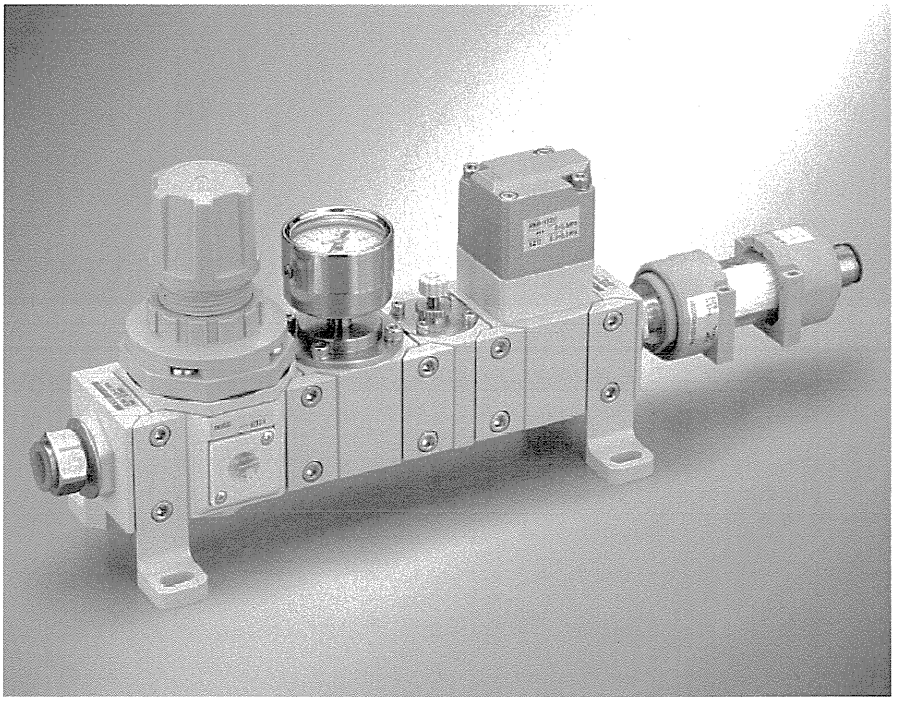
CKD

SM- 387621-A

INSTRUCTION MANUAL

Clean Air Unit

CAU30



- Please read this instruction manual carefully before using this product, particularly the section describing safety.
- Retain this instruction manual with the product for further consultation whenever necessary.

CKD Corporation

For Safety Use

To use this product safely, basic knowledge of pneumatic equipment, including materials, piping, electrical system and mechanism, is required (ISO 4414 , JIS B 8370).

We do not bear any responsibility for accidents caused by any person without such knowledge or arising from improper operation.

Our customers use this product for a very wide range of applications, and we cannot keep track of all of them. Depending on operating conditions, the product may fail to operate to maximum performance, or cause an accident. Thus, before placing an order, examine whether the product meets your application, requirements, and how to use it.

This product incorporates many functions and mechanisms to ensure safety. However, improper operation could result in an accident. To prevent such accidents, **read this operation manual carefully for proper operation.**

Observe the cautions on handling described in this manual, as well as the following instructions:

⚠ **DANGER** Failure to pay attention to DANGER notices may cause a situation that results in a fatality or serious injury and that requires urgent addressing.

⚠ **WARNING** Failure to pay attention to WARNING notices may result in a fatality or serious injury.

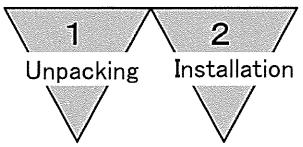
⚠ **CAUTION** Failure to pay attention to CAUTION notices may result in injury or damage to equipment or facilities.

※1) ISO 4414 :Pneumatic fluid power・・・Recommendations for the application of equipment to transmission and control systems.

※2) JIS B 8370: General rule for pneumatic systems

INDEX

Clean Air Unit
CAU30



I . Common

1. Unpacking

⚠ CAUTION	1) To prevent foreign matter from entering inside of the product, unpack the product just before starting of the piping.

1) Make sure that the model number indicated on the product is matched with that you have ordered.
2) Check the exterior of the product for damage.
3) Before starting operation, thoroughly read this instruction manual, as well as that supplied with the product.

2. Installation

2.1 Installation environment

⚠ WARNING	1) Do not install the product in a place where corrosive gas, or fluid chemical exists.

⚠ CAUTION	Do not install the product in a place listed below.Where: 1) Excessive vibration or impact exists. 2) The ambient temperature exceeds the specified range. 3) The air may be frozen. 4) The water drop or coolant is splashed onto the product. 5) The humidity is high and the temperature changes largely, causing dew condensation. 6) Sea breeze or seawater is splashed onto the product. 7) The product is exposed to the direct sunlight

1) Impacts, vibration or corrosive gas could result in product damage or external leaks.
2) Use in an atmosphere containing organic solvents or chemicals could damage the polyamide housing.

2.2 Installation

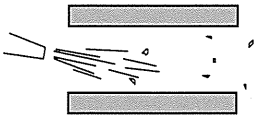
⚠ CAUTION	1) Install the product so that excessive force is not applied. 2) Allow clearance for maintenance. 3) Do not handle the product by pressure adjusting knob, a clean filter, or the pressure gauge of the regulator.

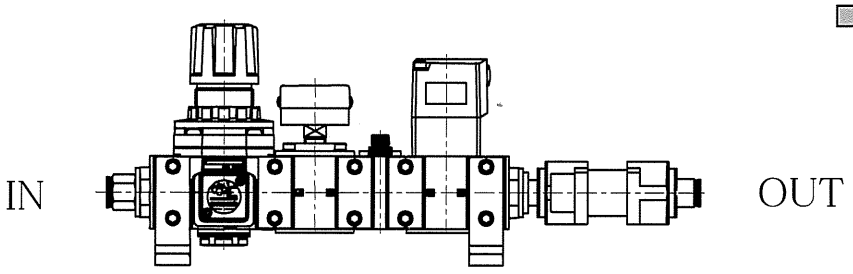
1) Handle the product by the body part.

2.3 Piping

⚠CAUTION	1) Flush the air piping to be used sufficiently before connecting the filter to it.If dust or sealant enters the inside of the pipe during piping work ,this may cause the product performance to fall off. 2) Connect it correctly after confirming the direction of the flow. 3) Do not apply excessive force on the product when connecting the pipe.Make sure that force, such as tension, compression, bending or external force from the tube, is not applied on the product when piping or mounting.

1) Flush air into the pipe to blow out foreign substances and chips before piping.
2) Connect piping after confirming IN and OUT of the product.





⚠CAUTION	4) Use the appropriale tube 5) Carefully connect the piping so that no bending moment caused by the piping load is applied to the main body and piping. 6) When supplying compressed air for the first time after connecting the pipes, do not apply a high pressure right away. 7) When supplying compressed air for the first time after connecting pipes, confirm that no air is leaking from any pipe connections. 8) Pipe so that piping connection does not separate from each other by the device's movement, vibration, tension, etc. When using the chuck holding mechanism, the chuck will be released creating a hazardous state. Confirm that the tube has been inserted properly, and make sure that there is no tension during use. The tube could be dislocated or damaged if there is any tension.

3) Applicable tube
The piping is designed to be connected with a push-in joint. Piping tubes of an improper outer diameter, tube thickness or hardness may cause disconnection or leakage. Use our specified tubes.

Tube	Outer diameter	Outer diameter tolerance	Inner diameter	Minimum bending radius
Soft nylon F-1500series	10^{DIA}	±0.1	7.2^{DIA}	40
	12^{DIA}		8.9^{DIA}	55
Urethane U−9500series	10^{DIA}	+0.1 -0.2	6.5^{DIA}	40
	12^{DIA}		8^{DIA}	50

(units in millimater)

3. Proper operation

⚠ WARNING	1) Always operate the product within its specifications. 2) This product is intended for industrial use , and must not be used in medical equipment , or components or circuits that risk involve human lives when the product fails.

⚠ CAUTION	1) Check the working media and air circuit. For media, always use clean air that solid matter, water content, and oil content are removed completely using the dryer and filter and oil mist filter. Never flow the oily air. (JIS B 8392-1:2000 Compressed air clean class1,3,1 or better) 2) Avoid using this product for constantly rotating or oscillating applications. Joint could be damaged. 3) Confirm the screw parts such as bolts with the hexagon socket do not loosen. 4) Do not get on the product or put heavy load. 5) Fully understand characteristics of compressed air before designing the pneumatic circuit. 6) Install a "pressure switch" and "shut-off valve" on the device's compressed air supply side. The pressure switch is used to disable operation if set pressure cannot be reached. The shut-off valve dischanges residual compressed air outside the pneumatic circuit, preventing malfunction caused by residual compressed air. 7) Indicate the maintenance conditions in the device's instruction manual. The product's performance can fall remarkbly with improper working status, working environment and maintenance. Which makes it difficulto to attain safety . With correct maintenance, optiman performance can be maintained. 8) Do not disassemble or remodel the product.

4. Troubleshooting

Trouble symptom	Cause	Remedy
Pressure does not increase.	Primary pressure is insufficient.	Check the primary pressure.
	Primary piping is too long or throttled.	Make the primary piping shorter or the piping size larger.
The pressure does not drop.	There is no relief with the non-relief type.	Switch to a relief type.
Leaks start from the cover. The set pressure rises abnormally.	Dust is sticking to the valve of the regulator. Diaphragm is broken of the regulator.	Replace the product.
Secondary pressure pulsates.	Pulsation may occur depending on the piping conditions and	Lower the primary pressure or throttle the piping.
Air leak from the push-in joint.	The tube is not inserted completely.	Confirm whether the tube is inserted completely.
Insufficient flow rate. Remarkable pressure drop.	The filter element is clogged.	Stop the compressed air and replance with a new filter element.

5. How to order

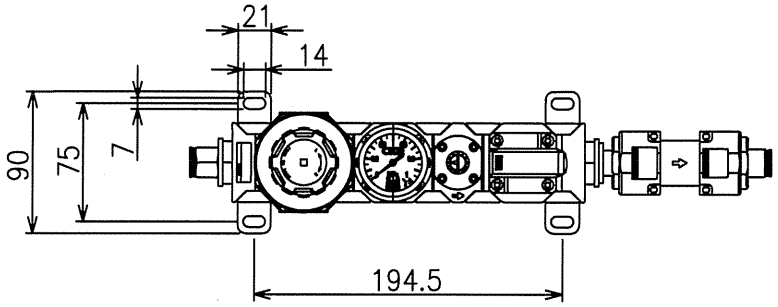
Working media		Cleaned compressed air
Max. working pressure	MPa	0.7 (In case of option L : 0.5MPa)
Proof pressure	MPa	1
Working temperature	℃	5～45
Set pressure range	MPa	0.05～0.6 (In case of oputionL:0.05～0.3)
Part size (IN·OUT)		10^{DIA}、12^{DIA}
Filtration rating	μm	0.01μm (Efficiency : ＞99.99%)
Processing flow rate	L/min	400 *1
Assured differential withstanding pressure *2	MPa	0.5
Needle speed rotation		More than 12 rotation
Pilot air pressure for valve	MPa	0.4～0.5
Pilot connection caliber for valve		Rc1/8
Oil treatment prohibited portion specification		Fluid passege section : Oil treatment prohibited

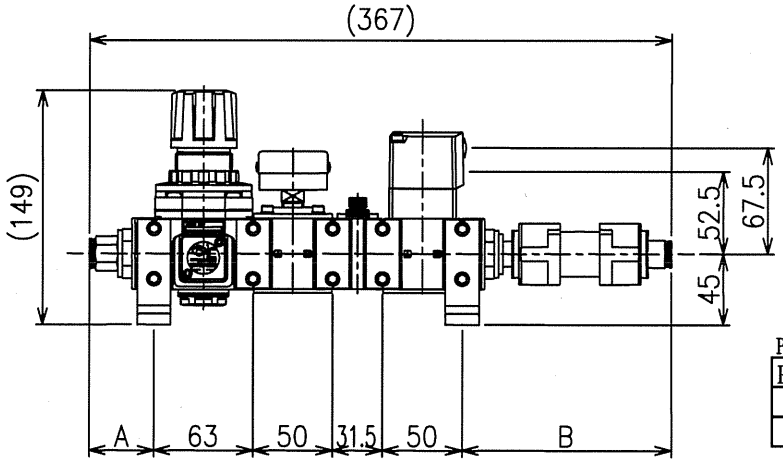
Note1 : When primary pressure 0.7MPa, setting pressure 0.5MPa, and flowing quantity at pressure descent 0.15MPa.
Please confirm the flowing quantity characteristic table in detail.
Note2 : It is a differential pressure before and behind the filter.
Note3 : Please do not flow air more than the processing flowing quantity.

6. Outside dimensions

6. 1 1 System

●CAU30-□-R□GY49N1V□F (regulator, pressure gauge, needle, valve, and filter)

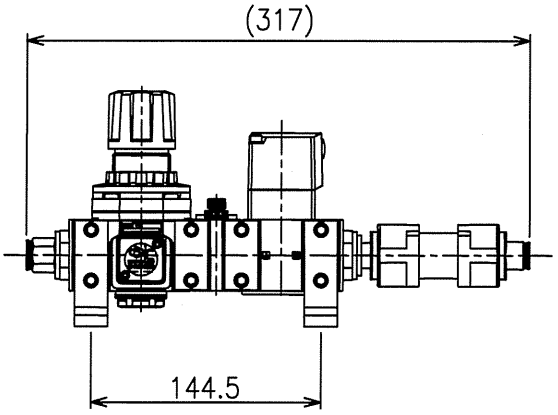




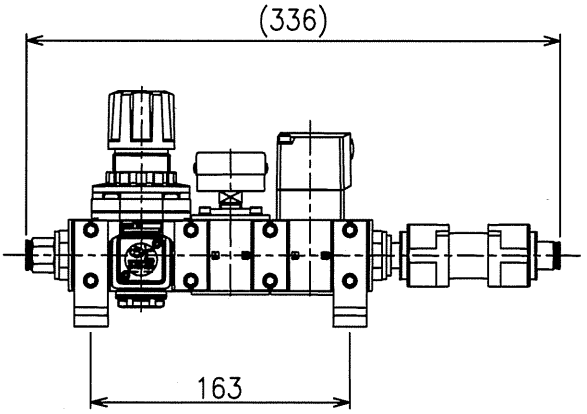
Port size dimentions list

Port size	A	B
H10	41	132
H12	42.5	133.5

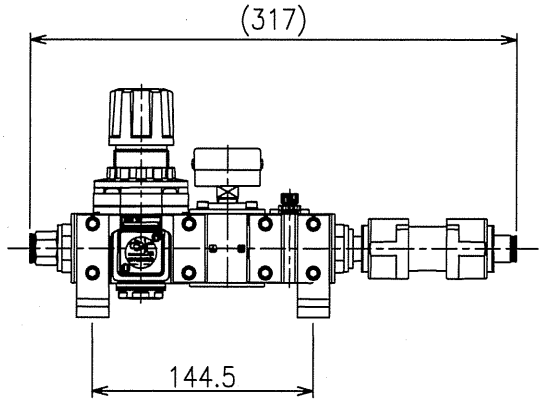
●CAU30-□-R□N1V□F
(regulator, needle, valve, and filter)



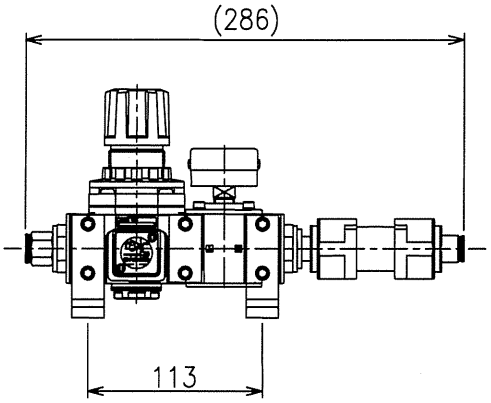
●CAU30-□-R□GY49V□F
(regulator, pressure gauge, valve, and filter)



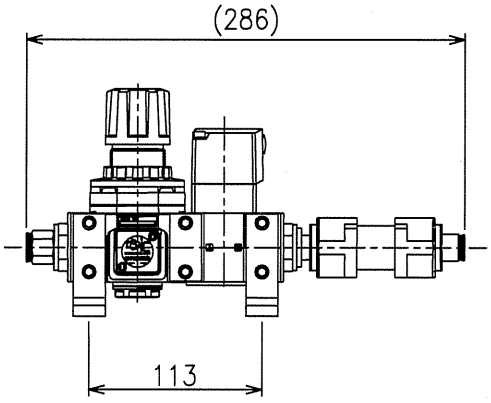
●CAU30-□-R□GY49N1F
(regulator, pressure gauge, needle, and filte



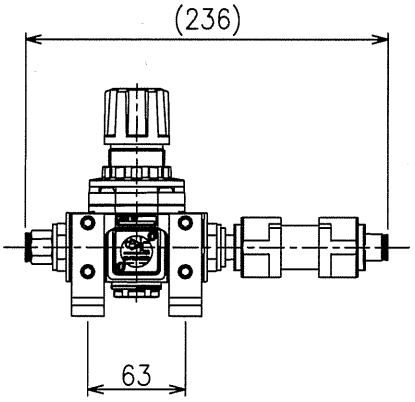
●CAU30-□-R□GY49F
(regulator, pressure gauge, and filter)



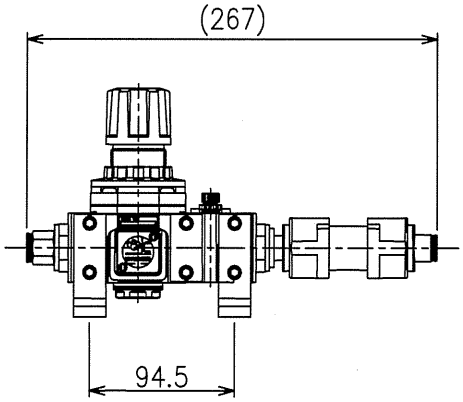
●CAU30-□-R□V□F
(regulator, valve, and filter)



●CAU30-□-R□F
(regulator and filter)

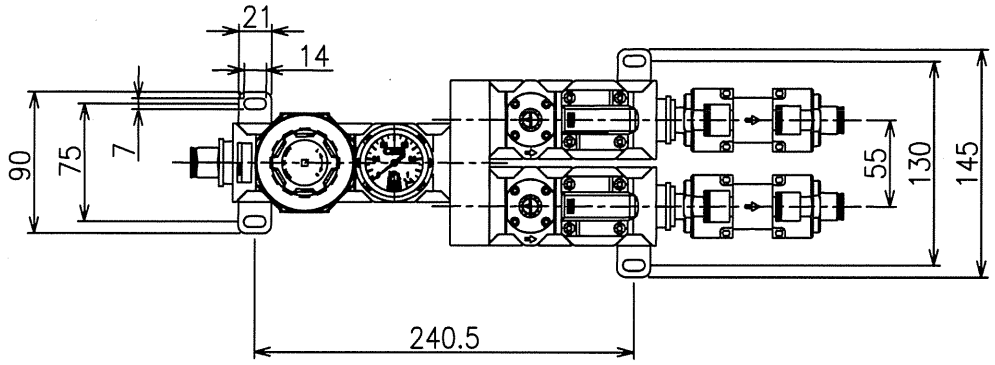


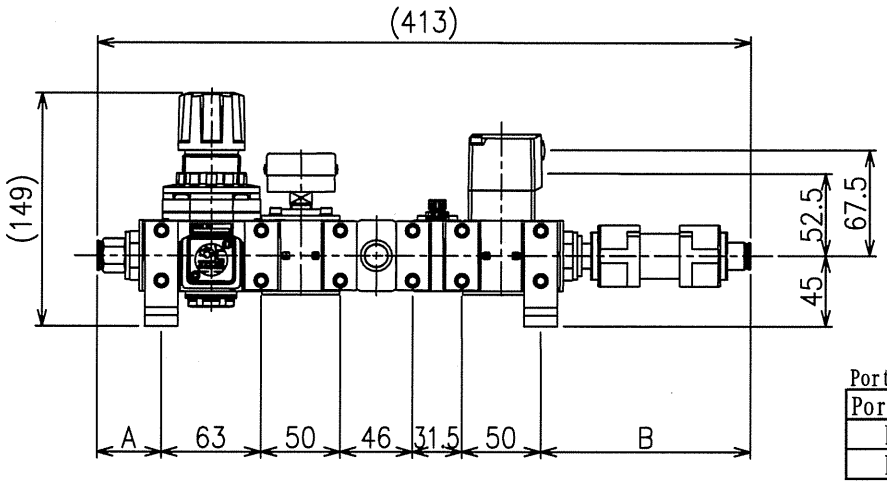
●CAU30-□-R□N1F
regulator, needle, and filter)



6. 2　　2 System

●CAU30-□-2-R□GY49N1V□F (regulator, pressure gauge, needle, valve, and filter)

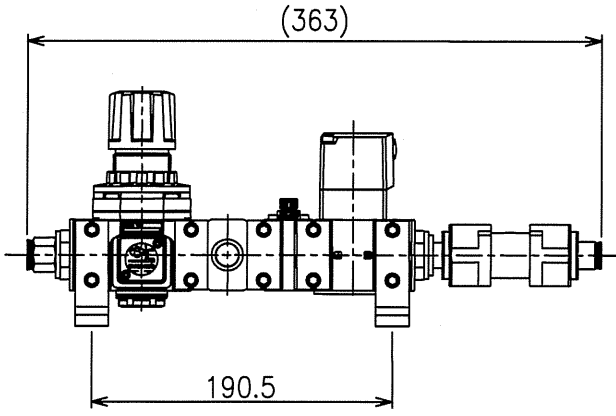




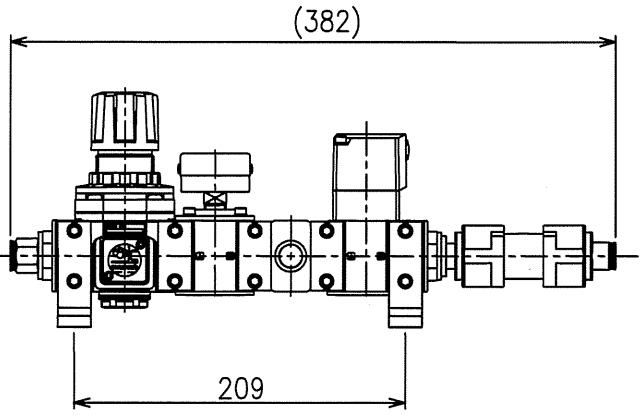
Port size dimentions list

Port size	A	B
H10	41	132
H12	42.5	133.5

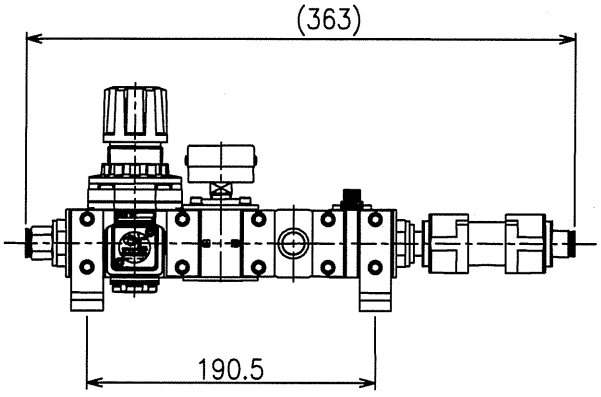
●CAU30-□-2-R□N1V□F
(regulator, needle, valve, and filter)



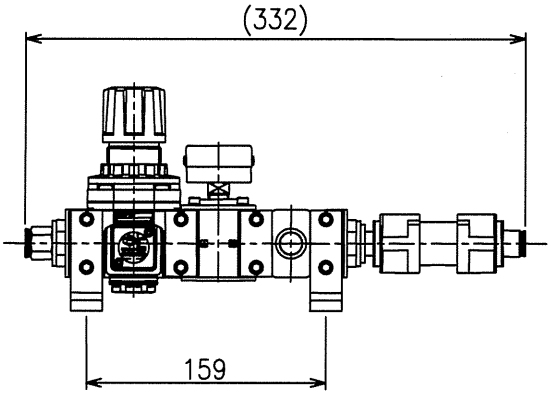
●CAU30-□-2-R□GY49V□F
(regulator, pressure gauge, valve, and filter)



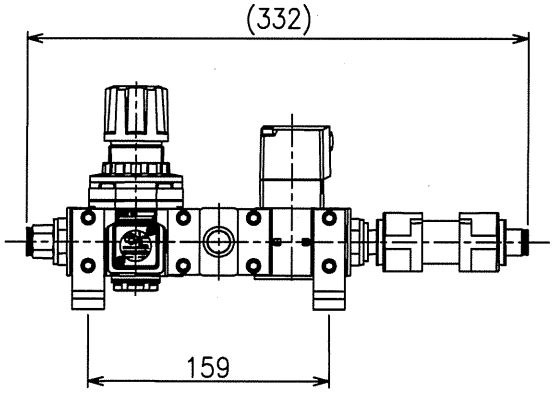
●CAU30-□-2-R□GY49N1F
(regulator, pressure gauge, needle, and filte



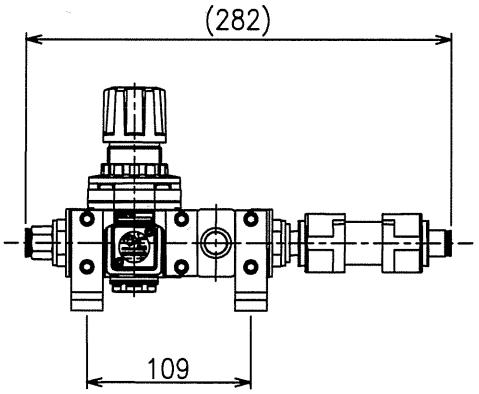
●CAU30-□-2-R□GY49F
(regulator, pressure gauge, and filter)



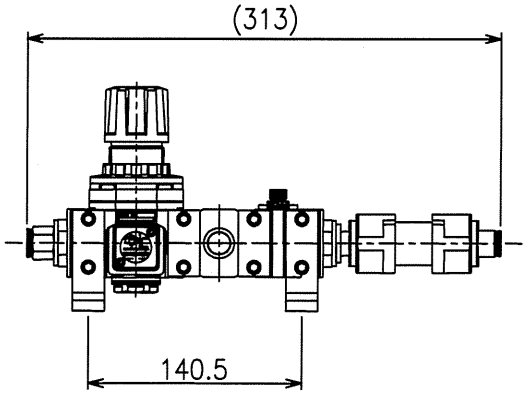
●CAU30-□-2-R□V□F
(regulator, valve, and filter)



●CAU30-□-2-R□F
(regulator and filter)



●CAU30-□-2-R□N1F
(regulator, needle, and filter)



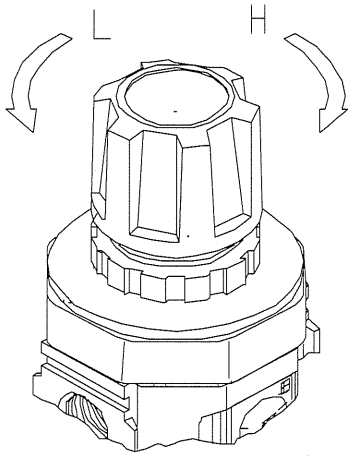
Ⅱ. Regulator

1. Proper operati

⚠WARNING	1) If the output pressure exceeding the set pressure value of the regulator may cause the secondary unit to break or malfunction, always install an appropriate safety unit. 2)The regulator might not be able to be used with the second side sealing up circuit and balance circuit.Please consult our company, in such case.

⚠CAUTION	1) Pulsations may occur depending on the working conditions and piping conditions. If pulsations occur, lower the primary pressure. 2) When the primary pressure is released, the secondary pressure will flow to the primary side. If faults occur in other devices when the fluids on the secondary side flow to the primary side, provide a circuit to maintain the pressure. 3) Set secondary side pressure of the regulator to 85% or less of the primary side, or else the pressure drop could increase. 4) Pressure and flow characteristics and relief start pressure may be less than the standard regulator (R3000 Series , etc). Depending on usage , such as when back pressure rises , set pressure may increase around 0.2 MPa . It is recommended to use a pressure gauge compatible with set pressure + 0.2 MPa. 5) When used in applications where primary pressure is 0.7 MPa or more , keep the difference in primary and set prssure within 0.4 MPa . Pulsation could occur if the difference in pressures is high and if secondary piping is large . If so , lower primary side pressure or restrict the secondary line . If pulsation occer and cannot be removed .

1) Secondary side pressure adjustment
Pressure adjusting knob is unlocked when it is pulled one step upward. Turning the knob to the direction of H marking on the top of the knob raises the secondary pressure higher while it lowers when the knob is turned toward L. After setting secondary pressure, push the knob down to have it locked



Pull the pressure adjusting knob and release the lock before setting the regulator pressure. The regulator could be damaged if the pressure is set without releasing the lock.
Adjust the pressure in the pressure rise direction. The pressure cannot be set correctly if it is adjusted in the downward direction.
Unless the pressure is consumed , the pressure of the secondary side cannot be reduced when a nonrelief type regulater is used.
Lock the pressure adjustment knob after adjusting the pressure.
2) A pressure higher than the primary pressure cannot be set.
3) Manually operate the pressure adjustment knob. Use of tools, etc., may result in damage.
4) The set pressure may deviate slightly when the pressure adjustment knob is locked.
5) When the primary pressure is released, the secondary pressure will flow to the primary side. However, if a backpressure is applied, it may not flow to the primary side.

2. Maintenance

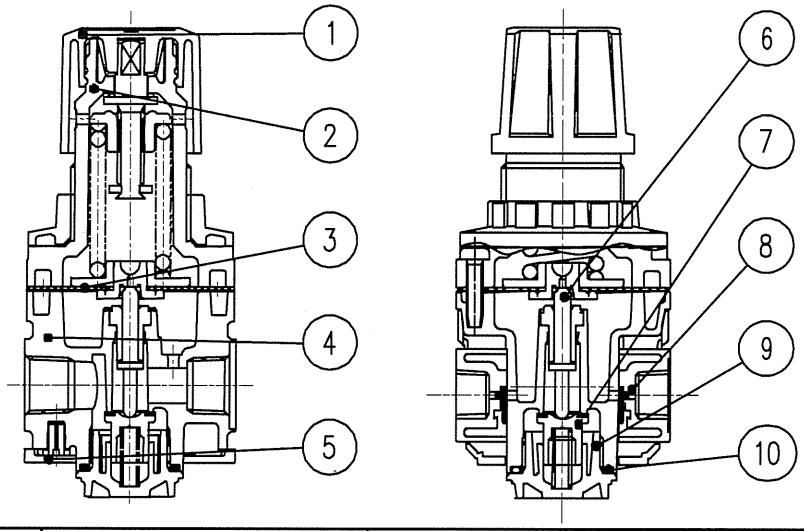
2. 1 Inspection

1) Daily inspection
Before operating the product, it is recommended to inspect the set pressure using a pressure gauge.
2) Periodic inspection
To operate the product in its optimal operating state, carry out the periodic inspection normally once every six months.
Inspect the set pressure using a pressure gauge.
Check that no leak occurs in the piping.

2. 2 Disassembly and assembly

⚠ CAUTION	1) Before starting the maintenance work, turn OFF the power, shut down the supply pressure, and make sure that no residual pressure remains. 2) Do not disassemble or remodel the product.

3. Internal structure



Part No.	Part name	Material
1	Knob	Polyacetal resin
2	Cover	PBT resin
3	Diaphragm assembly	Zinc alloy die-casting / nitrile rubber
4	Body	Aluminum alloy die casting
5	Plate cover	ABS resin
6	Stem	Aluminum alloy
7	Gauge plug assembly	Polycarbonate , nitrile rubber and steel
8	Valve	rubber
9	Bottom cap	Polyacetal resin
10	Bottom O-ring	Fluoro rubber

Ⅲ. Needle

1. Installation

1) Check the needle valve speed or rotation.
A stopper mechanism is provided, but damage could result if the needle is turned too far. Check the product of its rotation.
2) Do not turn the knob too forcibly when fully closing or opening the knob (0.05N-m or less). As well, do not pinch the lock nut when adjusting the needle. Otherwise the needle will gall or be broken.
3) Because oil treatment is prohibited turns of the adjustment knob may be tense.

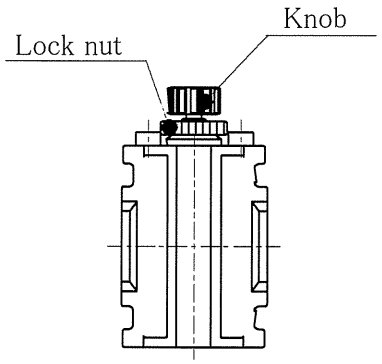
2. Proper operation

2. 1 Design and Selection

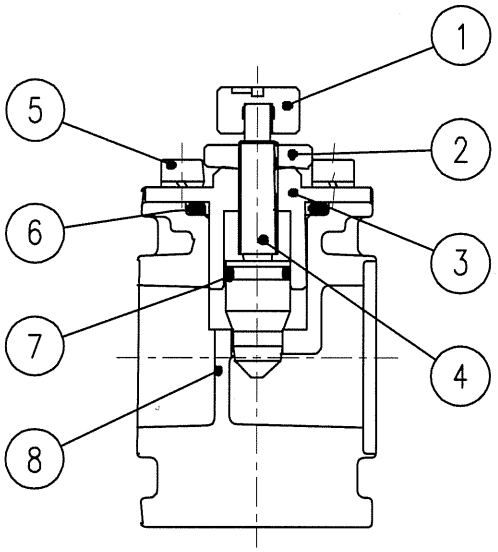
1) This product cannot be used as a stop valve with zero leakage. Slight leakage is allowed in product specifications.
2) Fully understand characteristics of compressed air before designing the pneumatic circuit.
If instantaneous stopping and holding are required during an emergency stop, functions equivalent to mechanical, hydraulic or electrical methods cannot be anticipated.
Pop out, ejection, and leaks resulting from air compressibility and expansion may occur.

2. 2 Flowing quantity adjusting method

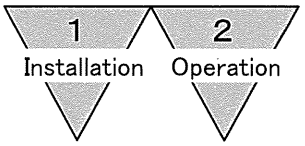
1) Turn the knob clockwise to close, or turn it counterclockwise to open. After the knob position is adjusted, do not fail to tighten the lock nut.
2) There is no directionality when setting up the needle valve.



3. Internal structure



Part No.	Part name	Material (Surface treatment)
1	Knob	PBT resin
2	Lock nut	Brass (electroless nickeling)
3	Needle guide	Aluminum alloy
4	Needle	Brass (electroless nickeling)
5	Hexagon socket head cap screw	Stainless steel
6	O-ring	nitrile rubber
7	O-ring	Fluoro rubber
8	Needle body	Aluminum alloy die casting



Ⅳ. Valve

1. Installation

1) Removal of foreign body

Dust and the foreign matter, etc. in the fluid cause the malfunction and the seat leakagc of the valve .

Please installa filter of 5μm or less in the pilot air circuit.

2) Piping

The supply port on the pilot side shall be piped as shown in the following table when piping.

Moreover, the exhaust cap on the respiration hole side opposite to the pilot port is a rubber plug for the mis-piping prevention.

Operation classification		supply port
Normally closed type	V1	X
Double action type	V3	X and Y

3) Lubrication and unlubrication

Unlubrication is possible for the pilot air for the valve.

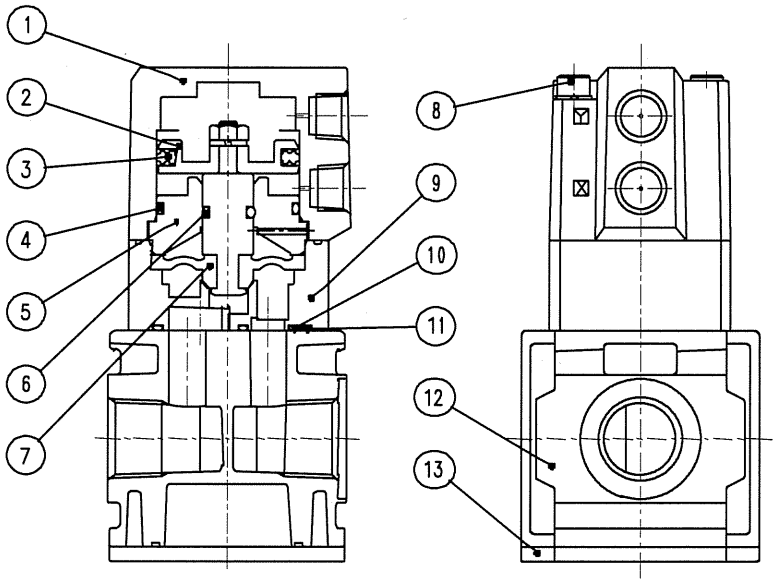
4) Drain measures

Please improve the pilot air quality by dehumidification with the after air conditioner drier, the foreign body removal with the filter, and the tar removal with the tar removal filter; etc.

2. Proper operation

1) Please make the differential pressure between primary and the secondary sides to be of the valve 0.1MPa or more .

3. Internal structure



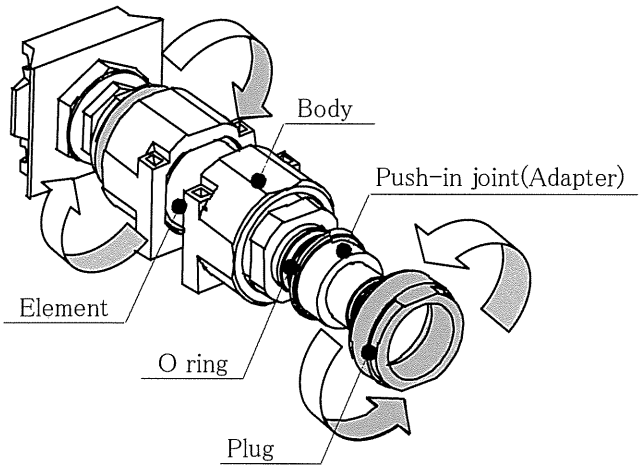
Part No.	Part name	Material (Surface treatment)
1	Cylinder cover	Aluminum alloy die casting
2	Piston ass'y	Aluminum alloy/ Stainless steel
3	Packing	nitrile rubber
4	O-ring	nitrile rubber
5	Adapter	Aluminum alloy
6	O-ring	Fluoro rubber
7	Diaphragm	EPDM rubber
8	screw	Stainless steel
9	Body	Polypropylene fiber
10	O-ring	Fluoro rubber
11	O-ring	Fluoro rubber
12	Module body	Aluminum alloy die casting
13	Bottom plate	Steel

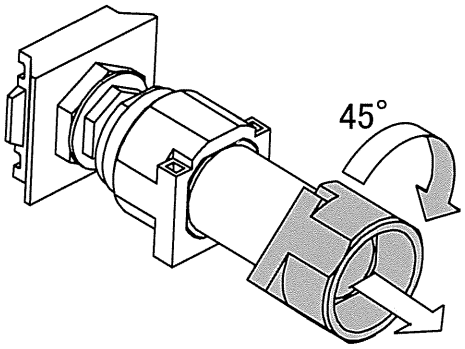
V. Filter

1. Maintenance

1.1 Replacement of filter element

The element can be replaced for the FCS1000. The replacement method is explained below.





1) Removing the element

① Turn and remove the plug. Remove the push in joint (adapter for screw) and the O-ring. The plug, body, push in joint and adapter are not included in the replacement parts, so take care not to lose or damage, etc., them.

② Move the body to the position where it rotates freely in respect to the element. Rotate (45°) to where removal is possible, and then remove the element and body.

③ Remove the opposite side in the same manner.

2) Mounting the element

① Assemble the body and element so that the element's convex section securely fits with the concave section on the inner side of the body.

② Assemble the O-ring and joint, and then assemble and fix the plug onto the body. Tighten the plug at 7 to 7.5N·m.

③ Assemble the opposite side in the same manner.

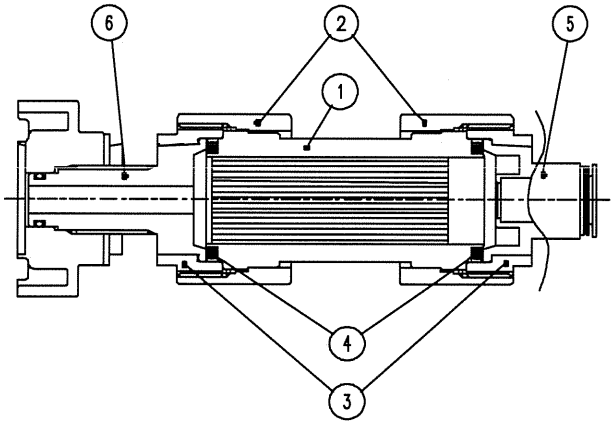
1.2 Inspection

⚠ CAUTION	1) Periodically inspect and replace the element as a clogged element could result in a drop in performance. 2) Periodically inspect for cracks, damage and other deterioration in the transparent resin. 3) Do not disassemble or remadel the product. 4) Before starting the maintenance work, turn OFF the power, shut down the supply pressure, and make sure that there is no residual pressure.

1) Periodic inspection

To operate the product in its optimal operating state, carry out the periodic inspection normally once every six months.

2. Internal structure



Part No.	Part name	Material (Surface treatment)
1	Element	Polyamide , Polypropylene and Urethane rubber
2	Body	Polyamide resin
3	Plug	Polyamide resin
4	O-ring	Fluoro rubber
5	Push-in joint	Brass (electroless nickeling) Nitrile rubber , Polypropylene and Stainless steel
6	Adapter	Aluminum