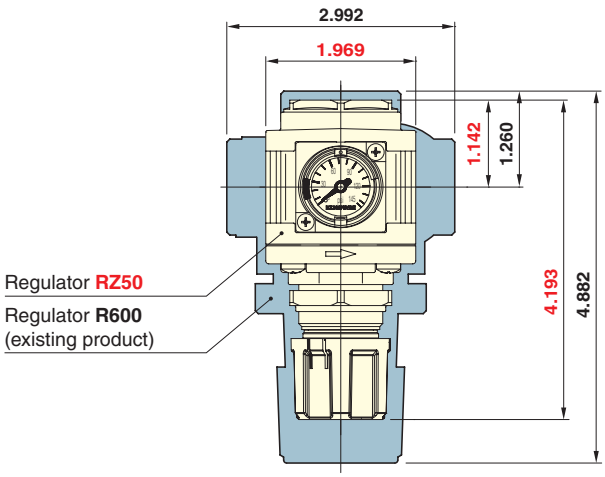
Down sizing	Improved flow rate characteristics allow a smaller configuration (close side-by-side spacing is possible).
Flexible installation	Water removal function is eliminated for more flexible installation.
Improved operability and maintainability	Improved knob operability and simple bowl installation and removal.
Pressure gauge, pressure switch	Supports □1.181 in. integrated pressure gauges, other pressure gauges, and pressure switches.
Supports a wide variety of environments	Ozone resistance specifications and NCU specifications (copper free)[Note] are standard.

Note: Excluding pressure switch and pressure gauge options.

Compact design

Improved flow rate characteristics enable a smaller configuration.

*Compared to the **R600** and **RZ50** Koganei Regulator.



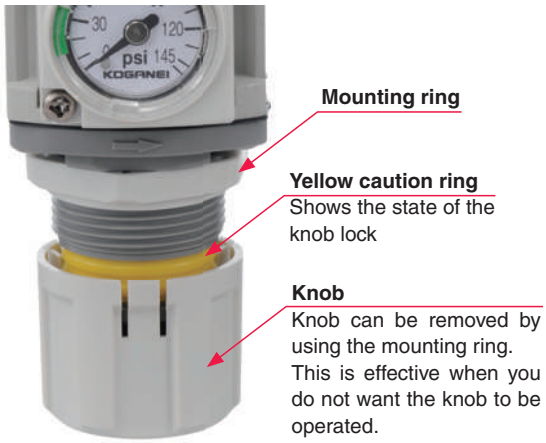
More flexible installation

Water and impurity removal functions have been eliminated for more flexible installation. Bowl can be mounted on the top or the sides.

Filter regulator
FRZ40

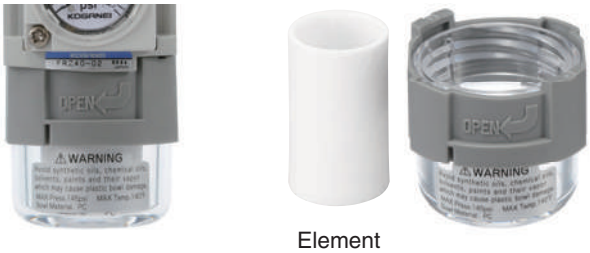
Improved knob operability

- The knob is sized and shaped to turn smoothly with a light touch for easy operation. Also, the knob lock precision has been improved to reduce changes in pressure settings when the knob is locked.
- The status of the lock release can be checked with the yellow caution ring.



Improved maintainability

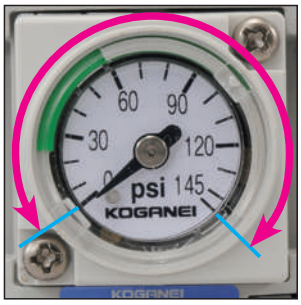
- The bowl can be removed and attached in two easy steps. The filter element can be replaced easily even in small narrow spaces.
- The filter element is a non-woven-fabric. Improved porosity and enlarged circumference area extend its operating life.



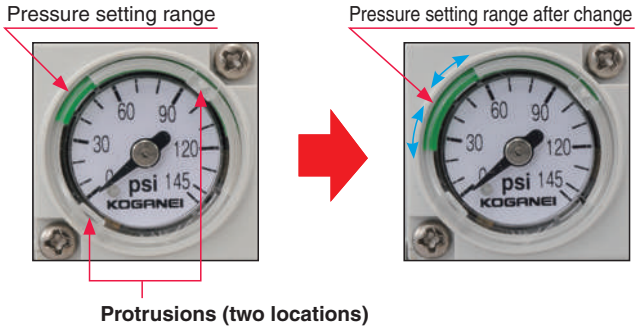
□1.181 in. series integrated pressure gauge

- □1.181 in. integrated pressure gauge is compact with almost nothing sticking out. Visibility is also improved with an easy to see 270° swing angle display.

270° swing angle



- Flexible change of the pressure setting range (the green part) is possible. Freely changeable upper and lower setting limits eliminate the need to remove the front cover (the transparent plastic part) and to use special tools.



The setting pressure range display can be changed as desired by rotating the protrusions (two locations) clockwise or counter clockwise.

*Other pressure gauges and pressure switches are available.
See the next page for details.

Pressure gauge, pressure switch

Can select various types of pressure gauges and pressure switches other than the □1.181 in. integrated pressure gauge.

Order code G1-40-F11

ϕ1.575 in. pressure gauge
(145 psi specification)

G3-40-F11

ϕ1.575 in. pressure gauge
(43.5 psi specification)

G1S-40-F11

ϕ1.575 in. stainless steel
Bourdon tube pressure gauge
(145 psi specification)

G3S-40-F11

ϕ1.575 in. stainless steel
Bourdon tube pressure gauge
(43.5 psi specification)

Digital pressure switch
GS620-3W
(145 psi specifications)

GS1-50-F11-□-□

Pressure gauge with
built-in switches
(145 psi specification)

Pressure switch module

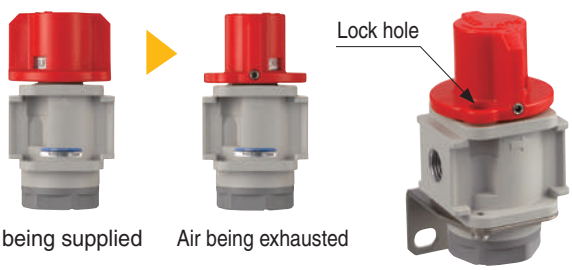
The pressure in the air line is easy to detect with the connecting bracket and integrated compact pressure switch. The set pressure can be adjusted from the front.

Note: Cannot be installed with the 30 series body size.

Residual pressure exhaust valve

The pressure in the air line can be exhausted through a 3-port valve. Better safety through a lock mechanism (with a lock hole) while exhausting residual pressure. Also, an easy to see red color is used for better visibility of the operating Knob.

Note: Cannot be installed with the 30 series body size.



Air being supplied Air being exhausted

Module adapter

These devices are used to connect devices for the 40 series and 50 series body sizes.

Note: Cannot be installed with the 30 series body size.

F module
(for connections)

D module
(for connections, with bracket)

T module
(for branches)

DT module
(for branches, with bracket)

S adapter
(for changing pipe size)

DS adapter
(for changing pipe size, with bracket)

Module bracket
(for module adapters)

Coupling plate
(replacement parts)

Bracket

The brackets can be used with all size filter regulators and regulators.

Panel mounting

A ϕ1.122 in. panel mounting hole can be used for all sizes of the filter regulators and regulators.

Safety precautions (FRZ series)

Always read these precautions carefully before use.

Before selecting and using the products, please read all safety precautions carefully to ensure proper product use.
The safety precautions described below are to help you use the product safely and correctly, and to prevent injury or damage to you, other people, and assets..
Always adhere to the following safety regulations: ISO4414 (Pneumatic fluid power - General rules and safety requirements for systems and their components) and JIS B 8370 (General rules relating to pneumatic systems).

The directions are ranked according to degree of potential danger or damage: "DANGER", "WARNING", "CAUTION", and "ATTENTION".

⚠ DANGER	Indicates situations that can be clearly predicted as dangerous. Failure to avoid the situation creates the risk of death or serious injury. It could also result in damage or destruction of assets.
⚠ WARNING	Indicates situations that, while not immediately dangerous, could become dangerous. Failure to avoid the situation creates the risk of death or serious injury. It could also result in damage or destruction of assets.
⚠ CAUTION	Indicates situations that, while not immediately dangerous, could become dangerous. Failure to avoid the situation creates the risk of minor or semi-serious injury. It could also result in damage or destruction of assets.
⚠ ATTENTION	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 for use in general industrial machinery.

- ■ When selecting and handling equipment, the system designer or another person with sufficient knowledge and experience should always read the safety precautions, catalog, instruction manual and other literature before commencing operation. Improper handling is dangerous.
- ■ After reading the instruction manual, catalog, and other documentation, always store them in a location that allows easy availability for reference to users of this product.
- ■ Whenever transferring or lending the product to another person, always attach the catalog, instruction manual, and other information to the product where they are easily visible in order 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 contingencies. Read the catalog and instruction 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. Machines 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 high levels of safety. Using the product in any of the ways described above creates the risk of loss of 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. Doing so creates the risk of ignition and fire.
- ● When mounting the product and workpiece, always make sure they are firmly supported and secured in place. Falling, dropping, or abnormal operation of the product creates the risk of personal injury.
- ● People using a pacemaker or other similar medical devices should keep a distance of at least 3.28 ft away from the product. There is a strong magnet inside the product and the magnetic field of this magnet may cause a pacemaker to malfunction.
- ● Never attempt to modify the product. Doing so can cause malfunctions and create the risk of personal injury, electric shock, fire, etc.
- ● Never attempt inappropriate disassembly, assembly or repair of the product relating to basic construction, or to its performance or to functions. Doing so creates the risk of injury, electric shock, fire, etc.
- ● Do not splash water on the product. Spraying it with water, washing it, or using it under water could result in malfunction of the product leading to injury, electric shocks, fire, etc.
- ● While the product is in operation, avoid touching it with your hands or otherwise approaching too close. Also, do not attempt to make any adjustments to internal or attached mechanisms, or to perform any type of adjustment (disconnecting cable connectors, adjusting pressure switches, disconnecting tubes or sealed plugs, adjusting the product's mounting position, etc.) while the product is in operation.
  Falling, dropping, or abnormal operation of the product creates the risk of personal injury.

⚠ WARNING

- ● Because Koganei products are designed for use under a wide variety of conditions, decisions concerning conformance with a particular system should be made upon the careful evaluation by the person in charge of system design.
  Assurances concerning expected system performance and safety are the responsibility of the designer who decides system conformity. Be sure to use the latest catalogs and technical materials to study and evaluate specification details, to consider the possibility of machine breakdown, and to configure a system that ensures fail-safe safety and reliability.
- ● Do not use the product in excess of its specification range. Doing so creates the risk of product breakdown, loss of function, or damage. It could also drastically reduce operating life.
- ● Before supplying air or electricity to the device and before starting operation, always conduct a safety check of the area of machine operation. Unintentional supply of air or electricity creates the risk of injury due to contact with moving parts.
- ● Do not touch terminals, switches, or other parts, while power is turned on. Doing so creates the risk of electric shock and malfunction.
- ● Do not allow the product to be thrown into fire. Doing so creates the risk of explosion resulting in the release of toxic gases.
- ● Do not sit on the product, place your foot on it, or place other objects on it. Doing so creates the risk of injury due to tripping or the product tipping over, resulting in product damage and abnormal, erratic, or runaway operation.
- ● Before conducting maintenance, inspection, repair, replacement, or any other similar procedure, always completely cut off the air supply and confirm that residual pressure inside the product or in piping connected to the product is atmospheric pressure. In particular, be aware that residual air will still be in the compressor or storage tank.
  The actuator may move abruptly if residual air pressure remains inside the piping, causing injury.
- ● Use safety circuits or design a system that prevents damage to machinery or injury to personnel when the machine is shut down due to an emergency stop or electrical power failure.
- ● Before performing any kind of wiring work, be sure to turn off power. Failure to do so creates the risk of electric shock.
- ● Do not allow lead wires and other cords to become damaged. Allowing a cord to become cut, bent excessively, pulled, rolled up, placed under heavy objects, or squeezed between two objects creates the risk of current leaks or defective continuity that can lead to fire, electric shock, or abnormal operation.
- ● Do not connect or disconnect connectors while power is turned on. Also, never apply unnecessary force to connectors. Doing so creates the risk of personal injury, device damage, and electric shock due to abnormal machine operation.
- ● Always check the catalog and other reference materials for correct product wiring and piping. Improper wiring and piping creates the risk of damage to and abnormal operation of the actuator, etc.
- ● After completing wiring work, check to make sure that all connections are correct before turning on power.
- ● After completing piping work, check to make sure that the circuit is correct before supplying air.

- Do not use any type of medium that is not specifically stipulated in the specifications. Using a non-specified medium could lead to loss of function in the short term, sudden degradation of performance, and a reduced 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 become stuck, resulting in equipment operation delays or in sudden movements. Before these initial operations, always run a test to check that operating performance is normal.
- Do not use the product in locations that are subject to direct sunlight (ultraviolet rays); locations with high humidity and temperature, dust, salt, or iron powder. Do not use fluids in the product or use the product in an environment that includes corrosive fluids such as organic solvents, phosphate ester type hydraulic oil, sulfur dioxide, chlorine gas, flon gas, ozone, acids, alkaline, etc. It could lead to early shutdown of some functions, a sudden degradation of performance, and a reduced operating life. For information about materials, see Major Parts and Materials.
- When the device is not used for long periods (over 30 days), it is possible that the contacting parts may have become stuck leading to delayed operation or sudden movements, resulting in injury. Check for proper operation a minimum of once every 30 days.
- Do not place the wiring that controls the pressure switch near power lines running a large current, powerful magnetic fields, or where power surges occur. It could cause erratic operation.
- Do not use the product at the beach in direct sunlight, near mercury vapor lamps, or near equipment that generates ozone. Ozone causes rubber components to deteriorate resulting in reduced performance, or degradation or stop of functions.
- Do not use in locations where there is a heat source nearby or that are subject to radiated heat.

⚠ CAUTION

- When mounting the product, leave room for adequate working space around it. Failure to do so will make it more difficult to conduct daily inspections or maintenance, which could eventually lead to system shutdown or damage to the product.
- Whenever transporting or installing a heavy product, use a lift or supports to securely support it, and use several people to help lift it and take other precautions to ensure personal safety.
- Do not scratch, dent, or deform the product by climbing on it, using it as a scaffold, or placing objects on top of it. Doing so creates the risk of damage to or breakage of the product, resulting in operational shutdown or degraded performance.
- Always post an "operations in progress" sign for installations, adjustments, or other operations, to avoid unintentional supplying of air or electrical power, etc. Unintentional supplying of air or electricity can cause electric shock or sudden operation and may result in injury.
- Do not bring any magnetic media or memory within 3.28 ft of the product. There is a strong magnet inside the product and the magnetic field of this magnet may damage the data on the magnetic media.
- If an electric leakage occurs on the control circuit, it may cause the product to operate unexpectedly. Protect the control circuit from electricity leaks so that electricity leaks do not exceed the allowance in the product specifications.
- Use the specified lubricant to lubricate sliding parts. Not doing so leads to changes in the physical properties, deterioration of the materials used, or reduced functionality.
- Do not block the product's vent holes. The pressure will fluctuate if the air volume changes during operations. If the vents are blocked the pressure balance will be disrupted, operations will no longer be as expected resulting in injury or damage to equipment.
- Use in extremely dry air under temperatures lower than -4°F may affect the quality of the lubricating oil used. This creates the risk of degraded performance, loss of function, or other problems

⚠ ATTENTION

- When considering the possibility of using this product in situations or environments not specifically noted in the catalog or instruction manual, or in applications where safety is an important requirement such as in aircraft equipment, combustion equipment, leisure equipment, safety equipment, and other places where human life or assets may be greatly affected, take adequate safety precautions such as allowing plenty of margin for ratings and performance, or fail-safe measures. Contact the sales department at Koganei regarding use in such applications.
- Use a protective cover and other means to ensure that the operating parts of mechanical devices are isolated and do not come into direct contact with human bodies.
- Do not configure control of the actuator in a way that could cause workpieces to fall due to power failure.
  Configure control of the system to prevent workpieces and other items from falling due to power failure or by emergency stops of mechanical devices.
- Attach a muffler to the exhaust port.
  It will reduce the noise during exhaust.
- Lock the pressure regulation knob after regulating the pressure.
- When handling the product, wear protective gloves, safety glasses, safety shoes, and other protective clothing.
- 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, consult your nearest Koganei sales office or Koganei Overseas Department. The addresses and telephone numbers are shown on the back cover of this catalog.

⚠ Other precautions

- 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 equivalent parts (recommended parts).
  Always observe the prescribed methods and procedures.
  2. Never attempt inappropriate disassembly or assembly of the product relating to basic configurations, or its performance or functions.
  3. The sales of pressure gauges with PSI indications in Japan are prohibited by the Japanese law.

Koganei shall not be held responsible for any problems that occur as a result of these items not being properly observed.

Warranty and General Disclaimer

1. Warranty Period
Koganei warrants this product for a period of no more than 180 days from the date of delivery.
2. Scope of Warranty and General Disclaimer
(1) The Koganei product warranty covers individual products. When a product purchased from Koganei or from an authorized Koganei distributor malfunctions during the warranty period in a way that is attributable to Koganei responsibility, Koganei will repair or replace the product free of charge. Even if a product is still within the warranty period, its durability is determined by its operation cycles and other factors. Contact your nearest Koganei sales office or the Koganei overseas department for details.
(2) Koganei shall not be held responsible for any losses or for any damage to other machinery caused by breakdown, loss of function, or loss of performance of Koganei products.
(3) Koganei shall not be held responsible for any losses due to use or storage of the product in a way that is outside of the product specifications prescribed in Koganei catalogs and the instruction manual, and/or due to actions that violate the mounting, installation, adjustment, maintenance and other safety precautions.
(4) Koganei shall not be held responsible for any losses caused by breakdown of the product due to factors outside the responsibility of Koganei, including but not limited to fire, natural disaster, the actions of third parties, and intentional actions or errors by you.

Precautions for the FRZ series

Design and selection

●Selection

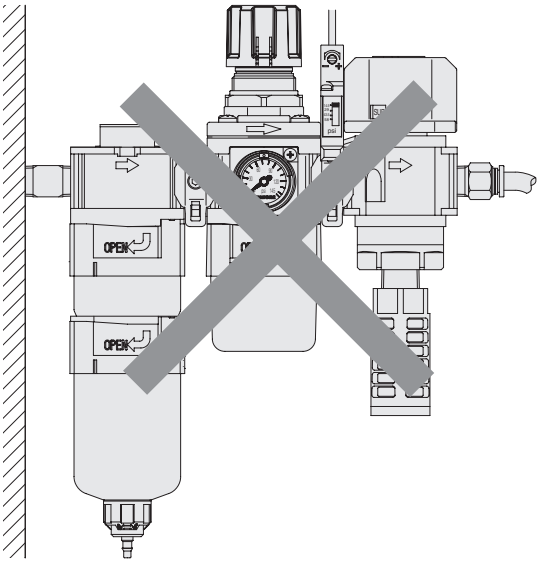
Look at the "Handling Instructions and Precautions", "Specifications", "Various Characteristics", "Dimensions", and other technical materials for each product to make the correct decision.

Mounting (installation) and piping

●Mounting (installation) direction, support, and securing

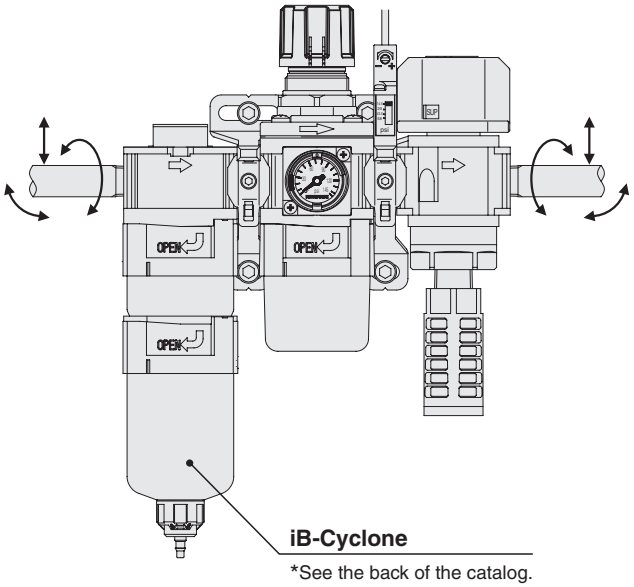
1. The products cannot be mounted (installed) if a bending moment or twisting moment is applied to the product or piping.

NOTE Applying bending moment or twisting moment may damage the product.



2. Do not attach piping so that just one side is fixed as shown in the following diagram. Support external piping separately.

NOTE Operating the knob and the moment caused by the OUT (secondary) side pipes may damage the product's piping connections.



*See the back of the catalog.

Note The muffler must be prepared by the user.

3. Use the D□ module or a bracket to install all the products.

4. The product can be mounted (installed) in any direction. It is also possible to install it with the bowl of the filter on top.

5. When mounting (installing) the product, always make sure it is secured and sufficiently supported.

NOTE If the product is not securely fixed in place, it may fall over, be dropped, or operate abnormally and may cause an injury.

●Maintenance space requirements

Assure there is sufficient space for maintenance inspections and maintenance work. See the dimension diagrams for each of the products regarding the maintenance space.

NOTE It there is not enough allowance for maintenance space, it will be impossible to remove the filter regulator bowl assembly and replace the filter.

NOTE If there is not enough allowance for maintenance space, it will be impossible to do maintenance inspections and maintenance work so the equipment may stop or the product may be damaged.

●Direction of flow

1. Connect the filter regulators and regulators so that the medium flows in the IN port (primary) side and out the OUT port (secondary) side.

2. Connect the residual pressure exhaust valves so that the medium flows from the 1 (P) port (primary) side to the 2 (A) port (secondary) side.

3. Use the flow marks on the products to identify the direction of flow of the medium in the filter regulators, regulators, and residual pressure exhaust valves.
See the "Handling Instructions and Precautions" for each product regarding the relationship of the flow marks and direction of flow of the medium being used (filter regulators, regulators on page ❽ and residual pressure exhaust valves on page ⓬.

NOTE Connecting the products so the medium flows in reverse will cause the product to stop functioning and damage it.

Precautions for the FRZ series

●Attaching steel pipes and fittings

If steel pipes and fittings are attached to the threaded sections of the aluminum die-cast parts of the product, tighten them to the torque recommended in our standards.

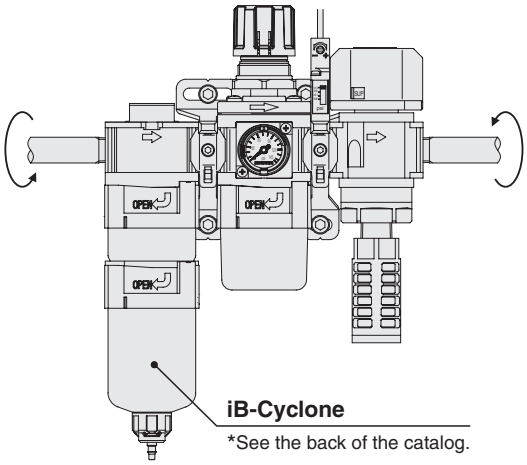
NOTE Tightening with excessive torque may damage the product or injure workers or operators.

Recommended tightening torque ft•lbf

Connecting thread	M5	1/8	1/4	3/8	1/2
Torque	0.74 to 1.11	5.2 to 6.6	8.9 to 10.3	16.2 to 17.7	20.7 to 22.1

NOTE Use a tightening torque of 2.21 to 3.69 ft•lbf if the various pressure gauges are mounted on the NPT1/4 pressure port plate.

NOTE If a muffler or something is attached to the 3 (R) port of the residual exhaust valve, tighten it to 1.33 to 1.63 ft•lbf.



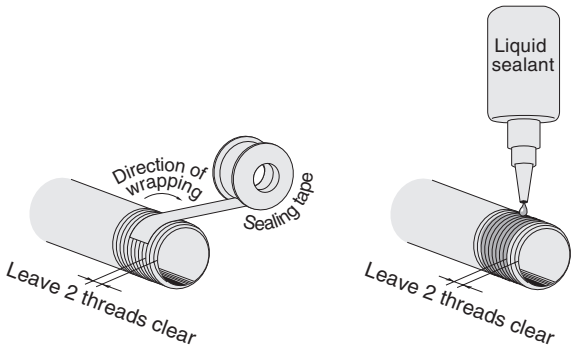
Note The muffler must be prepared by the user.

●Preventing contamination by foreign matter

1. Remove all foreign matter, such as metal chips, cutting oil, or dirt, from inside pipes with an air blower (flushing) and thorough washing before fitting the pipes.
2. Do not allow foreign matter, such as metal chips, or sealing tape from the piping threads, to get into the pipes when fitting the pipes.

NOTE Foreign matter entering the piping may damage the product or reduce its performance and service life.

3. Wrap the sealing tape in the direction as shown in the diagram below leaving 1.5 to 2 threads uncovered. When using liquid sealant, apply a suitable amount and leave 1.5 to 2.0 threads uncovered.



NOTE If the sealing tape or sealant gets on the lip of pipes and fittings, bits of it may get into the pipes and cause air leaks.

4. If you are using liquid sealant, do not get it on the polycarbonate parts (the bowl of the filter regulator and the front cover of the pressure gauge).

NOTE If liquid sealant gets on the polycarbonate parts, it may damage them.

Medium and operating environment

●Media

1. Use clean air (through 5 μm or smaller filter) for the supply medium. Contact the nearest Koganei sales office or overseas department if you are considering using something other than cleaned air.
2. Cannot use air that contains water and fluids.

NOTE Using air that contains water and fluids will cause the product's functions to stop after a short period and will reduce the product performance and service life.

3. If air that contains water and fluids is used, or if it is possible that they may be mixed in with the air being used, the water and fluids must be removed completely by installing a water and fluids removal device (such as the iB-Cyclone*) on the primary side. *See the back of the catalog.
4. Avoid using media that is prone to extreme pulsating or surging.

NOTE Medium prone to extreme pulsating or surges will cause the product's functions to stop after a short period and will reduce the product performance and service life.

●Operating environment

1. Do not use the product in locations that are subject to direct sunlight (ultraviolet rays); locations with high humidity and temperature, dust, salt, or iron powder.
2. Cover the unit when using it in locations where it might be subject to excessive dust, dripping water, dripping oil, etc.
3. Do not use the product in environments subject to external vibration or impact.

NOTE External vibrations or shocks may result in damage to component parts.

4. Avoid piping that is rigid, such as steel piping, if vibrations are transmitted. Use flexible tubes so that the product is not subject to the vibrations.

●Medium and operating environment

1. The temperature of the medium and the ambient environment must be within the range in the specifications.

NOTE Using the product in an environment that is outside the specified temperature or with media that is outside the specified temperature will cause the product's functions to stop after a short period and will reduce the product performance and service life.

2. Do not use media in the product or use the product in an environment that includes corrosive fluids such as organic solvents, phosphate ester type hydraulic oil, sulfur dioxide, chlorine gas, flon gas, ozone, acids, alkaline, etc.

NOTE Using the product in an environment or with media that is specified in the above item 2 will cause the product's functions to stop after a short period and will reduce the product performance and service life.

3. The bowl and the front cover of the pressure gauge of the filter regulator are polycarbonate. This product cannot be used in environments with the gases and fluids in item **2**, nor thread-locking adhesive, leak detection fluid, hot water or where it may be exposed to them. This product also cannot be used in direct ultra-violet light. See page ⑯ for details.

Operation and maintenance inspections

●Method of use

Read the "Handling Instructions and Precautions" for each product for instructions on correct usage (Filter regulator and regulator page ⑧ to ⑫, residual pressure exhaust valve page ⑫ and page ⑬, module adapters page ⑭, pressure switch module page ⑭ and page ⑮, □1.181 in. integrated pressure gauge page ⑮).

●Maintenance (maintenance inspection)

1. Performance and functions may decrease as the pneumatic equipment ages. Always conduct daily inspections of the pneumatic equipment, and confirm that all requisite system functions are satisfied, to prevent accidents from happening.
2. Read the "Handling Instructions and Precautions" for instructions on correctly doing maintenance and replacing maintenance parts (Filter regulator and regulators page ⑪ and page ⑫).
3. The product must be disassembled and reassembled to use the seal kit.

NOTE The product is no longer under warranty if it is disassembled or reassembled.

Filter regulator
Regulator

Design and selection

●Pressure setting

1. A safety device must be installed for equipment/devices installed on the OUT port (secondary) side of the filter regulator or the regulator, because the equipment/device will be damaged or malfunction due to the pressure if the set pressure value is exceeded.

2. We recommend setting the pressure on the OUT port (secondary) side to less than 85% of the supply pressure setting on the IN port (primary) side.

NOTE If the pressure is set above 85%, the effect of the fluctuations in the IN port (primary) side pressure and flow rate are more prone to affect the OUT port (secondary) side pressure, and it becomes unstable.

3. It is not possible to install a valve on the IN port (primary) side of the internal pilot type filter regulator or regulator (such as models FRZ4□, FRZ5□, RZ4□, RZ5□) to repeatedly switch the pressure on the IN port (primary) side.

NOTE Changing the pressure of the IN port (primary) side may cause fluctuation in the OUT port (secondary) side set pressure.

4. The OUT port (secondary) side pressure may fluctuate if air is not consumed for a long time or if a sealed circuit or balance circuit is used. Contact your nearest Koganei sales office or overseas department.

5. Contact your nearest Koganei sales office or overseas department if you are using a circuit that needs highly precise pressure regulation.

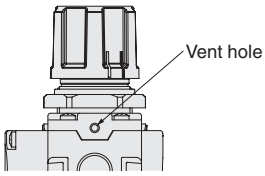
●OUT Port (secondary) side pressure exhaust and vent hole

1. When the knob on the filter regulator or regulator is turned to reduce the OUT port (secondary) side pressure or when the OUT port (secondary) side pressure is higher than the set pressure and is exhausted, air is exhausted to the outside through the vent hole shown in the diagram.

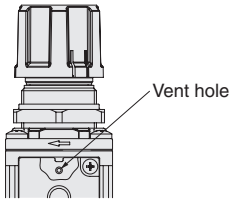
NOTE There may be some vibration and noise caused by the exhaust.

2. Install a separate exhaust mechanism on the OUT port (secondary) side if an external force applied to an actuator or something on the OUT port (secondary) side of the filter regulator or regulator generates a sudden pressure increase.

NOTE The relief port is smaller than the diameter of the pipe and may not be able to adapt to the sudden rise in pressure of the OUT port (secondary) side.



For **FRZ3** and **RZ3**



For **FRZ4**, **RZ4**, **FRZ5**, and **RZ5**

●Reverse flow from the OUT port (secondary) side to the IN port (primary) side (residual pressure exhaust)

1. Select the filter regulator or regulator (such as models FRZ32 and RZ32) with built in check mechanism specifications to release residual pressure on the IN port (primary) side to reduce pressure on the OUT port (secondary) side of the direct operation type filter regulator and regulator (such as models FRZ3□ and RZ3□).

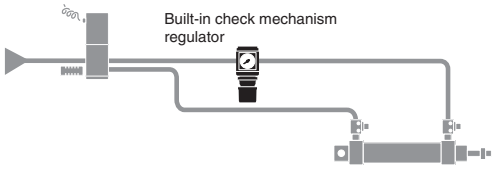
NOTE Residual pressure processing on the OUT port (secondary) side with the standard specifications and low-pressure specifications may not be possible depending on the operating conditions.

2. The internal pilot type filter regulators and regulators (such as models FRZ4□, FRZ5□, RZ4□, RZ5□) use the relief port on the OUT port (secondary) side to reduce residual pressure when the IN port (primary) side pressure is released.

3. When using a built-in check mechanism specification filter regulator or regulator (such as models FRZ32 or RZ32) installed after the valve to adjust the thrust of the actuator, set the pressure on the OUT port (secondary) side of the built-in check mechanism specification filter regulator or regulator not to rise above the set pressure, which may be caused by the back pressure of the actuator (As a guideline, the difference in pressure for the push side and the pull side of the actuator should be 43.5 psi or less.)

<Reference> Improving the system with a filter regulator or regulator with built-in check mechanism.

The filter regulator or regulator with built-in check mechanism releases pressure from the OUT port (secondary) side pressure to the IN port (primary) side as the main valve temporarily opens, because the pressure balance is disrupted when the built-in check valve is open as the IN port (primary) side pressure is lost. Due to easy change of the thrust of the pushing and pulling sides of the actuators, you can reduce air consumption by operating with low pressure on the side which does not need thrust.



●Water and fluids removal

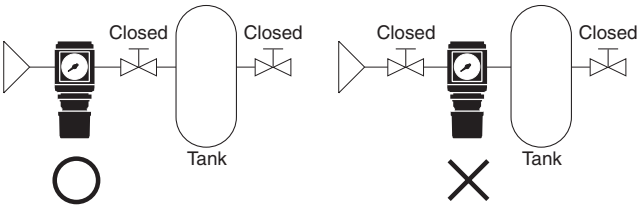
The filter regulator does not have a water and fluids removal function.

●Air consumption

1. The internal pilot type filter regulators and regulators (such as models FRZ4□, FRZ5□, RZ4□, RZ5□) consume air while regulating pressure on the OUT port (secondary) side.

2. Air consumption varies depending on the relationship of the IN port (primary) side pressure and the OUT port (secondary) side pressure.

3. The internal pilot type filter regulators and regulators (such as models FRZ4□, FRZ5□, RZ4□, RZ5□) reduce pressure by consuming air when the IN port (primary) side and OUT port (secondary) side are cut off and sealed.

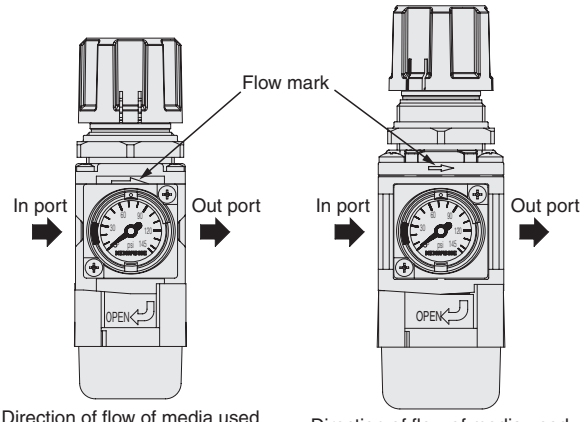


Pressure in tank decreases due to air consumption.

Mounting (installation) and piping

●Flow mark

The following diagram shows the relationship of the direction of flow of the media and the flow mark on the filter regulator or regulator.



Direction of flow of media used

For **FRZ3**□ and **RZ3**□

Direction of flow of media used

For **FRZ4**□, **FRZ5**□, **RZ4**□, and **RZ5**□

Filter regulator
Regulator

●Piping work

Connect pipes and fittings to the filter regulator and regulator IN ports and OUT ports so that the weight and torque of the pipes do not affect the product. When tightening the piping, grip the main unit and tighten it to the torque recommended on page ❼.

NOTE Applying unnecessary force or impact to the knob, bowl assembly, or pressure gauge may damage component parts.

●Installing brackets

To install brackets, do it in the following order.

① Remove the knob.
(For how to remove the knob see "Removing the knob" on page ❿.)
② Attach the bracket.
③ Screw on the mounting ring.

NOTE Tighten the mounting ring to less than 2.21 ft•lbf.

④ Attach the knob.
(For how to attach the knob see "Attaching the knob" on page ❿.)

●Panel mount

1. All the mounting holes for the filter regulator and regulators for the panel mount installation are ϕ1.122 in.

2. See the following table for the thickness of panels.

in

Model	FRZ3□ RZ3□	FRZ4□ RZ4□	FRZ5□ RZ5□
Thickness	0.118 or less	0.276 or less	

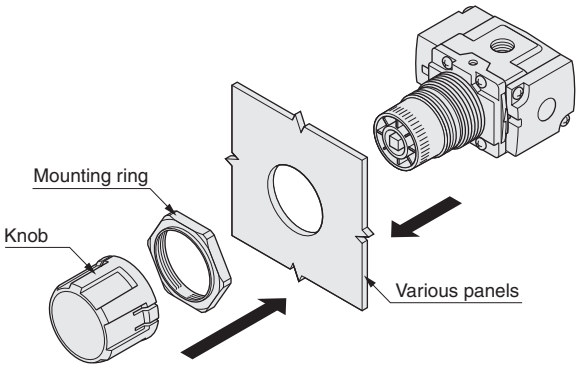
NOTE Using a panel that is thicker than specified may make it impossible to secure the mounting ring or decrease the visibility of the yellow caution ring.

3. Use the following procedure to install with a panel mount.

① Remove the knob.
(For how to remove the knob see "Removing the knob" on page ❿.)
② Attach the filter regulator or regulator to the panel.
③ Screw on the mounting ring.

NOTE Tighten the mounting ring to less than 2.21 ft•lbf.

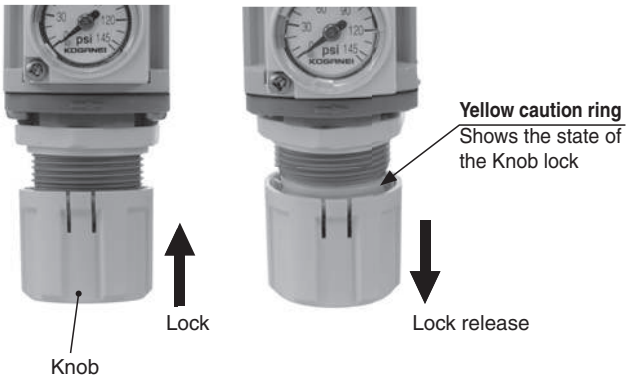
④ Attach the knob.
(For how to attach the knob see "Attaching the knob" on page ❿.)



Operation and maintenance inspections

●Locking and releasing the knob

1. The Knobs on the filter regulators and regulators use a push lock mechanism.
Use the procedure shown below to lock and release the knob.



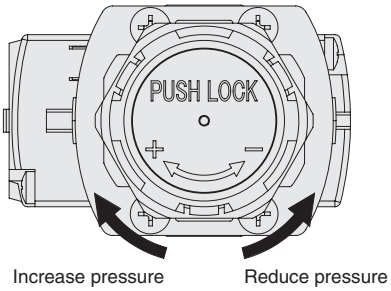
2. Always release the knob lock when regulating the pressure.

NOTE Turning the knob while it is locked may damage component parts.

3. Lock the knob after regulating the pressure.

●Pressure regulation

1. Pressure regulation is done as shown in the following diagram by turning the knob in the "+" direction to increase pressure and in the "−" direction, shown at the base of the knob, to reduce it.



2. Start at a low pressure and match it to the desired set pressure when regulating the pressure. If you exceed the desired pressure, lower the pressure again and start from a low pressure again to set the pressure.

NOTE Starting from a high pressure to set the desired pressure causes unstable pressure on the OUT port (secondary) side.

3. Use a pressure gauge to check the pressure on the IN port (primary) side and OUT port (secondary) side while regulating the pressure.

4. It is possible to increase the set pressure to exceed the upper limit of the pressure setting range by turning the knob to the upper limit of the "+" side, but keep the regulated pressure within the pressure setting range.

NOTE Turning the knob farther than necessary may damage component parts.

●Removing the knob

Use the following procedure to remove the knob.

① Release the knob lock.
(For how to release the knob lock see "Locking and releasing the knob lock" on page ❾.)

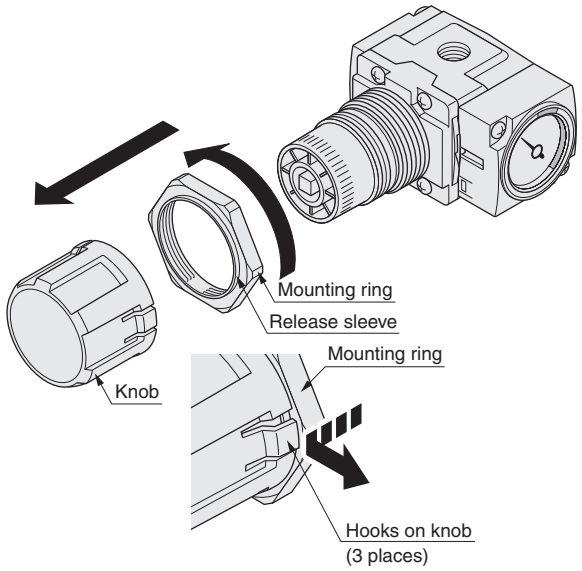
② Turn the mounting ring counterclockwise (in the direction of the arrow in the diagram below).

NOTE Turn the mounting ring until it comes off the threads.

③ Pull the mounting ring over in the direction of the knob.

NOTE The release sleeve of the mounting ring must be pulled up until it spreads the hooks (3 places) on the knob.

④ Pull off the knob and the mounting ring together.



●Attaching the knob

1. Use the following procedure to attach the knob.

① Release the pressure of the IN port (primary) side to the atmosphere.

② Screw on the mounting ring.

NOTE Installing the knob before screwing on the mounting ring makes it impossible to attach the mounting ring and makes the knob difficult to remove.

③ Press the knob in until the yellow caution ring is not visible.

NOTE Before pressing on the knob, align the square section of the adjusting assembly and the square indented portion of the base of the knob to make the knob easier to press on (on page ⓫).

2. Attaching the knob while the filter regulator or regulator IN ports (primary) side pressure is being supplied, may cause a temporary rise in pressure on the OUT port (secondary) side pressure.
Before attaching the knob, always release pressure on the IN port (primary) side to the atmosphere, because a temporary increase in pressure on the OUT port (secondary) side may occur which may damage equipment or devices on the OUT port (secondary) side or cause a malfunction.

NOTE It may damage the equipment or devices or injure workers or operators.

3. If it is impossible to release the pressure on the IN port (primary) side to the atmosphere, the pressure on the OUT port (secondary) side will rise temporarily, check for any effect it may have had on equipment and devices that are installed after the filter regulator or regulators, and then attach the knob.

●Changing the □1.181 in. integrated pressure gauge and pressure port plate

Use the following procedure to rotate the □1.181 in. integrated pressure gauge 180°, and to change the □1.181 in. integrated pressure gauge or pressure port plate.

① Remove the two small screws.

② Remove any metal chips from the female thread hole with an air blower.

NOTE If there are any metal chips left, they may break the threads or get on the o-ring and cause an air leak.

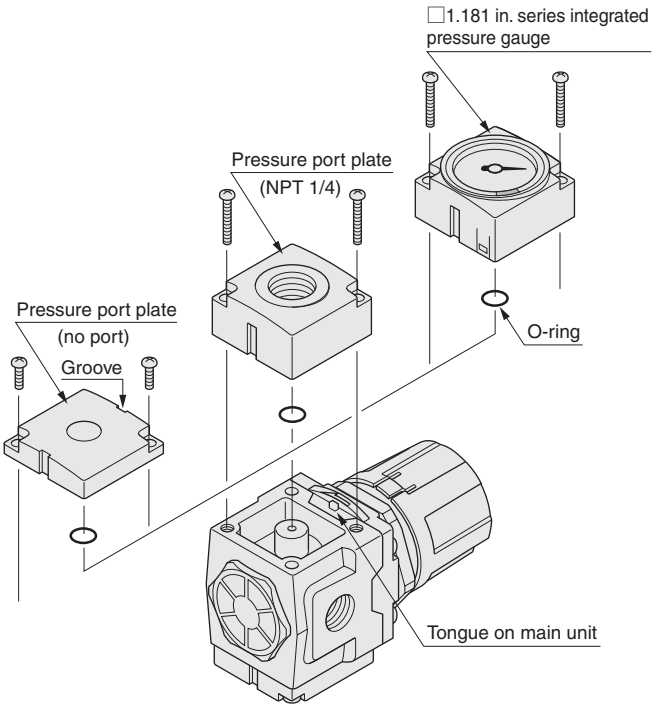
③ Put the o-ring on the □1.181 in. integrated pressure gauge or pressure port plate.

NOTE Not using an o-ring will result in air leaks.

④ Align the groove on the □1.181 in. integrated pressure gauge or pressure port plate with the tongue on the main unit and attach it.

⑤ Tighten the two mounting screws to 0.66 to 0.81 ft•lbf

NOTE If torque exceeding the specifications is applied, the head of the screw or threads may be damaged and cause damage to component parts. Also, if torque below the specifications is used, the screw may come loose and cause an air leak.



Filter regulator
Regulator

●Installing provided options

1. When installing the various types of pressure gauges, always apply the wrench on the square or hexagonal part of the piping connections.

NOTE Gripping the body of the various pressure gauges to tighten them may damage component parts.

2. Use a tightening torque of 2.21 to 3.69 ft•lbf if the various pressure gauges are mounted on the NPT1/4 port plate provided.

NOTE If torque exceeding the specifications is applied, it may damage component parts. Also, if torque below the specifications is used, the screw may come loose and cause an air leak.

3. There is a stopper on the NPT1/4 female thread of the NPT1/4 pressure port plate.

NOTE Further tightening after the stopper has been reached may damage component parts.

●Replacing the pressure port plate, knob, and mounting ring

1. When replacing the pressure port plate, refer to "Replacing the □1.181 in. integrated pressure gauge and pressure port plate" on page ⓾.

2. When replacing the knob and mounting ring, refer to "Removing the knob" and "Attaching the knob" on page ⓾.

●Replacing the seal kit, element, and bowl assembly

1. To replace the seal kit, element, and bowl assembly, remove the filter regulator or regulator and do the work on a work table.

2. The o-rings and other sealing materials (except for the diaphragm) of the filter regulator and regulator are coated with grease.

3. Contact your nearest Koganei sales office or overseas department if you are considering re-coating the o-rings and other parts.
Recommended grease: Lithium Soap based No. 2 or equivalent

4. Periodically replace the element in the filter regulator.

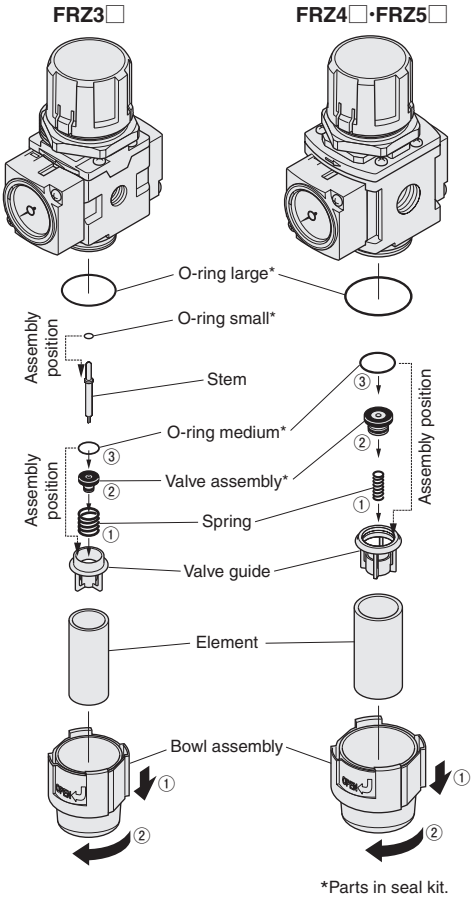
NOTE The service life of the element varies depending on the quality of air supplied to the IN port (primary) side. If there is a lot of foreign matter in the air supply to the IN port (primary) side, install a pre-filter on the IN port (primary) side or change the element more often. As a guideline, change the element after a year of use.

5. When replacing the seal kit, element, and bowl assembly, be careful not to lose component parts.

6. Refer to the diagram at right when replacing the seal kit, element, and bowl assembly.

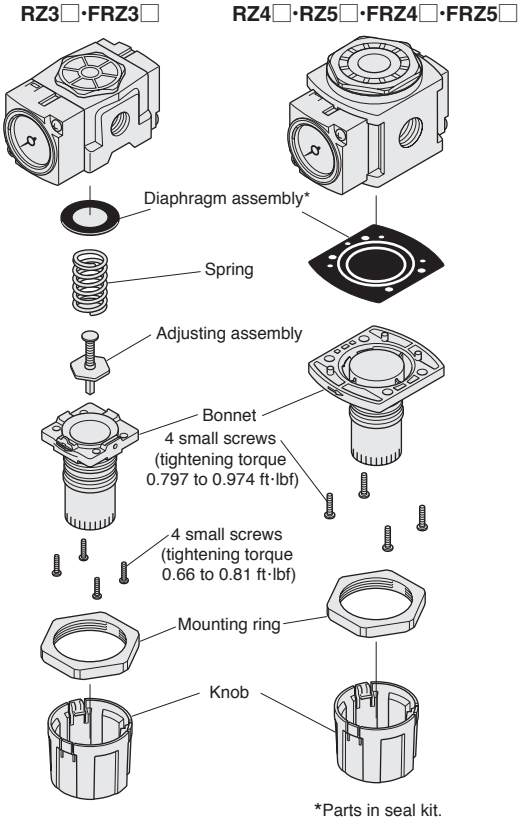
NOTE Always assemble the component parts correctly.

Filter regulator bowl side



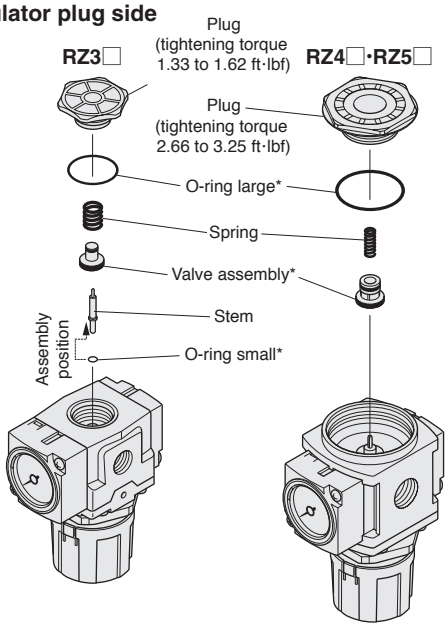
NOTE The product is no longer under warranty if it is disassembled or reassembled.

Regulator and filter regulator knob side



NOTE The product is no longer under warranty if it is disassembled or reassembled.

Regulator plug side



*Parts in seal kit.

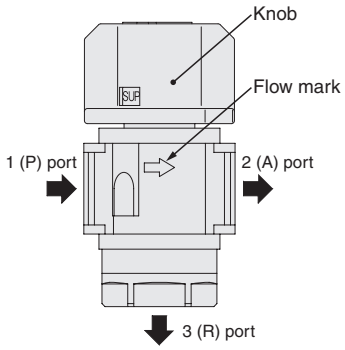
NOTE The product is no longer under warranty if it is disassembled or reassembled.

Residual pressure exhaust valve

Mounting (installation) and piping

●Flow mark

The following diagram shows the relationship of the direction of flow of the media and the flow mark on the residual pressure exhaust valve.



●Piping work

1. Connect pipes and fittings to the residual pressure exhaust valve 1 (P) port and 2 (A) port so that the weight and torque of the pipes do not affect the product. When tightening the piping, grip the main unit and tighten it to the torque recommended on page ❼.

NOTE Applying unnecessary force or impact to the knob may damage component parts.

2. If a muffler or something is attached to the 3 (R) port of the residual exhaust valve, tighten it to 1.33 to 1.62 ft•lbf.

NOTE The muffler must be prepared by the user.

NOTE If torque exceeding the specifications is applied, it may damage component parts. Also, if torque below the specifications is used, the screw may come loose.

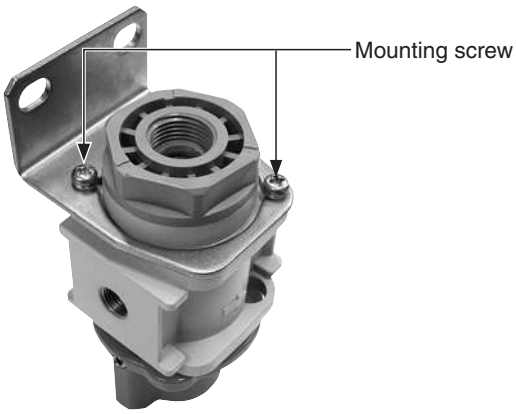
●Installing brackets

To install brackets, do it in the following order.

① Attach the bracket.

② Tighten the two mounting screws to 0.915 to 1.11 ft•lbf.

NOTE If torque exceeding the specifications is applied, the head of the screw or threads may be damaged and cause damage to component parts. Also, if torque below the specifications is used, the screw may come loose and cause an air leak.



Operation and maintenance inspections

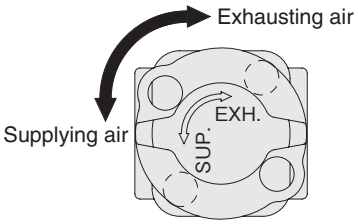
●State of air supply and exhaust

1. State of air supply is that air flows through from 1 (P) port (primary) side to 2 (A) port (secondary) side and is shut off at the 3 (R) port.

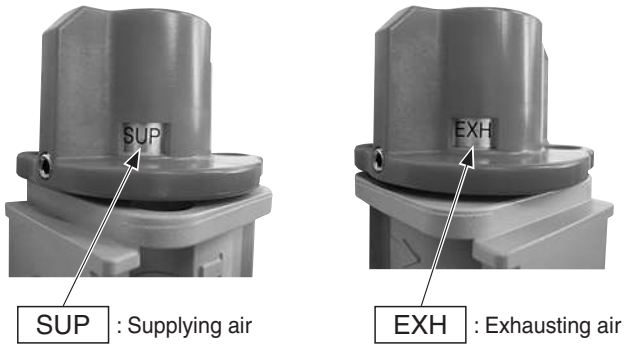
2. State of air exhaust is that air flows through from 2 (A) port (secondary) side to 3 (R) port and is shut off at 1 (P) port (primary) side.

●Switching the state of air supply and exhaust

1. To switch the air flow from supply to exhaust and vice versa, turn the knob 90° to "SUP", which is shown near the bottom of the knob, to supply air, or turn the knob 90° to "EXH" to exhaust air.



2. Check the window shown in the diagram below to see the state of the residual pressure exhaust valve. If "SUP" is showing, air is being supplied. If "EXH" is showing, air is being exhausted.



3. Turn the knob slowly to gradually supply or exhaust air.

NOTE 1(P) port (primary) side air cannot flow to 2 (A) port (secondary) side and 3 (R) port at the same time.

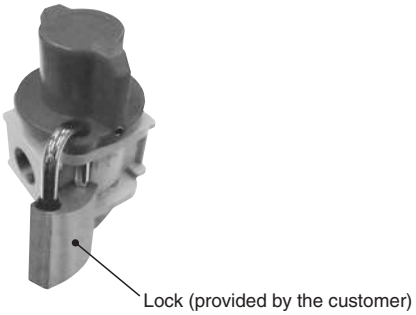
●Using the lock hole

1. The lock hole on the residual pressure exhaust valve is used to secure the air flow in a state of exhaust and to prevent changes to the state of the air supply.

NOTE Air cannot be supplied while the look hole is used.

2. The diameter of the lock hole is ϕ0.394 in.

3. A lock must be supplied separately.



Module adapter

Mounting (installation) and piping

●Mounting (installation)

1. Use the various modules and adapters when combining the relevant FRZ series models and the relevant iB-Cyclone* models.
*See the back of the catalog.

2. Refer to "List of models" on page ㉝ regarding combinations of the relevant models, modules, and adapters.

NOTE The FRZ3□, RZ3□, and IBCY30 cannot be used together.

3. When assembling the products, check the flow marks on the products and assemble them so the media flows in the same direction. See the "Handling Instructions and Precautions" for each product regarding the relationship of the flow marks and direction of flow of the medium being used (filter regulators, regulators on page ❽ and residual pressure exhaust valves on page ⓬.

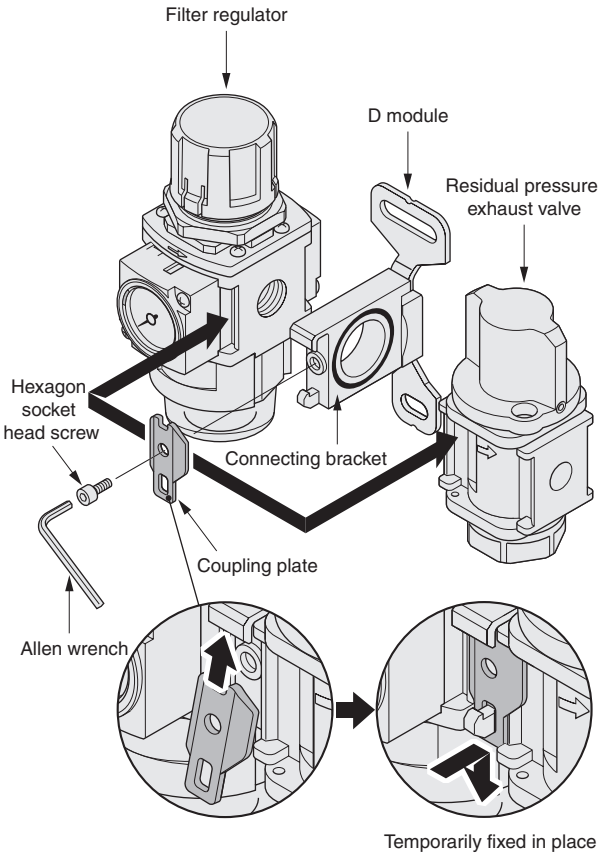
4. Use the following procedure to assemble the products using the modules and adapters.
① Attach the o-rings to the connecting bracket (2 places)

NOTE Not using an o-ring will result in air leaks.

② Temporarily fix the products to the coupling plate.
③ Tighten a hexagon socket head screw to 0.66 to 0.81 ft•lbf.

NOTE If torque exceeding the specifications is applied, it may damage component parts. Also, if torque below the specifications is used, the screw may come loose.

<Example assembly>



Pressure switch module

Mounting (installation) piping

●Mounting (installation)

1. The method to install the pressure switch modules is the same for the various modules and adapters. Refer to the "Handling Instructions and Precautions" for the modules and adapters.

2. Do not pull too hard on the wires or bend them too much. Also, when handling the products, carry them by the pressure switch side and do not apply too much force to the wires.

3. Be careful when handling the pressure switch modules, subjecting them to strong impact may cause damage or malfunction.

●Contact capacity

Use the specified load voltage and load current.

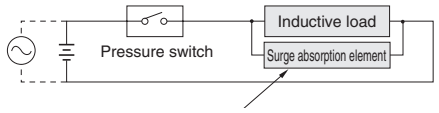
NOTE Using a load voltage or a load current that is outside the specifications may cause the contacts to fuse.

●Contact protection measure

The pressure switch module uses a reed sensor switch. Take the contact protection measures shown in the diagram below.

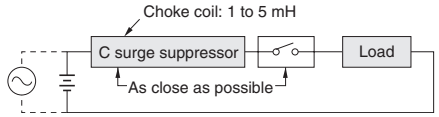
NOTE Contacts may fuse if measures to protect the contacts are not taken.

For connecting an inductive load (electromagnetic relay etc)



For DC ... Diode or CR, etc.
For AC ... CR etc.
Diode: Forward current should be more than the circuit current and the reverse current should be 10 times greater or more than the circuit voltage.
CR: C=0.01 to 0.1 μF
R=1 to 4 kΩ

If a capacitive surge occurs (if wire length is 32.8 ft)



Medium and operating environment

●Operating environment

The pressure switch module uses a magnetically sensitive sensor switch.
Avoid large electric currents, such as locations where there is a strong magnetic field or near power lines.

NOTE Use in locations with strong external magnetic fields or near strong electric currents may cause the pressure switch module to malfunction.

Operation and maintenance inspections

●Detection pressure scale

1. Use a detection pressure scale as a guideline.

NOTE Use a multi meter to confirm the output of the pressure switch module.

NOTE To accurately set the detected pressure, use a separate pressure gauge.

2. Detection pressure scale is for the set value when the supplied pressure falls.

3. Detection pressure scale is for the set value when the OFF signal is detected.

NOTE The ON signal is detected when the pressure exceeds the set pressure on the detection pressure scale by the response differential.

●Settings for the detection pressure

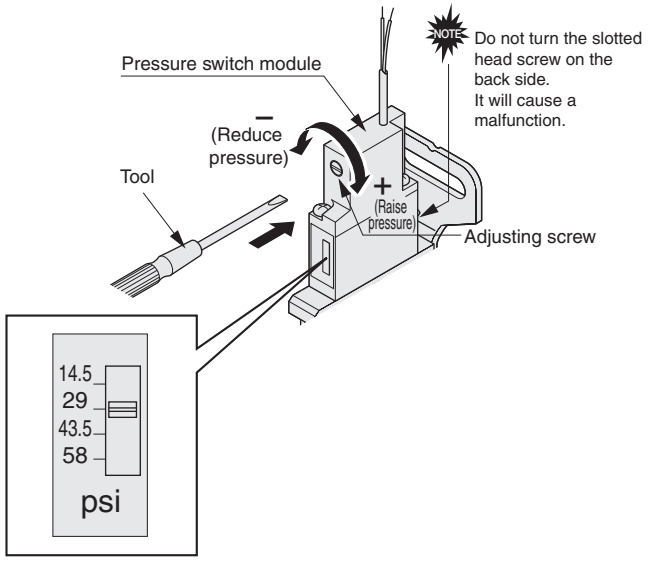
1. The detection pressure can be set to a value over the range of detection pressure, but always set it within the specified values.

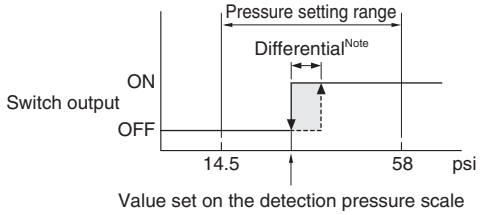
NOTE Setting the pressure over the range of the detection pressure will damage component parts.

2. Use the following procedure to set the detection pressure.

① Turn the adjusting screw toward the "+" until the regulating indicator is aligned with the desired detection pressure on the scale.

② Supply pressure and use a multi meter to confirm that the signal indicates the desired pressure setting is detected.





Value set on the detection pressure scale

Note: Response differential is less than 12 psi

□1.181 in. series integrated pressure gauge

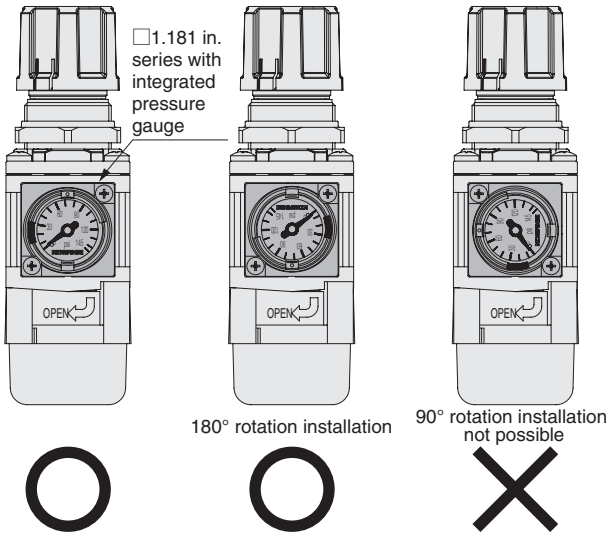
Mounting (installation) and piping

●Mounting (installation)

1. Read the "Handling Instructions and Precautions" for the filter regulator and regulator when installing the □1.181 in. integrated pressure gauge to the filter regulator or the regulator.

2. Install the □1.181 in. integrated pressure gauge to the filter regulator or regulator in the orientation shown in the diagram below.

NOTE It is possible to change the □1.181 in. integrated pressure gauge installation to a 180° orientation, but it is not possible to change it to a 90° orientation.



Medium and operating environment

●Surging, vibration, and shock

The □1.181 in. integrated pressure gauge is a precision device. It cannot be used if the medium surges, or external vibration or shock is applied.

NOTE Surges in the media, external vibrations or shocks may result in damage to component parts.

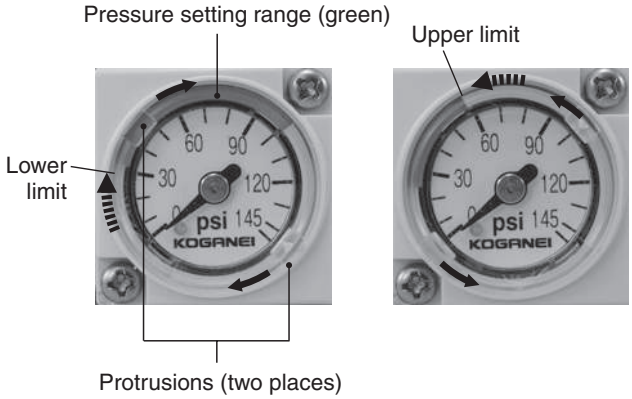
Operation and maintenance inspections

●Adjusting the range of the set pressure

1. Use the procedure below to adjust the range of the set pressure (the green portion).

1. Adjust the lower limit of the range of the set pressure by rotating the protrusions (2 places) clockwise with your hand.
2. Adjust the upper limit of the range of the set pressure by rotating the protrusions (2 places) clockwise with your hand.

NOTE Adjusting the range of the set pressure with a tool may damage component parts.



●About the chemical resistance of polycarbonate

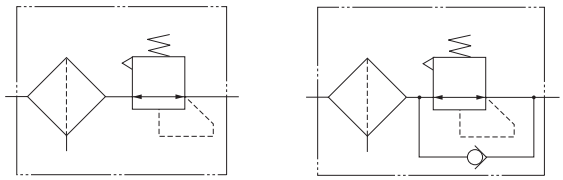
The chemicals in the following table degrade polycarbonate. Because of this, they may damage the bowl of the filter regulator or the front cover of the pressure gauge and cause an accident. The products cannot be used in locations where the chemicals in the following table are present in the compressed air, ambient air, or on surfaces. This does not mean that polycarbonate is chemically resistant to all chemicals not listed below.

Type	Classification	Chemical name	Application example
Inorganic compound	Acid	Chlorine, sulfuric acid, nitric acid, fluorine, phosphoric acid, chromic acid	Acid cleaning for metals, acid degreasing, and coating processing
	Alkali	Caustic soda, caustic potash, hydrated lime, ammonia water, sodium carbonate	Alkaline degreasing of metals
	Inorganic salt	Sodium sulfide, potassium nitrate, potassium dichromate, sodium nitrate	Dyes, rust inhibitor
Organic compounds	Aromatic hydrocarbons	Benzene, toluene, xylene, ethyl benzene, styrene	Paint thinner (Benzene, toluene, xylene)
	Chlorinated aliphatic hydrocarbons	Methyl chloride, ethylene chloride, methylene chloride, acetylene dichloride, chloroform, trichlene, tetrachloroethylene, carbon tetrachloride	Organic solvents for metal cleaning (trichlene, tetrachloroethylene, carbon tetrachloride)
	Chlorinated aromatic hydrocarbons	Chlorobenzene, dichlorobenzene, benzene hexachloride (BHC)	Agricultural chemicals
	Petroleum components	Solvent, naphtha, gasoline	Fuel
	Alcohol	Methyl alcohol, ethyl alcohol, cyclohexanol, benzyl alcohol	Anti-freezing agents
	Phenol	Carbolic acid, cresol, naphthol	Antiseptic solutions
	Ether	Methyl ether, methyl ethyl ether, ethyl ether	Brake fluid additive, detergent
	Ketones	Acetone, methyl ethyl ketone, cyclohexane, acetophenone	Cleaning solutions
	Carboxylic acid	Formic acid, acetic acid, butyl acid, acrylic acid, oxalic acid, phthalic acid	Dyes, aluminum processing solution (oxalic acid), paint medium (phthalic acid)
	Phthalic acid ester	Dimethyl phthalate (DMP), diethyl phthalate (DEP), dibutyl phthalate (DBP), dioctyl phthalate (DOP)	Lubricants, synthetic hydraulic fluids, corrosion resistant additives, synthetic resin plasticizer
	Oxyacid	Glycolic acid, lactic acid, malic acid, citric acid, tartaric acid	Food preservatives, acidulant
	Nitro compounds	Nitromethane, nitroethane, nitroethylene, nitrobenzene	Paint solvent, explosives
	Aminos	Methylamine, dioctylamine, ethylamine, aniline, acetanilide	Brake fluid additive
	Nitrile	Acetonitrile, acrylonitrile, benzonitrile	Nitrile rubber materials

Filter regulator

FRZ30-F11·FRZ31-F11·FRZ32-F11
FRZ40-F11·FRZ41-F11
FRZ50-F11·FRZ51-F11

Symbol



●Standard
●Low pressure

●Built-in check mechanism

Specifications

Item \ Model		FRZ30-F11	FRZ40-F11	FRZ50-F11
	Standard	FRZ30-F11	FRZ40-F11	FRZ50-F11
	For low pressure	FRZ31-F11	FRZ41-F11	FRZ51-F11
	Built-in check mechanism	FRZ32-F11	———	———
Medium		Air		
Port size		M5×0.8mm, NPT1/8, NPT1/4	NPT1/8, NPT1/4, NPT3/8	NPT1/4, NPT3/8, NPT1/2
Maximum operating pressure	psi	145		
Proof pressure	psi	218		
Operating temperature range (atmosphere and media)	°F	41 to 140 (non-condensation)		
Filtration	μm	5		
Regulation method		Direct operation type and relief type	Internal pilot type and relief type	
Pressure setting range psi	Standard/built-in check mechanism	7 to 123		
	For low pressure	7 to 58		
Relief start pressure	psi	Set pressure +7 or less		
Air consumption[Note 1]	ft³/min (SCFM)	—	0.18 or less	
Materials of major parts	Body	Die cast aluminum alloy		
	Bonnet and adapter	Polyacetal		
	Diaphragm	Base fabric + synthetic rubber		
	Bowl	Polycarbonate		
	Filter element	Non-woven fabric		
	Bracket	Steel plate (electroless nickel plated)		
Mass (for standard specifications and largest port size)	lb	0.35	0.44	0.64
Standard equipment		Mounting ring		
Option[Note 2]		□1.181 in. integrated pressure gauge (assembled), other pressure gauges (included parts), brackets (included parts)		

Note 1: Maximum value of specified range. Air consumption varies depending on the relationship of the primary pressure and the secondary pressure.
2: Refer to the order codes and the specifications for each product starting on page ㊲ for details on the various types of options.

Order codes

FRZ □ – **F11** – □ – □ – □

NPT thread specifications

Body Model \ Port size NPT	M5	1/8	1/4	3/8	1/2	
30	M5	01	02			Standard
40		01	02	03		Standard
50			02	03	04	Standard
31	M5	01	02			Low pressure
41		01	02	03		Low pressure
51			02	03	04	Low pressure
32	M5	01	02			Built-in check mechanism

Filter regulator

Bracket
Blank — No bracket
B — With bracket

Pressure gauge specifications
Blank — No pressure gauge (pressure gauge connection port NPT1/4)
GP1 — No pressure gauge (pressure gauge connection port NPT1/8)
GN — No pressure gauge (No pressure gauge connection port)
G1C — 145 psi specification □1.181 in. integrated pressure gauge
G4C — 58 psi specification □1.181 in. integrated pressure gauge
G1 — 145 psi specification ϕ1.575 in. pressure gauge
G3 — 44 psi specification ϕ1.575 in. pressure gauge
G1S — 145 psi specification ϕ1.575 in. stainless Bourdon tube pressure gauge
G3S — 44 psi specification ϕ1.575 in. stainless Bourdon tube pressure gauge
GS6 — 145 psi specification digital pressure switch
GS1A — 145 psi specification □1.969 in. pressure gauge with built-in switch Lead wire For 24 VDC
GS1B — 145 psi specification □1.969 in. pressure gauge with built-in switch Lead wire For 100 VAC, 200 VAC
GS1C — 145 psi specification □1.969 in. pressure gauge with built-in switch With DIN connector For 24 VDC
GS1D — 145 psi specification □1.969 in. pressure gauge with built-in switch With DIN connector For 100 VAC, 200 VAC

Note: Refer to order codes and dimensions on page ㊳ to ㊺ for information about the specifications for pressure gauges, pressure gauges with electronic switches, pressure gauges with built-in pressure switches, and purchasing individual parts.

●Order codes for brackets only

8Z-BK

Order codes

●Parts for maintenance

●Bowl assembly

BA-FRZ□-F11

Body size
30 —— **For FRZ3□**
40 —— **For FRZ4□**
50 —— **For FRZ5□**

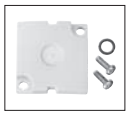
●Element

E-□Z

Body size
30 —— **For FRZ3□**
40 —— **For FRZ4□**
50 —— **For FRZ5□**

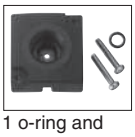
●Pressure port plate

P-FRZ (without pressure gauge connection port)



1 o-ring and
2 small screws

GP-FRZ□-F11 (with pressure gauge connection port)



Connection port diameter
Blank NPT1/4
1 NPT1/8

1 o-ring and
2 small screws

●Seal kit (various o-rings, 1 valve assembly, and 1 diaphragm assembly)

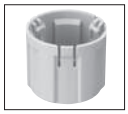
SRK-FRZ□

Body size
30 —— **For FRZ3□**
40 —— **For FRZ4□**
50 —— **For FRZ5□**

Refer to "Replacing the seal kit, element, and bowl assembly" on page ⓫ for the component parts of the seal kit.

●Knob

H-FRZ

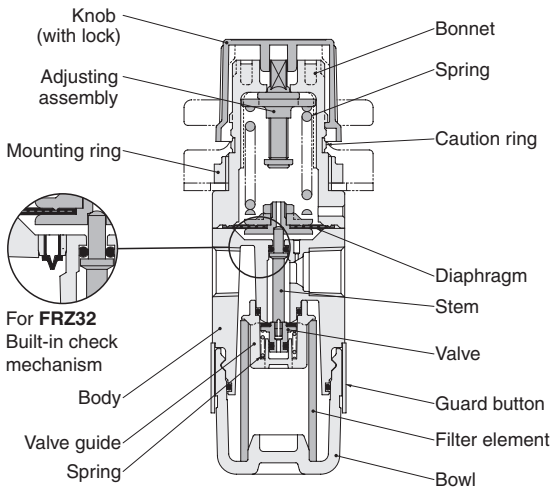


●Mounting ring

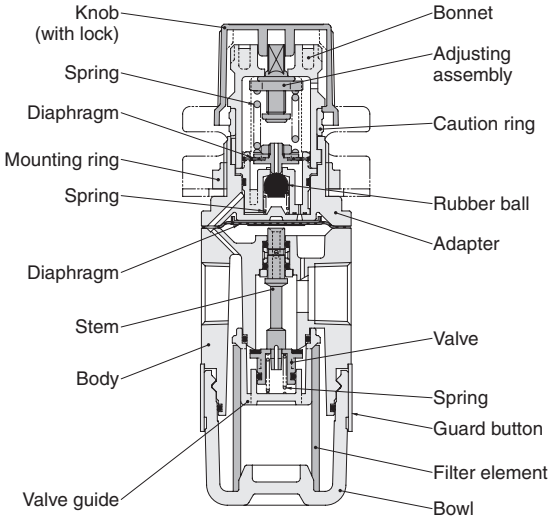
R-FRZ

Inner construction

FRZ3□



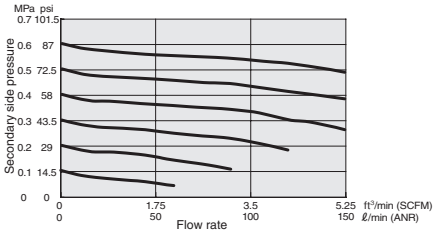
FRZ4□·FRZ5□



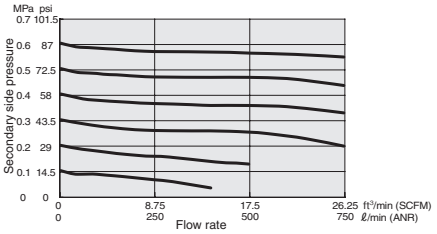
Flow rate characteristics

●Standard and built-in check mechanism

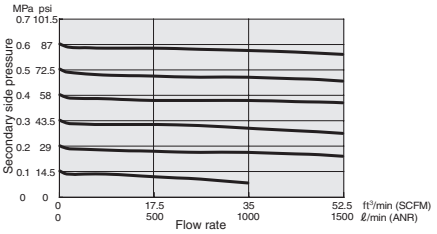
FRZ30-F11-M5
FRZ32-F11-M5



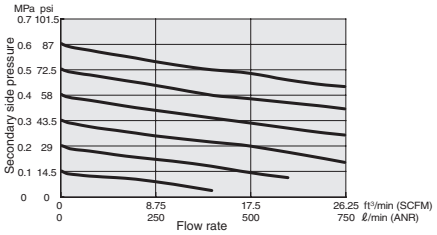
FRZ40-F11-01



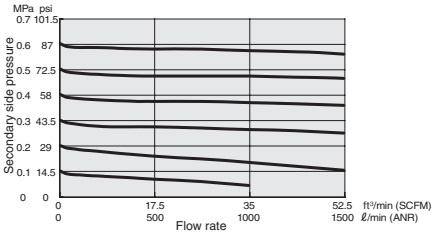
FRZ50-F11-02



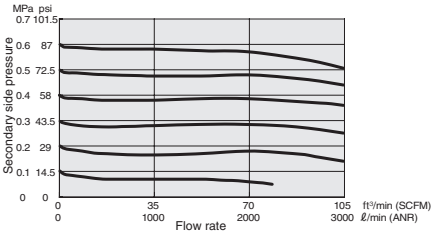
FRZ30-F11-01
FRZ32-F11-01



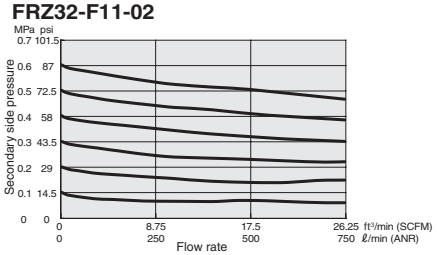
FRZ40-F11-02



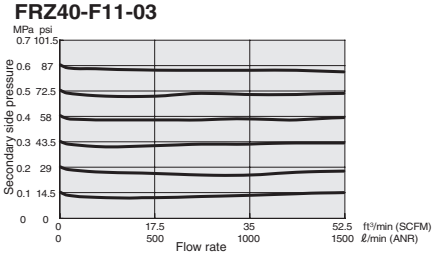
FRZ50-F11-03



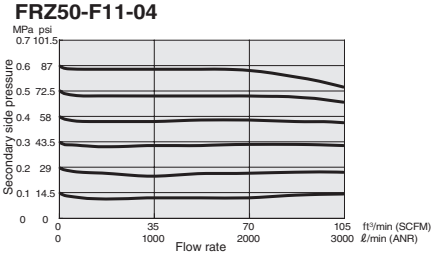
FRZ30-F11-02
FRZ32-F11-02



FRZ40-F11-03



FRZ50-F11-04

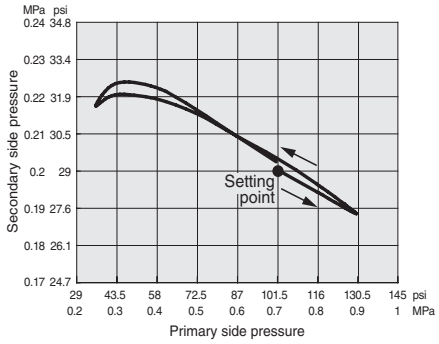


Remarks: Graphs show flow rate characteristics at 101.5 psi constant pressure on the primary side.

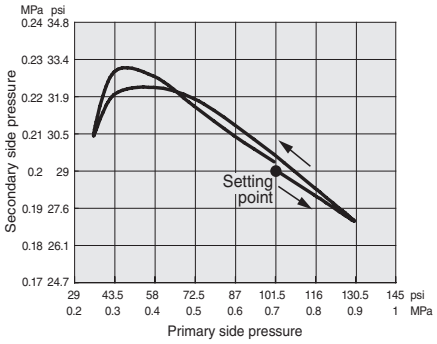
Pressure characteristics

●Standard and built-in check mechanism

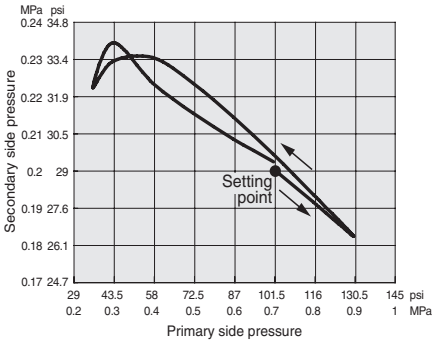
FRZ30-F11
FRZ32-F11



FRZ40-F11

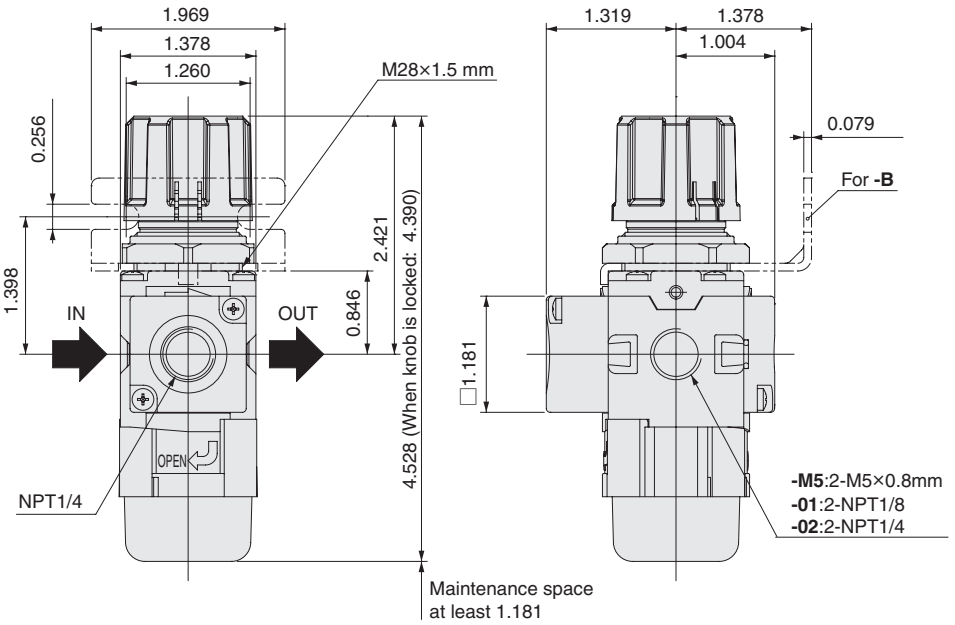


FRZ50-F11

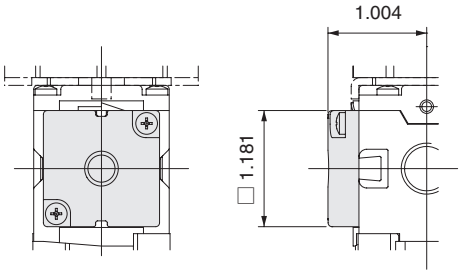


Filter regulator dimensions in.

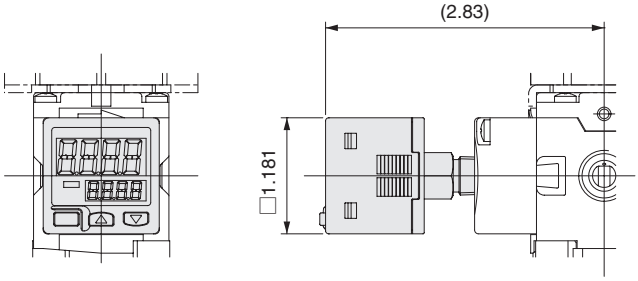
●**FRZ30-F11**
●**FRZ31-F11**
●**FRZ32-F11**



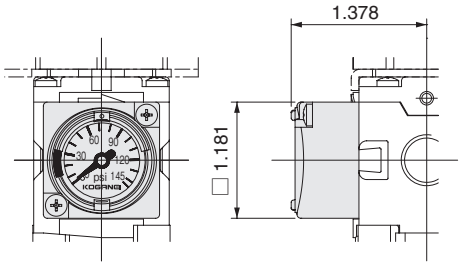
●**Pressure gauge options**



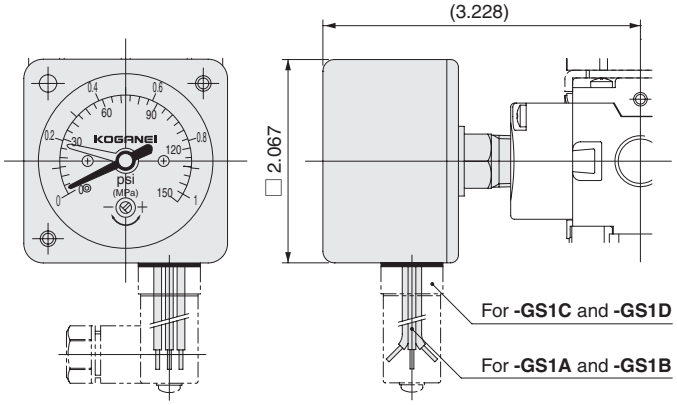
For **-GN**



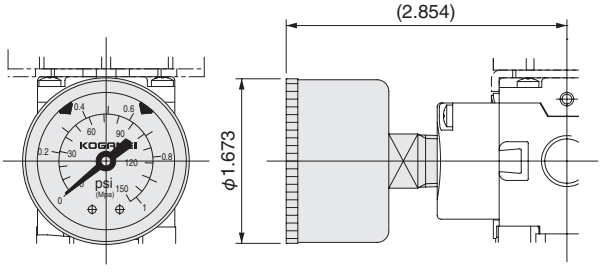
For **-GS6**



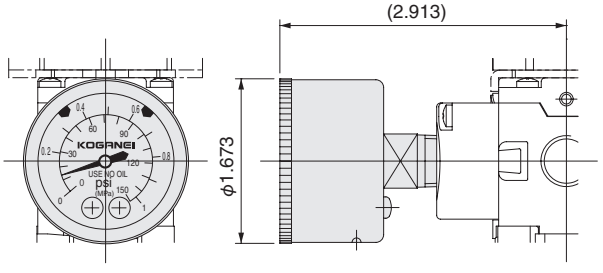
For **-G1C** and **-G4C**



For **-GS1A**, **-GS1B**, **-GS1C**, and **-GS1D**



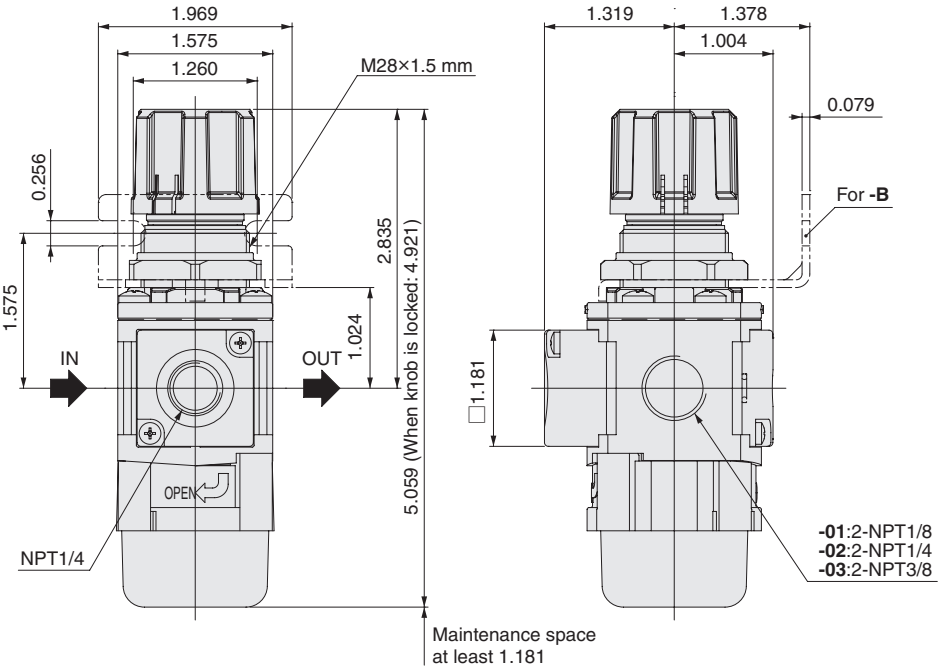
For **-G1** and **-G3**



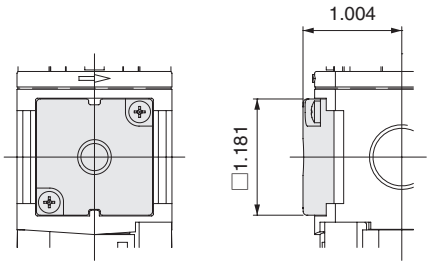
For **-G1S** and **-G3S**

Filter regulator dimensions in.

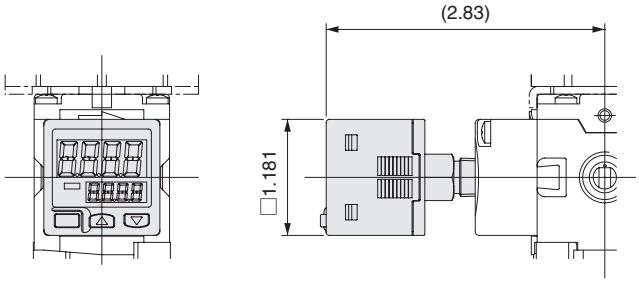
●FRZ40-F11
●FRZ41-F11



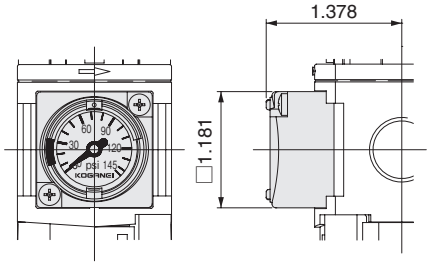
●**Pressure gauge options**



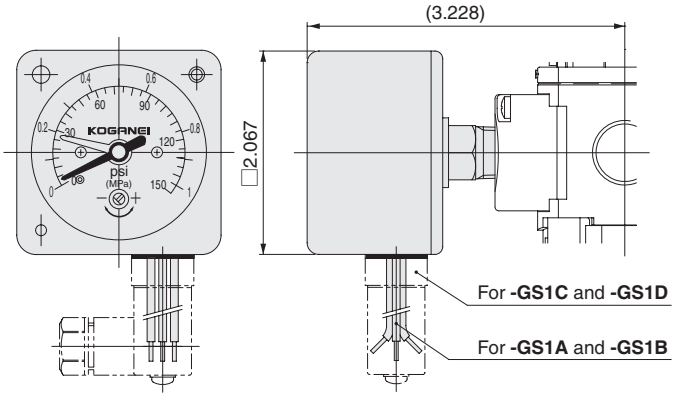
For **-GN**



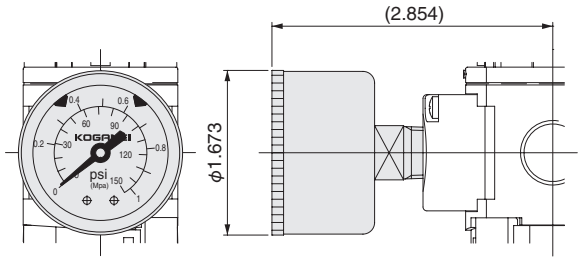
For **-GS6**



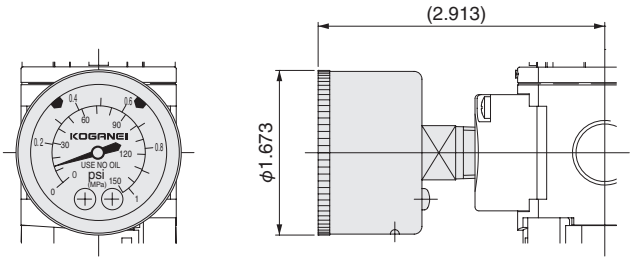
For **-G1C** and **-G4C**



For **-GS1A**, **-GS1B**, **-GS1C**, and **-GS1D**

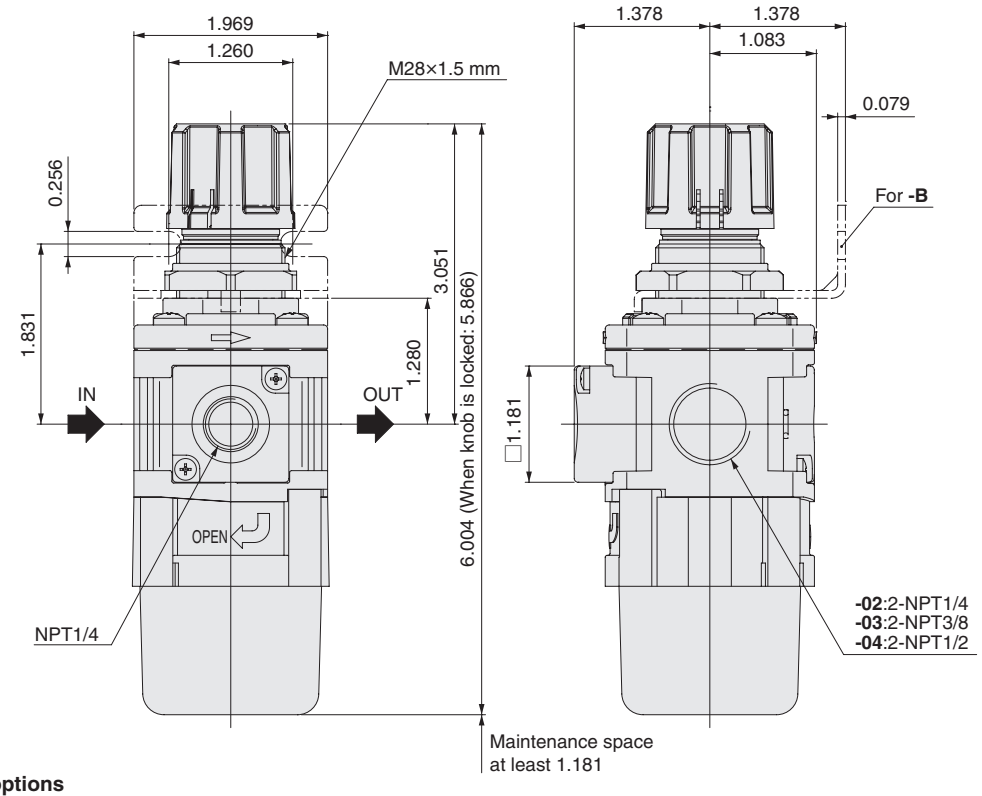


For **-G1** and **-G3**

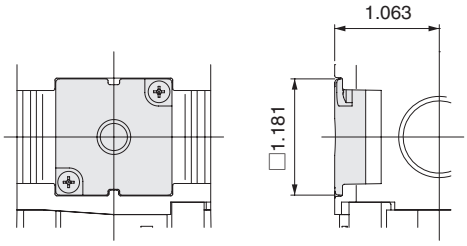


For **-G1S** and **-G3S**

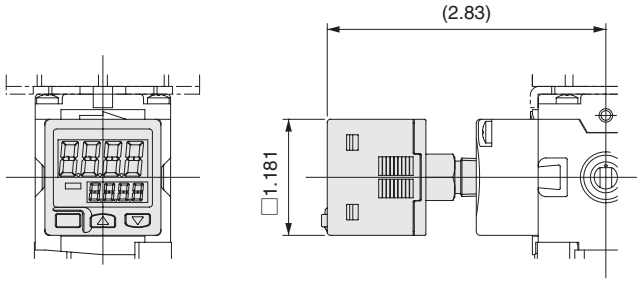
●FRZ50-F11
●FRZ51-F11



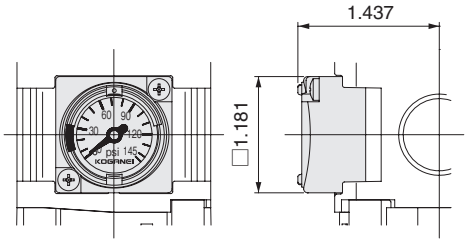
●Pressure gauge options



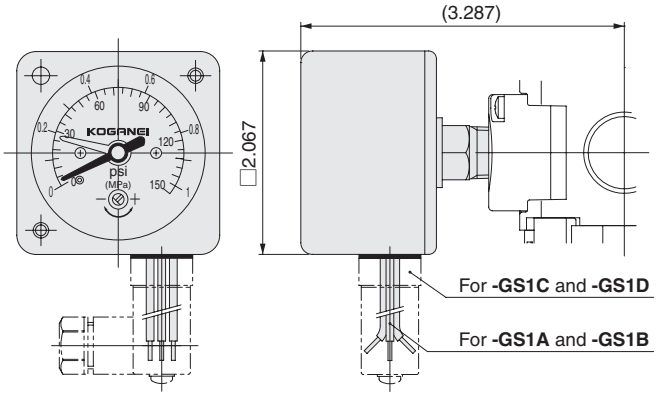
For **-GN**



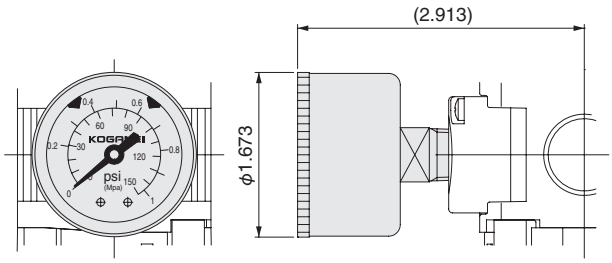
For **-GS6**



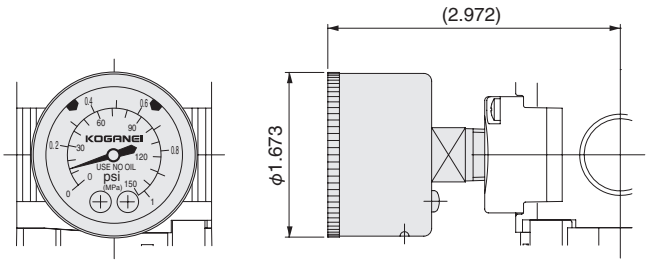
For **-G1C** and **-G4C**



For **-GS1A**, **-GS1B**, **-GS1C**, and **-GS1D**



For **-G1** and **-G3**



For **-G1S** and **-G3S**

Regulator

RZ30-F11·RZ31-F11·RZ32-F11
RZ40-F11·RZ41-F11
RZ50-F11·RZ51-F11

Symbol

●Standard
●Low pressure

●Built-in check mechanism

Specifications

Item \ Model		RZ30-F11	RZ40-F11	RZ50-F11
	Standard	RZ30-F11	RZ40-F11	RZ50-F11
	For low pressure	RZ31-F11	RZ41-F11	RZ51-F11
	Built-in check mechanism	RZ32-F11	———	———
Medium		Air		
Port size		M5×0.8mm, NPT1/8, NPT1/4	NPT1/8, NPT1/4, NPT3/8	NPT1/4, NPT3/8, NPT1/2
Maximum operating pressure	psi	145		
Proof pressure	psi	218		
Operating temperature range (atmosphere and media)	°F	41 to 140 (non-condensation)		
Regulation method		Direct operation type and relief type	Internal pilot type and relief type	
Pressure setting range psi	Standard/built-in check mechanism	7 to 123		
	For low pressure	7 to 58		
Relief start pressure	psi	Set pressure +7 or less		
Air consumption[Note 1]	ft³/min (SCFM)	—	0.18 or less	
Materials of major parts	Body	Die cast aluminum alloy		
	Bonnet and adapter	Polyacetal		
	Diaphragm	Base fabric + synthetic rubber		
	Bracket	Steel plate (electroless nickel plated)		
Mass (for standard specifications and largest port size)	lb	0.29	0.37	0.53
Standard equipment		Mounting ring		
Option[Note 2]		□1.181 in. integrated pressure gauge (assembled), other pressure gauges (included parts), brackets (included parts)		

Note 1: Maximum value of specified range. Air consumption varies depending on the relationship of the primary pressure and the secondary pressure.
2: Refer to the order codes and the specifications for each product starting on page ㊲ for details on the various types of options.

Order codes

RZ □ – **F11** – □ – □ – □

NPT thread specifications

Bracket
Blank ——No bracket
B ——With bracket

Body Model	Port size M5	1/8	1/4	3/8	1/2	
30	M5	01	02			Standard
40		01	02	03		
50			02	03	04	
31	M5	01	02			Low pressure
41		01	02	03		
51			02	03	04	
32	M5	01	02			Built-in check mechanism

Regulator

Pressure gauge specifications
Blank —— No pressure gauge (pressure gauge connection port NPT1/4)
GP1 —— No pressure gauge (pressure gauge connection port NPT1/8)
GN —— No pressure gauge (No pressure gauge connection port)
G1C —— 145 psi specification □1.181 in. integrated pressure gauge
G4C —— 58 psi specification □1.181 in. integrated pressure gauge
G1 —— 145 psi specification ϕ1.575 in. pressure gauge
G3 —— 44 psi specification ϕ1.575 in. pressure gauge
G1S —— 145 psi specification ϕ1.575 in. stainless Bourdon tube pressure gauge
G3S —— 44 psi specification ϕ1.575 in. stainless Bourdon tube pressure gauge
GS6 —— 145 psi specification digital pressure switch
GS1A —— 145 psi specification □1.969 in. pressure gauge with built-in switch Lead wire For 24 VDC
GS1B —— 145 psi specification □1.969 in. pressure gauge with built-in switch Lead wire For 100 VAC, 200 VAC
GS1C —— 145 psi specification □1.969 in. pressure gauge with built-in switch With DIN connector For 24 VDC
GS1D —— 145 psi specification □1.969 in. pressure gauge with built-in switch With DIN connector For 100 VAC, 200 VAC

Note: Refer to order codes and dimensions on page ㊳ to ㊺ for information about the specifications for pressure gauges, pressure gauges with electronic switches, pressure gauges with built-in pressure switches, and purchasing individual parts.

●Order codes for brackets only

8Z-BK

Order codes

●Parts for maintenance

●Seal kit (various o-rings, 1 valve assembly, and 1 diaphragm assembly)

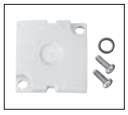
SRK-RZ□

Body size
30 ——**For RZ3□**
40 ——**For RZ4□**
50 ——**For RZ5□**

Refer to "Replacing the seal kit, element, and bowl assembly" on page ⓫ and ⓬ for the component parts of the seal kit.

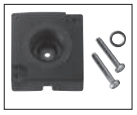
●Pressure port plate

P-FRZ (without pressure gauge connection port)



1 o-ring and
2 small screws

GP-FRZ-F11 (with pressure gauge connection port)

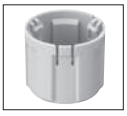


Connection port diameter
Blank NPT1/4
1 NPT1/8

1 o-ring and
2 small screws

●Knob

H-FRZ

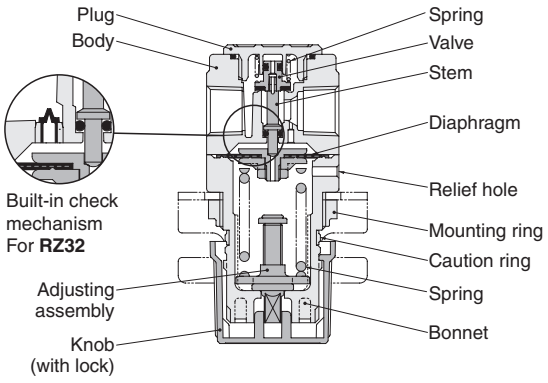


●Mounting ring

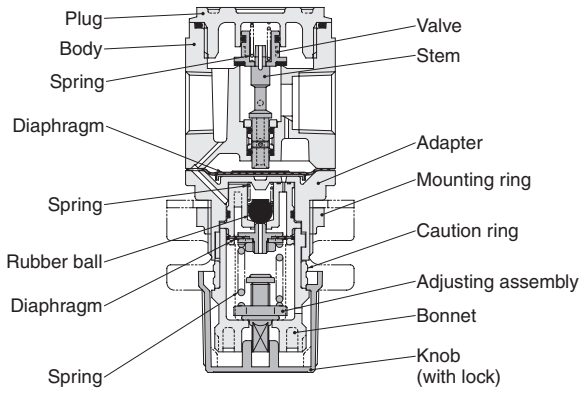
R-FRZ

Inner construction

RZ3□



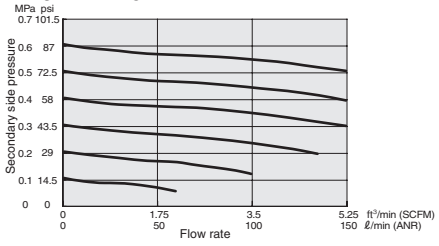
RZ4□·RZ5□



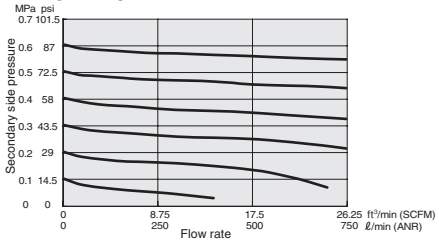
Flow rate characteristics

●Standard and built-in check mechanism

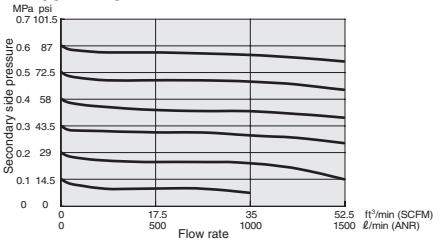
RZ30-F11-M5
RZ32-F11-M5



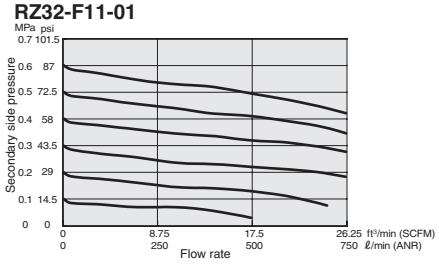
RZ40-F11-01



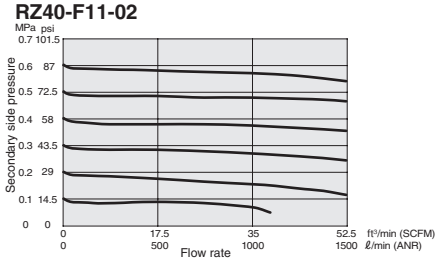
RZ50-F11-02



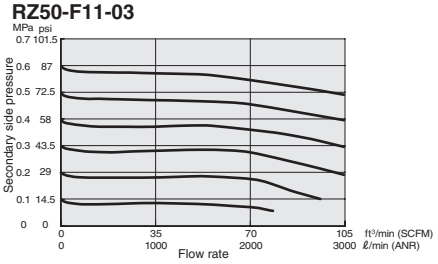
RZ30-F11-01
RZ32-F11-01



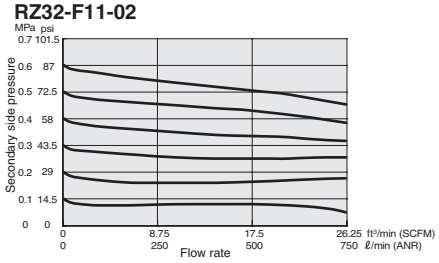
RZ40-F11-02



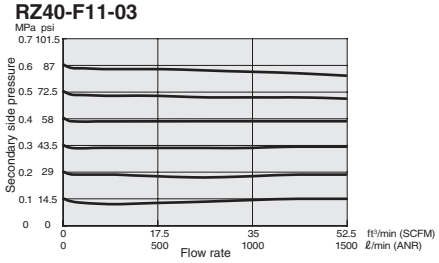
RZ50-F11-03



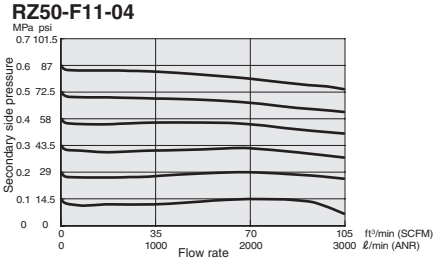
RZ30-F11-02
RZ32-F11-02



RZ40-F11-03



RZ50-F11-04

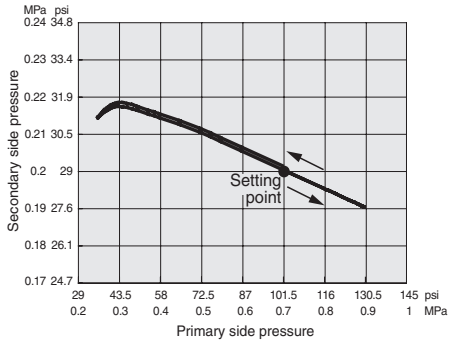


Remarks: Graphs show flow rate characteristics at 0.7 MPa constant pressure on the primary side.

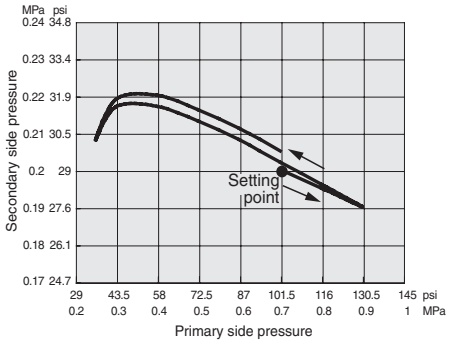
Pressure characteristics

●Standard and built-in check mechanism

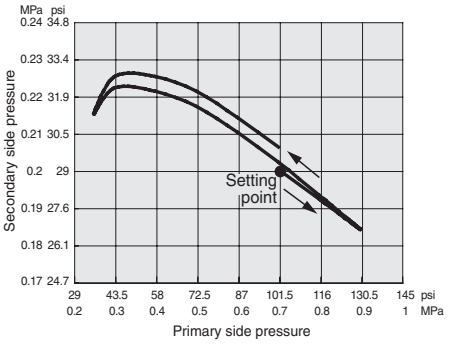
RZ30-F11
RZ32-F11



RZ40-F11

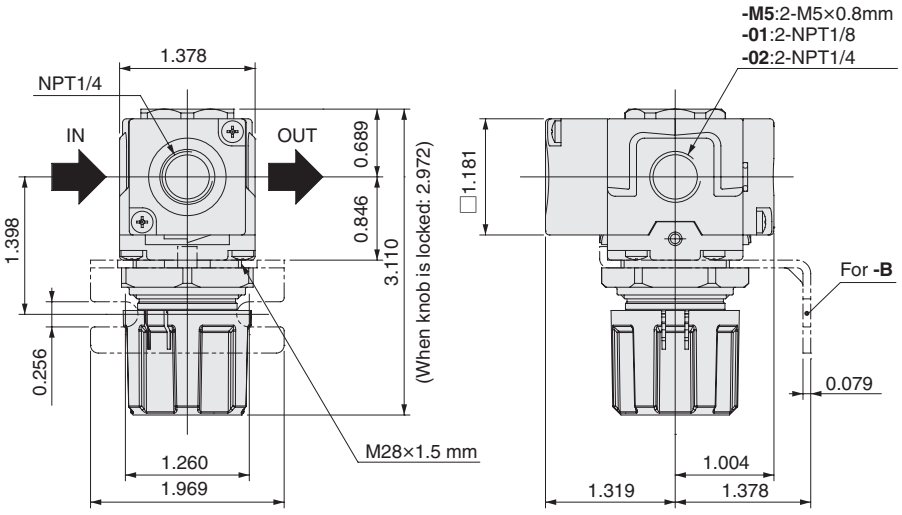


RZ50-F11

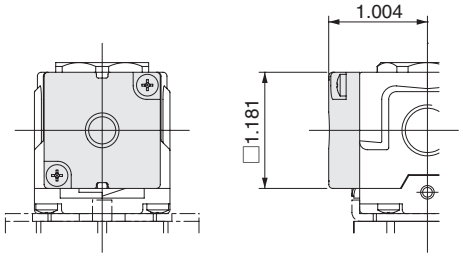


Regulator dimensions in.

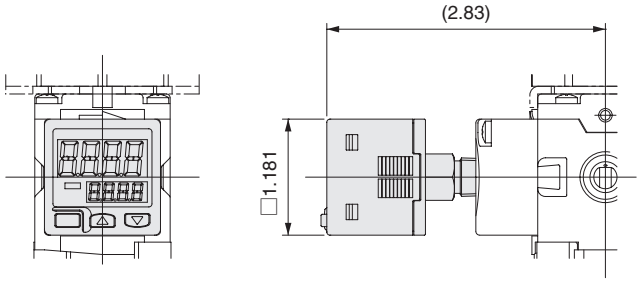
●**RZ30-F11**
●**RZ31-F11**
●**RZ32-F11**



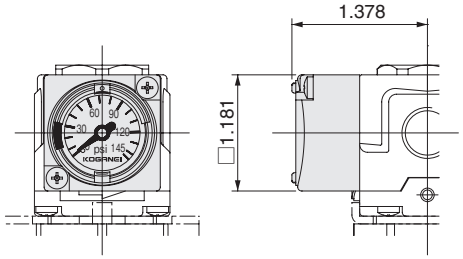
●**Pressure gauge options**



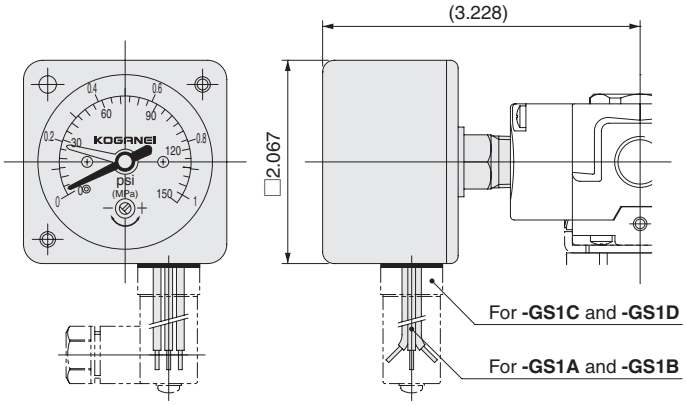
For **-GN**



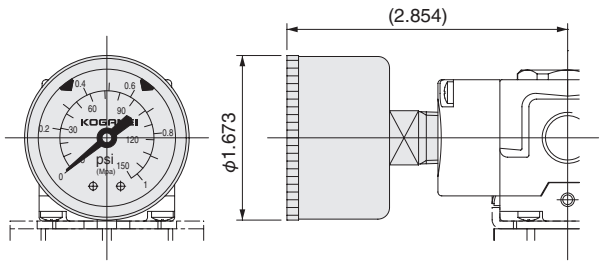
For **-GS6**



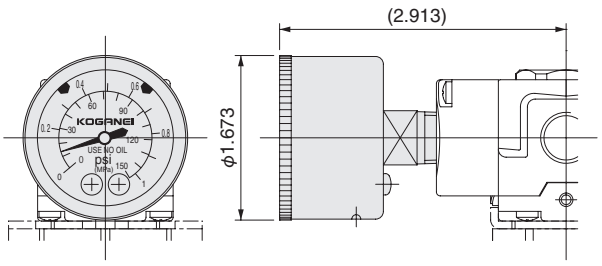
For **-G1C** and **-G4C**



For **-GS1A**, **-GS1B**, **-GS1C**, and **-GS1D**



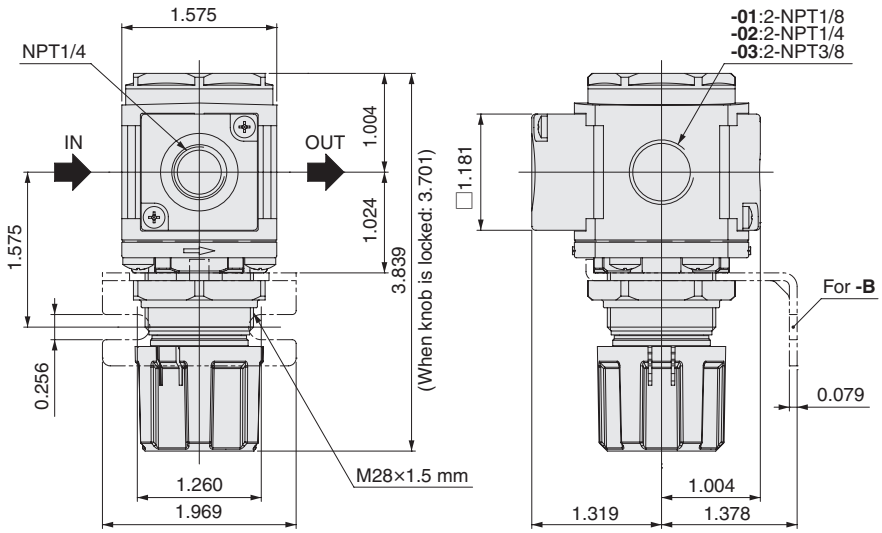
For **-G1** and **-G3**



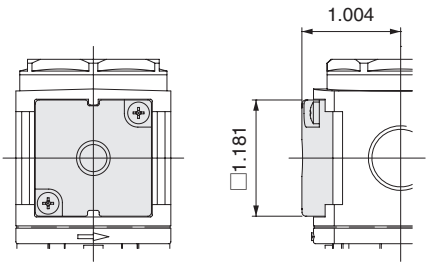
For **-G1S** and **-G3S**

Regulator dimensions in.

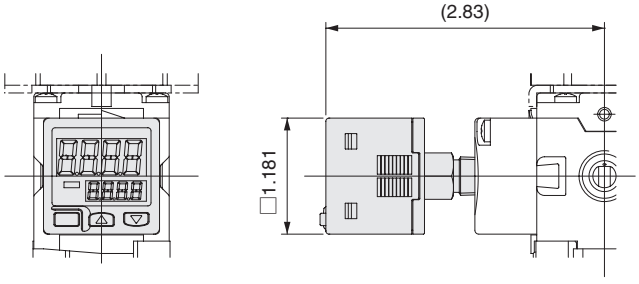
●**RZ40-F11**
●**RZ41-F11**



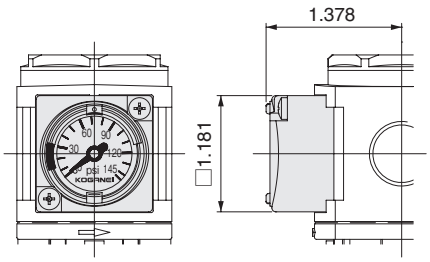
●**Pressure gauge options**



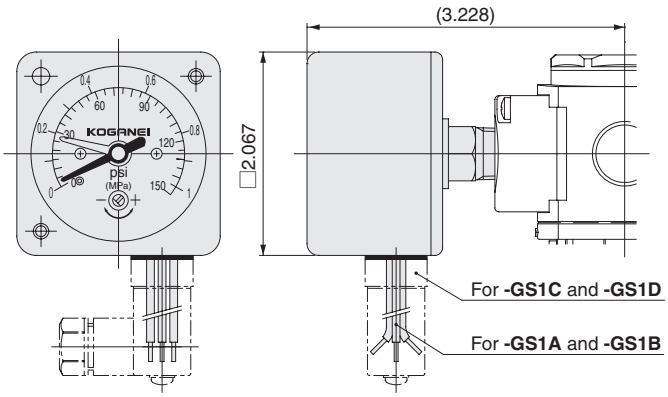
For **-GN**



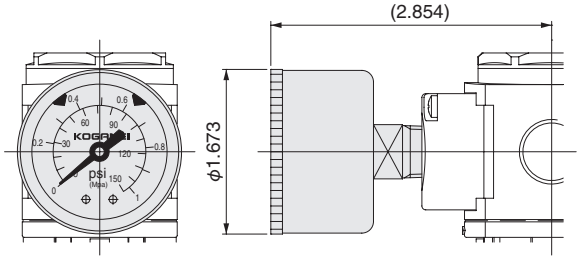
For **-GS6**



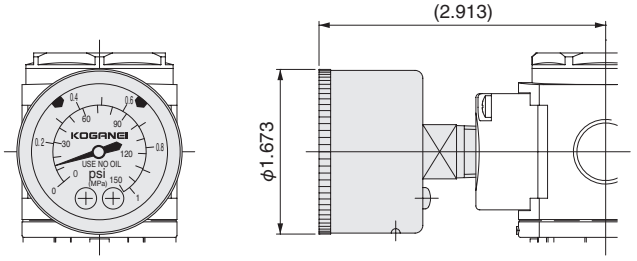
For **-G1C** and **-G4C**



For **-GS1A**, **-GS1B**, **-GS1C**, and **-GS1D**

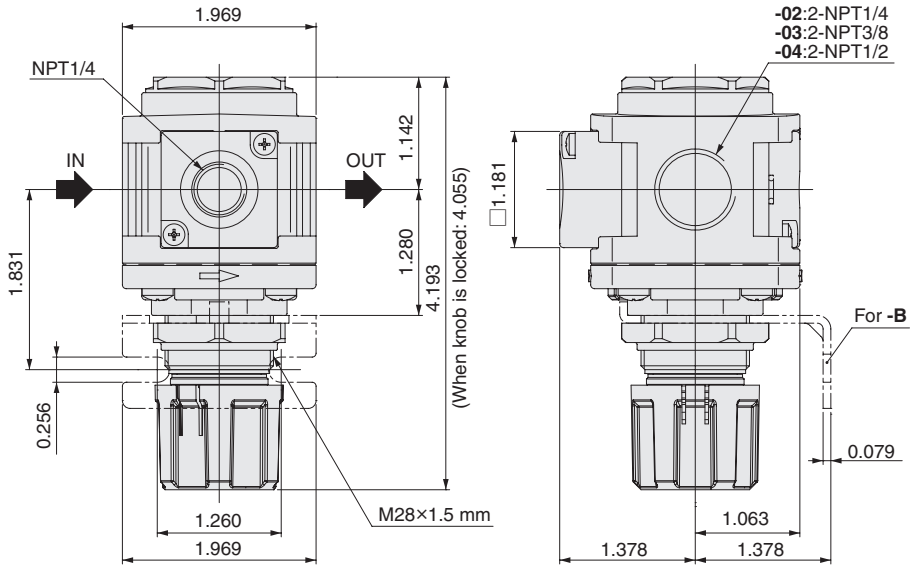


For **-G1** and **-G3**

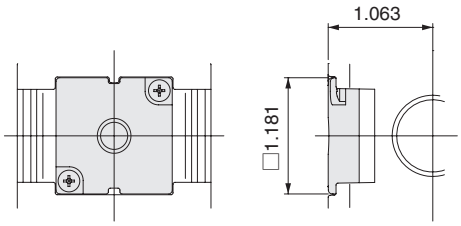


For **-G1S** and **-G3S**

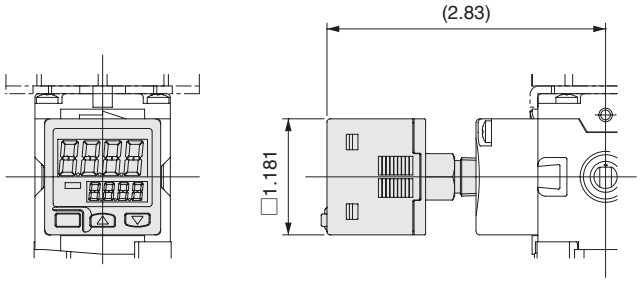
●RZ50-F11
●RZ51-F11



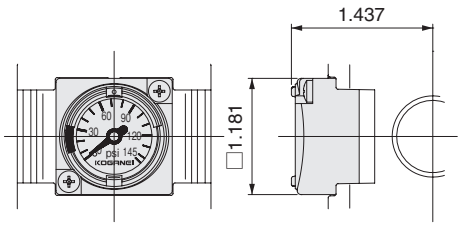
●Pressure gauge options



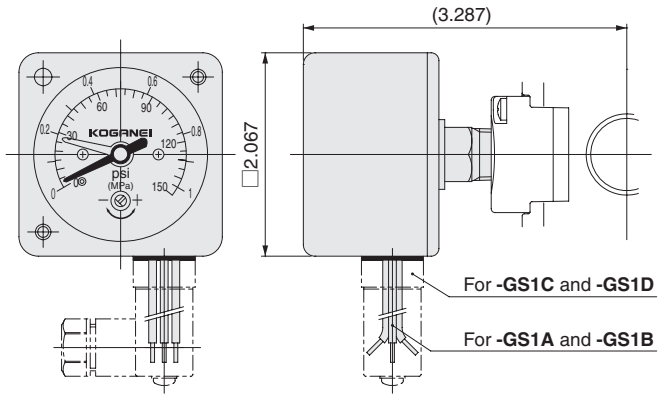
For **-GN**



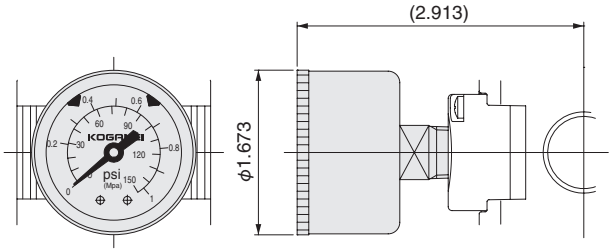
For **-GS6**



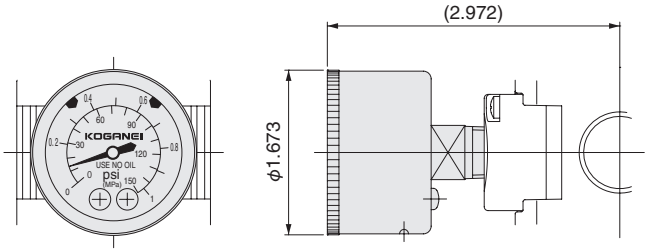
For **-G1C** and **-G4C**



For **-GS1A**, **-GS1B**, **-GS1C**, and **-GS1D**



For **-G1** and **-G3**

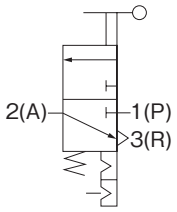


For **-G1S** and **-G3S**

Residual pressure exhaust valve

50VZ-F11

Symbol



Specifications

Item			Model	50VZ-F11-01	50VZ-F11-02	50VZ-F11-03	50VZ-F11-04
Media				Air			
Port size NPT	1 (P) and 2 (A)			1/8	1/4	3/8	1/2
	3 (R)			3/8			
Maximum operating pressure			psi	145			
Proof pressure			psi	218			
Operating temperature range (atmosphere and media)			°F	41 to 140			
Method of operation				Manually operated Knob			
Number of positions and ports				2 positions and 3 ports			
Operating torque of knob			ft•lbf	0.74			
Knob operation angle				90°			
Flow rate characteristics	1 (P) → 2 (A)	Sonic conductance C	$dm^3/(s•bar)$	4.28	8.60	12.46	13.36
		Critical pressure ratio	b	0.23	0.38	0.21	0.31
		Effective area [Cv][Note]		1.19	2.39	3.46	3.71
	2 (A) →3 (R)	Sonic conductance C	$dm^3/(s•bar)$	7.87	11.00		
		Critical pressure ratio	b	0.89	0.32		
		Effective area [Cv][Note]		2.19	3.06		
Materials of major parts	Body			Die cast aluminum alloy			
	Knob			Polyacetal			
Mass			lb	0.49	0.49	0.46	0.44
Options				Bracket {Steel plate (electroless nickel plated)}			

Note: The effective areas are calculated values, and they are not measured values.
Remark 1: Specified values are according to Koganei test standards.
2: The muffler must be provided by the user.

Order codes

50 VZ – F11 – □ – □

NPT thread specifications

Bracket
Blank — No bracket
B — With bracket

Port size

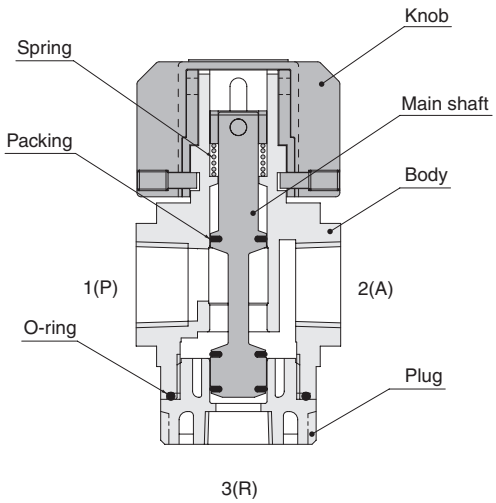
1/8	1/4	3/8	1/2
01	**02**	**03**	**04**

Residual pressure exhaust valve

●Order codes for bracket only

8Z-BV

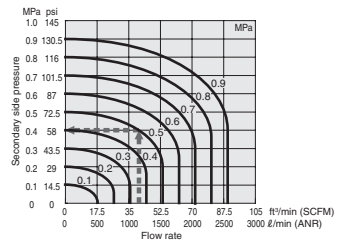
Inner construction



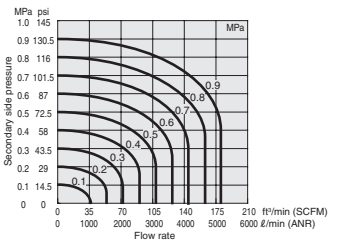
Flow rate characteristics

●Air supply flow rate

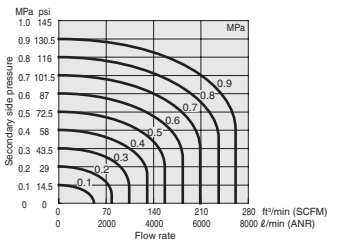
50VZ-F11-01



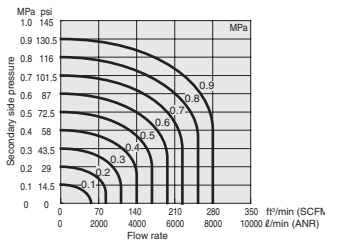
50VZ-F11-02



50VZ-F11-03



50VZ-F11-04



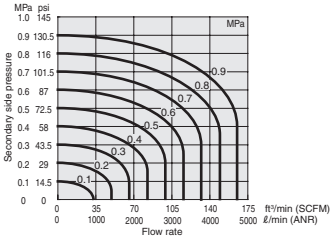
Explanation of diagrams

At supply pressure of 73 psi and flow rate of 40.6 ft³/min (SCFM) gives valve outlet pressure of 58 psi.

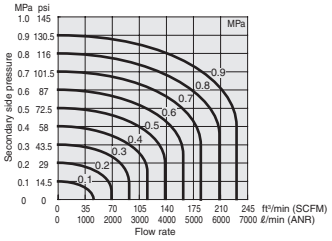
1 MPa = 145 psi
1 ℓ/min = 0.0353 ft³/min

●Exhaust flow rate

50VZ-F11-01



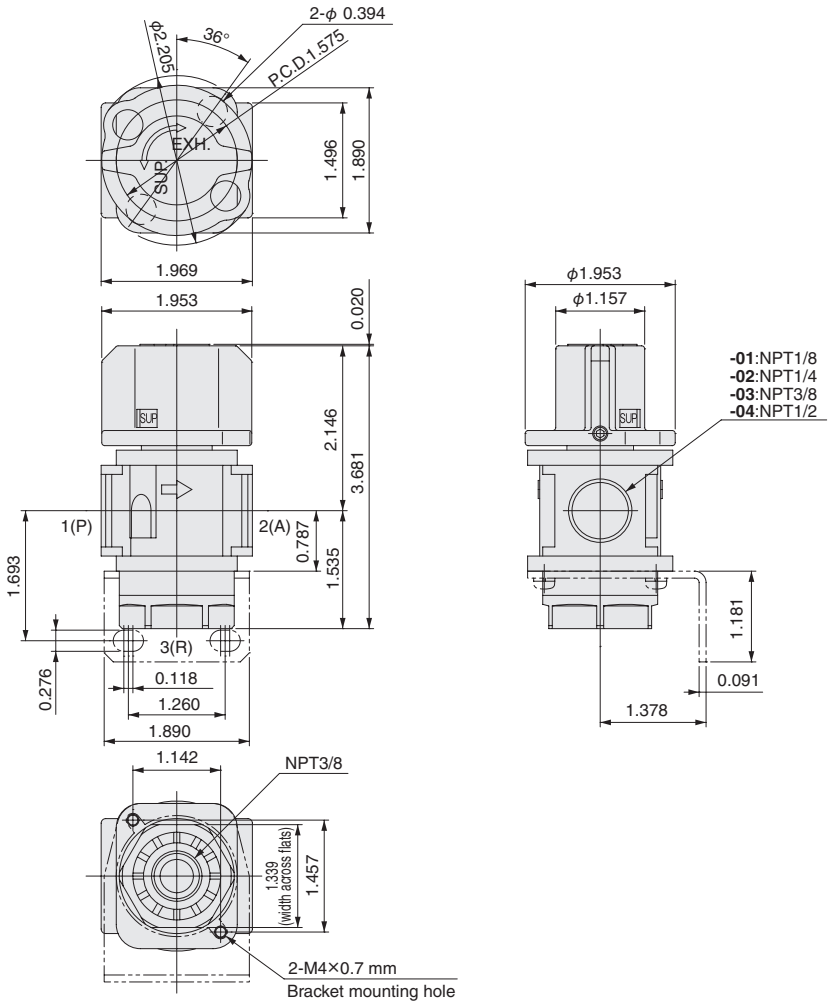
50VZ-F11-02, -03, -04



1 MPa = 145 psi
1 ℓ/min = 0.0353 ft³/min

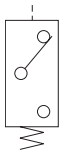
Residual pressure exhaust valve dimensions in.

●50VZ-F11



Pressure switch module

Symbol



Specifications

Item \ Model			8Z-PS□-F11	8Z-DPS□-F11
Media			Air	
Connection method			Specifically for FRZ series module installation	
Maximum operating pressure		psi	145	
Proof pressure		psi	218	
Operating temperature range (atmosphere and media)		°F	41 to 140 (non-condensation)	
Pressure setting range		psi	15 to 58	
Response differential		psi	12 or less	
Contact type			Reed contact of "a" contact (NO)	
Electrical Specifications	Wiring type		2 wire type	
	Load voltage		5 to 28 VDC, 85 to 115 VAC	
	Load current		DC 40 mA MAX., AC 20 mA MAX.	
	Internal voltage drop[Note 1]		0.1 V MAX (at load current of DC 40 mA)	
	Leakage current		0 mA	
	Response time		1 ms MAX	
	Insulation resistance		100 MΩ MIN. (500 VDC Megger, between case and lead wire terminal)	
	Dielectric strength		1500 VAC (50/60 Hz) in 1 minute (between case and lead wire terminal)	
	Shock resistance [Note 2]	G	30 (non-repeated)	
	Vibration resistance[Note 2]		9G (total amplitude 0.059 in 10 to 55 Hz) resonance frequency 2750 ±250 Hz	
	Lead wires[Note 3]		PCCV 0.2 SQ × 2-wire (brown and blue) × ℓ	
	Contact protection measure[Note 4]		Required	
Mass		oz	2.12 (for wire length A: 39 in)	3.00 (for wire length A: 39 in)

Note 1: Internal voltage drop changes with the load current.
2: According to Koganei test standards.
3: Lead wire length ℓ: A; 39 in, B; 118 in
4: Refer to page ⓮ regarding contact protection measures.

Note: Pressure switch modules cannot be assembled with the filter regulator FRZ3□-F11 and the regulator RZ3□-F11.

Order codes

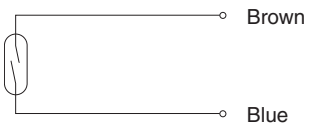
8Z – □ □ – F11

NPT thread specifications

Lead wire length
A ——39 in
B ——118 in

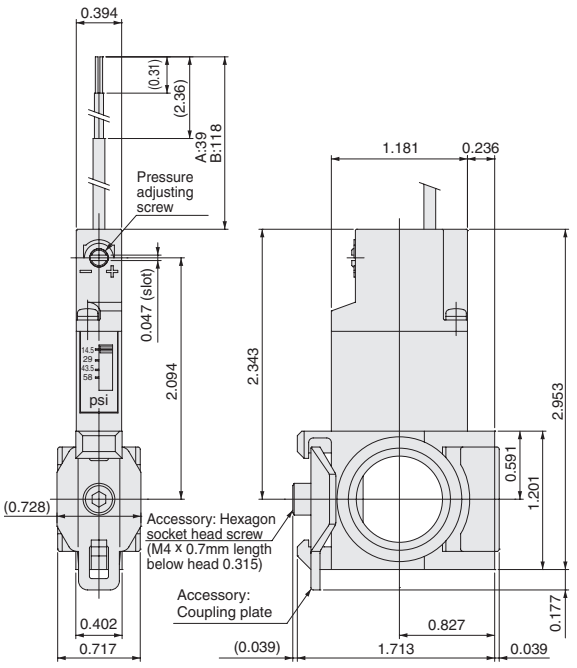
Module
PS ——Pressure switch module
DPS ——Pressure switch module (with bracket)

Internal circuit



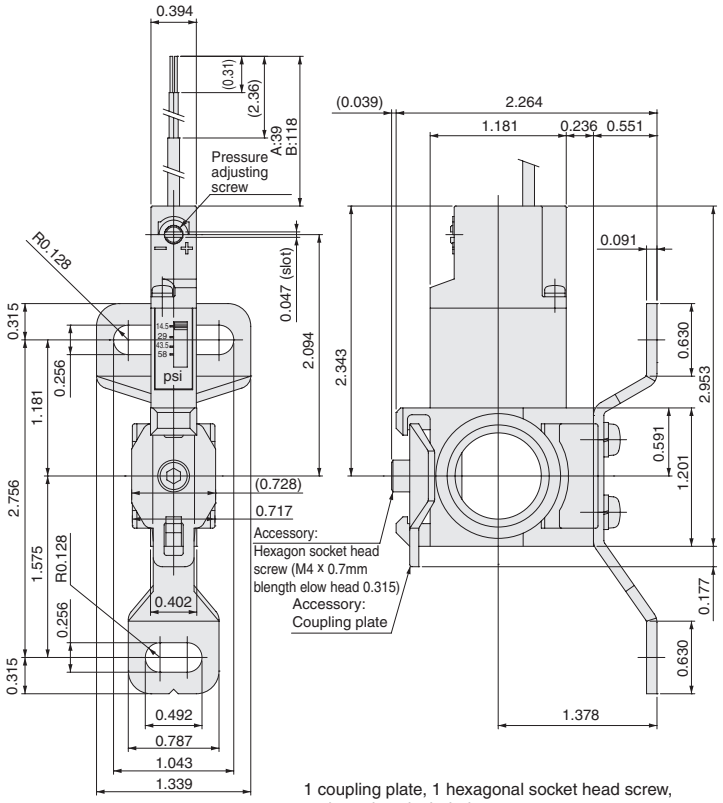
Pressure switch module dimensions in.

●8Z-PS□-F11



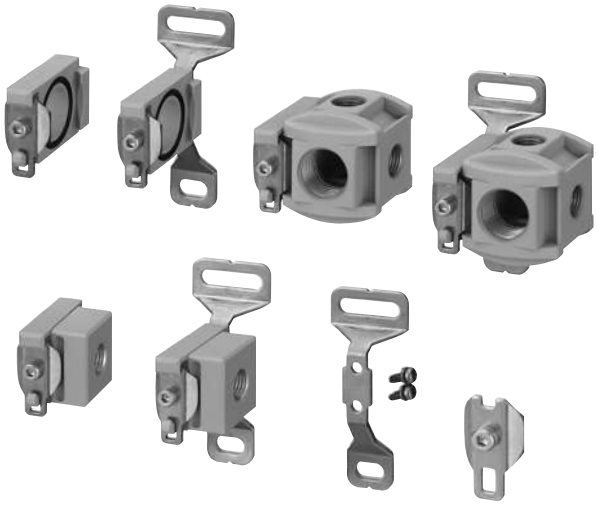
l coupling plate, 1 hexagonal socket head screw, and 2 o-rings included

●8Z-DPS□-F11



1 coupling plate, 1 hexagonal socket head screw, and 2 o-rings included

Module adapter



Order codes

8Z – □

Module adapter

F ——— F module (for connecting)[Note]
D ——— D module (for connecting, with bracket)[Note]
DP ——— Module bracket[Note]
FP ——— Coupling plate[Note]

8Z – □ □ – **F11**

Port size[Note]

NPT1/8	NPT1/4	NPT3/8	NPT1/2
1	**2**	**3**	**4**

Module adapter

T ——— T module (for branching)
DT ——— DT module (for branching, with bracket)
S ——— S adapter (for changing pipe size)
DS ——— DS adapter (for changing pipe size, with bracket)

Note: The port size cannot be selected for the F module (F), D module (D), module bracket (DP), and coupling plate (FP).

Note: Modules and adapters cannot be assembled with the filter regulator FRZ3□-F11 and the regulator RZ3□-F11.

List of models

F module (for connecting)	D module (For connecting with bracket)	T module (For branching)	DT module (For branching, with bracket)
8Z-F	**8Z-D**	**8Z-T□-F11**	**8Z-DT□-F11**
			

●Compatible models
Filter regulators: **FRZ40-F11**, **FRZ41-F11**, **FRZ50-F11**, **FRZ51-F11**
Regulators: **RZ40-F11**, **RZ41-F11**, **RZ50-F11**, **RZ51-F11**
Residual pressure exhaust valve: **50VZ-F11**
iB-Cyclone: **IBCY40-F11**, **IBCY50-F11**

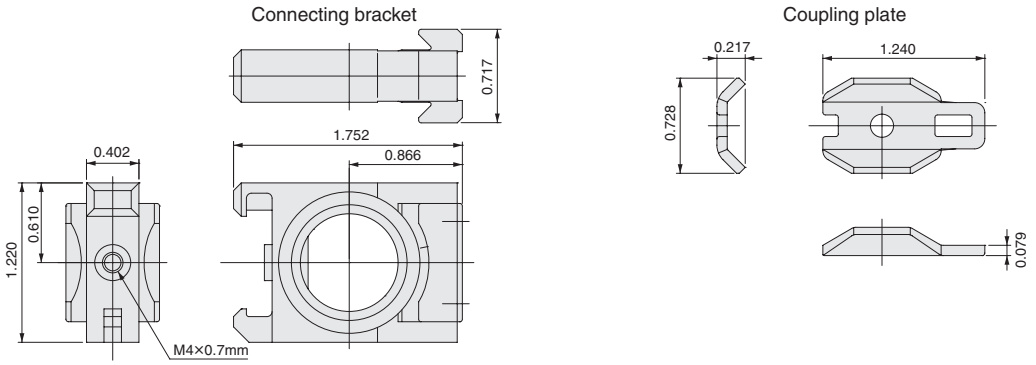
S adapter (for changing pipe size)	DS adapter (for changing pipe size, with bracket)	Module bracket	Coupling plate
8Z-S□-F11	**8Z-DS□-F11**	**8Z-DP**	**8Z-FP**
			

●Compatible models
Filter regulators: **FRZ40-F11**, **FRZ41-F11**, **FRZ50-F11**, **FRZ51-F11**
Regulators: **RZ40-F11**, **RZ41-F11**, **RZ50-F11**, **RZ51-F11**
Residual pressure exhaust valve: **50VZ-F11**
iB-Cyclone: **IBCY40-F11**, **IBCY50-F11**

[Materials of major parts] Connecting bracket, intermediate branch block, piping adapter: die cast aluminum alloy
Module bracket, coupling plate: Steel plate (electroless nickel plated)

F module dimensions in.

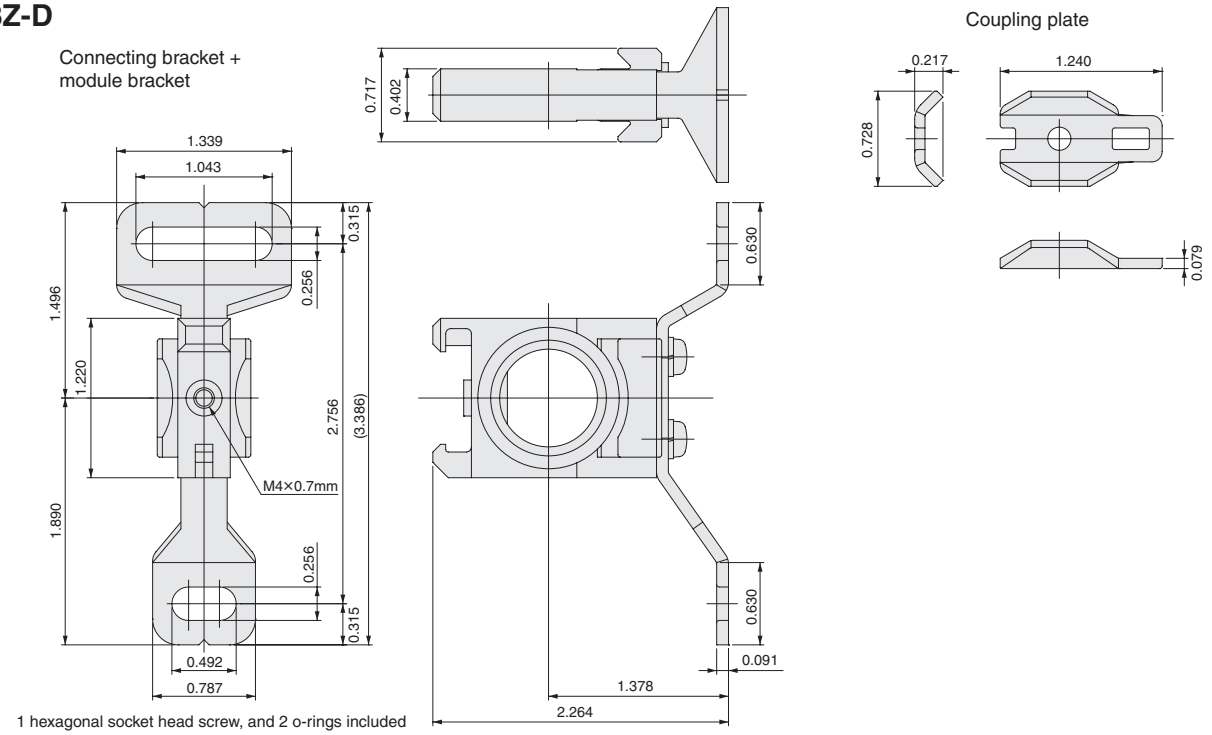
●8Z-F



1 hexagonal socket head screw, and 2 o-rings included

D module dimensions in.

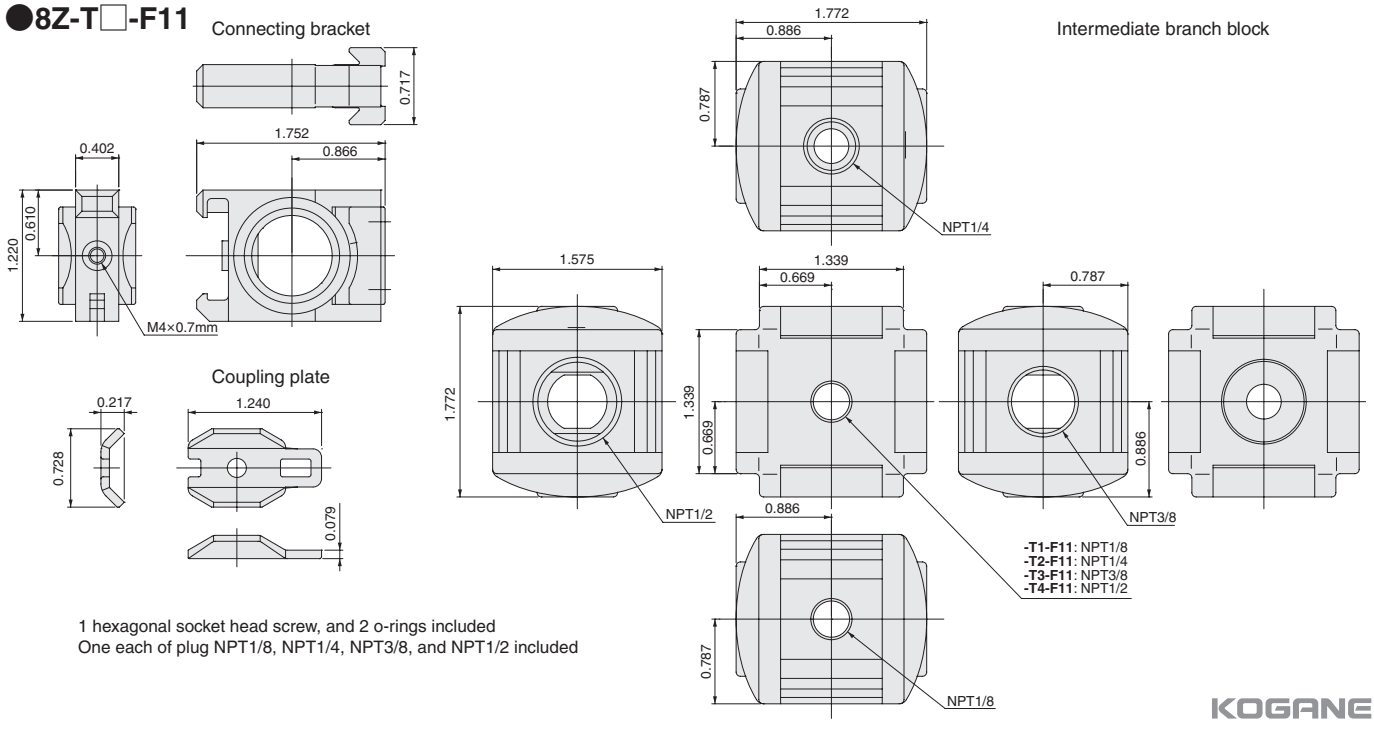
●8Z-D



1 hexagonal socket head screw, and 2 o-rings included

T module dimensions in.

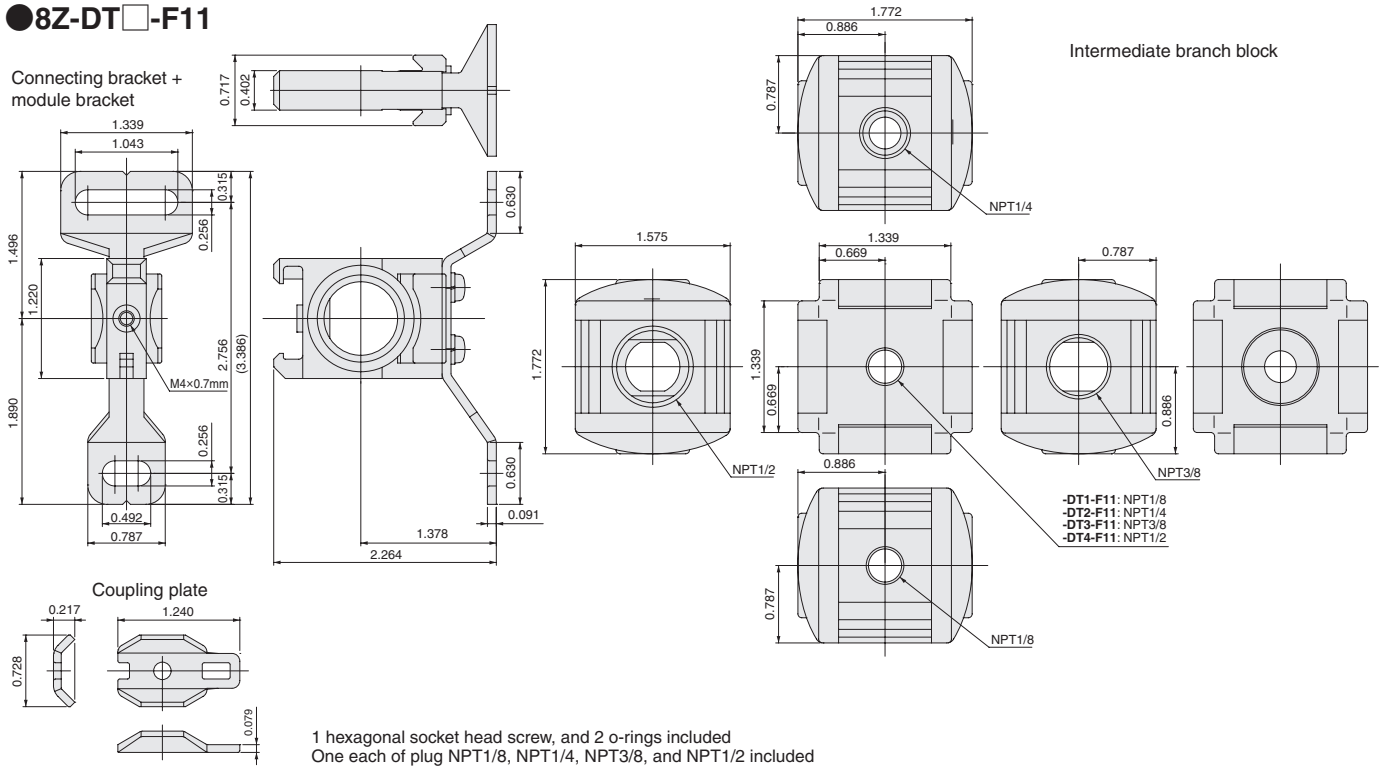
●8Z-T□-F11



1 hexagonal socket head screw, and 2 o-rings included
One each of plug NPT1/8, NPT1/4, NPT3/8, and NPT1/2 included

DT module dimensions in.

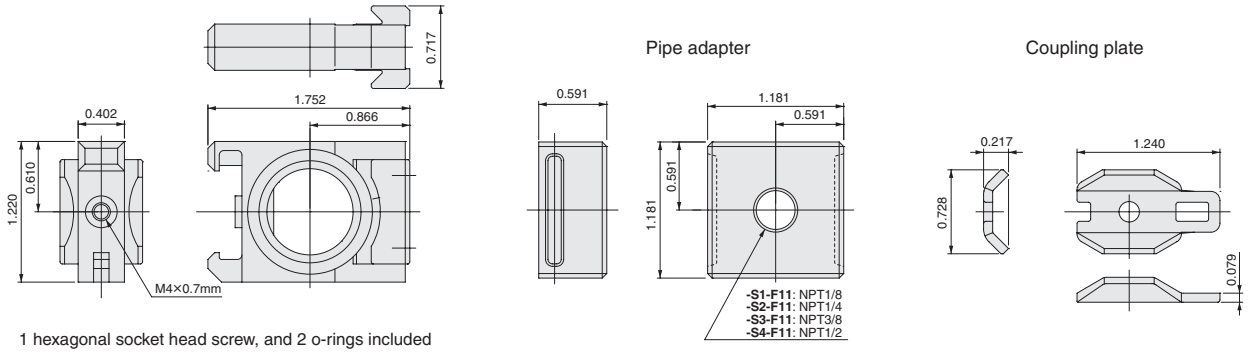
●8Z-DT□-F11



1 hexagonal socket head screw, and 2 o-rings included
One each of plug NPT1/8, NPT1/4, NPT3/8, and NPT1/2 included

S adapter dimensions in.

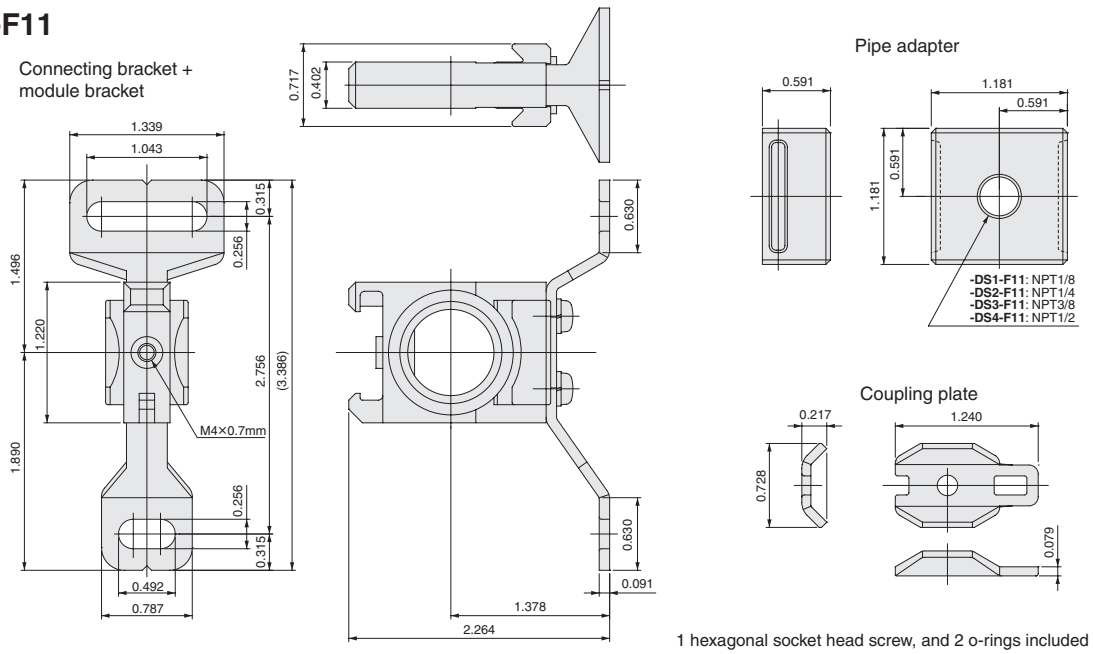
●8Z-S□-F11 Connecting bracket



1 hexagonal socket head screw, and 2 o-rings included

DS adapter dimensions in.

●8Z-DS□-F11

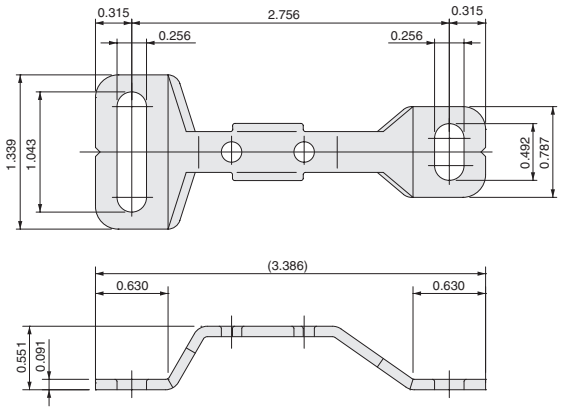


1 hexagonal socket head screw, and 2 o-rings included

Module bracket dimensions in.

●8Z-DP

Module bracket

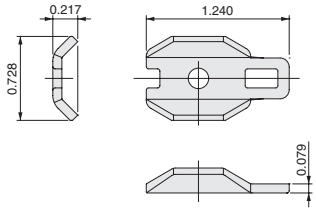


2 phillips head self-tapping screws
and 2 washers included

Coupling plate dimensions in.

●8Z-FP

Coupling plate



1 hexagonal socket screw included

Bracket

Bracket shape and applicable devices

Applicable model		Bracket model	Remarks
Filter regulator	**FRZ3□**, **FRZ4□**, **FRZ5□**	**8Z-BK**	Option to support the product body.
Regulator	**RZ3□**, **RZ4□**, **RZ5□**	**8Z-BK**	Option to support the product body.
Residual pressure exhaust valve	**50VZ**	**8Z-BV**	Option to support the product body.

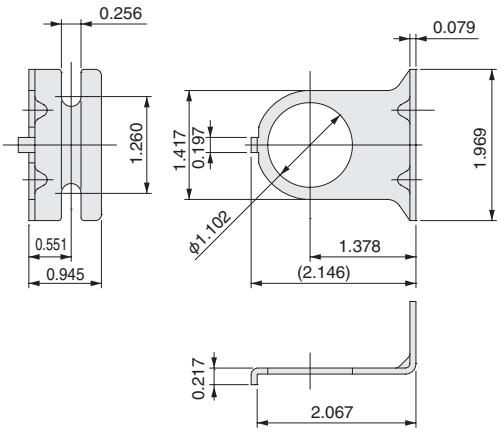
[Materials of major parts] Steel plate (electroless nickel plated)

Bracket dimensions in.

■For filter regulators and regulators

●8Z-BK

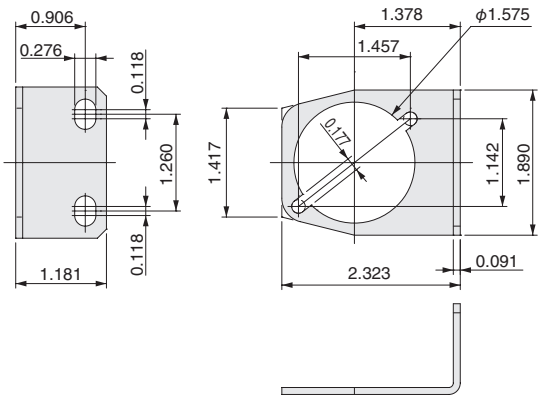
Bracket



■For residual pressure exhaust valve

●8Z-BV

Bracket



2 cross-head pan screws included

□1.181 in. integrated pressure gauge

G1C-30-F11·G4C-30-F11

● □1.181 in. integrated pressure gauge for FRZ series.

Symbol

Order codes

G □ C – 30 – F11

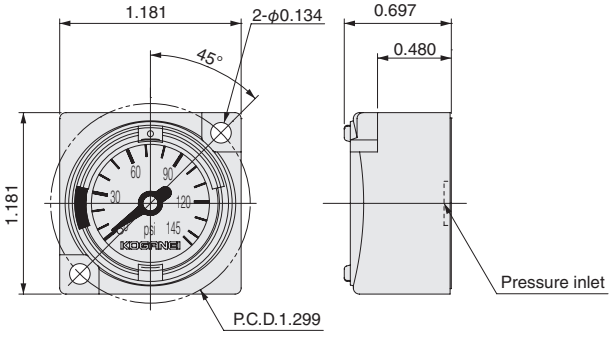
- **F11** — NPT thread specifications
- **30** — Outside dimensions: Outside dimensions □1.181 in.
- **□** — Pressure indicator range: **1** — Standard specifications 145 psi; **4** — Low pressure specifications 58 psi
- **G** — Pressure gauge

Specifications

Item \ Model		G1C-30-F11	G4C-30-F11
Media		Air	
Connection method		O-ring seal, M3×0.5mm (secured by 2 screws)	
Maximum operating pressure	psi	145	58
Operating temperature range (atmosphere and media)	°F	41 to 140 (non-condensation)	
Pressure indicator range	psi	0 to145	0 to 58
Display zone movable range	psi	0 to145	0 to 58
Display zone maximum set range	psi	72.5	29
Accuracy (for atmosphere and medium at 41 to 95°F)		F.S.±4%	F.S.±6%
Materials of major parts	Case	Polybutylene terephthalate	
	Front cover	Polycarbonate	
	Bourdon tube	Brass	
Mass	oz	1.06	
Applicable models		FRZ3□-F11, FRZ4□-F11, FRZ5□-F11, RZ3□-F11, RZ4□-F11, RZ5□-F11	

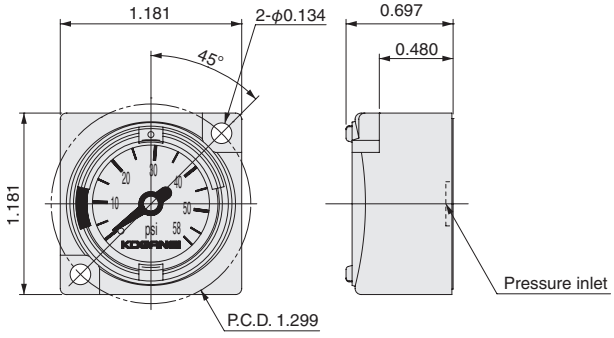
Pressure gauge dimensions in.

G1C-30-F11



2 phillips head self-tapping screws and 1 o-ring included

G4C-30-F11



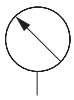
2 phillips head self-tapping screws and 1 o-ring included

Refer to page ⓯ regarding the handling instructions and precautions for the □1.181 in. integrated pressure gauge.

Pressure gauge

G1-40-F11·G3-40-F11

Symbol



Order codes

G □ – 40 – F11

NPT thread specifications

Outside diameter
40 —— Outside diameter 1.575 in.

Pressure indicator range
1 —— Standard specifications 145 psi
3 —— Low pressure specifications 43.5 psi

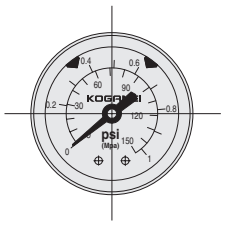
Pressure gauge

Specifications

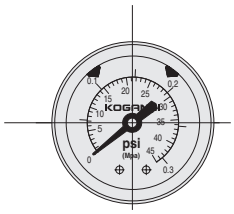
Item		Model	G1-40-F11	G3-40-F11
Medium			Air	
Port size			NPT1/4 (M5×0.8)	
Pressure indicator range		psi	0 to 145	0 to 43.5
Accuracy			F.S.±3%	
Outside diameter		in	1.575	
Maximum operating pressure		psi	134.9	36.3
Operating temperature range (atmosphere and media)		°F	41 to 140 (non-condensation)	
Mass		oz	3.17	
Materials	Case		ABS	
	Connection port thread		Brass	
	Bourdon tube		Brass	

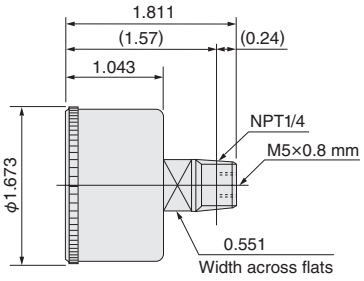
Pressure gauge dimensions in.

●G1-40-F11



●G3-40-F11





Handling instructions and precautions

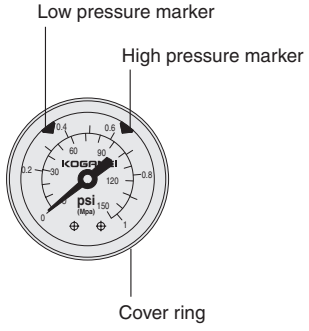
NOTE The pressure gauge is a precision measuring device.
Be careful of impacts and vibrations.

Mounting and piping

During mounting and piping operations, do not grab the pressure gauge body to tighten. For tightening, always use a wrench on the piping connection port's square portion. Use a tightening torque of 2.21 to 3.69 ft•lbf if the pressure gauges are mounted on the pressure port plate with NPT1/4.

Preset marker

You can set the preset marker. Rotate the cover ring to first set the low pressure and then set the high pressure.

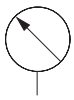


Pressure gauge

G1S-40-F11·G3S-40-F11

●**Stainless steel Bourdon tube pressure gauge.**

Symbol



Order codes

G □ S – 40 – F11

NPT thread specifications

Outside diameter
40 —— Outside diameter 1.575 in.

Pressure indicator range
1 —— Standard specifications 145 psi
3 —— Low pressure specifications 43.5 psi

Pressure gauge

Specifications

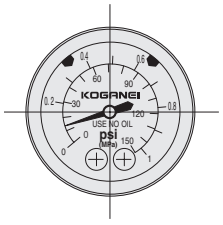
Item / Model		G1S-40-F11	G3S-40-F11
Media		Air, N_2, O_2, CO_2, He, Ar	
Port size		NPT1/4	
Pressure indicator range	psi	0 to 145	0 to 43.5
Accuracy		F.S. ±2.5%	
Maximum operating pressure	psi	134.9	36.3
Operating temperature range	°F	41 to 140 (non-condensation)	
Mass	oz	3.21	

Materials

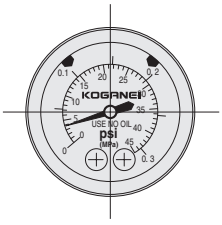
Name	Materials
Case	SPCC (painted black)
Connection port thread	SUS316
Bourdon tube	SUS316
Clear cover	Plastic (PC)

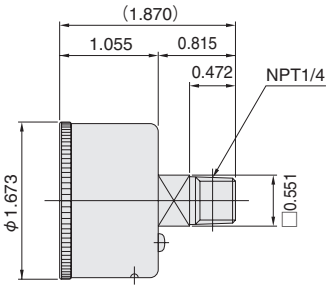
Pressure gauge dimensions in.

●**G1S-40-F11**
Standard specifications
145 psi



●**G3S-40-F11**
Low pressure specifications
43.5 psi





Handling instructions and precautions

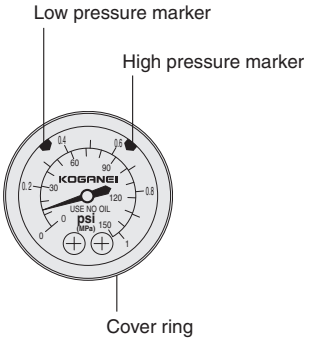
NOTE The pressure gauge is a precision measuring device.
Be careful of impacts and vibrations.

Mounting and piping

During mounting and piping operations, do not grab the pressure gauge body to tighten. For tightening, always use a wrench on the piping connection port's square portion. Use a tightening torque of 2.21 to 3.69 ft•lbf if the pressure gauges are mounted on the pressure port plate with NPT1/4.

Preset marker

You can set the preset marker. Rotate the cover ring to first set the low pressure and then set the high pressure.



Digital pressure switch

GS620-3W

Specifications

Item \ Type / Model		Standard / High-pressure type / **GS620-3W**
Indication of pressure		Gauge pressure
Rated pressure range		−14.5 to +145 psi
Pressure setting range		−14.5 to +145 psi
Proof pressure		218 psi
Applicable media		Non-corrosive gas
Supply voltage		12 to 24 VDC ±10%, ripple P-P 10% or less
Power consumption		Normal operation: 720 mW or less (current consumption 30 mA or less at 24 V supply voltage) ECO mode (at STD): 480 mW or less (current consumption 20 mA or less at 24 V supply voltage), ECO mode (at FULL): 360 mW or less (current consumption 15 mA or less at 24 V supply voltage)
Comparative output		PNP transistor open collector • Maximum inflowing current: 100 mA • Applied voltage: 30 VDC or less (between comparative output and 0 V) • Residual voltage: 2 V or less (at inflowing current 100 mA, however, cable must be less than 78.7 in. long)
	Output operation	Selectable, either NO or NC by key operation
	Output mode	EASY mode/hysteresis mode/window comparator mode
	Response differential (hysteresis)	Minimum 1 digit (variable)
	Repeatability	± 0.2% F.S. (within ± 2 digits)
	Response time	2.5 ms, 5 ms, 10 ms, 25 ms, 50 ms, 100 ms, 250 ms, 500 ms, 1000 ms, 5000 ms, selectable by key operation
	Short circuit protection	Equipped
Display		4 digits + 4 digits, 3-color LCD display (display refresh rate: 250 ms, 500 ms, 1000 ms, selectable by key operation)
	Displayed pressure range	−14.5 to +145 psi
Indicators		Orange LED (comparative output 1 operation indicator, comparative output 2 operation indicator: Lights up when comparative output is ON)
Environmental resistance	Protective structure	IP40 (IEC)
	Ambient temperature	14 to 122 °F, in storage: 14 to 140 °F
	Ambient humidity	35 to 85% RH (however, no condensation or freezing), in storage: 35 to 85% RH
	Dielectric strength	1000 VAC for one minute (between electrical connection part and case)
	Insulation resistance	50 MΩ or over at 500 VDC meggers (between electrical connection part and case)
	Vibration resistance	Endurance 10 to 500 Hz, total amplitude 0.118 in, 2 hours in each of the XYZ directions (with panel mounting: Endurance 10 to 150 Hz, total amplitude 0.0295 in., 2 hours in each of the XYZ directions)
	Shock resistance	Endurance 328 ft/s^2 (about 10 G), 3 times in each of the XYZ directions
Thermal characteristics		Within ±1% F.S. (reference at +68 °F)
Pressure port		M5×0.8 mm female thread and NPT1/8 male thread
Materials		Case: PBT (fiberglass reinforced), LCD display: Acrylic, pressure port: SUS303, mounting thread: brass (nickel plated), switches: silicon rubber
Connection method		Connectors
Wire length		Up to 328 ft long on a cable of 0.00047 in^2. or larger
Mass		Approximately 1.41 oz
Accessories		78.7 in. cable with connector: 1 pc.

Note: Unspecified measuring conditions use an ambient temperature of + 68 °F.

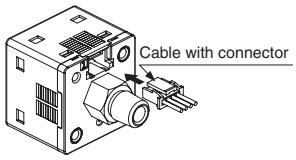
General precautions

Wiring

1. Always shut off the power supply before performing wiring work.
2. Confirm that the power source does not fluctuate over the rated power.
3. Be sure to ground to frame ground (F.G.) terminal of the power source when using a commercially available switching regulator.
4. When using equipment that could be sources of electric noise (such as switching regulators, inverter motors, etc.) near the pressure switch installation, be sure to ground the equipment's frame ground (F.G.) terminal.
5. Avoid wiring parallel to high voltage lines or power lines, or inside the same wiring conduits. Induction could cause erratic operation.
6. Incorrect wiring could cause malfunctions.
7. After completing wiring work, check to make sure that all connections are correct.

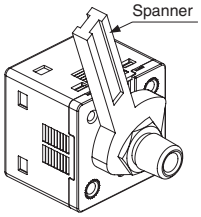
Connections

Do not apply stress directly to the connectors or to the wires coming out of the connectors.



Mounting and piping

Use a tightening torque of 2.21 to 3.69 ft•lbf when mounting on the pressure port plate with NPT1/8. For details, see page ⓫ "Installing provided options".



Other precautions

1. The GS6 series is for use with non-corrosive gases. Do not use with liquids or with corrosive gases.
2. Use within the rated pressure range.
3. Do not apply pressure in excess of the proof pressure. Doing so could damage the diaphragm and cause malfunctions.
4. Avoid using the product immediately after the power is turned on, while it is in a transitory state (about 0.5 sec).
5. Avoid use in very humid or dusty locations.
6. Be careful that the product does not come in direct contact with organic solvents, such as thinner, or water, oil, or grease.
7. Do not put pins or anything else in the pressure port. Doing so could damage the diaphragm and cause malfunctions.
8. Do not operate the keys with a pin or similar sharp object.

About the RUN mode

This is the normal operating mode.

Setting items	Description
Threshold value setting	You can directly change the ON/OFF threshold value by just pressing the UP key or DOWN key.
Zero adjust function	This function forces the pressure value to zero when the pressure port is open to the atmosphere.
Key lock function	This function prevents key operations.
Peak & bottom hold function	This function shows the peak and bottom values of changes in the pressure. The peak value appears in the main display, the bottom value appears in the sub display.

About the menu setting mode

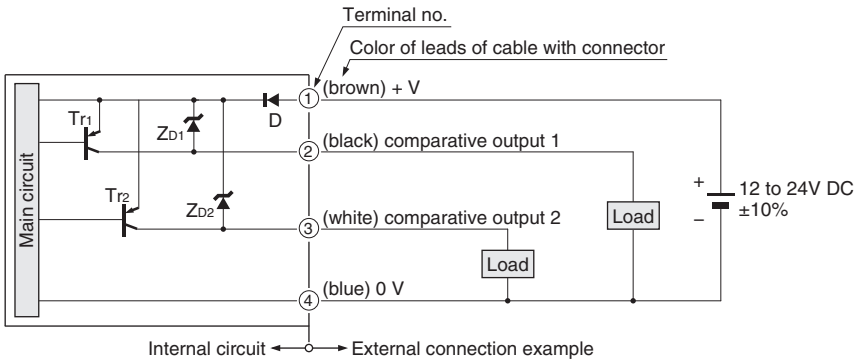
1. While in the RUN mode, press and hold the mode switch key for 2 seconds to switch to the menu setting mode.
2. Press and hold the mode switch key while doing settings to switch to the RUN mode. When this is done, the items you changed are set.

Setting items	Description
Comparative output 1 output mode settings	Sets the output mode of comparative output 1.
Comparative output 2 output mode settings	Sets the output mode of comparative output 2.
NO/NC switching	Sets either normally open (NO) or normally closed (NC).
Response time setting	Sets the response time. Select a response time from 2.5 ms, 5 ms, 10 ms, 25 ms, 50 ms, 100 ms, 250 ms, 500 ms, 1000 ms, or 5000 ms.
Main display color switching	You can switch the color of the main display. Set red/green or green/red depending on whether output is ON/OFF. Also, you can set whether the normal color is red or green.
Unit switching (high-pressure type only)	You can switch the units for the pressure .

Remarks: See the instruction manual provided with the product for details about setting the modes, functions and values.

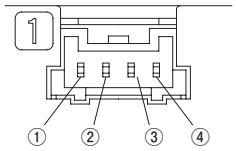
Input/output circuit and connections

Input/output circuit diagram



Code…D : Reverse current protection diode for power supply
Z_{D1}, Z_{D2} : Zener diodes for surge voltage absorption
Tr_1, Tr_2 : PNP output transistor

Terminal layout



Terminal no.	Name
①	+V
②	Comparative output 1
③	Comparative output 2
④	0V

Order codes

GS6 20 – 3W

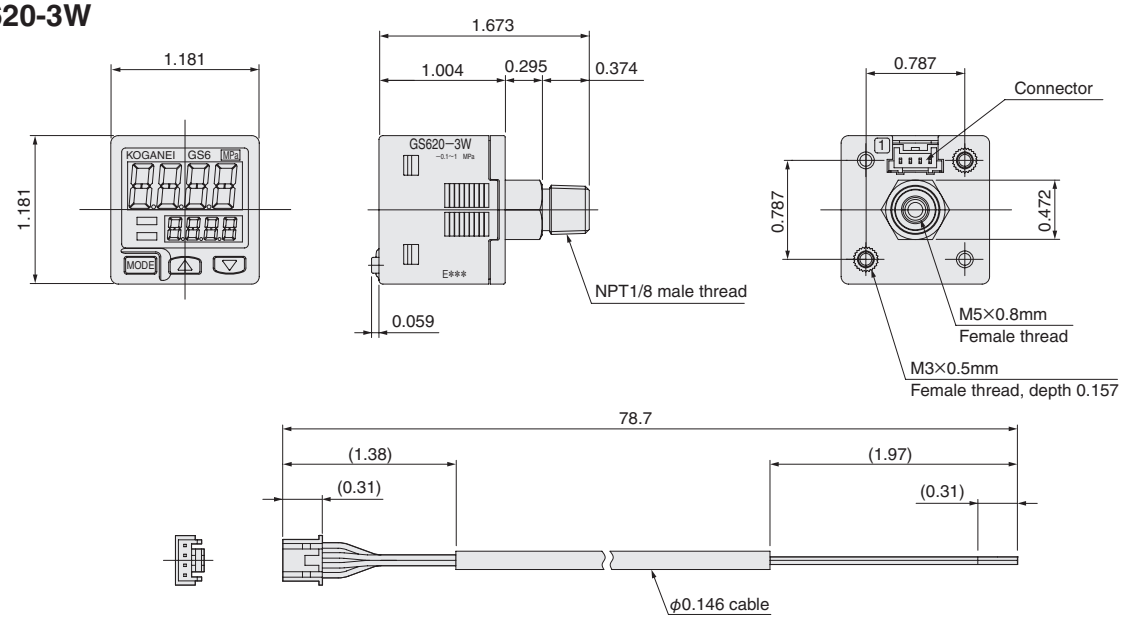
NPT thread specifications

Digital pressure switch

Operating pressure range
20： High-pressure type -14.5 to +145 psi

Dimensions in.

GS620-3W

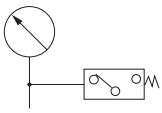


Pressure gauge with built-in switches

GS1-50-F11

- **The set pressure and operating pressure are indicated on the same pressure gauge. Panel mounting offers convenient centralized control and management built into the control panel.**
- **An indicator is standard equipment, to check the switch operation state. Wiring connection methods offered include a standard grommet (lead wire) type, and a DIN connector type as an option.**

Symbol



Order codes

GS1-50 - F11 - ☐ - ☐

NPT thread specifications

Wiring
Blank — Lead-wire type
T — DIN type connector

Voltage
AL — For 100 VAC, 200 VAC
DL — For 24 VDC

Pressure gauge with built-in switch
(outer diameter 1.969 in.)

Remarks: A model with built-in contact protection circuit (external surge absorption element) for AC is available. Contact your nearest Koganei sales office for details.

Specifications

Item			Model: GS1-50-F11-☐-☐
Media			Air
Maximum operating pressure		psi	120
Pressure gauge specifications	Operating temperature range (atmosphere and media)	°F	41 to 140
	Pressure indicator range	psi	0 to 145
	Indicator accuracy		F.S.±3%
Switch specifications	Pressure adjusting range	psi	14.5 to 120
	Regulating pressure indication error Note 1 and Note 3	psi	±7
	Repeatability Note 3	psi	±7 (41 to 113°F)
	Response differential	psi	10 or less
	Contact type		Micro switch a-contact (NO)
	Wiring — Standard		Lead wire Length: Approx. 19.7 in. (UL1007 AWG22)
	Wiring — Options		DIN connector
	Indicator		Standard equipment: LED for DC, neon lamp for AC
Shock resistance		G	1
Mounting direction			Any
Mass		oz	6.00 (with DIN connector 6.70)
Materials	Body		Aluminum die-casting
	Case		SPCC
	Connection port thread		Brass
	Bourdon tube		Brass

Notes 1: Shows when the pressure is rising.
2: Use a set pressure that has a differential of at least 14.5 psi with the supply pressure.
3: Regulating pressure indicator errors and repeatability errors could be accumulated. (maximum ±14.5 psi) Be careful during operations.

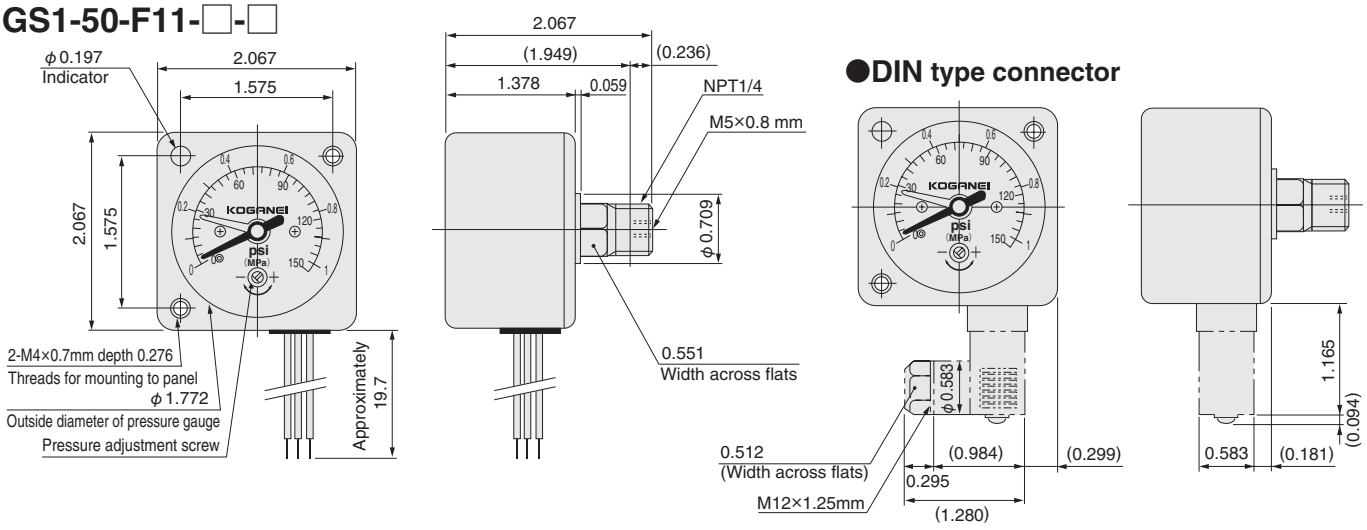
Micro switch rating

A

Operating current range \ Rated voltage		DC30V	AC125V	AC250V
Inductive load	Continuous	0.05 to 0.1	0.01 to 0.1	0.01 to 0.05
	Inrush	0.5 MAX.	0.5 MAX.	0.2 MAX.
Non-inductive load		0.01 to 0.5	0.01 to 0.3	0.01 to 0.2

Dimensions of pressure gauge with built-in switch in.

GS1-50-F11-☐-☐



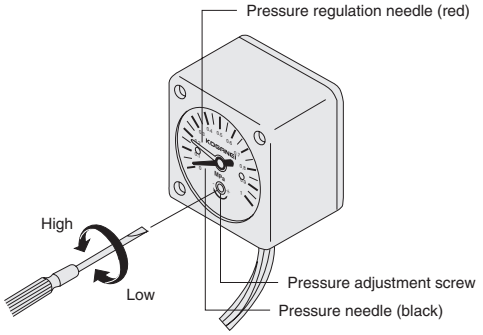
Pressure gauge with built-in switches

Mounting and piping

1. While any mounting direction is acceptable, install a throttle mechanism in cases where pressure pulsation is particularly severe, such as when mounted between a valve and an actuator. For mounting in locations subject to strong vibrations, consult us.
2. During mounting and piping operations, do not grab the pressure gauge body to tighten. For tightening, always use a wrench on the piping connection port hexagonal section. Use a tightening torque of 2.21 to 3.69 ft•lbf if the pressure gauges are mounted on the pressure port plate with NPT1/4.

Pressure regulation

Rotate the pressure adjustment screw, align the pressure regulation needle (red) to the set pressure, and set. Rotating the pressure adjustment screw to the left (counterclockwise) sets to a higher pressure, and rotating it to the right (clockwise) sets to a lower pressure. When the air pressure rises to the set pressure, the switch is activated, and when it falls to less than the setting pressure 10 psi (response differential), the switch is returned to the original state.



NOTE
1. To regulate the pressure, do not remove the cap on the lens surface, but insert a small screwdriver into a slit in the cap instead, and directly rotate the pressure adjustment screw.
2. The pressure needle has an indication error of ±7 psi. For fine-tuning adjustment, apply compressed air at the set pressure to check the switch triggering action.

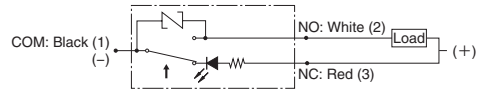
General precautions

1. Use this product to check the supply pressure. For use in precision control circuits, consult us.
2. Switch performance may be degraded in installation locations where the temperature is higher than 113°F or where the humidity is constantly 50% or less. For use in these kinds of places, consult us.
3. If there is silicon gas in the ambient atmosphere, it may cause a contact failure because the contact operation uses micro switches. If there is silicon oil or silicon products in the vicinity of the product, eliminate the source of the silicon gas or use a contact protection circuit (for AC).

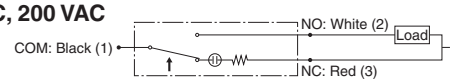
Wiring instructions

Pay attention to the NC and NO contacts and the colors of lead wires (in wires with connectors, the terminal numbers) for wiring. In the diagram below, the numbers in parentheses ( ) represent the terminal numbers, while the ⬆ shows the direction of rising pressure. The indicator lamp switches off when the value is at the set pressure or higher, and lights up as a warning when the value falls below the set pressure.

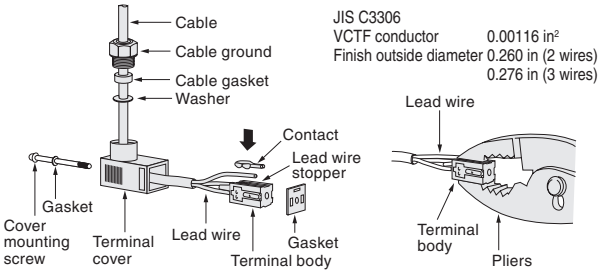
●24 VDC



●100 VAC, 200 VAC



●Wiring instructions with DIN connector

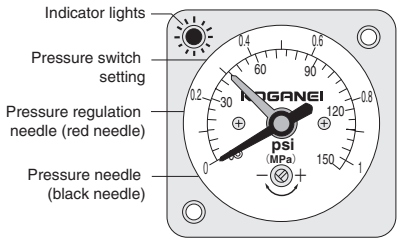


When peeling off the sheath (for cabtyre sheath only), pay attention to the lead wire bending direction. Setting the outer lead wires inside the terminal cover to be about 0.31 in longer than the inner wires can make it easier to mount the terminal body onto the terminal cover. Without peeling off their insulations, insert the lead wires into the terminal body until they bump up against the lead wire stopper, lower the contact from above to the lead wire, and use pliers to push them into firm contact, so that the contacts are touching the core wire.

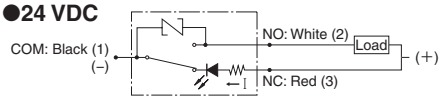
NOTE For the connector type, the connector wiring position at time of delivery is in the connecting thread side (back side).

Switch setting method and operations

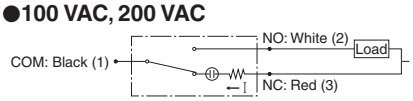
Setting example: Want the switch to activate when the pressure is at 43.5 psi or less.



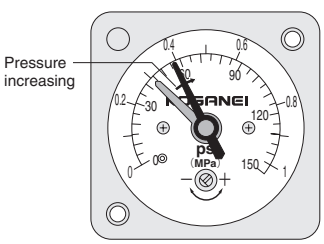
●24 VDC



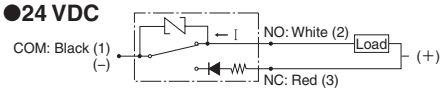
●100 VAC, 200 VAC



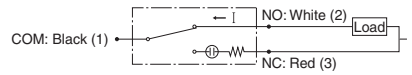
Set the pressure regulation needle (red needle) to 43.5 psi. When the pressure is in the range of 0 to 43.5 psi., the built-in switch remains at NC, as shown in the circuit diagram above, and the indicator lamp lights up.



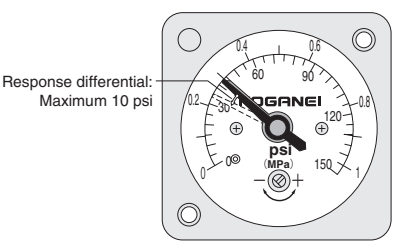
●24 VDC



●100 VAC, 200 VAC



When the pressure supply increases, close to the pressure regulation needle (red needle), the built-in switch flips to NO, as shown in the circuit diagram above, the load current flows, and the indicator lamp goes out. The position at this time is A. At this time switching position A has a maximum 14.5 psi differential in relation to the pressure needle (black needle) because of a pressure needle tolerance of ±7 psi and repeatability accuracy of ±7 psi have accumulated.



When the pressure falls, and the pressure needle (black needle) is higher than the pressure regulation needle (red needle), the internal switch changes to NC with a maximum response differential of 10 psi. When this happens, check the switching position and adjust the pressure regulation needle (red needle). Note that NC cannot be used as a load contact. Use the switching of NO to OFF by controlling a relay or other B-contact device.

Limited Warranty

KOGANEI CORP. warrants its products to be free from defects in material and workmanship subject to the following provisions.

Warranty Period The warranty period is 180 days from the date of delivery.

Koganei Responsibility If a defect in material or workmanship is found during the warranty period, KOGANEI CORP. will replace any part proved defective under normal use free of charge and will provide the service necessary to replace such a part.

Limitations

- This warranty is in lieu of all other warranties, expressed or implied, and is limited to the original cost of the product and shall not include any transportation fee, the cost of installation or any liability for direct, indirect or consequential damage or delay resulting from the defects.
- KOGANEI CORP. shall in no way be liable or responsible for injuries or damage to persons or property arising out of the use or operation of the manufacturer's product.
- This warranty shall be void if the engineered safety devices are removed, made inoperative or not periodically checked for proper functioning.
- Any operation beyond the rated capacity, any improper use or application, or any improper installation of the product, or any substitution upon it with parts not furnished or approved by KOGANEI CORP., shall void this warranty.
- This warranty covers only such items supplied by KOGANEI CORP. The products of other manufacturers are covered only by such warranties made by those original manufacturers, even though such items may have been included as the components.

The specifications are subject to change without notice.

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