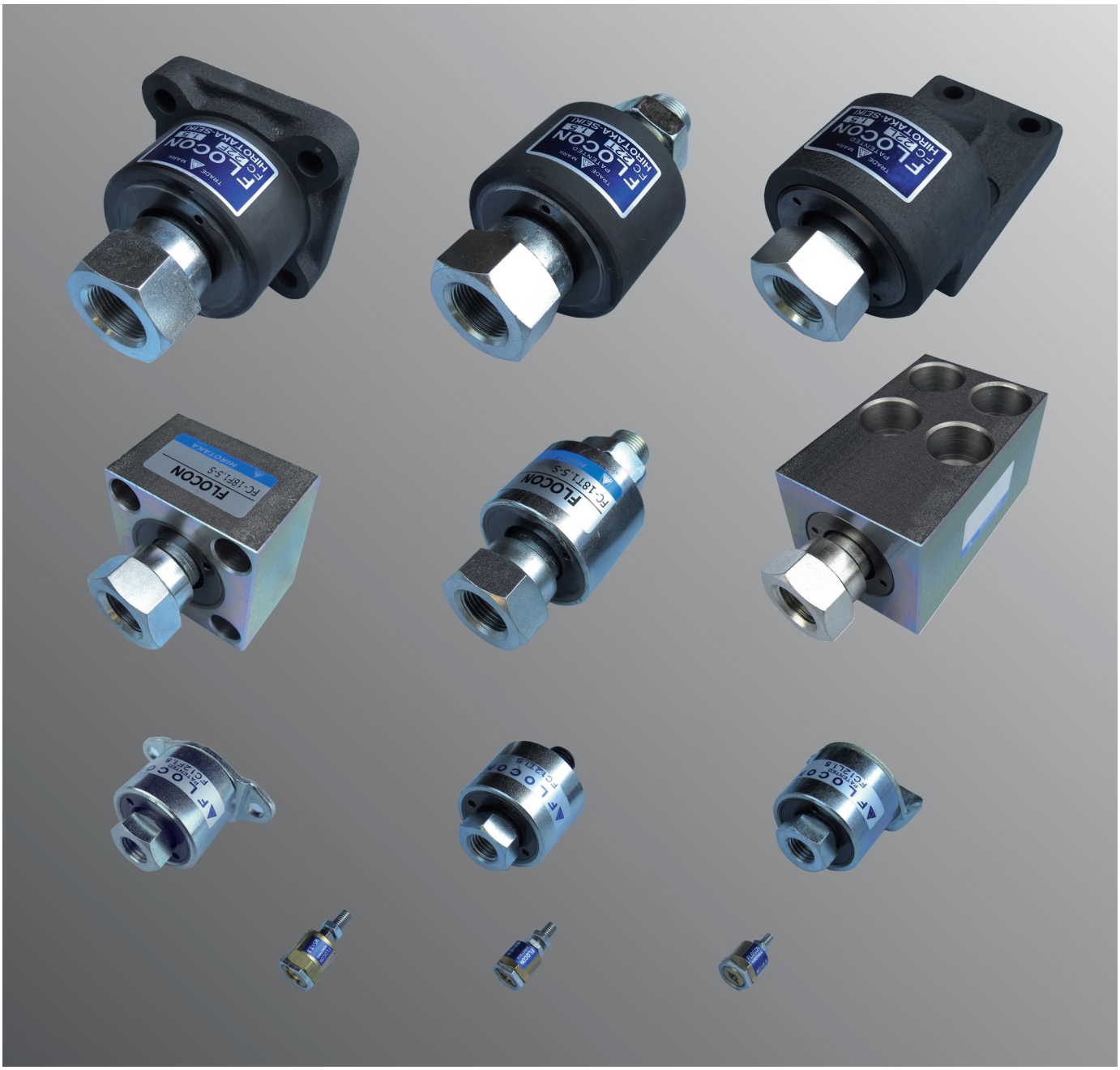
For air and hydraulic cylinders

FLOATING CONNECTOR

Extends the life of the cylinder and realizes smooth movement.



HIROTAKA MFG. CO.,LTD.

Protects the rod type cylinder from misalignment and parallelism error and maintains smooth movement!

In addition to the miniature type and standard type, when the pushing load is large lineup to strong types that demonstrate great power.
The standard type has the best lateral load followability due to ball bearings.

Overview

There are many toroubles such as the cylinder does not move smoothly, intermittent chattering and galling occur especially when the speed is slowed down, or as a result of long-term use, the rod bends, air leakage occure because the bearing is worn out.
In most cases, these are caused by misalignment between the cylinder and the object to be operated, or lack of parallelism. Floating Connector (FLOCON) is a product that reduces the burden on the installation worker due to such like these misalignment, eliminates troubles, and dramatically extends the life of the cylinder and equipment.。

Feature

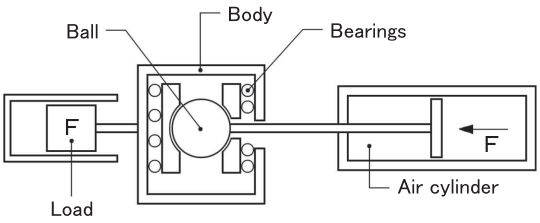
1. Since the alignment and parallelism between the cylinder and the object to be operated can be adjusted by eye measurement level, the cylinder can be easily installed.
2. Since the structure does not apply an strong lateral load, the life of the cylinder can be extended and smooth movement can be obtained.
3. There are a wide variety of models from mini type to large and powerful type considering various mounting locations.
4. Save time and expenses and improve work efficiency.

Lateral load during operation

Standard type (Rolling system)

The standard type FLOCON uses bearings to reduce the coefficient of friction, operate at about 1/25 or less of the cylinder thrust, significantly reduce the lateral load, and perfectly absorb misalignment.

Lateral load required for operation =
Cylinder thrust (Load) "F" × Coefficient of friction "μ"



Coefficient of frintion μ = 0.04 or less

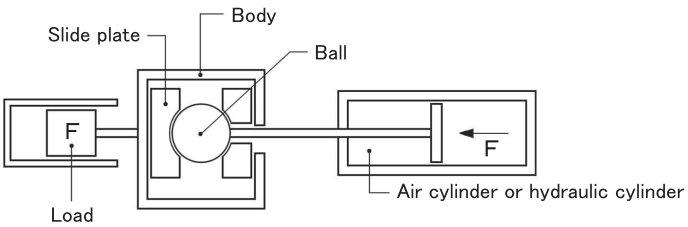
Lateral load of rolling system "Fμ" (at 0.5MPa)

Bore size / μ	ϕ20	ϕ32	ϕ40	ϕ50
0.04	6.1N	15.7N	24.7N	38.5N

Strong type (Sliding system)

The strong type FLOCON uses slide plate instead of the bearing, so it shows great power when the pressing load is large.

Lateral load required for operation =
Cylinder thrust (Load) "F" × Coefficient of friction "μ"



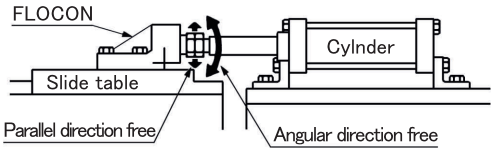
Coefficient of frintion μ = 0.4

Lateral load of sliding system "Fμ" (at 0.5MPa)

Bore size / μ	ϕ20	ϕ32	ϕ40	ϕ50
0.4	61.7N	157.8N	247.1N	385.4N

Effect of FLOCON

- Prevention uneven wear of cylinder bearings
- Prevention abnormal wear of packing and seals
- Reduction of alignment man-hours during assembly
- Extend the life of cylinder and equipment
- Smooth cylinder operation
- Chatter reduction at low pressure operation
- Prevention of thrust reduction



Precautions for safe handling

- The threaded portion can be rotated, but FLOCON is not a fitting designed for rotational axis. So, do not use for rotational applications.
- No lublication required.
  Lublicating grease is already filled.
- Cannot be disassembled and reused.
- The maximum working load is the value at static load.
- Note that the working load value will be smaller if the impact is repeated.
- Cannot be used for TC, CA, CB type cylinders.

FLOATING CONNECTOR

FC series

For air and hydraulic cylinders

Specification

Miniature・Standard type

Model number	Maximum working load (Static load) Unit : N	Allowable eccentricity φU mm	Rotating angle
FC3	18	1	10°
FC4	53	1	10°
FC5～6	120	1	10°
FC8	580	1	10°
FC10～12	1100	1.5	10°
FC14～18	5200	2	10°
FC20～24	7600	3	10°
FC26～30	13500	3	10°
FC33～45	24500	3	10°

Strong type（S type）

Model number	Maximum working load Unit : N		Allowable eccentricity φU mm	Rotating angle
	Push	Pull		
FC14～16-S	19600	5200	2	10°
FC18-S	39200	5200	2	10°
FC20～24-S	39200	7600	3	10°
FC26～27-S	39200	13500	3	10°
FC30-S	78400	13500	3	10°
FC33～45-S	78400	24500	3	10°

※ The maximum working load is the value at static load.

How to order

FC 22 F 1.5 D - S

FC: Floating Connector
22 ①, F ②, 1.5 ③, D ④, S ⑤

Example for model number

FC22F1.5

① Nominal thread size : 22mm
② Mounting type : Flange type
③ Pitch : 1.5mm
④ Dust cover : Without dust cover
⑤ Standard type

① Nominal thread size	
3 … 3mm	22…22mm
4 … 4mm	24…24mm
5 … 5mm	26…26mm
6 … 6mm	27…27mm
8 … 8mm	30…30mm
10…10mm	33…33mm
12…12mm	36…36mm
14…14mm	40…40mm
16…16mm	42…42mm
18…18mm	45…45mm
20…20mm	

② Mounting type
T …… Screw type
F …… Flange type
L …… Bracket type

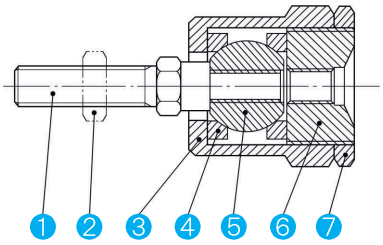
③ Thread pitch
0.5 …0.5mm (FC3)
0.7 …0.7mm (FC4)
0.8 …0.8mm (FC5)
1.0 …1.0mm (FC6,8)
1.25…1.25mm (FC10)
1.5 …1.5mm (FC12～45)

④ Dust cover (Only standard type)
Nil … Without dust cover
D … With dust cover

⑤ Strong type
Nil … Standard type
S … Strong type

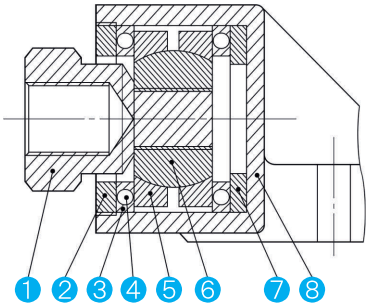
Construction

Miniature type



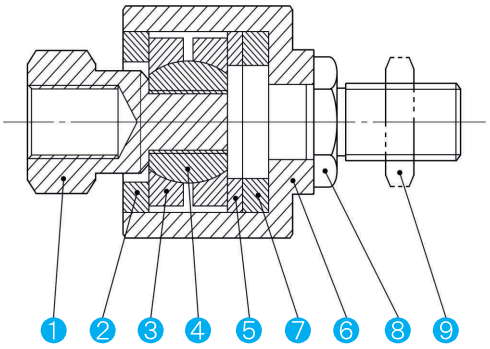
No.	Description	Material
1	Stud	Stainless steel
2	Lock nut	Rolled steel
3	Case	Copper alloy
4	Ball holder	Copper alloy
5	Ball joiner	Copper alloy
6	Socket	Copper alloy
7	Socket nut	Steel

Standard type



No.	Description	Material
1	Socket	Rolled steel
2	Cap	Bearing steel
3	Steel ball hold plate	Nitrile rubber
4	Steel ball	Bearing steel
5	Ball holder	Bearing steel
6	Ball joiner	Carbon steel
7	Steel ball holder	Bearing steel
8	Case	Cast iron

Strong type



No.	Description	Material
1	Socket	Rolled steel
2	Cap	Bearing steel
3	Ball holder	Bearing steel
4	Ball joiner	Carbon steel
5	Washer (1)	Bearing steel
6	Case	Rolled steel
7	Washer (2)	Carbon steel
8	Stud	Rolled steel
9	Lock nut	Rolled steel

FLOATING CONNECTOR

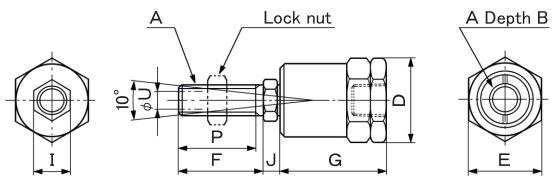
FC series

For air and hydraulic cylinders

Miniature・Standard type
(M3～M45)

Dimensions

FC3T～6T



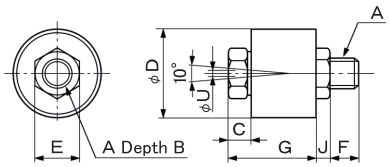
Miniature type

- Mounting type is "T" only.
- Custom thread pitch cannot be manufactured.
- Come with a lock nut.

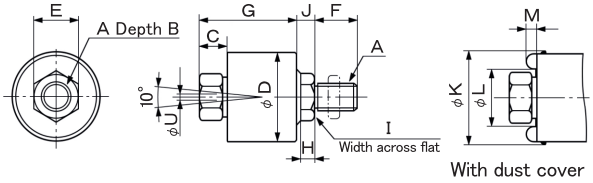
Standard type

- Custom thread pitch can be manufactured.
- The accuracy for the maximum clearance in the thrust direction is 0.05 mm or less.
- FC14T1.5 to FC30T1.5 comes with a lock nut.

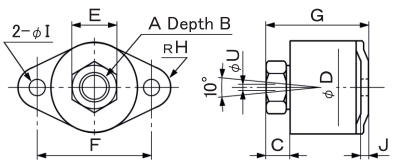
FC8 T ～12 T



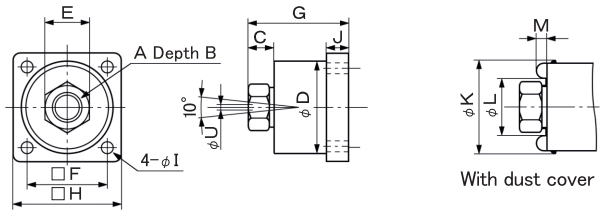
FC14 T ～45 T



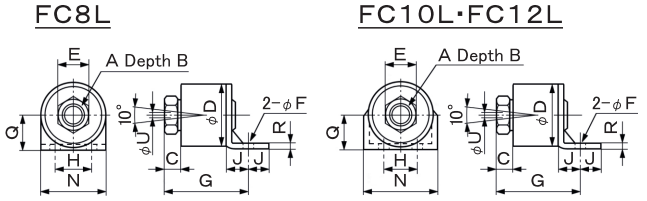
FC8 F ～12 F



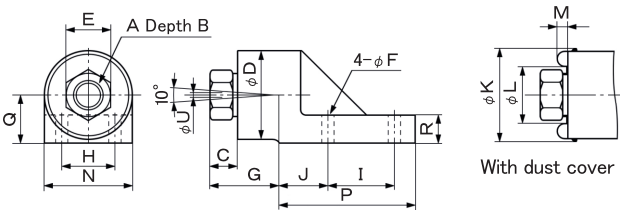
FC14 F ～45 F



FC8 L ～12 L



FC14 L ～45 L



Dimentions

Miniature type FC3T～FC6T

Symbol / Model No.	A Thread size	A Pitch	B	D	E	F	G	I	J	P	Allowable eccentricity U	Maximum working load (N)	Mass (gf)
FC3T 0.5	3	0.5	4.5	12.7	11	8	12	5.5	3	8	1	18	8
FC4T 0.7	4	0.7	4.5	12.7	11	10	12	7	4	10	1	53	9
FC5T 0.8	5	0.8	6	16.2	14	12.5	17	6	4	11	1	120	21
FC6T 1.0	6	1.0	6	16.2	14	15.5	17	6	4	14	1	120	22

Unit : mm

Standard type FC8□～FC45□

Symbol		Model No. FC8□	FC10□	FC12□	FC14□	FC16□	FC18□	FC20□	FC22□	FC24□	FC26□	FC27□	FC30□	FC33□	FC36□	FC40□	FC42□	FC45□
A	Thread size	8	10	12	14	16	18	20	22	24	26	27	30	33	36	40	42	45
	Pitch	1.0	1.25	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
B		8	10	10	13	13	15	20	22	22	22	22	22	35	35	35	35	35
C		6	9.5	9.5	14	14	24	21	31	31	33	33	33	50	50	50	50	50
D	T	30	36	36	45	45	45	61	61	61	69	69	69	87	87	87	87	87
	F	30	36	36	49	49	49	61	61	61	69	69	69	87	87	87	87	87
	L	30	36	36	51	51	51	62	62	62	69	69	69	87	87	87	87	87
E		14	19	19	23	23	29	32	35	35	41	41	41	54	54	54	67	67
F	T	12	12	12	24	24	24	32	32	32	42	42	42	60	60	60	60	60
	F	40	48	48	43	43	43	55	55	55	64	64	64	80	80	80	80	80
	L	5.5	6.5	6.5	7	7	7	9	9	9	11	11	11	14	14	14	14	14
G ±1.0	T	30	36	36	49	49	59	64.5	74.5	74.5	84	84	84	117	117	117	117	117
	F	36	43.5	43.5	54	54	64	68	78	78	88	88	88	123	123	123	123	123
	L	39.5	48	48	35	35	45	45	55	55	61	61	61	85	85	85	85	85
H	T	—	—	—	—	—	—	6	6	6	8	8	8	10	10	10	10	10
	F	6	7	7	59	59	59	76	76	76	87	87	87	111	111	111	111	111
	L	16	20	20	28	28	28	36	36	36	40	40	40	52	52	52	52	52
I	T	13	17.5	19	23	23	23	29	29	29	35	35	35	54	54	54	54	54
	F	5.5	6.5	6.5	7	7	7	9	9	9	11	11	11	14	14	14	14	14
	L	—	—	—	35	35	35	46	46	46	54	54	54	68	68	68	68	68
J	T	3	3	3	6	6	6	11.5	11.5	11.5	15	15	15	20	20	20	20	20
	F	3	3	3	12	12	12	15	15	15	16	16	16	20	20	20	20	20
	L	10	12	12	27	27	27	34	34	34	42	42	42	55	55	55	55	55
K	T L	32	38	38	48	48	48	65	65	65	73	73	73	91	91	91	91	91
	F	32	38	38	52	52	52	65	65	65	73	73	73	91	91	91	91	91
L		20	26	26	31	31	31	41	41	41	45	45	45	61	61	61	61	61
M		2	3	3	4	4	4	6	6	6	10	10	10	10	10	10	10	10
N	L	31	43	43	51	51	51	62	62	62	69	69	69	87	87	87	87	87
P	L	—	—	—	70	70	70	90	90	90	112	112	112	144	144	144	144	144
Q	L	16	19	19	26	26	26	32	32	32	37	37	37	47	47	47	47	47
R	L	3	3	3	14	14	14	18	18	18	22	22	22	28	28	28	28	28
U	Allowable eccentricity	1	1.5	1.5	2	2	2	3	3	3	3	3	3	3	3	3	3	3
Maximum working load (N)		580	1100	1100	5200	5200	5200	7600	7600	7600	13500	13500	13500	24500	24500	24500	24500	24500
Mass (kgf)	T	0.12	0.19	0.20	0.40	0.40	0.50	1.10	1.10	1.10	1.80	1.80	1.80	4.20	4.20	4.20	4.30	4.30
	F	0.14	0.20	0.20	0.54	0.54	0.60	1.00	1.10	1.10	1.80	1.80	1.80	4.00	4.00	4.00	4.20	4.20
	L	0.16	0.27	0.28	0.80	0.80	0.90	1.40	1.50	1.50	2.30	2.30	2.30	4.60	4.60	4.60	4.70	4.70

Unit : mm

Note 1) The threaded part can rotate, but it cannot be used for rotation because it is not a rotating joint.
Note 2) No refueling required. It is filled with lubricating grease.
Note 3) Do not reuse if disassembled.
Note 4) Note that the maximum working load value will decrease in the case of repeated impact load.

FLOATING CONNECTOR

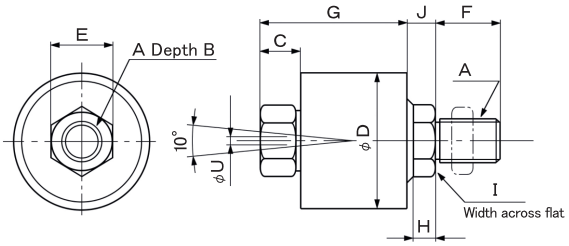
FC series

For air and hydraulic cylinders

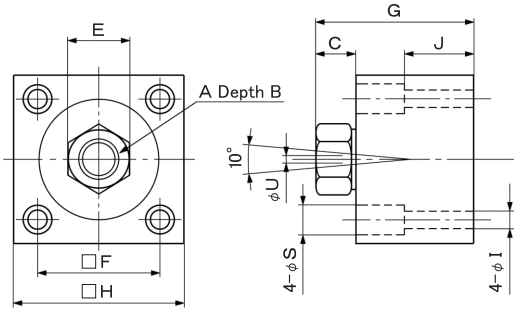
Strong type
（M14～M45）

Dimensions

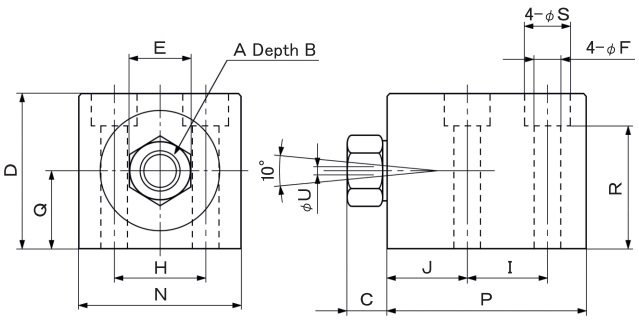
FC14[T]-S～FC45[T]-S



FC14[F]-S～FC45[F]-S



FC14[L]-S～FC45[L]-S



Dimensions

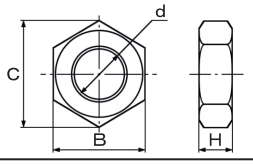
Strong type FC14□-S～FC45□-S

Symbol	Model No.	FC14□-S	FC16□-S	FC18□-S	FC20□-S	FC22□-S	FC24□-S	FC26□-S	FC27□-S	FC30□-S	FC33□-S	FC36□-S	FC40□-S	FC42□-S	FC45□-S
A	Thread size	14	16	18	20	22	24	26	27	30	33	36	40	42	45
	Pitch	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
B		13	13	15	20	22	22	22	22	22	35	35	35	35	35
C		17	17	27	24.5	34.5	34.5	36.5	36.5	36.5	54	54	54	54	54
D	T	45	45	45	61	61	61	69	69	69	87	87	87	87	87
	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	L	52	52	52	64	64	64	72	72	72	87	87	87	87	87
E		23	23	29	32	35	35	41	41	41	54	54	54	67	67
F	T	24	24	24	32	32	32	42	42	42	60	60	60	60	60
	F	43	43	43	55	55	55	64	64	64	80	80	80	80	80
	L	16	16	16	16	16	16	20	20	20	20	20	20	20	20
G ±1.0	T	52	52	62	68	78	78	87.5	87.5	87.5	121	121	121	121	121
	F	57	57	67	72	82	82	91	91	91	127	127	127	127	127
	L	—	—	—	—	—	—	—	—	—	—	—	—	—	—
H	T	—	—	—	6	6	6	8	8	8	10	10	10	10	10
	F	60	60	60	75	75	75	90	90	90	110	110	110	110	110
	L	30	30	30	30	30	30	34	34	34	50	50	50	50	50
I	T	23	23	23	29	29	29	35	35	35	54	54	54	54	54
	F	7	7	7	9	9	9	11	11	11	14	14	14	14	14
	L	34	34	34	34	34	34	35	35	35	50	50	50	50	50
J	T	6	6	6	11.5	11.5	11.5	15	15	15	20	20	20	20	20
	F	25	25	25	30	30	30	30	30	30	35	35	35	35	35
	L	48	48	48	55	55	55	65	65	65	85	85	85	85	85
N	L	60	60	60	64	64	64	72	72	72	87	87	87	87	87
P	L	97	97	97	104	104	104	120	120	120	156	156	156	156	156
Q	L	26	26	26	32	32	32	37	37	37	47	47	47	47	47
R	L	34	34	34	34	34	34	52	52	52	55	55	55	55	55
S	F	13	13	13	16	16	16	18.5	18.5	18.5	23	23	23	23	23
	L	23	23	23	23	23	23	29	29	29	29	29	29	29	29
U	Allowable eccentricity	2	2	2	3	3	3	3	3	3	3	3	3	3	3
Maximum working load (N)	Tension	5200	5200	5200	7600	7600	7600	13500	13500	13500	24500	24500	24500	24500	24500
	Compression	19600	19600	39200	39200	39200	39200	39200	39200	78400	78400	78400	78400	78400	78400
Mass (kgf)	T	0.40	0.40	0.50	1.30	1.30	1.30	2.00	2.00	2.00	4.30	4.30	4.30	4.40	4.40
	F	1.00	1.00	1.06	1.80	1.90	1.90	3.30	3.30	3.30	6.60	6.60	6.60	6.80	6.80
	L	1.80	1.80	1.80	3.00	3.00	3.00	4.20	4.20	4.20	8.60	8.60	8.60	8.70	8.70

Unit : mm

Note 1) Use the strong type when the compression load is large.
Note 2) It cannot manufacture less than thread size 12 mm.
Note 3) The threaded part can rotate, but it cannot be used for rotation because it is not a rotating joint.
Note 4) No refueling required. It is filled with lubricating grease.
Note 5) Do not reuse if disassembled.
Note 6) Note that the maximum working load value will decrease in the case of repeated impact load.
Note 7) FC14T1.5-S to FC30T1.5-S comes with a lock nut.

Lock nut



Unit : mm

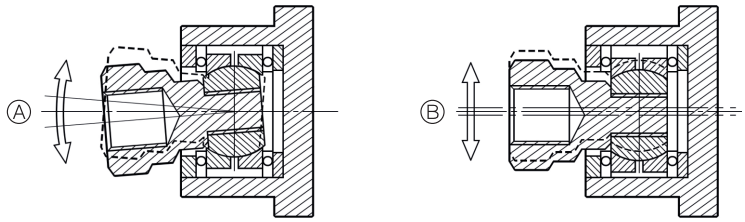
Symbol \ Thread	M14	M16	M18	M20	M22	M24	M26	M27	M30
d	M14 P1.5	M16 P1.5	M18 P1.5	M20 P1.5	M22 P1.5	M24 P1.5	M26 P1.5	M27 P1.5	M30 P1.5
H	8	10	11	12	13	14	16	16	18
B	22	24	27	30	32	36	41	41	46
C	25.4	27.7	31.2	34.6	37.0	41.6	47.3	47.3	53.1

FLOATING CONNECTOR

FC series

For air and hydraulic cylinders

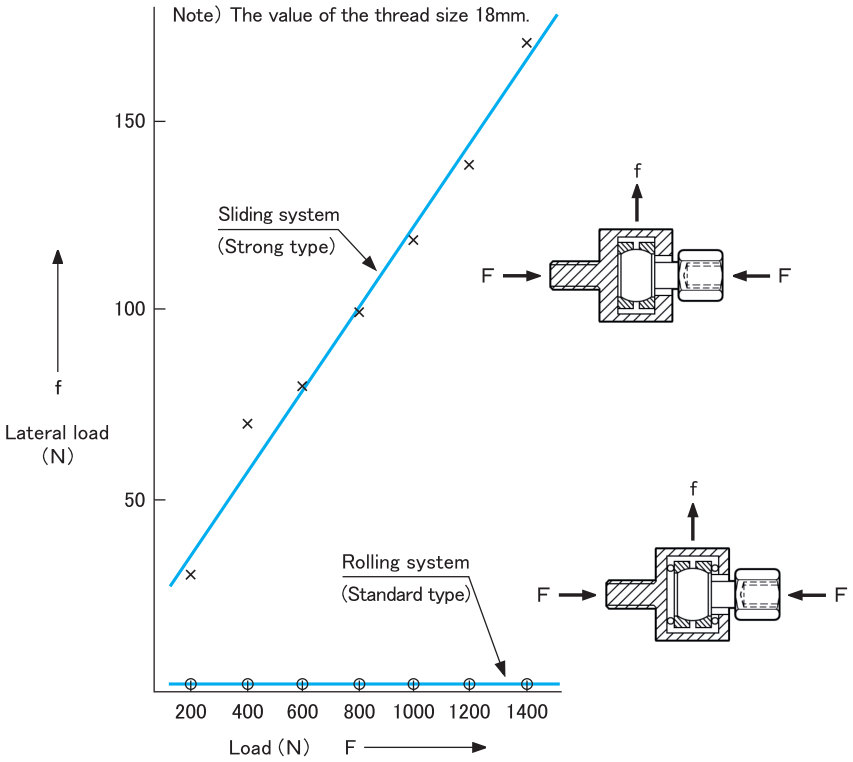
Operating principles



The swing motion Ⓐ and eccentric movement motion Ⓑ of the ball joint are housed in a compact case to absorb the deviation in the three-dimensional direction.

Since the alignment and parallelism between the cylinder and the object to be operated can be adjusted by eye measurement level, the cylinder can be easily installed.

Comparison of load and lateral load

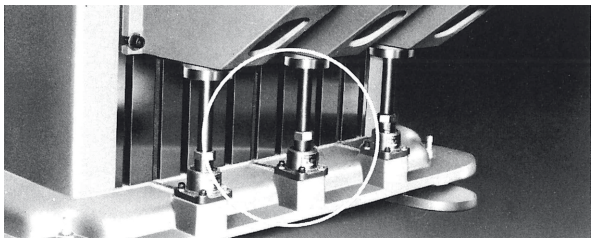


The left graph shows the values of the perpendicular movement force (F) at each axial load (f) for FC18T (Rolling system) and FC18T-S (Sliding system).

(The smaller the value of "f", the smaller the eccentric load on the bearing of the cylinder, and the more durable the cylinder.)

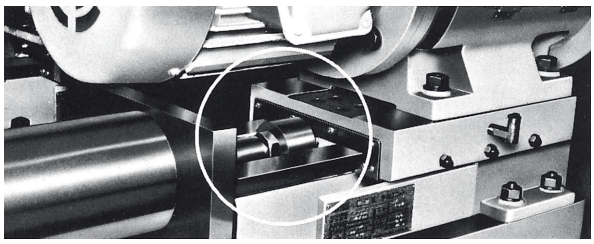
Usage example

Usage example for F type



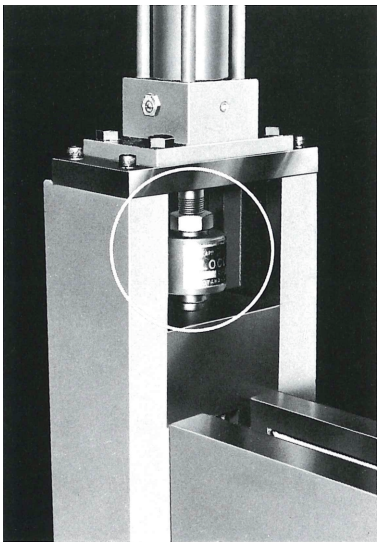
● F type is used for the jack device of vertical transfer.

Usage example for L type



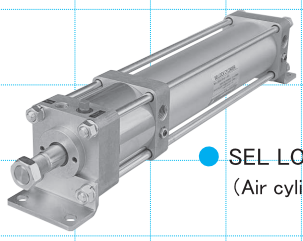
● L type is used for the slide base of the multi-axis drill unir.

Usage example for T type

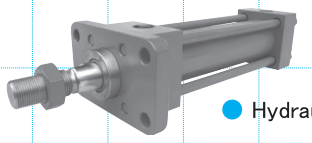


● T type is used for the vertical movement JIG.

Related product



● SEL LOCK CYLINDER
(Air cylinder with braking unit)



● Hydraulic cylinder

● PNEUMATIC POWER CYLINDER
(High thrust air cylinder)

● POWER PACK CYLINDER
(High thrust air cylinder)

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SEL NUT
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