

INSTRUCTION MANUAL

FREE JOINT

FJ

- 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.

For Safety Use

To use this product safely, basic knowledge of pneumatic equipment, including materials, piping, electrical system and mechanism, is required (ISO 4414 *1 JIS B 8370 *2).


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:

Additionally, the caution is classified into the following three groups, “CAUTION”, “WARNING”, and “DANGER”, to identify the degree of the danger it presents and possible hazard.

 **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.

INSTALLATION (Page 2)



WARNING :

- a) When screwing the male screw of the rod into the female screw of the socket or case, pay special attention so that the male screw is not in contact with the bottom of the female screw.
 - If the product is operated with the rod in contact with the bottom of the female screw, the ball stud is not floating, resulting in incorrect operation.
As a guide, the appropriate depth of the screw thread engagement with the female screw is obtained at a position where the male screw is returned one or two rotations after it has been completely in contact with the bottom of the female screw.
For FJ-3-5, strictly observe the length of the thread engagement.
- b) When connecting an object to be driven and the cylinder rod using the free joint, tighten the screws with a proper torque corresponding to the thread size to secure them firmly. Additionally, if it is predicted that the connection becomes loose during operation, take appropriate loose prevention measures, such as pin lock or applying of the glue.
 - If the connection becomes loose and is disconnected, the object to be driven may move unexpectedly or fall down, causing the equipment to be damaged or to malfunction.
- c) Prevent to apply the joint of this type as rotating joint because it is not designed accordingly although the section of stud of this product is rotatable to a certain extent.

MAINTENANCE (Page 3)



WARNING :

- a) Once the product has been disassembled, do not reuse it.
- b) Before performing an overhaul inspection on the actuator, deactivate residual pressure completely.
- c) While the actuator is operating, do not step into or place hands in the driving mechanism.
- d) To prevent an electric shock, do not touch the electric wiring connections (exposed live parts) of the actuator equipped with a solenoid valve or switch.
Perform an overhaul inspection with the power off. Also, do not touch these live parts with wet hands.

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Free joint

Manual No. SM-6990-A

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1. PRODUCT

1.1 Specifications

Item Model code	Nominal diameter of thread × pitch	Max. Tension and compression working load kN			Allowable eccentricity (mm)	Oscillating angle	Working temperature range
		Basic type	Flange type	Foot type			
FJ-※-3	M3×0.5	0.019	—	—	0.5	±5°	-10 to 60℃
4	M4×0.7	0.053	—	—	0.5		
5	M5×0.8	0.121	—	—	0.5		
6	M6×1	1.08	—	—	0.75		
8	M8×1	1.08			0.75		
8-1.25	M8×1.25	1.08			0.75		
10	M10×1.25	2.45			0.75		
12-1.25	M12×1.25	2.45			0.75		
12	M12×1.5	2.45			0.75		
14	M14×1.5	5.88			1.0		
16	M16×1.5	10.8			1.5		
18	M18×1.5	10.8			1.5		
22	M22×1.5	17.6			2.0		
26	M26×1.5	27.5			3.0		
30	M30×1.5	60.8			3.0		
36	M36×1.5	87.3			4.0		
40	M40×1.5	87.3			4.0		
45	M45×1.5	108			4.0		

Note1 : Max. Tension and compression working load is represented by static load.

Note2 : FJ-8-1.25 and FJ-12-1.25 are optional while FJ-36, 40, 45 are order production items.

1.2 Applicable cylinders

Applicable cylinder	Model code	Tube bore (Reference)
SCP-6 SMD2-6	FJ-0-3	6
SCP-10 SMD2-10	FJ-0-4	10
SCP-15 SSD-12-N SMD2-16	FJ-0-5	12, 15, 16
SSD-16-N SMD2-20	FJ-0-6	16, 20
CMA2 CMK2 CKV-20	FJ-0-8	20
CML-20 SMD2-25 SSD-20-N SCM-20	FJ-0-8-1.25	20, 25
CMA2-30 CML-25, 32 CMK2 SKV2-25, 32 SMD2-32 FCD-25-N SCM-25, 32 SSD-25-N	FJ-0-10	25, 30, 32
CML-40	FJ-0-12-1.25	40
CMA2 CMK2 CKV2-40	FJ-0-12	40
SCA2-40 FCD-32, 40-N SSD-32, 40-N SCM-40	FJ-0-14	32, 40
CAV-50	FJ-0-16	50
SCA2-50, 63 SSD-50, 63-N FCD-50, 63-N SCM-50, 63	FJ-0-18	50, 63
CAV-75, 100 SCA2-80 SSD-80-N SCM-80	FJ-0-22	75, 80, 100
SCA2-100 SSD-100-N SCM-100	FJ-0-26	100
SCS-125, 140 SSD-125-N	FJ-0-30	125, 140
SCS-160 SSD-160-N	FJ-0-36	160
SCS-180	FJ-0-40	180
SCS-200	FJ-0-45	200

Note1 : The contents of the table above are some representative examples. When selecting other model than presented here, refer to the size of tube bore.



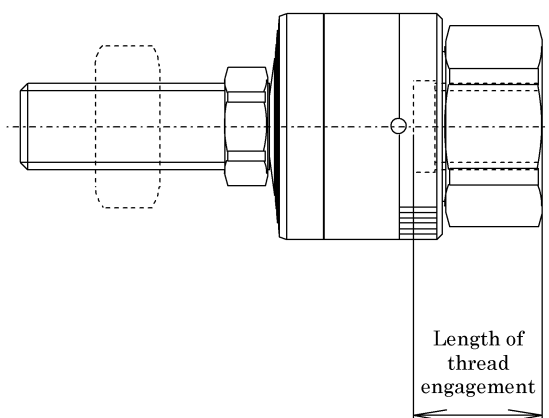
2. INSTALLATION



WARNING :

- a) When screwing the male screw of the rod into the female screw of the socket or case, pay special attention so that the male screw is not in contact with the bottom of the female screw.
 - If the product is operated with the rod in contact with the bottom of the female screw, the ball stud is not floating, resulting in incorrect operation.
As a guide, the appropriate depth of the screw thread engagement with the female screw is obtained at a position where the male screw is returned one or two rotations after it has been completely in contact with the bottom of the female screw.
For FJ-3-5, strictly observe the length of the thread engagement.
- b) When connecting an object to be driven and the cylinder rod using the free joint, tighten the screws with a proper torque corresponding to the thread size to secure them firmly. Additionally, if it is predicted that the connection becomes loose during operation, take appropriate loose prevention measures, such as pin lock or applying of the glue.
 - If the connection becomes loose and is disconnected, the object to be driven may move unexpectedly or fall down, causing the equipment to be damaged or to malfunction.
- c) Prevent to apply the joint of this type as rotating joint because it is not designed accordingly although the section of stud of this product is rotatable to a certain extent.

- Length of thread engagement



Model code	Length of thread engagement
FJ-※-3	4.5
FJ-※-4	4.4
FJ-※-5	6
FJ-※-6	12
FJ-※-8	12
FJ-※-8-1.25	12
FJ-※-10	12
FJ-※-12-1.25	11.8
FJ-※-12	11.8
FJ-※-14	16.5
FJ-※-16	16.9
FJ-※-18	16.9
FJ-※-22	17.2
FJ-※-26	20.8
FJ-※-30	26
FJ-※-36	25
FJ-※-40	25
FJ-※-45	36

3. MAINTENANCE



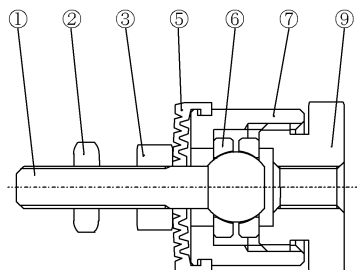
WARNING :

- a) Once the product has been disassembled, do not reuse it.
- b) Before performing an overhaul inspection on the actuator, deactivate residual pressure completely.
- c) While the actuator is operating, do not step into or place hands in the driving mechanism.
- d) To prevent an electric shock, do not touch the electric wiring connections (exposed live parts) of the actuator equipped with a solenoid valve or switch.
Perform an overhaul inspection with the power off.
Also, do not touch these live parts with wet hands.

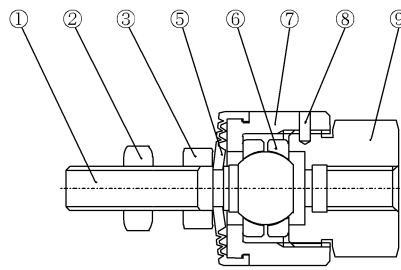


4. INTERNAL STRUCTURE AND MAJOR PARTS LIST

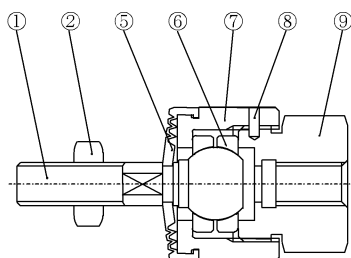
● FJ-0-3 to 5



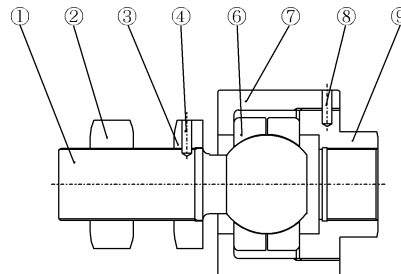
● FJ-0-6 to 10



● FJ-0-12 to 30



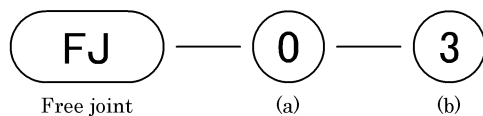
● FJ-0-36 to 45



No.	Part name	Material	Surface treatment
①	Ball stud	SUJ2 (FJ-6 to 45) S45C (FJ-3 to 5)	Zinc chromate Nickel plate
②	Rod nut	S20C (FJ-3 to 30) SGD41-D (FJ-36 to 45)	Zinc chromate Zinc chromate
③	Stud nut	C3604BD (FJ-3) S45C (FJ-4 to 10) SGD41-D (FJ-36 to 45)	Nickel plate Zinc chromate Zinc chromate
④	Spring pin	SK5	Black oxide finish
⑤	Dust cover	Special NBR	—
⑥	Ball holder	S45C (FJ-3 to 5) SCM435 (FJ-8 to 45)	Nickel plate Zinc chromate
⑦	Case	C3604BD (FJ-3 to 5) S45C (FJ-8 to 45)	Nickel plate Zinc chromate
⑧	Spring pin	SK5	Black oxide finish
⑨	Socket	C3604BD (FJ-3 to 5) S45C (FJ-8 to 45)	Nickel plate Zinc chromate
	Foot	SPCC (FJ-8, 10, 12) FCD-40 (FJ-14 to 30) S45C (FJ-36 to 45)	Zinc chromate
	Flange	SS400	Zinc chromate

Note1 : Dust cover is not provided for FJ-30 and over.

5. HOW TO ORDER



(a) Mounting type		(b) Nominal diameter of thread × Pitch			
0	Basic type	3	M3×0.5	14	M14×1.5
F	Flange type	4	M4×0.7	16	M16×1.5
L	Foot type	5	M5×0.8	18	M18×1.5
		6	M6×1	22	M22×1.5
		8	M8×1	26	M26×1.5
		8-1.25	M8×1.25	30	M30×1.5
		10	M10×1.25	36	M36×1.5
		12-1.25	M12×1.25	40	M40×1.5
		12	M12×1.5	45	M45×1.5

Note1 : Basic type only is available for model FJ-※-3 to 6.

Note2 : FJ-8-1.25 and FJ-12-1.25 are optional while FJ-36, 40, 45 are order production items.