CKD

SM-327852-A/2

INSTRUCTION MANUAL

INLINE TYPE CLEAN FILTER

FCS SERIES

- 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 safety, basic knowledge of pneumatic equipment, including materials, piping, electrical system and mechanism, is required (to the level pursuant to JIS B 8370 Pneumatic System Rules).

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 WARNING 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

FCS SERIES

INLINE TYPE CLEAN FILUTER

INSTRUCTION MANUAL No. SM - 327852-A

1. Unpacking

CAUTION

1) To prevent foreign matter from entering the inside of the product, do not unpack the product immediately before starting the piping.
2) Unpack this product in a clean room.
   This product has been packed in a clean room. It should be opened in a clean room just before 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
2) Use the stainless steel element type FCS500-□□-□-P90,P94 and FCS1000-□□-P90,P94 when using the product in an atmosphere containing chemicals or organic solvents, or where these substances could adhere.
3) This product is intended for industrial use, and must not be used in devices or circuits used for medical equipment or devices that involve human lives.

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 gases could result in product damage or external leaks.
2) Use in an atmosphere containing organic solvents or chemicals could damage the element.

2.2 Installation

CAUTION

1) Install the product so that excessive force is not applied.
2) Allow a clearance for maintenance

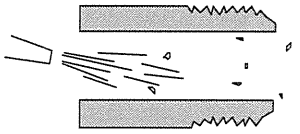
1) The product is installed in any mounting direction.

2.3 Piping

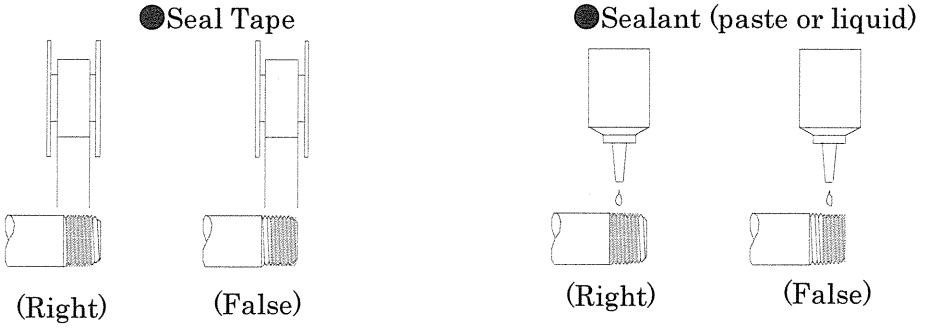
CAUTION

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 down.
2) Make sure that foreign matters do not enter when screwing the pipes or joints.
   Make sure that the pipe thread swarf or sealant does not enter when screwing in the pipes or joints. If dust or sealant enters the inside of the pipe during piping work, This may cause the product performance down.
3) Confirm the flow direction indicated with the arrow and correctly connect the product. Installation in the reverse direction will shorten the product life.
4) 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.

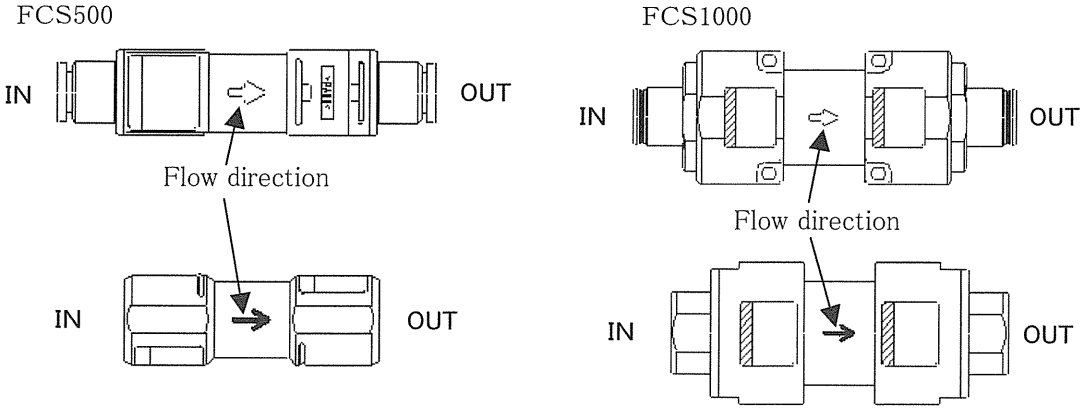
1) Flush air into the pipe to blow out foreign substances and chips before piping.



2) Refrain from mapplying sealant or sealing tape approx. two pitches of tread off the tip of the pipe to avoid residual substances from falling into the piping system.



3) Before connecting the piping, always check the IN and OUT markings shown on the product



CAUTION

5) Use the appropriale tube
6) When connecting the piping, tighten it using a proper tightening torque
7) When using the internal thread type or external thread type, fix the across flat with a spanner, etc., and pipe. Avoid fixing other sections.
8) Carefully connect the piping so that no bending moment caused by the piping load is applied to the main body and piping.
9) When supplying compressed air for the first time after connecting the pipes, do not apply a high pressure right away.

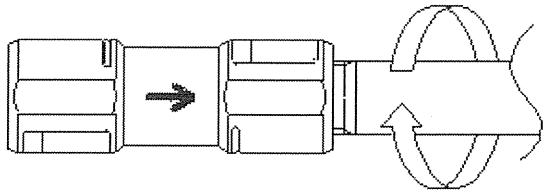
4) Applicable tube

The pipingis designed to be connected with a push-in joint.Piping tubes of an improper outer diameter, wall thickness or hardness may become disconnected or cause leakage. Use our specified

.Tube	Outer diameter	Outer diameter tolerance	Inner diameter	Minimum bending radius
Soft nylon F-1500series	4^{DIA}	±0. 1	2.5^{DIA}	10
	6^{DIA}		4^{DIA}	20
	8^{DIA}		5.7^{DIA}	30
	10^{DIA}		7.2^{DIA}	40
	12^{DIA}		8.9^{DIA}	55
Urethane U−9500series	4^{DIA}	+0. 1 −0. 15	2^{DIA}	10
	6^{DIA}		4^{DIA}	20
	8^{DIA}	+0. 1 −0. 2	5^{DIA}	30
	10^{DIA}		6.5^{DIA}	40
	12^{DIA}		8^{DIA}	50

5) When connecting the piping, tighten it using a proper tightening torque.

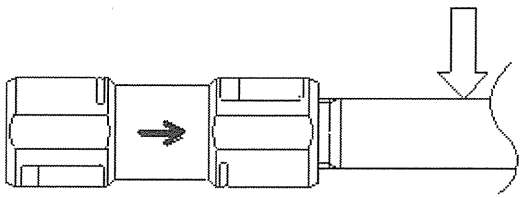
Avoid applying too much torque to the body or the piping.



Port size	Tightening torque (N·m)
Rc1/8	3～5
Rc1/4	6～8
Rc3/8	13～15

6) Avoid applying a piping load or torque to the body or piping.

If installed in this manner, the filter may receive abnormal stress, resulting in breakage.



Max. torque (N·m)
20

3. Proper operation

WARNING

1) Always operate the product within its specifications.

CAUTION

1) Check the working media and air circuit.
   For media, always use the 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.
2) Do not use at a pressure exceeding the max. working pressure and max differential pressure.
   Failure to observe this could result in product or element damage.
3) Do not flow air exceeding the max. flow rate.
   Failure to observe this could result in a drop of the filtration efficiency and element damage.
4) This product cannot be used as an absolute filter.
   The filtration efficiency is 99.99% within the working conditions.

4. .Maintenance

4.1 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 modify the product.
4) Before starting the maintenance work, turn OFF the power, shut down the supply pressure, and make sure that there is any residual pressure.

1) Periodic inspection

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

Check that no leak occurs in the piping.

4.2 Replacement of filter element

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

1) Plastic type

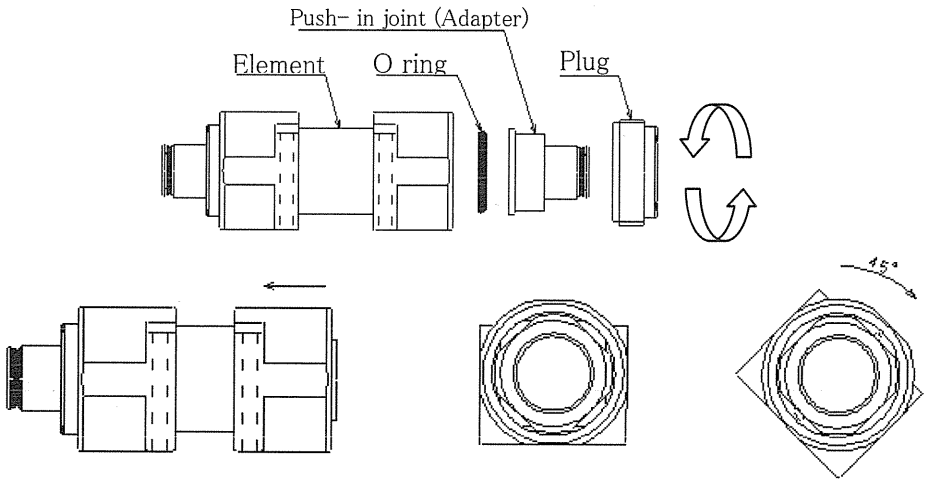
Removing the element

①Turn 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.

②Move 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.

where removal is possible, and then remove the element and body.

③Remove the opposite side in the same manner.



Mounting the element

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

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

③Remove the opposite side in the same manner.

2) Stainless steel type

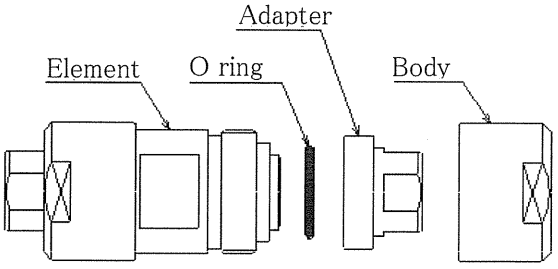
Removing the element

Turn and remove the body. Then, remove the joint and O-ring. The adapter and body are not included in the replacement parts, so take care not to lose or damage, etc., them.

Mounting the element

Assemble the O-ring and joint onto the element,and then assemble and fix the body onto the element.

Tighten the body at 50 to 60N·m.



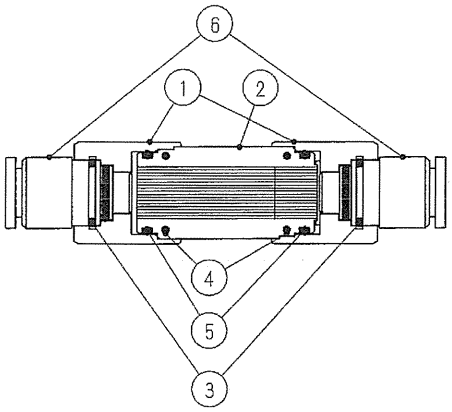
5. Troubleshooting

Trouble symptom	Cause	Remedy
Air leak from the push-in joint.	The tube is not inserted completely.	Confirm whether the tube is inserted completely.
	The seal material of the push-in joint is expanded, shrunken or damaged.	Replace the the push-in joint with a new one. (Please consult us for spare cartridge push-in joint.
Insufficient flow rate. Remarkable pressure drop.	The life of the element has expired.	Stop the compressed air before replacing with a new part.

6. .Internal structure

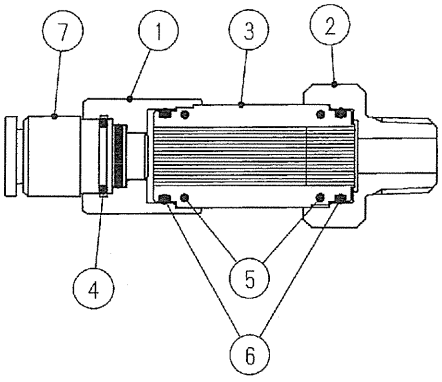
FCS500

1) Polyamide element type



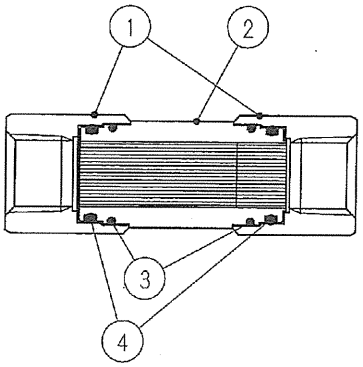
Part No.	Part name	Material (Surface treatment)	Qty
1	Body	PA	2
2	Element	PA･PP･U	1
3	Pin	SUS304	2
4	Pin	SUS304	2
5	O-ring	FKM	2
6	Push-in joint	C3604(Nickel coating) HNBR･PBT･SUS301	2

2) External thread type



Part No.	Part name	Material (Surface treatment)	Qty
1	Body	PA	1
2	Body (Taper pipe thread)	A6063 (Anodic Oxide coating)	1
3	Element	PA･PP･U	1
4	Pin	SUS304	1
5	Pin	SUS304	2
6	O-ring	FKM	2
7	Push-in joint (Port size 4^{DIA}、6^{DIA}、8^{DIA})	C3604(Nickel coating) HNBR･PBT･SUS301	1

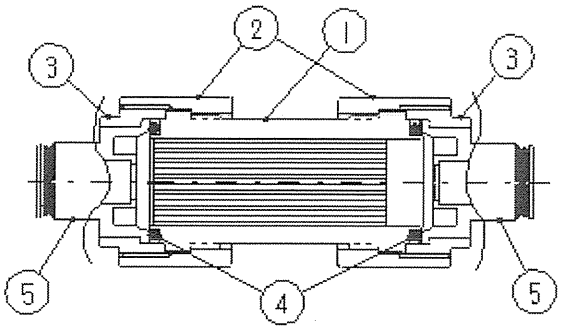
3) Stainless steel element type



Part No	Part name	Material (Surface treatment)	Qty
1	Body	SUS304	2
2	Element	SUS304･PP･U	1
3	Pin	SUS304	2
4	O-ring	FKM	2

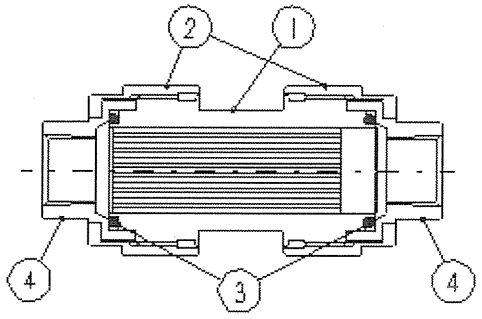
FCS1000

1) Plastic type



Part No.	Part name	Material (Surface treatment)	Qty
1	Element	PA・PP・U	1
2	Body	PA	2
3	Plug	PA	2
4	O ring	NBR	2
5	Push-in joint (Port size 8^{DIA},10^{DIA},12^{DIA})	C3604 (Nickel coating) NBR・PP・SUS301	2
	Adapter (Port size Rc1/4,Rc3/8 R1/4,R3/8)	A2017 (Anodic Oxide coating)	2

2) Stainless steel type



Part No.	Part name	Material (Surface treatment)	Qty
1	Element	SUS304・PP・U	1
2	Body	SUS304	2
3	O ring	FKM	2
4	Adapter (Port size Rc1/4,Rc3/8)	SUS304	2

7. Product specifications and how to order

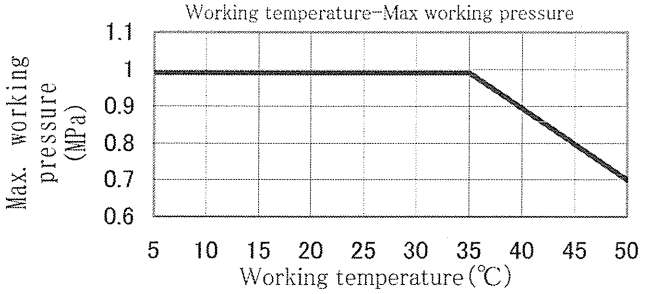
7.1 Product specifications

FCS500

1) Working media : Cleaned compressed air、N_2
(ISO8573-1Compressed air clean class2,3,2 or better)

2) Max. working pressure : FCS500-□□ 0.99MPa(5～35℃)

Fig.1 FCS500－□□
Working temperature-Max working pressure



FCS500-□□-□-P9
Cleaned compressed air 1.5MPa
N_2 0.99MPa

3) Min. working pressure : -0.095MPa

4) Proof pressure : 1.5MPa
2.25MPa only when using compressed air with the model FCS500-□□-□-P9.

5) Max. flow rate : FCS500-H8H8 , H88A , 8AH8 , 88－□-P9 ; 80L/min(ANR)
Another model code ; 50L/min(ANR)

6) Filtration rating : 0.01 μ m(Efficiency : ＞99.99%)

7) Working temperature range : FCS500-□□ ; 5～50℃
FCS500-□□-□-P9 ; 5～45℃

8) Working humidity range : 30～80%R.H.

9) Vibration Shock : Do not expose the product to excessive shock or vibration.

10) Port size : FCS500-□□ ; Push-in joint 4^{DIA} , 6^{DIA} , 8^{DIA}
R 1/8、R1/4
FCS500-□□-□-P9 ; Rc 1/8、Rc 1/4

11) Mass : FCS500-□□ ; 45g
: FCS500-□□-□-P9 ; 100g

7 Specifications and model No.

FCS1000

1)Working media : Cleaned compressed air、N_2
(ISO8573-1Compressed air clean class2,3,2 or better)

2)Max. working pressure : FCS1000-□□ ; 0.99MPa
FCS1000-□□-P90,P94
Cleaned compressed air ; 1.5MPa
N_2 ; 0.99MPa

3)Min. working pressure : -0.095MPa

4)Proof pressure : 1.5MPa
2.25MPa only when using compressed air with the model FCS1000-□□-□-P90,P94.

5)Max. flow rate : When min. port size are
φ8 or R1/4 ; 300L/min.(ANR)
φ10 or R3/8,Rc1/4 ; 350L/min(ANR)
φ12 or Rc3/8 ; 400L/min(ANR)

6) Filtration rating : 0.01μm(Efficiency : >99.99%)

7) Working temperature range : 5～45℃

8)Working humidity range : 30～80%R.H.

9)Vibration Shock : Do not expose the product to excessive shock or vibration.

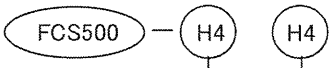
10)Port size : FCS1000-□□ ; Push-in joint 8DIA , 10DIA , 12DIA
R1/4 , R3/8 , Rc1/4 , Rc3/8
FCS1000-□□-P90,P94 ; Rc1/4 , Rc3/8

11)Mass : FCS1000-□□
Both side push-in joint ; 150g
Both side internal thread ; 110g
Both side external thread ; 130g
: FCS1000-□□-P90,P94 ; 500g

7.2 How to order

FCS500

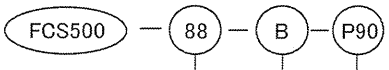
1) Polyamide element type , External thread type



In-side pipe size	
H4	4^{DIA}
H6	6^{DIA}
H8	8^{DIA}
6A	R1/8
8A	R1/4

Out-side pipe size	
H4	4^{DIA}
H6	6^{DIA}
H8	8^{DIA}
6A	R1/8
8A	R1/4

2) Stainless steel element type

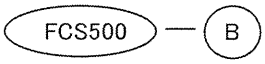


Pipe size	
66	Rc1/8
88	Rc1/4

Attachment	
No code	None
B	Braket , Screw

Clean room specifications		
	Structure/treatment	Material restriction
P90	Stainless steel material used Oil-prohibited	-
P94	Stainless steel material used Oil-prohibited	Copper/silicon/halogen(fluorine/chlorine/bromine) not acceptable

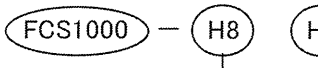
Bracket



Consult with CKD when using the bracket with the polyamide element type.

FCS1000

1) Plastic type



In-side pipe size	
H8	8^{DIA}
H10	10^{DIA}
H12	12^{DIA}
8A	R1/4
10A	R3/8
8	Rc1/4
10	Rc3/8

Out-side pipe size	
H8	8^{DIA}
H10	10^{DIA}
H12	12^{DIA}
8A	R1/4
10A	R3/8
8	Rc1/4
10	Rc3/8

2) Stainless steel type

FCS1000 — 8 — 8 — P90

Model Code

In-side pipe size	
8	Rc1/4
10	Rc3/8

Out-side pipe size	
8	Rc1/4
10	Rc3/8

Clean room specifications		
	Structure/treatment	Material restriction
P90	Stainless steel material used Oil-prohibited	-
P94	Stainless steel material used Oil-prohibited	Copper/silicon/halogen (fluorine/chlorine/bromine) not acceptable

Replacement filter element

1) Plastic type

FCS1000 — E

Model Code

2) Stainless steel type

P90 : FCS1000 — E — P90

Model Code

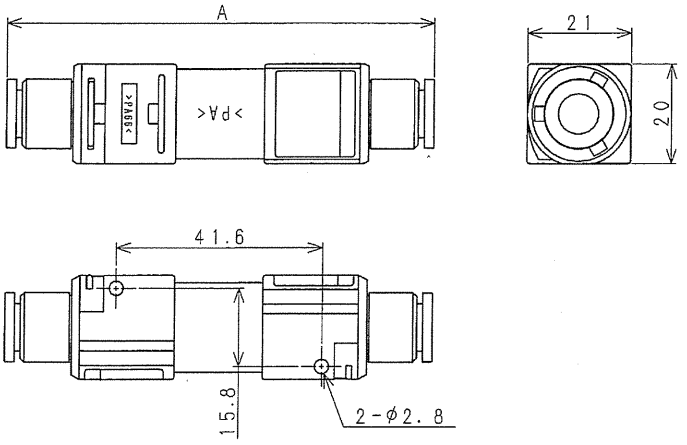
P94 : FCS1000 — E — P94

Model Code

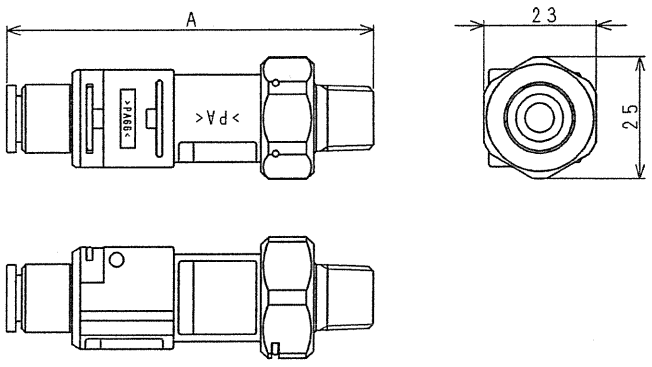
7.3 Outside dimensions

FCS500

1) Polyamide element type (Dimension A is shown in Table 7.)



2) External thread type (Dimension A is shown in Table 1.)



3) Stainless steel element type

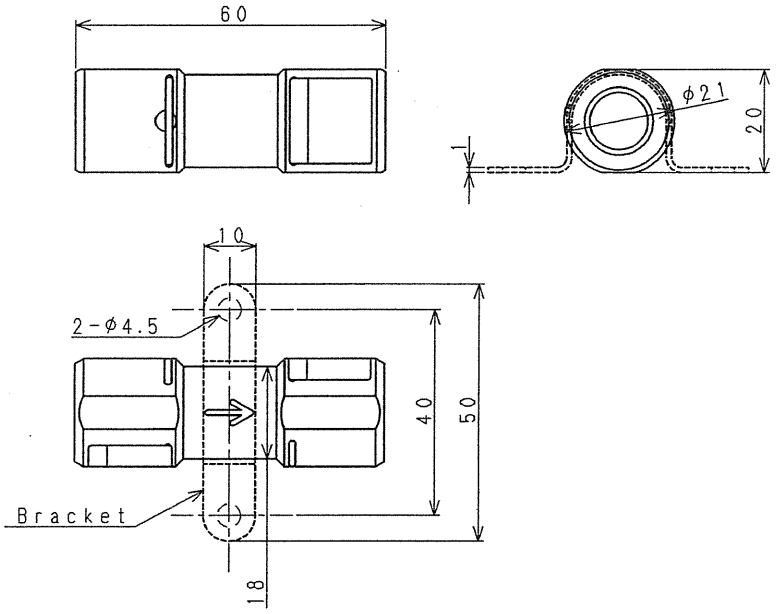
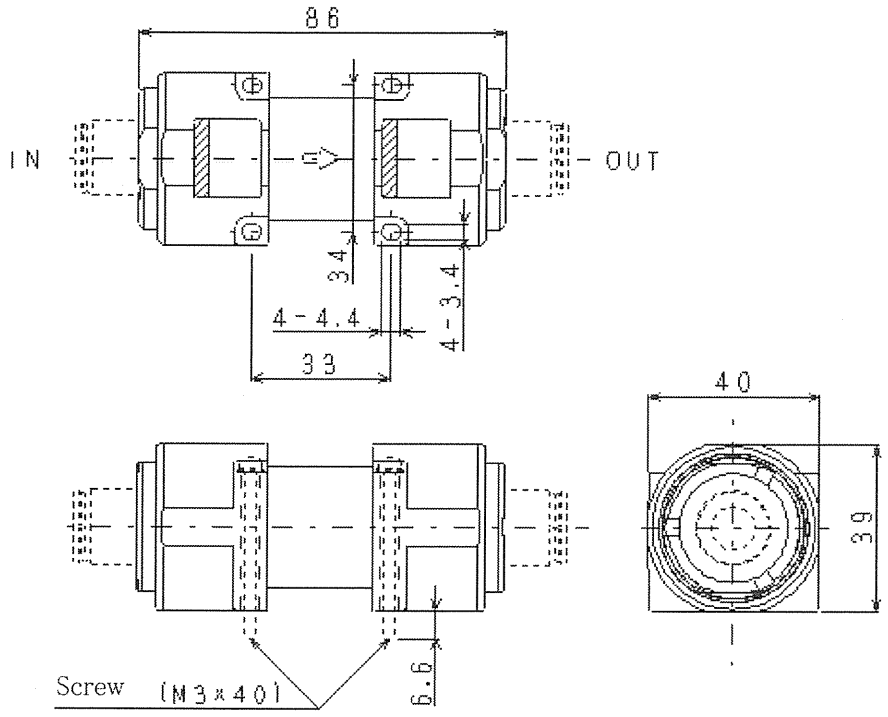


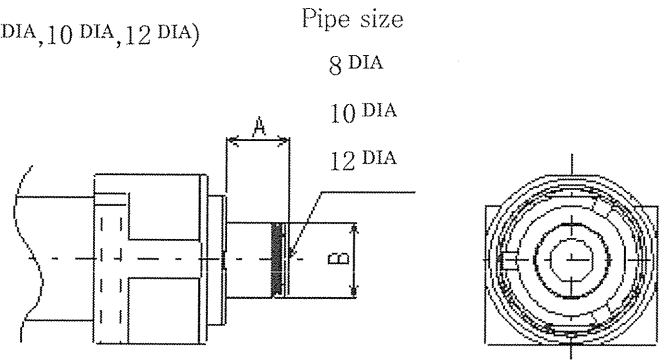
Table 1. Dimension A (Polyamide element type , External thread type)

Pipe size code	H4H4	H4H6 H6H4	H4H8 H8H4	H46A 6AH4	H48A H86A 6AH8 8AH4	H6H6	H6H8 H8H6	H66A 6AH6	H68A 8AH6	8AH8 H88A	H8H8
Dimension A (mm)	80.5	83	84	69.5	73	85	86	72	75	76	87

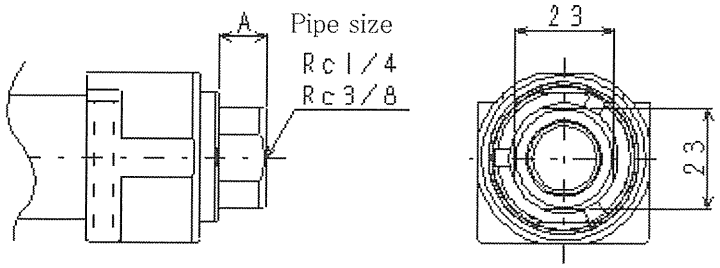
1) Plastic type (Dimension A and B is shown in Table 2.)



・Push-in joint (8DIA,10 DIA,12 DIA)



・Internal thread (Rc1/4,Rc3/8)



・External thread (R1/4,R3/8)

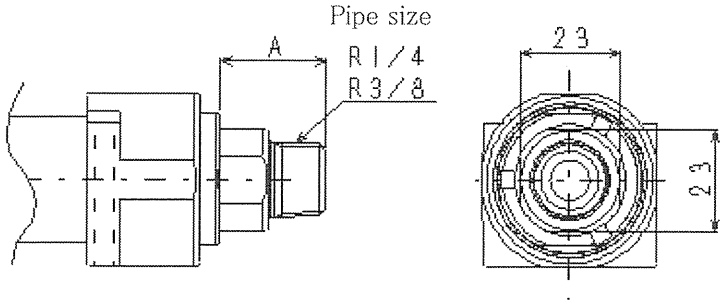


Table 2. Dimension A and B

Pipe size model code	Pipe size	A	B
H8	Push-in joint 8DIA	12	17.5DIA
H10	Push-in joint 10 DIA	14.5	17.5DIA
H12	Push-in joint 12DIA	16	19.5DIA
8A	R1／4	24	—
10A	R3／8	24	—
8	Rc1／4	11	—
10	Rc3／8	11	—

2) Stainless steel type