

Linear Dampers

FPD-0715/0725/0745/0750/0755/0760 Series



Model Description

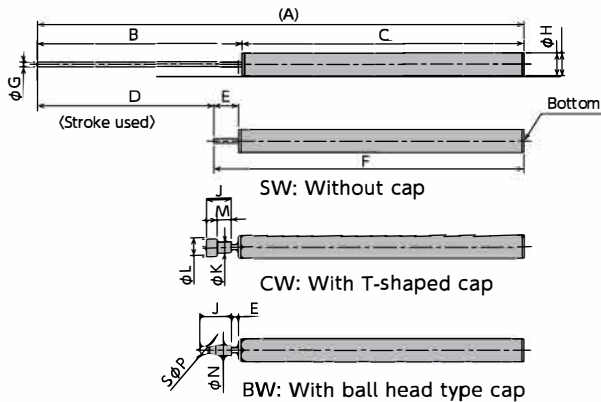
F P D - 0 7 4 5 A 1 - S W

① ② ③ ④ ⑤ ⑥

- ① Series name
- ② External diameter stroke
- ③ Stroke
- ④ With/Without self-returning
 - A : With Returning Spring
 - B : Without Returning Spring
- ⑤ Characteristics Number
 - 1 : Low-load (low thrust) specifications
 - 2 : Medium-load (medium thrust) specifications
 - 3 : High-load (high thrust) specifications
- ⑥ Symbols indicating form SW: Without cap
 - CW : With T-shaped cap
 - BW : With ball head type cap

External Dimensions

FPD-0715/0745/0750/0755/0760 External Dimensions



FPD-0725 External Dimensions

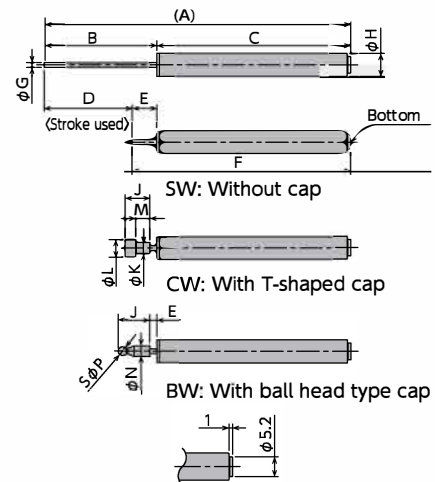


Fig. 1 Bottom Shape of FPD-0725 Series

*FPD-0715A Series are provided with Returning Spring Type only
 *The shape of the bottom of FPD-0725 series differs from FPD-07□□ series. (Ref. Fig. 1)

Dimensions

MODEL	A	B	C	D	E	F	G	H	J	K	L	M	N	P	Mass(g)		
FPD-0715A□-SW	66	22	44	15	7	51	1.5	7.2	-	-	-	-	-	-	2.7		
FPD-0715A□-CW	68	24			2	53			7	62	-	3.5	5.5	4	-	-	-
FPD-0725A□-SW	87	32	55	25	7	62			7	3.5	5.5	4	-	-	-	3.4	
FPD-0725A□-CW	89	34			2	64			7	64	7	3.5	5.5	4	-	-	3.6
FPD-0725B□-SW	87	32			7	62			7	62	-	-	-	-	-	-	3.2
FPD-0725B□-CW	89	34	2	64	7	64			7	3.5	5.5	4	-	-	3.4		
FPD-0725B□-BW	91	36	2	66	9	-			-	-	-	3.4	2.8	3.3	3.3		
FPD-0745A□-SW	138	57	81	45	12	93			7	3.5	5.5	4	-	-	-	4.9	
FPD-0745A□-CW	140	59			7	95			7	95	7	3.5	5.5	4	-	-	5.1
FPD-0750B□-SW	138	57			7	88			-	-	-	-	-	-	-	-	4.7
FPD-0750B□-CW	140	59	50	90	7	90			7	3.5	5.5	4	-	-	4.9		
FPD-0750B□-BW	142	61	2	92	9	-			-	-	3.4	2.8	4.8	4.8			
FPD-0755A□-SW	159	67	92	55	12	104	-	-	-	-	-	-	-	5.6			
FPD-0755A□-CW	161	69			7	106	7	106	7	3.5	5.5	4	-	-	5.8		
FPD-0760B□-SW	159	67			7	99	-	-	-	-	-	-	-	-	5.3		
FPD-0760B□-CW	161	69	60	101	7	101	7	3.5	5.5	4	-	-	5.5				
FPD-0760B□-BW	163	71	2	103	9	-	-	-	3.4	2.8	5.4	5.4					

*The characteristics number 1, 2, or 3 is inserted in the □.

●Products specification might be changed without notice.

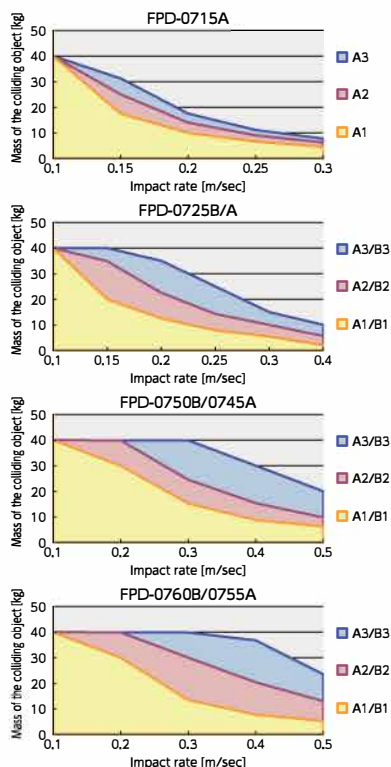
Specifications

MODEL	Max absorption energy J (kgf·m)	Speed range m/s	Cylinder cap color
FPD-0715A1-□	0.2(0.02)	Under 0.3	Black
FPD-0715A2-□	0.28(0.028)	Under 0.3	White
FPD-0715A3-□	0.3(0.03)	Under 0.3	Blue
FPD-0725A1-□	0.25(0.025)	Under 0.4	Black
FPD-0725A2-□	0.45(0.045)	Under 0.4	White
FPD-0725A3-□	0.8(0.08)	Under 0.4	Blue
FPD-0725B1-□	0.25(0.025)	Under 0.4	Black
FPD-0725B2-□	0.45(0.045)	Under 0.4	White
FPD-0725B3-□	0.8(0.08)	Under 0.4	Blue
FPD-0745A1-□	0.7(0.07)	Under 0.5	Black
FPD-0745A2-□	1.25(0.125)	Under 0.5	White
FPD-0745A3-□	2.5(0.25)	Under 0.5	Blue
FPD-0750B1-□	0.7(0.07)	Under 0.5	Black
FPD-0750B2-□	1.25(0.125)	Under 0.5	White
FPD-0750B3-□	2.5(0.25)	Under 0.5	Blue
FPD-0755A1-□	0.75(0.075)	Under 0.5	Black
FPD-0755A2-□	1.6(0.16)	Under 0.5	White
FPD-0755A3-□	2.9(0.29)	Under 0.5	Blue
FPD-0760B1-□	0.75(0.075)	Under 0.5	Black
FPD-0760B2-□	1.6(0.16)	Under 0.5	White
FPD-0760B3-□	2.9(0.29)	Under 0.5	Blue

Common Specifications

Recovering power of piston rod N(kgf)	With returning spring : ≤5 (0.5), Without returning spring : ≤1.5 (0.15)
Main unit material	Resin
Range of operating temperature, degree s C	5~40°C

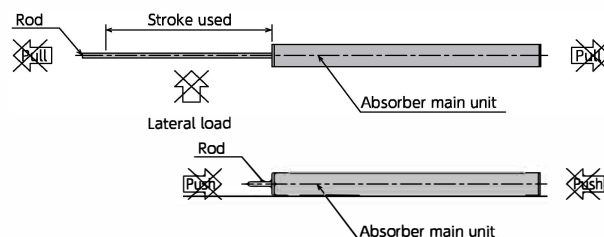
Absorbable energy range under a horizontal inertial collision condition



*The absorbable energy ranges above represent the properties under a condition where no thrusting force exists.

Precautions for Use

- * Use with an external stopper.
- * Ensure that sufficient mounting strength is secured for this product.
- * 2 or more of this product can be used in parallel.
- * Do not use this product in a vacuum or a location where it may come in contact with oil.
- * Ensure that an eccentric load is not applied to the soft absorber.
- * Do not press the piston rod of linear damper in beyond the stroke used.
(This will cause the incomplete return of the piston rod and other failures.)
- * Do not pull the linear damper beyond the stroke used.
(This will cause the damage or failure of the linear damper.)
- * When the gap between the pressing time and the returning time of the piston rod is large, the durability may be affected. Confirm its performance in an actual machine before use.
- ** A falling impact will cause a deformation, damage, etc. Please handle with special care.



Linear Dampers

FPD-0805 Series



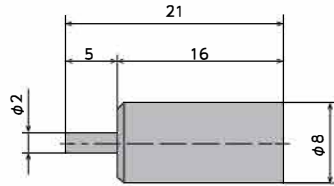
Model Description

F P D - 0 8 0 5 A 5 - S W

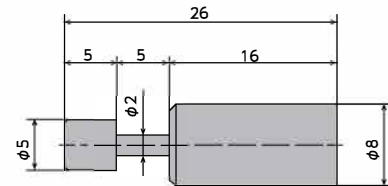
① ② ③ ④ ⑤ ⑥

- ① Series name
- ② External diameter
- ③ Stroke
- ④ Characteristics number
 - A1: Low-load specifications
 - A2: High-load specifications
- ⑤ Symbols indicating form
 - S : S type (Standard)
 - C : C type (Cap)
 - * Please refer to the external dimensions.
- ⑥ Symbols indicating color W : White

External Dimensions



FPD-0805A□-SW (S type)



FPD-0805A□-CW (C type)

Specifications

MODEL	Max absorption energy J (kgf·m)	Impact speed range m/s	Push Speed rang mm/s	Max load thrust N(kgf)	Cylinder cap color
FPD-0805A1	0.2	0.5 or lower	-	-	Black
FPD-0805A2	0.3	0.5 or lower	-	-	White
FPD-0805A5	-	-	50 or lower	80(8)	Blue
FPD-0805A7	-	-	20 or lower	100(10)	Brown

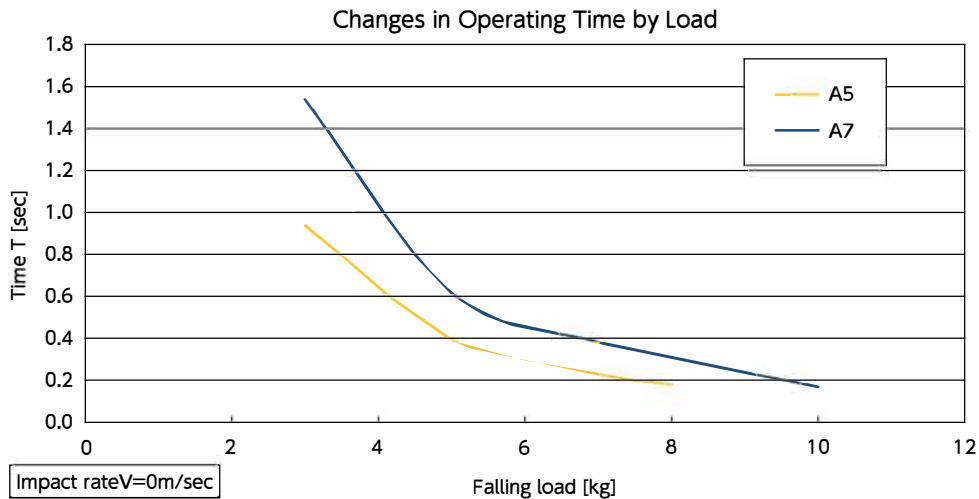
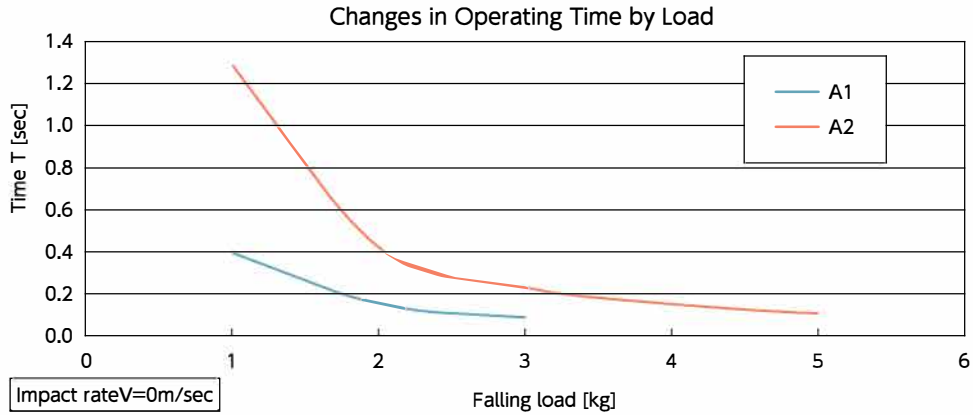
* For the motion-time of each load, please see the next page.

Common Specifications

Stroke (S/C type)	mm	5	Main Unit Material	Resin
Recovering power of piston rod	N (kgf)	6(0.6) or lower	Range of operating temperature, degrees °C	5~40
Mass	g	S type =1.3, C type =1.5		

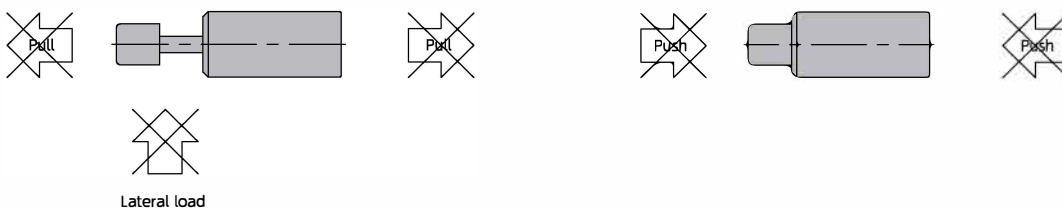
●Products specification might be changed without notice.

Graph of Operating Time by Load



Precautions for Use

- * Use with an external stopper.
- * Ensure that sufficient mounting strength is secured for this product.
- * 2 or more of this product can be used in parallel.
- * Do not use this product in a vacuum or a location where it may come in contact with oil.
- * Ensure that an eccentric load is not applied to the soft absorber.
Allowable eccentric angle: within $\pm 2.5^\circ$
- * Do not pull the soft absorber beyond the stroke used.
(This will cause the damage or failure of the linear damper.)
- * Do not press the piston rod of linear damper in beyond the stroke used.
(This will cause the incomplete return of the piston rod, and other failures.)
- * When the gap between the pressing time and the returning time of the piston rod is large, the durability may be affected. Confirm its performance in an actual machine before use.



Linear Dampers

FPD-1006/1008 Series



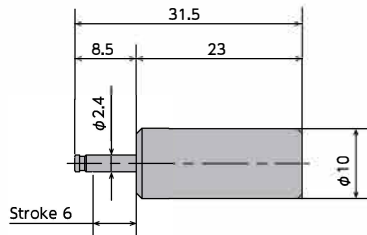
Model Description

F P D - 1 0 0 6 A 8 - S W

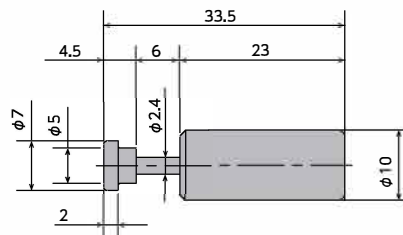
① ② ③ ④⑤ ⑥ ⑦

- ① Series name
- ② External diameter
- ③ Stroke
- ④ With/Without self-returning
A : With returning spring
B : Without returning spring
- ⑤ Characteristics number
3, 5 : High-load specifications
8, 12, 15 : Low-load specifications
- ⑥ Symbols indicating form
S : S type (Standard)
C : C type (Cap)
*Please refer to the external dimensions.
- ⑦ Symbols indicating color W : White

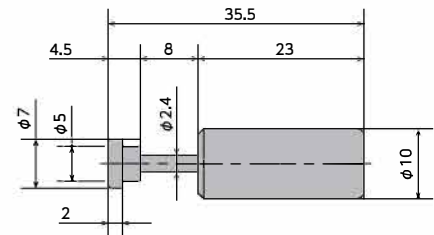
External Dimensions



FPD-1006A□-SW(S type)



FPD-1006A□-CW(C type)



FPD-1008B□-CW(C type)

* FPD-1006 Series are supplied only in types implementing a return spring, and FPD-1008 Series are supplied only in C-Type without a return spring.

Specifications

MODEL	Max absorption energy J(kgf·m)	Impact speed range m/s	Push Speed rang mm/s	Max load thrust N(kgf)	Cylinder cap color
FPD-1006A3	0.3	Under 0.5	-	-	Black
FPD-1006A5	0.4	Under 0.5	-	-	White
FPD-1006A8	-	-	Under 40	120(12)	Blue
FPD-1006A12	-	-	Under 30	160(16)	Brown
FPD-1006A15	-	-	Under 20	200(20)	Gray
FPD-1008B3	0.4	Under 0.5	-	-	Black
FPD-1008B5	0.5	Under 0.5	-	-	White
FPD-1008B8	-	-	Under 40	120(12)	Blue
FPD-1008B12	-	-	Under 30	160(16)	Brown
FPD-1008B15	-	-	Under 20	200(20)	Gray

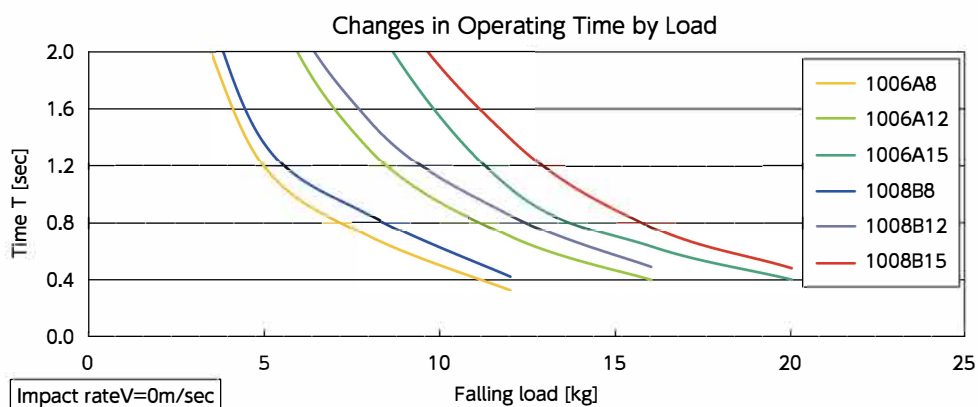
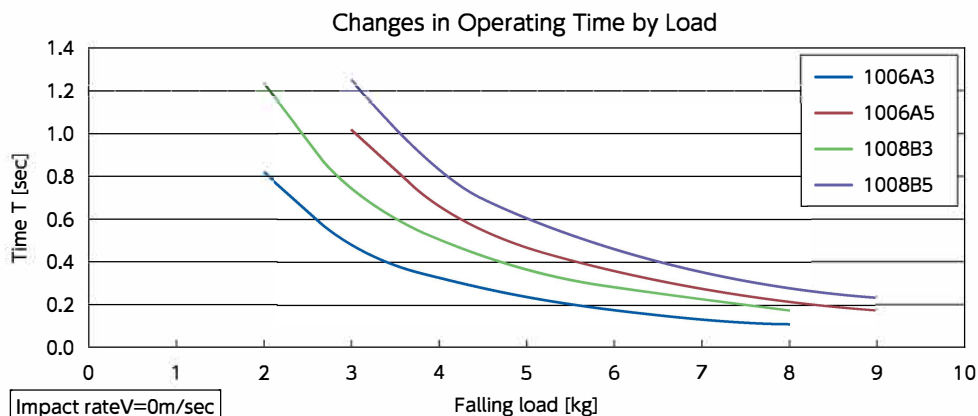
* For the motion-time of each load, please see the next page.

Common Specifications

Stroke	FPD-1006 6mm	Mass	FPD-1006 S type 2.9g
	FPD-1008 8mm		FPD-1006 C type 3.1g
Recovering power of piston rod N(kgf)	FPD-1006 Under 5(0.5)	Main unit material	FPD-1008 C type 3.0g
	FPD-1008 Under 1(0.1)		Resin
Range of operating temperature, degrees °C			5~40

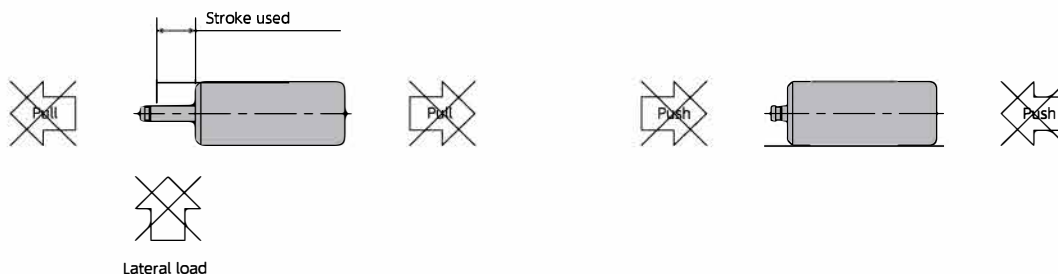
●Products specification might be changed without notice.

Graph of Operating Time by Load



Precautions for Use

- * Use with an external stopper.
- * Ensure that sufficient mounting strength is secured for this product.
- * 2 or more of this product can be used in parallel.
- * Do not use this product in a vacuum or a location where it may come in contact with oil.
- * Ensure that an eccentric load is not applied to the linear damper.
Allowable eccentric angle: within ± 2.5
- * Do not pull the linear damper beyond the stroke used.
(This will cause the damage or failure of the linear damper.)
- * Do not press the piston rod of linear damper in beyond the stroke used.
(This will cause the incomplete return of piston rod, and other failures.)
- * When the gap between the pressing time and the returning time of the piston rod is large, the durability may be affected.
Confirm its performance in an actual machine before use.



Linear Dampers

FPD-1012 Series



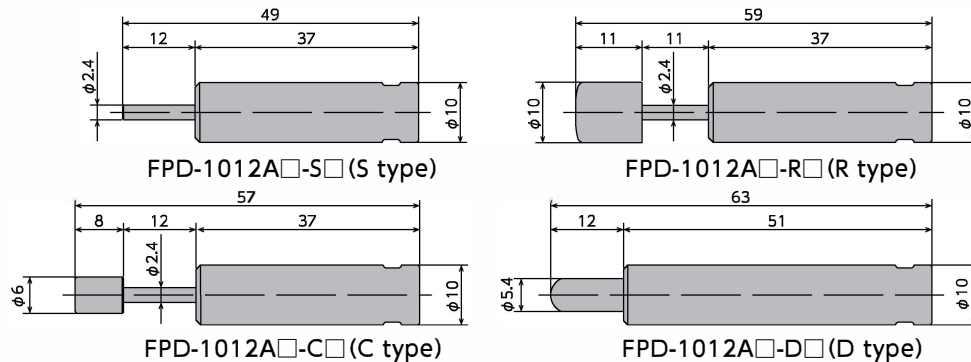
Model Description

F P D - 1 0 1 2 A 1 - S W

① ② ③ ④ ⑤ ⑥

- ① Base model
- ② External diameter
- ③ Stroke
- ④ Symbols indicating characteristics
 - A1 : Low-load specifications
 - A3 : Medium-load specifications
 - A5 : High-load specifications
- ⑤ Symbols indicating form
 - S : S type (Standard)
 - C : C type (Cap)
 - R : R type (Elastomer cap)
 - D : D type (Eccentric angle cap)
- ⑥ Color symbols
 - * Please refer to the external dimensions.
 - W : White B : Black

External Dimensions



Specifications

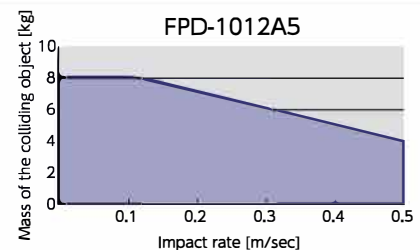
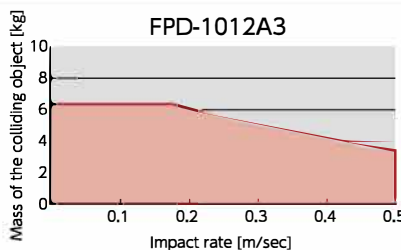
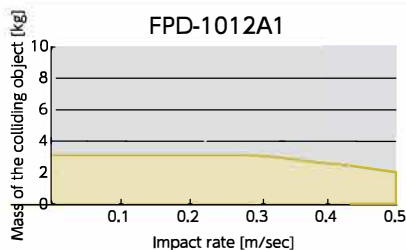
MODEL	load [kg]	Max absorption energy J (kgf·m)	Speed rang m/s	Cylinder cap color
FPD-1012A1	1	0.5(0.05)	0.5 or lower	Black
FPD-1012A3	3	0.8(0.08)	0.5 or lower	White
FPD-1012A5	5	1.0(0.10)	0.5 or lower	Blue

* For the motion-time of each load, please see the next page.

Common Specifications

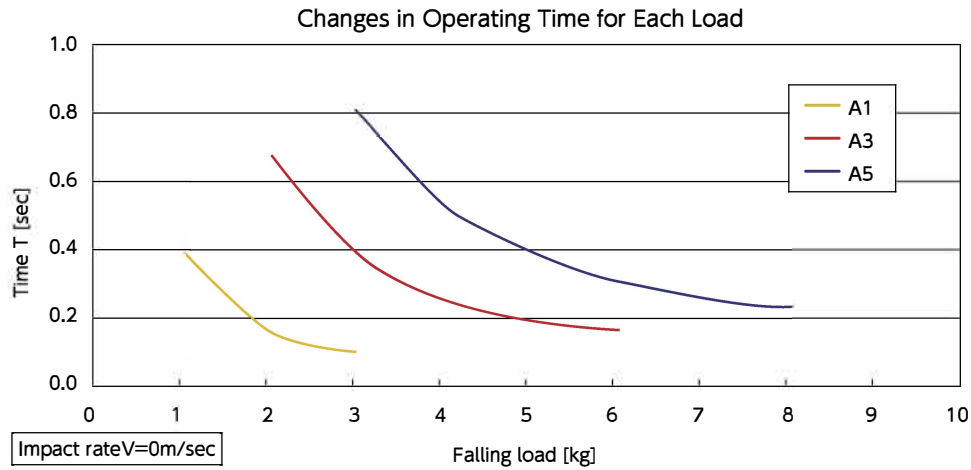
Stroke (S/C/D type)	mm	12	Mass	g	S type= 4.5, C type= 5.0, R type=5.7, D type =6.0
Stroke (R type)	mm	11	Main unit material	Resin	
Recovering power of the piston rod	N (kgf)	3(0.3) or less	Operating temperature	°C	
				5~40	

Impact rate and mass of the colliding object in freefall



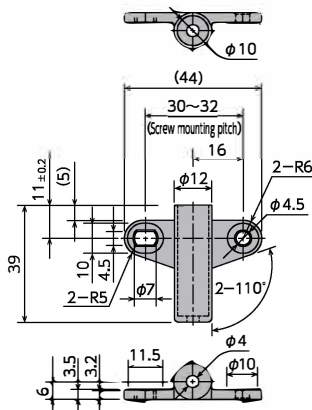
●Products specification might be changed without notice.

Characteristics Graph



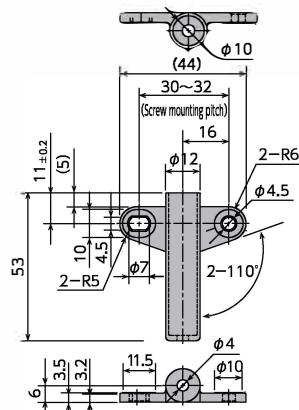
Optional Parts

OP-200-01B/W S/C/R type



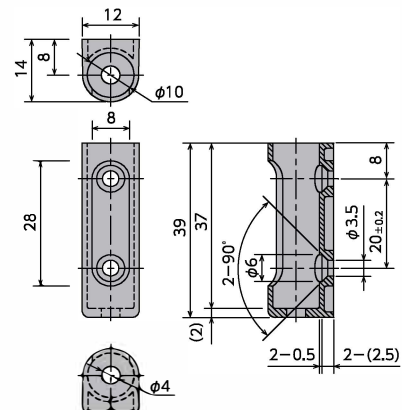
Screw: M4 (Truss screw)
 Recommended tightening torque : 0.5N·m

OP-200-02B/W D type



Screw: M4 (Truss screw)
 Recommended tightening torque : 0.5N·m

OP-200-03B/W S/C/R/D type

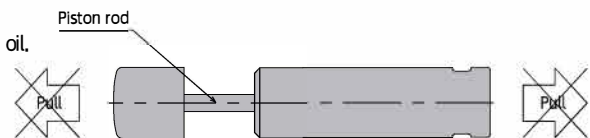


Screw: M3 (Flat head screw)
 Recommended tightening torque : 0.3N·m

- *These adaptors are dedicated for FPD-1012A series
- *They make it easy to install linear dampers.
- *There are 2 colors: white and black.
- *Material : Polyacetal (POM)

Precautions for Use

- * Do not use this product without carefully reading the attached owner's manual.
- * Use with an external stopper.
- * Ensure that sufficient mounting strength is secured for this product.
- * 2 or more of this product can be used in parallel.
- * Do not use this product in a vacuum or a location where it may come in contact with oil.
- * Ensure that an eccentric load is not applied to the linear damper.
 - S/C/R type ... Allowable eccentric angle: $\pm 2.5^\circ$ or less
 - D type Allowable eccentric angle: $\pm 6^\circ$ or less



- * Do not pull the piston rod of the linear damper.
 (This will cause air to get inside the linear damper, causing ineffective stroke, abnormal sounds, and other damage to the linear damper.)
- * The difference between the speed of stroke and return of piston rod might influence the durability of the damper. So, please confirm sufficient performance on actual machine before use.

Linear Dampers

FPD-1016 Series



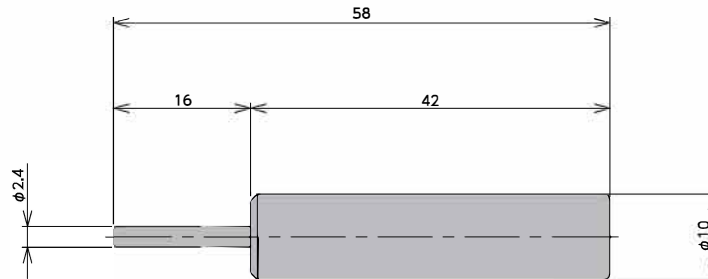
Model Description

FPD - 1016 A30 - SW

① ② ③ ④ ⑤ ⑥

- ① Series name
- ② External diameter
- ③ Stroke
- ④ Symbols indicating characteristic
A30: Low-load specification
A40: High-load specification
- ⑤ Symbols indicating form
S: S type (Standard)
*Please refer to the external dimensions
- ⑥ Symbols indicating color W : White

External Dimensions



FPD-1016A□-SW

Specifications

MODEL	Push speed range mm/s	Max load thrust N (kgf)	Cylinder cap color
FPD-1016A30-SW	15 or lower	300(30)	black
FPD-1016A40-SW		400(40)	white

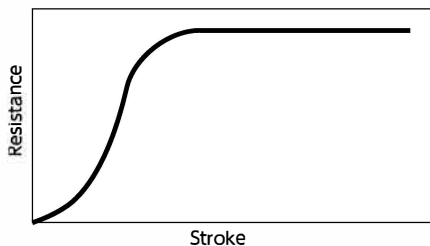
* For the motion-time of each load, please see the next page.

Common Specifications

Stroke	mm	16	Mass	g	5.2
			Main unit material		Resin
Recovering power of piston rod	N(kgf)	10 (1.0) or lower	Range of operating temperature	°C	5~40

Waveform of Resistance

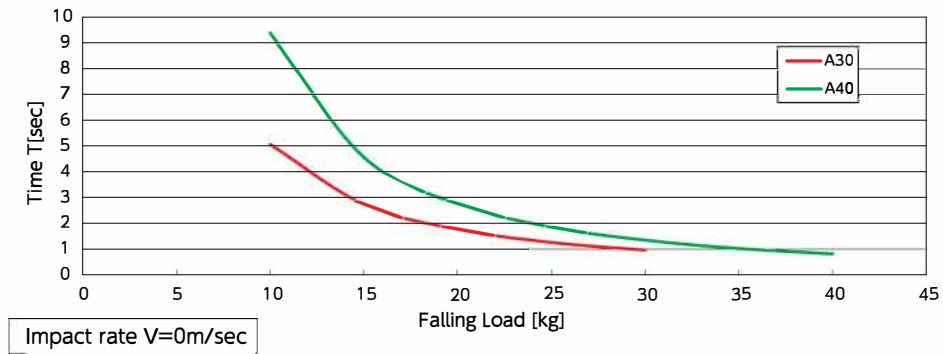
Waveform of Resistance: When pressing constant speed (F.Y.R.)



●Products specification might be changed without notice.

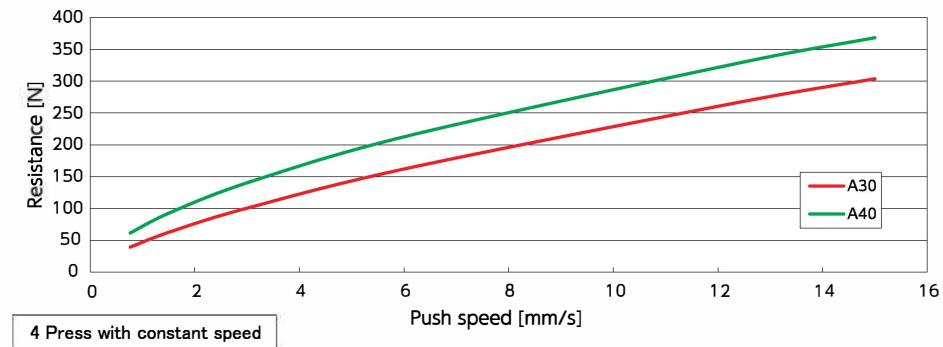
Graph of Operating Time by Load

Changes in Operating Time by load



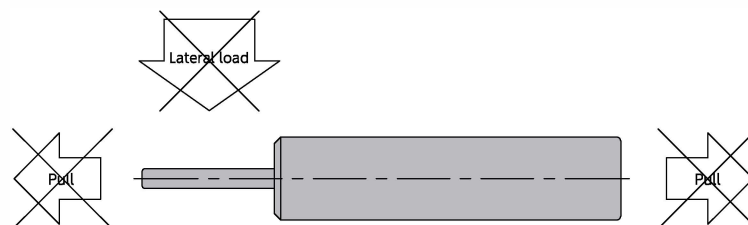
Graph of Resistance by Push Speed

Changes of Resistance by Push Speed



Precautions for Use

- * Use with an external stopper.
- * Ensure that sufficient mounting strength is secured for this product.
- * 2 or more of this product can be used in parallel.
- * Do not use this product in a vacuum or a location where it may come in contact with oil.
- * Ensure that an eccentric load is not applied to the linear damper.
Allowable eccentric angle: within ± 2.5
- * Do not pull the linear damper beyond the stroke used.
(This will cause the damage or failure of the linear damper.)
- * Do not press the piston rod of linear damper in beyond the stroke used.
(This will cause the incomplete return of piston rod, and other failures.)
- * When the gap between the pressing time and the returning time of the piston rod is large, the durability may be affected. Confirm its performance in an actual machine before use.



Linear Dampers

FPD-1018 Series



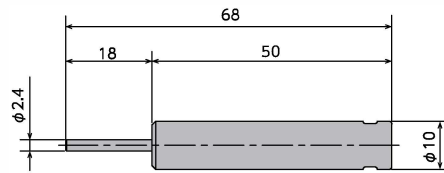
Model Description

F P D - 1 0 1 8 A 1 5 - S W

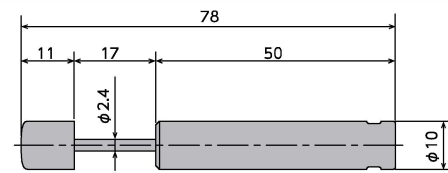
① ② ③ ④ ⑤ ⑥

- ① Series name
- ② External diameter
- ③ Stroke
- ④ Symbols indicating characteristics
 - A15 : Low-load specifications
 - A20 : High-load specifications
- ⑤ Symbols indicating form
 - S : S type (Standard)
 - C : C type (Cap)
 - R : R type (Elastomer cap)
 - * Please refer to the external dimensions.
- ⑥ Symbols indicating color W : White

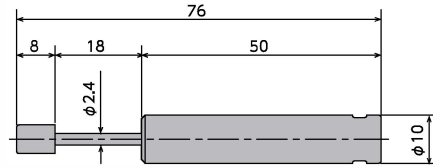
External Dimensions



FPD-1018A□-SW (S type)



FPD-1018A□-RW (R type)



FPD-1018A□-CW (C type)

Specifications

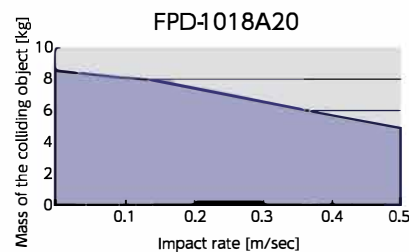
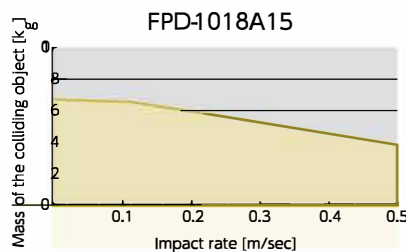
MODEL	Max absorption energy J (kgf·m)	Impact speed range m/s	Cylinder cap color
FPD-1018A15	1.2(0.12)	0.5 or lower	Brown
FPD-1018A20	1.5(0.15)	0.5 or lower	Gray

* For the motion-time of each load, please see the next page.

Common Specifications

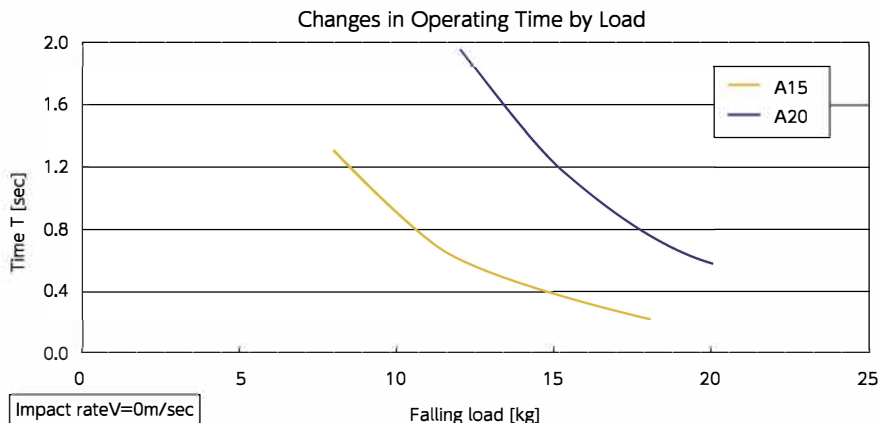
Stroke (S/C type)	mm	18	Mass	g	S type = 6.1, C type = 6.6, R type = 7.3
Stroke (R type)	mm	17	Main unit material		Resin
Recovering power of piston rod	N (kgf)	6(0.6) or lower	Range of operating temperature, degrees	°C	5~40

Graph of Impact Rate/Mass of Colliding Object Under the Condition of Free Fall



●Products specification might be changed without notice.

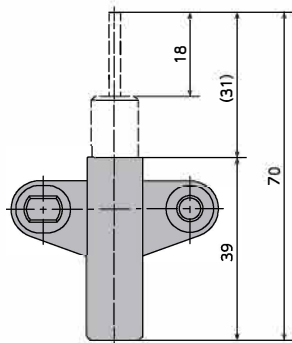
Graph of Operating Time by Load



Optional Parts

OP-200-01B/W

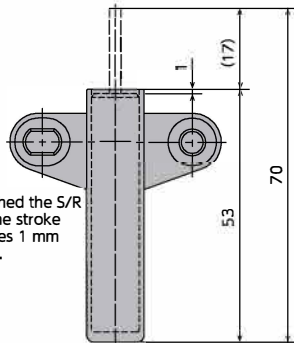
MODEL
OP-200-01B
OP-200-01W



Screw used: M4 (truss screw)
 Recommended tightening torque: 0.5 N·m

OP-200-02B/W

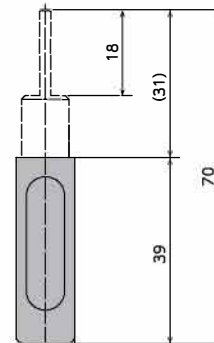
MODEL
OP-200-02B
OP-200-02W



Screw used: M4 (truss screw)
 Recommended tightening torque: 0.5 N·m

OP-200-03B/W

MODEL
OP-200-03B
OP-200-03W

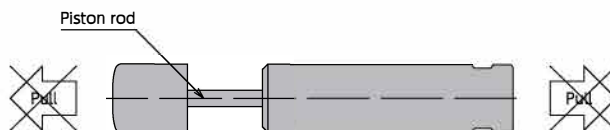


Screw used: M3 (countersunk screw)
 Recommended tightening torque: 0.3 N·m

- The diagram indicates the mounting dimensions of the adaptor for the FPD-1012 series used in combination with the FPD-1018S type.
- For the details of the adaptor specifications, please see the pages of the FPD-1012 series.

Precautions for Use

- * Use with an external stopper.
- * Ensure that sufficient mounting strength is secured for this product.
- * 2 or more of this product can be used in parallel.
- * Do not use this product in a vacuum or a location where it may come in contact with oil.
- * Ensure that an eccentric load is not applied to the soft absorber.
 - S/C/R type *** Allowable eccentric angle: $\pm 2.5^\circ$ or less
- * Do not pull the piston rod of the linear damper.
 (This will cause air to get inside the linear damper, causing ineffective stroke, abnormal sounds, and other damage to the linear damper.)
- * When the gap between the pressing time and the returning time of the piston rod is large, the durability may be affected. Confirm its performance in an actual machine before use.



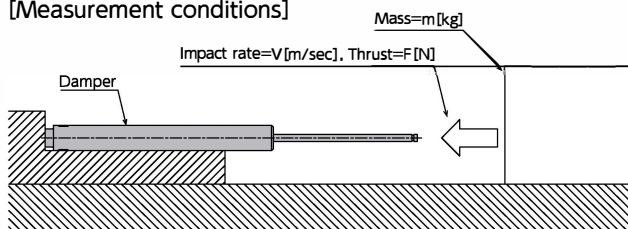
●Products specification might be changed without notice.

Motion performance

Model	Load [kg]	Thrust [N]	Impact rate [m/sec]	Motion time [sec]	Recovering power of the piston rod [N]	※Bottom color
FPD-1030A1-□W	10	6	0.3	0.2~1.5	5 or less	Black
FPD-1030A2-□W	10	8	0.3	0.2~1.5	5 or less	White
FPD-1030A3-□W	10	13	0.3	0.3~1.6	5 or less	Grey
FPD-1030B1-□W	10	5	0.3	0.2~1.2	1.5 or less	Black
FPD-1030B2-□W	10	8	0.3	0.2~1.2	1.5 or less	White
FPD-1030B3-□W	10	13	0.3	0.3~1.3	1.5 or less	Grey
FPD-1050A1-□W	10	8	0.5	0.3~2.0	6 or less	Black
FPD-1050A2-□W	10	10	0.5	0.4~2.2	6 or less	White
FPD-1050A3-□W	10	15	0.5	0.5~2.5	6 or less	Grey
FPD-1050B1-□W	10	5	0.5	0.3~2.0	1.5 or less	Black
FPD-1050B2-□W	15	8	0.5	0.4~2.2	1.5 or less	White
FPD-1050B3-□W	15	13	0.5	0.5~2.5	1.5 or less	Grey
FPD-1060A1-□W	10	8	0.5	0.3~2.0	6 or less	Black
FPD-1060A2-□W	10	10	0.5	0.4~2.2	6 or less	White
FPD-1060A3-□W	10	15	0.5	0.5~2.5	6 or less	Grey
FPD-1070B1-□W	10	5	0.5	0.3~2.0	1.5 or less	Black
FPD-1070B2-□W	15	8	0.5	0.4~2.2	1.5 or less	White
FPD-1070B3-□W	15	13	0.5	0.5~2.5	1.5 or less	Grey
FPD-10100B1-□W	10	5	0.5	0.8~3.0	1.5 or less	Black
FPD-10100B2-□W	15	8	0.5	0.8~3.2	1.5 or less	White
FPD-10100B3-□W	15	15	0.5	1.5~5.5	1.5 or less	Grey
FPD-10150B1-□W	20	15	0.5	0.8~3.5	4.0 or less	Black
FPD-10150B2-□W	20	20	0.5	0.8~3.5	4.0 or less	White
FPD-10150B3-□W	20	25	0.5	0.8~3.5	4.0 or less	Grey

The above performance was measured using Fuji Latex' s instruments. So, please select dampers accordingly, and confirm operation on actual machines before selecting final models.

[Measurement conditions]

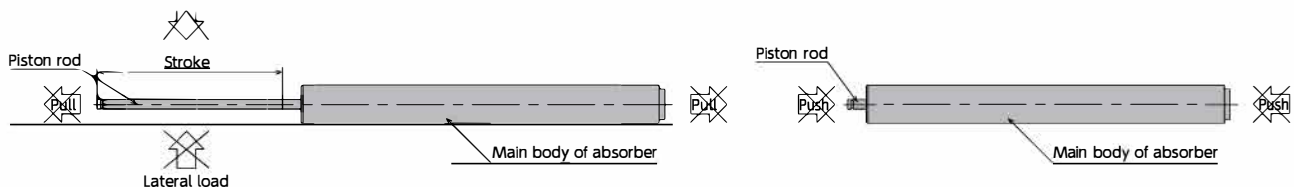


* Bottom color



Precautions in Use

- * Do not use this product without carefully reading the attached owner' s manual.
- * Use with an external stopper.
- * Ensure that sufficient mounting strength is secured for this product.
- * 2 or more of this product can be used in parallel.
- * Do not use this product in a vacuum or a location where it may come in contact with oil.
- * Ensure that an eccentric load (lateral load) is not applied to the linear damper.
- * Do not pull the piston rod of the linear damper more than stroke.
(This will cause air to get inside the linear damper, causing ineffective stroke, abnormal sounds, and other damage to the linear damper.)
- * Do not push the piston rod of the linear damper more than stroke.
(This will cause recovery failure and other damage to the linear damper.)
- * Although the main body of the FPD-10150B series may be slightly warped, there is no problem in terms of quality. However, it should be used after sufficiently confirming that there is no problem with respect to installation.



Linear Dampers

FPR-1040 Series



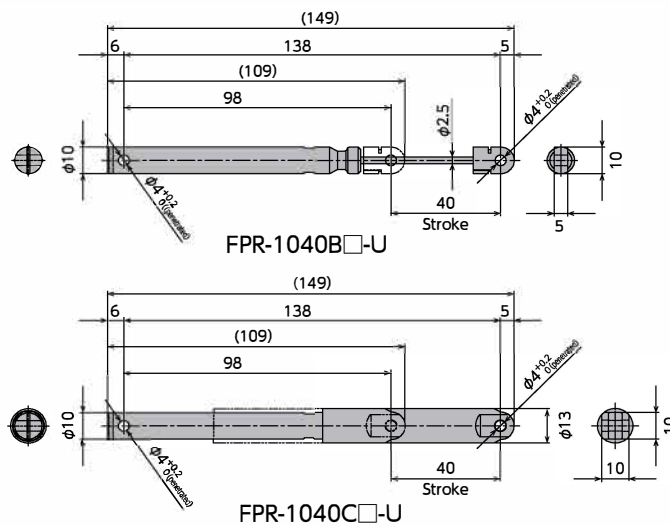
Model Description

F P R - 1 0 4 0 B 1 - U

① ② ③ ④ ⑤ ⑥

- ① Series name
- ② External diameter
- ③ Stroke
- ④ With/Without cover B : Without cover
 C : With cover
- ⑤ Symbols indicating characteristics
 - 1 : Low-load (low thrust) specifications
 - 2 : Medium-load (medium thrust) specifications
 - 3 : High-load (high thrust) specifications
- ⑥ Symbols indicating form U : With crevice

External Dimensions



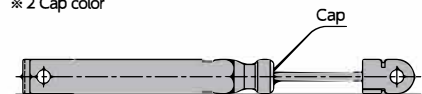
Specification

Model	Measuring speed [m/sec]	Resistance [N] ^{※1}	CAP COLOR ^{※2}
FPR-1040□1-U	0.04	30	Black
FPR-1040□2-U	0.04	45	White
FPR-1040□3-U	0.04	60	Gray

※ 1 The resistance generated is a reference value according to our measurement conditions.

● □ will be filled in with either B or C

※ 2 Cap color

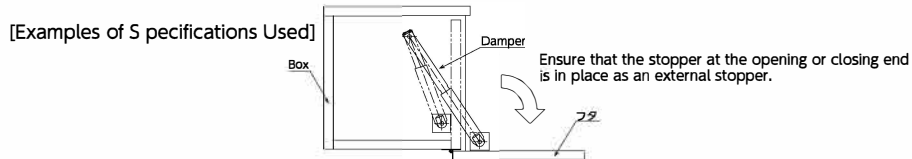
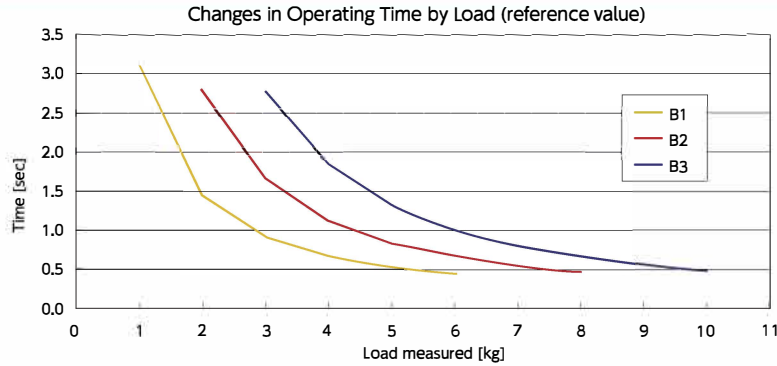


Common Specification

Stroke[mm]	40
External diameter[mm]	φ10
Mass[g](reference value)	FPR-1040B-U=11.6, FPR-1040C-U=14.2
Main unit material	Resin
Operating temperature[°C]	5~40

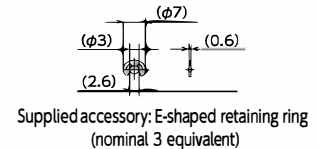
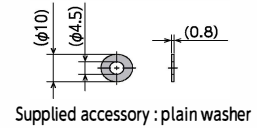
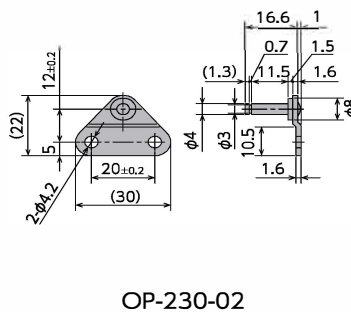
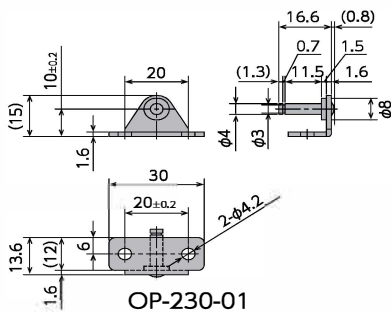
●Products specification might be changed without notice.

Graph of Operating Time by Load



Optional Parts

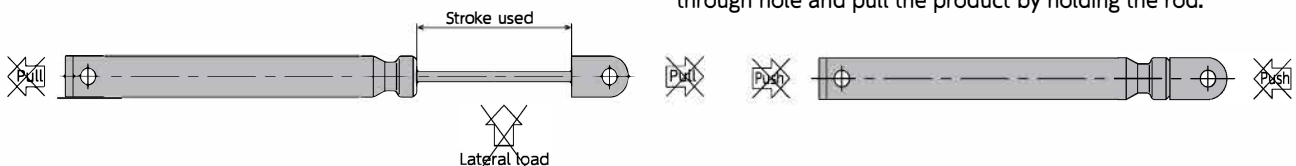
Model
OP-230-01
Model
OP-230-02



- Exclusive mounting fixture for FPR
- Facilitates the absorber mounting.
- A plain washer and E-shaped retaining ring are supplied to OP-230-01 and OP-230-02 each.
- Material: Metal

Precautions for Use

- * The linear damper generates the drag in the drawing direction.
- * Unusable to generate the resistance in the pushing direction.
- * Use with an external stopper.
- * Ensure that sufficient mounting strength is secured for this product.
- * 2 or more of this product can be used in parallel.
- * Do not use this product in a vacuum or a location where it may come in contact with oil.
- * Ensure that an eccentric load is not applied to the linear damper.
- * Do not pull the linear damper beyond the stroke used. (This will cause the damage or failure of the linear damper.)
- * Do not press the linear damper in beyond the stroke used. (This will cause the damage or failure of the linear damper.)
- * When the gap between the pressing time and the returning time of the piston rod is large, the durability may be affected. Confirm its performance in an actual machine before use.
- * For the products with cover, do not pull the cover part. When you need to pull the product, insert a rod into the φ 4 through hole and pull the product by holding the rod.



Linear Dampers

U Packing Seal

Fixed Type

Adjustable type

Self-adjusting

FPA-1475 Series

RoHS Compliant

●Products specification might be changed without notice.



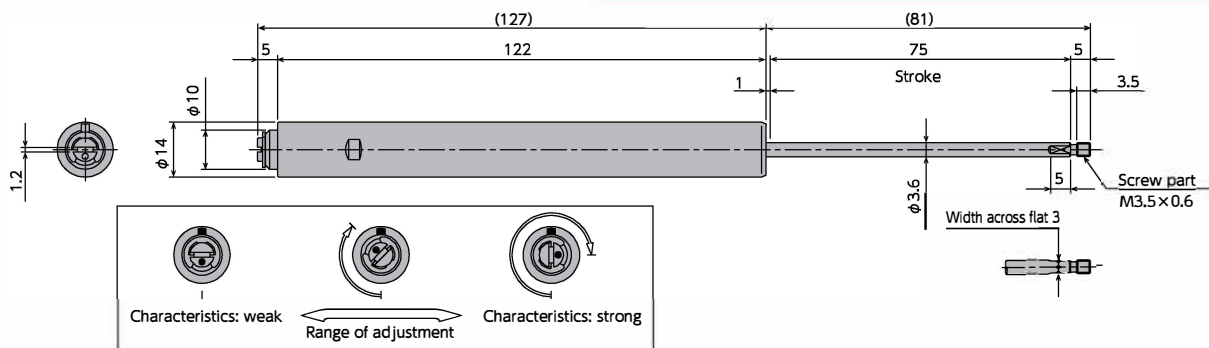
Model Description

F P A - 1 4 7 5 B 1 - S W

① ② ③ ④ ⑤ ⑥

- ① Series name
- ② External diameter
- ③ Stroke
- ④ For self-returning B : Without self-returning
With/Without spring
- ⑤ Symbols indicating characteristics
- ⑥ Symbols indicating form SW : Without cap

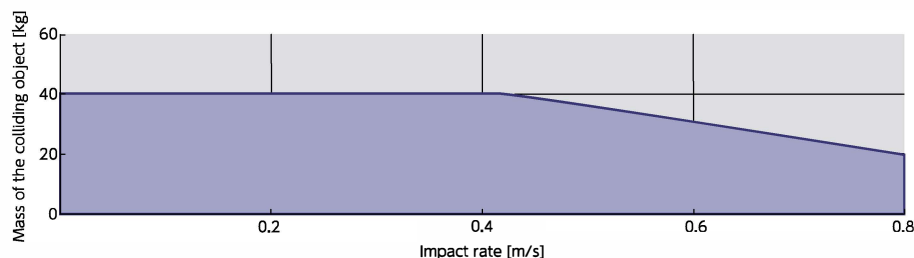
外形図



Specifications

Model	Stroke [mm]	Mass [g]	Main unit material	Range of impact rate [m/s]	range of operating temperature [°C]	Range of storage temperature [°C]
FPA-1475B1-SW	75	38	Resin	0.8 or lower	5~40	-10~50

Graph of Impact Rate/Mass of Colliding Object with the Condition of Horizontal Impact and No Thrust



Precautions for Use

- * The series do not have the self-returning function. The piston rod needs to be pulled out by external forces.
- * Use the product with the external stopper within the stroke range.
- * Ensure that sufficient mounting strength is secured for this product.
- * Do not use this product in a vacuum or a location where it may come in contact with oil.
- * Ensure that an eccentric load (lateral load) is not applied to the linear damper.
- * When the gap between the pressing time and the returning time of the piston rod is large, the durability may be affected. Confirm its performance in an actual machine before use.

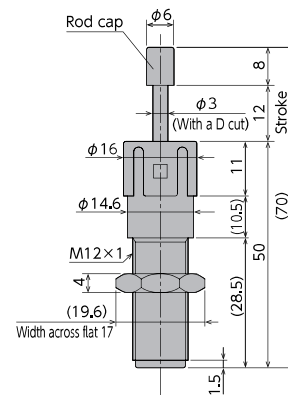
Soft Absorber

Bellofram Seal Type | Dashpot Structure
Fixed Type | Adjustable type | Self-adjusting

FA-1212C Series

RoHS Compliant

●Products specification might be changed without notice.



Specifications

Model	Max. absorption energy J(kgf·m)	Speed range m/s	Max. equivalent mass kg(kgf)	Max. drag N(kgf)	Absorption energy per minute J/min(kgf·m/min)	Max. cycle rate cycle/min	Rod cap colour
FA-1212C1-C	0.29(0.03)	0.1~1.0	1.5(1.5)	245(25)	14.7(1.5)	45	White
FA-1212C2-C	0.49(0.05)		3(3)	294(30)			5.0(0.5)
FA-1212C3-C	1.0(0.10)	0.1~0.7	5(5)		5	Yellow	
FA-1212C4-C			0.1~0.5			7.5(7.5)	
FA-1212C5-C				10(10)	Red		

Common Specifications

Stroke	mm	12
Recovering power of the piston rod	N(kgf)	2.45(0.25) or less
Operating temperature	°C	-10~50
Mass	g	15
Main unit material		Resin

Precautions for Use

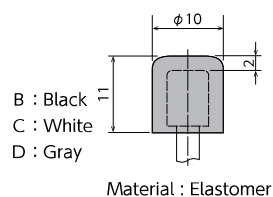
- * Do not use this product without carefully reading the attached owner's manual.
- * Use with an external stopper.
- * Ensure that sufficient mounting strength is secured for this product. (As a guideline, it should be 2 to 3 times the maximum drag listed in the catalogue.)
- * Do not turn the oil inlet screw located at the bottom of the main unit.
- * 2 or more of this product can be used in parallel.
- * Do not use this product in a vacuum or a location where it may come in contact with oil.
- * Ensure that an eccentric load is not applied to the soft absorber. (Allowable eccentric angle: within $\pm 2.5^\circ$)
- * Do not over-tighten the main unit and nuts. Please use the tightening torque (1.5N·m) listed in the owner's manual. If anchoring the absorber against the $\phi 14.6$ unit, please use a tightening torque of 1.0N·m.

Optional Parts

Muting cap OP-090-M12B/C/D

Model
OP-090-M12B
OP-090-M12C
OP-090-M12D

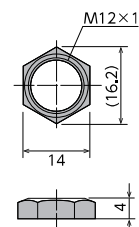
- A muting cap reduces the collision noise.
- To use, place it over a rod cap in the FA-1212C series.
- Stroke length is 11mm.



Small hexagon nut M12B

Model
M12B

- It is ideal for tight spaces, as it is smaller than the conventional hexagon nuts.



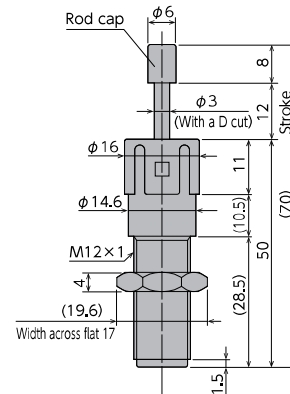
Standard nuts are sold separately as well.

Applicable Models	Model
FA-1212C	FA-1212C nut

New products
1 Soft Absorber
2 Rotary Damper
3 Magnum Series
4 Speed Controller
5 Helical Isolator
6 Model Selection Form

Soft Absorber

FA-1212L Series



Operating Performance

Model	Load (kg)	Thrust (N)	Impact rate (m/s)	Motion-time (sec)	Recovering power of the piston rod (N)	Rod cap color
FA-1212L1-C	3	30	0.7 or lower	0.3~2.0	9以下	White
FA-1212L3-C			0.5 or lower	2.3~4.0		Yellow
FA-1212L5-C			0.3 or lower	4.3~6.0		Red

The performance above is based on the measuring machine of our company. Refer to the above to select the damper, confirm its performance in an actual machine, and finally select the model.

Specifications

Stroke	mm	12
Max. absorption energy	J(kgf·m)	1.5(0.15)
Max. thrust :FA-1212L1	N(kgf)	49(5)
:FA-1212L3	N(kgf)	78(8)
:FA-1212L5	N(kgf)	117(12)
Max. drag	N(kgf)	490(50)
Range of operating temperature	°C	-10~50
Mass	g	15
Main unit material		Resin

Precautions for Use

- * Do not use this product without carefully reading the attached owner's manual.
- * Use with an external stopper.
- * Ensure that sufficient mounting strength is secured for this product.
(As a guideline, it should be 2 to 3 times the maximum drag listed in the catalog.)
- * Do not turn the oil inlet screw located at the bottom of the main unit.
- * 2 or more of this product can be used in parallel.
- * Do not use this product in a vacuum or a location where it may come in contact with oil.
- * Ensure that an eccentric load is not applied to the soft absorber. (Allowable eccentric angle: within $\pm 2.5^\circ$)
- * Do not over-tighten the main unit and nuts. Please use the tightening torque (1.5N·m) listed in the owner's manual. However, to fix the nut while pressing it against the $\phi 14.6$ part, use the tightening torque of 1 N·m.

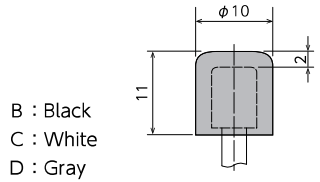
●Products specification might be changed without notice.

Optional Parts

Muting cap OP-090-M12B/C/D

Model
OP-090-M12B
OP-090-M12C
OP-090-M12D

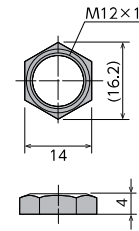
- A muting cap reduces the collision noise.
- To use, place it over a rod cap in the FA-1212L series.
- Stroke length is 11mm.



Small hexagon nut M12B

Model
M12B

- It is ideal for tight spaces, as it is smaller than the conventional hexagon nuts.

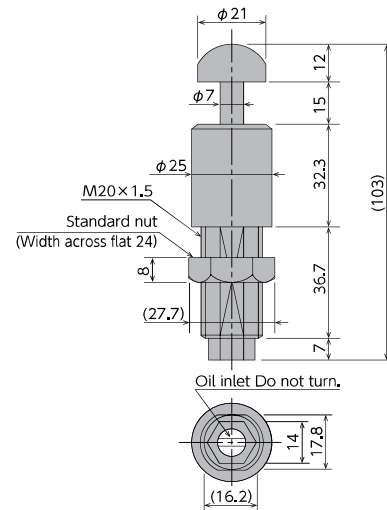
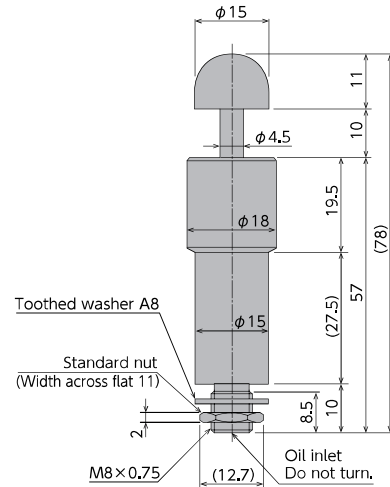


The standard nut is also sold separately.

Applicable Models	Model
FA-1212L	Nut for FA-1212C

Soft Absorber

FA-1010D/FA-1215B Series



Specifications

Model	Stroke mm	Max. absorption energy J(kgf·m)	Max. equivalent mass kg(kgf)	Max. drag N(kgf)	Absorption energy per minute J/min(kgf·m/min)	Recovering power of the piston rod N(kgf)	Mass g
FA-1010D2-C	10	0.98(0.1)	10(10)	980(100)	44.1(4.5)	5.88(0.6) or lower	41.5
FA-1010D3-C		2.05(0.21)	15(15)		78.4(8.0)		
FA-1010D4-C		3.23(0.33)	20(20)				
FA-1215B1-C	15	7.84(0.8)	30(30)	1470(150)	245(25)	11.8(1.2) or lower	116
FA-1215B2-C		11.7(1.2)	40(40)	1960(200)			

Common Specifications

Operating speed range	m/s	0.1~1.0(0.1 to 0.5 for the FA-1215 series)
Max. cycle rate	cycle/min	45((30 for the FA-1215 series)
Operating temperature	°C	-10~50

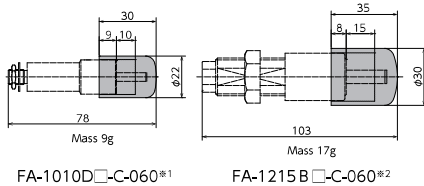
●Products specification might be changed without notice.

Optional Parts

Liquid-proof cap -060

Model
FA-1010D□-C-060
FA-1215B□-C-060

- A drip-proof cap is fitted on the main unit when shipped from the factory.
- Ideal for use in environments where oil splatter poses a problem.
- Ensure that the cap is facing upward. If the cap is facing sideways or downward, it cannot provide an effective means for liquid proofing.



- *1 □ will be filled in with a type indication code 2, 3 or 4
*2 □ will be filled in with a type indication code 1 or 2.

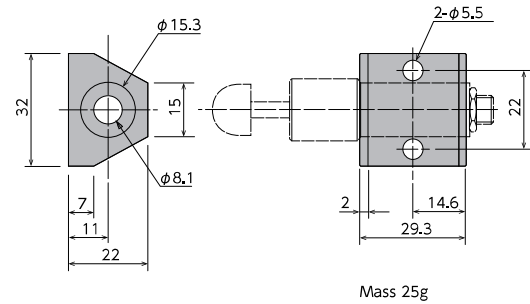
*Standard nuts are sold separately as well.

Applicable Models	Model
FA-1010D	FA-1010D M08 nut
FA-1215B	M20 nut

Bracket OP-1012A

Model
OP-1012A

- This is a mounting fixture for FA-1010D.

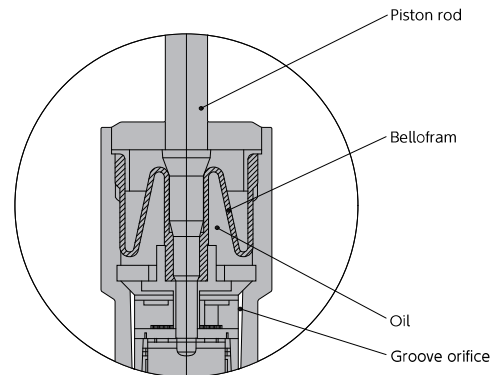


Bellofram Seal Type

Unlike the conventional U packing type, it uses a Bellofram seal, as shown below. Because it does not generate sliding resistance between the piston rod and the packing, the spring power required to recover the piston rod can be reduced. The Bellofram also acts as an accumulator based on its ability to change shape. In principle, as long as the Bello is not damaged, oil will never leak.

Groove-orifice type

The cross-sectional area of the orifice in the groove-orifice type changes continuously as the piston strokes, thereby enabling smooth energy absorption.

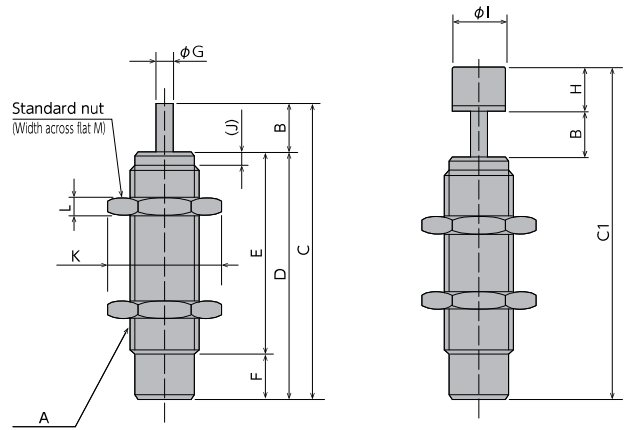


Precautions for Use

- * Do not use this product without carefully reading the attached owner's manual.
- * Use with an external stopper.
- * Ensure that sufficient mounting strength is secured for this product.
(As a guideline, it should be 2 to 3 times the maximum drag listed in the catalogue.)
- * Do not turn the oil inlet screw located at the bottom of the main unit.
- * 2 or more of this product can be used in parallel.
- * Do not use this product in a vacuum or a location where it may come in contact with oil.
- * Ensure that an eccentric load is not applied to the soft absorber.
(Allowable eccentric angle: within $\pm 2.5^\circ$)

Soft Absorber

FA-0805/FA-1005/FA-1008/FA-1210 Series



Dimensions

Model	A	B	C	C1	D	E	F	ϕG	H	ϕI	J	K	L	M
FA-0805SB*-S/C	M8×0.75 (M8×1)	5	32	37	27	22	5	2	5	6	1.5	12.7	2	11
FA-1005PMB*-S/C	M10×1	5	32	39	27	22	5	3	7	6	1.5	15	3	13
FA-1008PB*-S/C	M10×1	8	46	53	38	33	5	3	7	6	1.5	15	3	13
FA-1210KB*-S/C	M12×1	10	60	68	50	45	5	3.5	8	8	1.5	16.2	4	14

Specifications

Model	Stroke mm	Max. absorption energy J (kgf·m)	Max. equivalent mass kg (kgf)	Max. drag N (kgf)	Absorption energy per minute J/min (kgf·m/min)	Recovering power of the piston rod N (kgf)	Mass g
FA-0805SB1-S ▲	5	0.39 (0.04)	3 (3)	490 (50)	17.6 (1.8)	4.9 or lower (0.5)	8.6
FA-0805SB1-C ▲							8.8
FA-0805SB2-S ▲		0.68 (0.07)	5 (5)	588 (60)	22.5 (2.3)		8.6
FA-0805SB2-C ▲							8.8
FA-1005PMB1-S	5	0.68 (0.07)	5 (5)	735 (75)	41.1 (4.2)	5.88 or lower (0.6)	13.2
FA-1005PMB1-C							14.2
FA-1005PMB2-S		0.98 (0.1)	8 (8)	735 (75)	41.1 (4.2)		13.2
FA-1005PMB2-C							14.2
FA-1008PB1-S	8	0.98 (0.1)	7 (7)	735 (75)	58.8 (6.0)	5.88 or lower (0.6)	17.2
FA-1008PB1-C							18.2
FA-1008PB2-S		1.47 (0.15)	10 (10)	735 (75)	58.8 (6.0)		17.2
FA-1008PB2-C							18.2
FA-1210KB1-S	10	1.96 (0.2)	15 (15)	1470 (150)	98 (10)	9.8 or lower (1.0)	30.6
FA-1210KB1-C							32.6
FA-1210KB2-S		2.45 (0.25)	30 (30)	1470 (150)	98 (10)		30.6
FA-1210KB2-C							32.6

▲ The thread pitch P1.0 is supplied as well.

Common Specifications

Range of impact rate	m/s	0.3~1.0
Max. cycle rate	cycle/min	60 (45 for the FA-0805 series)
Operating temperature	°C	-5~70

Note) MB X 1.0 is also available as the main body's screw pitch specifications for the FA-0805 series. Please order using the model number FA-0805SB □-S-P1.0 or FA-0805SB □-C-P1.0. However, please note that there are no optional parts for it.
 Note) To place an order without a cap, put -S, and to place an order with a cap, put -C.
 Note) Cap colour: **1 is white and **2 is black.

Precautions for Use

- * Do not use this product without carefully reading the attached owner's manual.
- * Ensure that an external stopper (Stopper nut OP-020**) is also used.
- * Do not turn the oil inlet screw located at the bottom of the main unit.
- * Ensure that sufficient mounting strength is secured for this product. (As a guideline, it should be 2 to 3 times the maximum drag listed in the catalogue.)
- * Do not use this product in a vacuum or a location where it may come in contact with oil.
- * Ensure that an eccentric load is not applied to the soft absorber. (Allowable eccentric angle: within $\pm 2.5^\circ$)

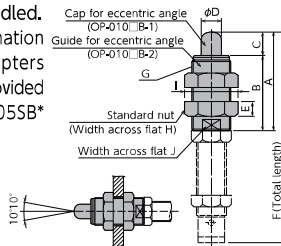
● Products specification might be changed without notice.

Optional Parts

Eccentric angle adaptor OP-010SB, PMB, PB, KB

Model
OP-010SB
OP-010PMB
OP-010PB
OP-010KB

- Screw the eccentric angle adaptor into the main unit until the cap for the eccentric angle and the piston rod form a tight connection. While maintaining this position, fasten the main unit's nut until secured.
- Use the eccentric angle adaptor when the eccentric angle is 2.5° or larger.
- The main unit can also be used as a stopper.
- Use it with a capless soft absorber.
- The maximum operating eccentric angle with an eccentric angle adaptor is ±10°.
- The caps and the guides for inclined use are not unbundled.
- The inclination angle adapters are not provided for FA-0805SB* -SP1.0.



Note) Material of cap for eccentric angle: POM

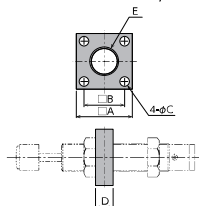
Model	A	B	C	φD	E	F
OP-010SB	28	23	5	6	4	44.5
OP-010PMB	28	23	5	8	6	44.5
OP-010PB	38	30	8	8	6	62.8
OP-010KB	48	38	10	10	5	81.8

Model	G	H	I	J	Mass g
OP-010SB	M12×1	14	16.2	10	13
OP-010PMB	M16×1.5	19	21.9	13	29
OP-010PB	M16×1.5	19	21.9	13	35
OP-010KB	M18×1.5	21	24.3	14	48

Square flange OP-040SB, PB, KB

Model
OP-040SB
OP-040PB
OP-040KB

- Once the attachment site is determined, use the main unit's nut to securely fasten in place.

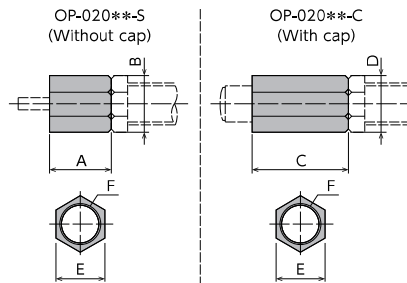


Model	A	B	C	D	E	Mass g
OP-040SB					M8×0.75	17
OP-040PB	25	18	3.2	4	M10×1	16
OP-040KB					M12×1	15

Stopper nut OP-020SB, PB, KB

Model
OP-020SB-S
OP-020SB-C
OP-020PB-S
OP-020PB-C
OP-020KB-S
OP-020KB-C

- Adjust so that it stops 1mm before the stroke end, and fasten with the main unit's nut until secured.



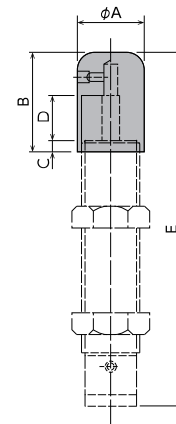
Note) When attaching, make sure that the side without a bearing chamfer is the impact surface.

Model	A	B	C	D	E	F	Mass g
OP-020SB-S	10	12.7	15	12.7	11	M8×0.75	S 5 C 7
OP-020PB-S	10	15	16	15	13	M10×1	S 6 C 9
OP-020KB-S	12	16.2	16	16.2	14	M12×1	S 6 C 8

Liquid-proof cap -060

Model
FA-1005PMB□-C-060
FA-1008PB□-C-060
FA-1210KB□-C-060

- A drip-proof cap is fitted on the unit on delivery.
- Liquid-proof caps are not sold separately.
- Ensure that the cap is facing upward. If the cap is facing sideways or downward, it cannot provide an effective means for liquid proofing.

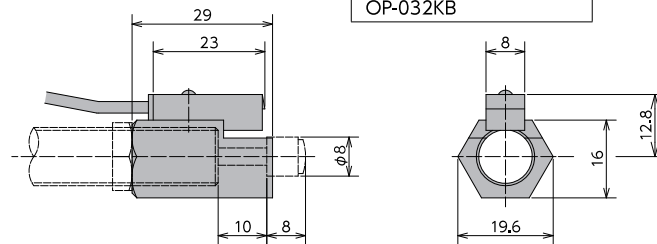


Model	φA	B	C	D	E	Mass g
FA-1005PMB□-C-060	13	15	3	5	39	9
FA-1008PB□-C-060	13	18	3	8	53	10
FA-1210KB□-C-060	17	28	9.5	10	68.5	25

- Model indication 1 or 2 is inserted in □.

Holder with switch OP-030KB-2

Model
OP-032KB



Mass 38g

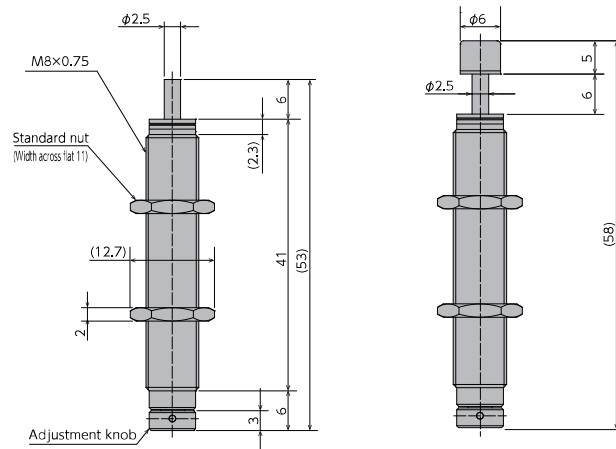
- Although a holder with a switch can be ordered on its own, we strongly recommend ordering one with the main unit. Please include the main unit's model number when placing an order.
- For switch specifications and precautions for use, please refer to page 23.

Standard nuts are sold separately as well.

Applicable Models	Model
FA-0805SB	M08 nut
FA-0805SB P1.0	M08-P1 nut
FA-1005PMB	M10 nut
FA-1008PB	M10 nut
FA-1210KB	M12 nut

Soft Absorber

FA-0806 Series



Specifications

Model	Stroke mm	Max. absorption energy J (kgf·m)	Max. equivalent mass kg (kgf)	Range of impact rate m/s	Orifice type
FA-0806-S	6	1.4 (0.14)	15 (15)	0.3~2	Single-orifice type
FA-0806-C					
FA-0806-S-P1.0					
FA-0806-C-P1.0					

Note: There are no optional parts for M8 x 1.0.

Note) To place an order without a cap, put -S at the end of the model number, and to place an order with a cap, put -C at the end of the model number.

Common Specifications

Max. drag	N(kgf)	670 (68.3)	Operating temperature	°C	-5~70
Max. cycle rate	cycle/min	45	Mass :S type	g	13.8
Max. absorption energy per minute	J/min (kgf·m/min)	36.7 (3.74)	:C type	g	14.1
Recovering power of the piston rod	N(kgf)	9 or lower (0.92)			

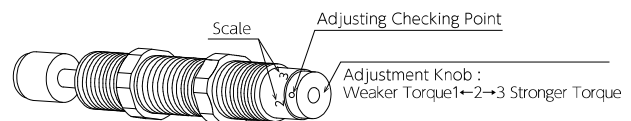
Absorption characteristics

Orifice type	Single-orifice type
Model number	FA-0806 Series
Application	For low to medium speed
Absorption characteristics	

Precautions for Use

- * Do not use this product without carefully reading the attached owner's manual.
- * We recommend that you use it with an external stopper (Stopper nut OP-020SB).
- * Ensure that sufficient mounting strength is secured for this product. (As a guideline, it should be 2 to 3 times the maximum drag listed in the catalogue.)
- * Do not use this product in a vacuum or a location where it may come in contact with oil.
- * Ensure that an eccentric load is not applied to the soft absorber. (Allowable eccentric angle: within $\pm 2.5^\circ$)

Adjustment Method



- * To adjust, turn the adjustment knob.
- * Because the adjustment can be done in an analog manner, a value between two integers on the indicator can be set.
- * It does not have a lock screw for locking the adjusted setting.

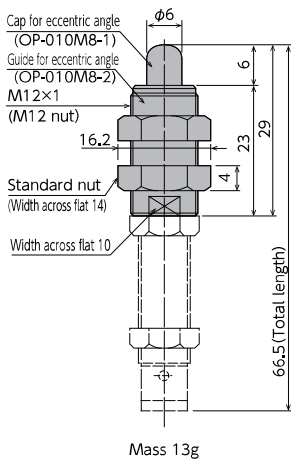
●Products specification might be changed without notice.

Optional Parts

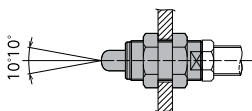
Eccentric angle adaptor OP-010M8

Model
OP-010MB

- Screw the eccentric angle adaptor into the main unit until the cap for the eccentric angle and the piston rod form a tight connection. While maintaining this position, fasten the main unit's nut until secured.
- Use the eccentric angle adaptor when the eccentric angle is 2.5° or larger.
- The main unit can also be used as a stopper.
- Use it with FA-0806-S.
- The maximum operating eccentric angle with an eccentric angle adaptor is ±10°.
- The maximum inclination angle using an inclination angle adapter is ±10°
- The caps and the guides for inclined use are not unbundled.



Mass 13g

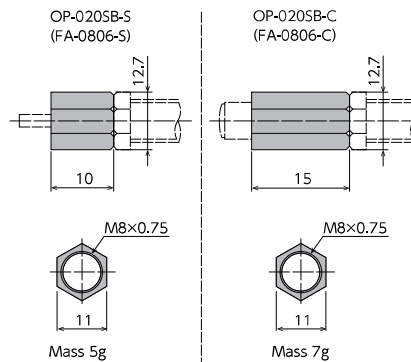


Note) Material of cap for eccentric angle: POM

Stopper nut OP-020SB

Model
OP-020SB-S
OP-020SB-C

- Adjust so that it stops 1mm before the stroke end, and fasten with the main unit's nut until secured.

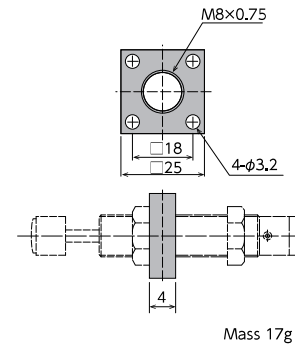


Note) When attaching, make sure that the side without a bearing chamfer is the impact surface.

Square flange OP-040SB

Model
OP-040SB

- Once the attachment site is determined, use the main unit's nut to securely fasten in place.



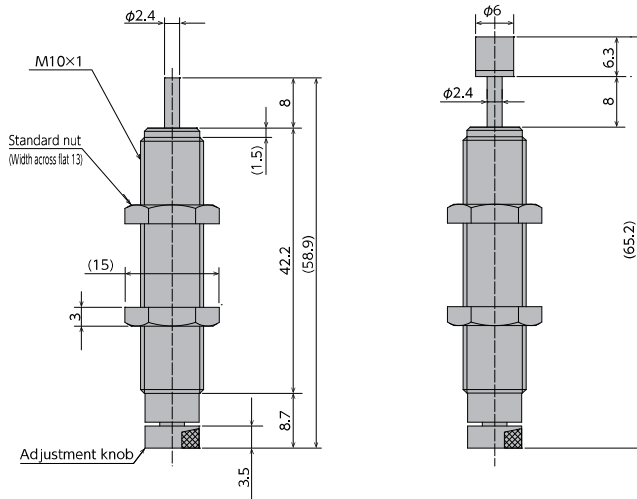
Mass 17g

Standard nuts are sold separately as well.

Applicable Models	Model
FA-0806-S/C	M08 nut
FA-0806-S/C-P1.0	M08-P1.0 nut

Soft Absorber

FA-1008VB/FA-1008VD/FWM-1008VBD Series



Specifications

Model	Stroke mm	Max. absorption energy J (kgf·m)	Max. equivalent mass kg (kgf)	Range of impact rate m/s	Orifice type
FA-1008VB-S	8	1.47 (0.15)	10 (10)	0.3~1	Single-orifice type
FA-1008VB-C					Multiple-orifice type
FA-1008VD-S		1.76 (0.18)	2.5 (2.5)	0.7~3	Multiple-orifice type
FA-1008VD-C					Multiple-varying orifice type
FWM-1008VBD-S			10 (10)	0.3~2	Multiple-varying orifice type
FWM-1008VBD-C					

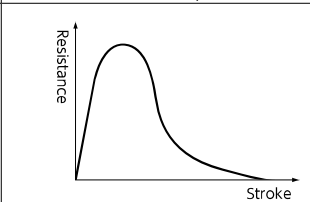
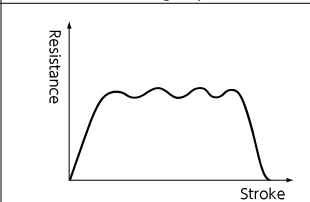
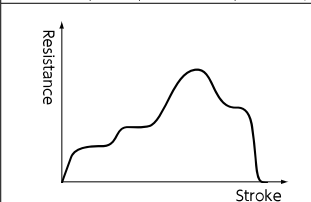
Note) To place an order without a cap, put -S at the end of the model number, and to place an order with a cap, put -C at the end of the model number.

Common Specifications

Max. drag	N (kgf)	637 (65)	Operating temperature	°C	-5~70
Max. cycle rate	cycle/min	60	Mass : S type	g	26.5
Max. absorption energy per minute	J/min (kgf·m/min)	58.8 (6)	: C type	g	27
Recovering power of the piston rod	N (kgf)	5.88 (0.6) or lower			

Selection Guideline

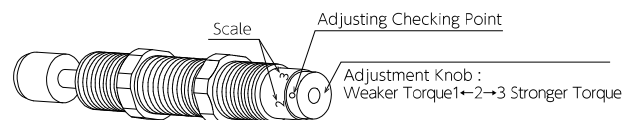
The FA-1008 series has the following three patterns of absorption characteristics depending on the orifice type. Please use the following information as a guideline when making your selection.

Orifice type	Single-orifice type	Multiple-orifice type	Multiple-varying orifice type
Model number	FA-1008VB series	FA-1008VD series	FWM-1008VBD series
Application	For low-speed	For high-speed	For medium speed, in particular with a pneumatic cylinder
Absorption characteristics			

Precautions for Use

- * Do not use this product without carefully reading the attached owner's manual.
- * Ensure that an external stopper (Stopper nut OP-020PB) is also used.
- * Do not turn the oil inlet screw located at the bottom of the main unit.
- * Ensure that sufficient mounting strength is secured for this product. (As a guideline, it should be 2 to 3 times the maximum drag listed in the catalogue.)
- * Do not use this product in a vacuum or a location where it may come in contact with oil.
- * Ensure that an eccentric load is not applied to the soft absorber (Allowable eccentric angle: within $\pm 2.5^\circ$)

Adjustment Method



- * To adjust, turn the adjustment knob.
- * Because the adjustment can be done in an analog manner, a value between two integers on the indicator can be set.
- * It does not have a lock screw for locking the adjusted setting.

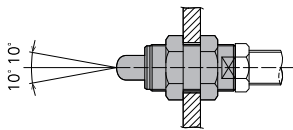
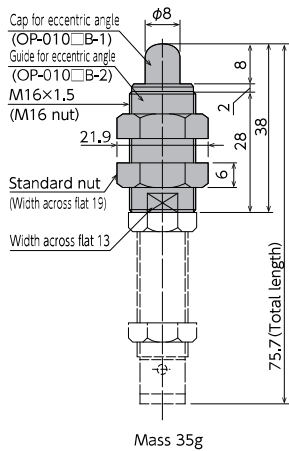
●Products specification might be changed without notice.

Optional Parts

Eccentric angle adaptor OP-010PB

Model
OP-010PB

- Screw the eccentric angle adaptor into the main unit until the cap for the eccentric angle and the piston rod form a tight connection. While maintaining this position, fasten the main unit's nut until secured.
- Use the eccentric angle adaptor when the eccentric angle is 2.5° or larger.
- The main unit can also be used as a stopper.
- Use it with a capless soft absorber.
- The maximum operating eccentric angle with an eccentric angle adaptor is ±10°.
- The caps and the guides for inclined use are not unbundled.

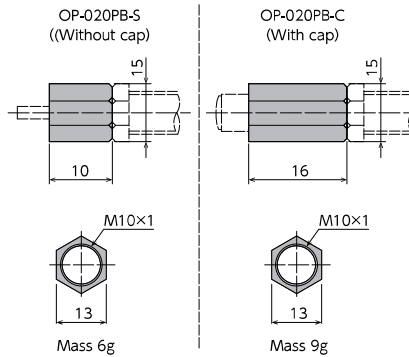


Note) Material of cap for eccentric angle: POM

Stopper nut OP-020PB-□

Model
OP-020PB-S
OP-020PB-C

- Adjust so that it stops 1mm before the stroke end, and fasten with the main unit's nut until secured.

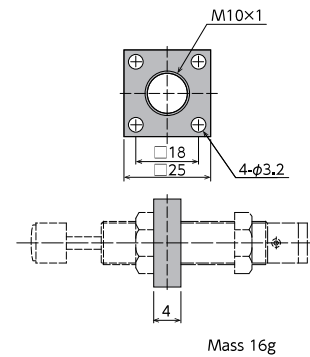


Note) When attaching, make sure that the side without a bearing chamfer is the impact surface.

Square flange OP-040PB

Model
OP-040PB

- Once the attachment site is determined, use the main unit's nut to securely fasten in place.

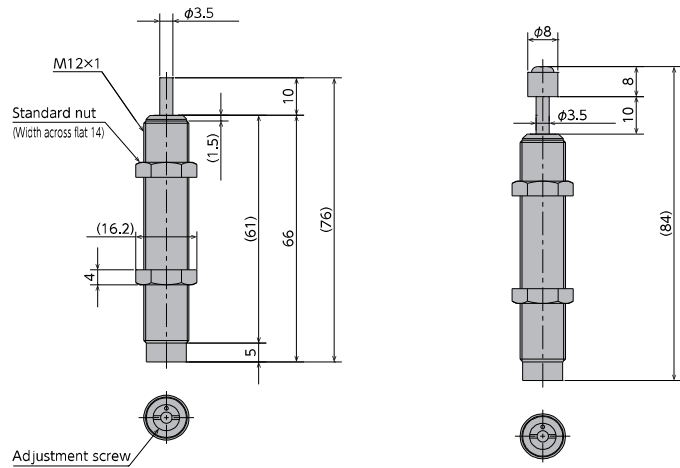


Standard nuts are sold separately as well.

Applicable Models	Model
FA-1008VB	M10 nut
FA-1008VD	
FWM-1008VBD	

Soft Absorber

FA-1210MB/FA-1210MD/FWM-1210MBD Series



Specifications

Model	Stroke mm	Max. absorption energy J (kgf·m)	Max. equivalent mass kg (kgf)	Range of impact rate m/s	Orifice type
FA-1210MB-S	10	2.94 (0.3)	30 (30)	0.3~1	Single-orifice type
FA-1210MB-C					
FA-1210MD-S		4.9 (0.5)	4 (4)	0.7~3	Multiple-orifice type
FA-1210MD-C					
FWM-1210MBD-S					
FWM-1210MBD-C			30 (30)	0.3~2	Multiple-varying orifice type

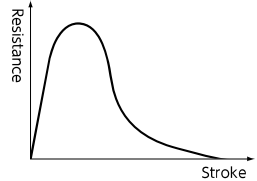
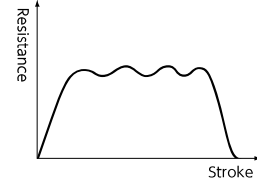
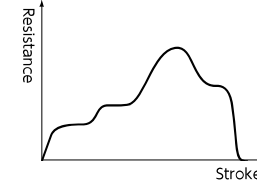
Note) To place an order without a cap, put -S at the end of the model number, and to place an order with a cap, put -C at the end of the model number.

Common Specifications

Max. drag	N (kgf)	1,470 (150)	Operating temperature	°C	-5~70
Max. cycle rate	cycle/min	60	Mass : S type	g	44
Max. absorption energy per minute	J/min (kgf·m/min)	98 (10)	: C type	g	47
Recovering power of the piston rod	N (kgf)	9.8 (1.0) or lower			

Selection Guideline

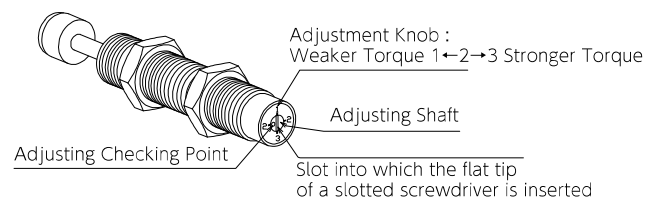
The FA-1210 series has the following three patterns of absorption characteristics depending on the orifice type. Please use the following information as a guideline when making your selection.

Orifice type	Single-orifice type	Multiple-orifice type	Multiple-varying orifice type
Model number	FA-1210MB series	FA-1210MD series	FWM-1210MBD series
Application	For low-speed	For high-speed	For medium speed, in particular with a pneumatic cylinder
Absorption characteristics			

Precautions for Use

- * Do not use this product without carefully reading the attached owner's manual.
- * Ensure that an external stopper (Stopper nut OP-020KB) is also used.
- * Do not turn the oil inlet screw located at the bottom of the main unit.
- * Ensure that sufficient mounting strength is secured for this product. (As a guideline, it should be 2 to 3 times the maximum drag listed in the catalogue.)
- * Do not use this product in a vacuum or a location where it may come in contact with oil.
- * Ensure that an eccentric load is not applied to the soft absorber (Allowable eccentric angle: within $\pm 2.5^\circ$)

Adjustment Method



- * To adjust, turn the adjustment knob with a slotted screw driver.
- * Because the adjustment can be done in an analog manner, a value between two integers on the indicator can be set.
- * It does not have a lock screw for locking the adjusted setting.

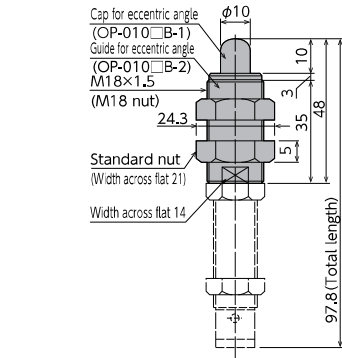
●Products specification might be changed without notice.

Optional Parts

Eccentric angle adaptor OP-010PB

Model
OP-010KB

- Screw the eccentric angle adaptor into the main unit until the cap for the eccentric angle and the piston rod form a tight connection. While maintaining this position, fasten the main unit's nut until secured.
- Use the eccentric angle adaptor when the eccentric angle is 2.5° or larger.
- The main unit can also be used as a stopper.
- Use it with a capless soft absorber.
- The maximum operating eccentric angle with an eccentric angle adaptor is ±10°.
- The caps and the guides for inclined use are not unbundled.



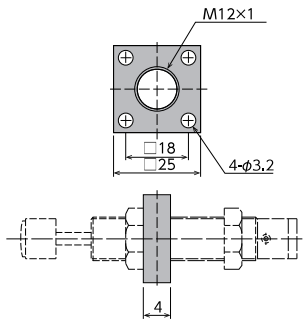
Mass 48g

Note) Material of cap for eccentric angle: POM

Square flange OP-040KB

Model
OP-040KB

- Once the attachment site is determined, use the main unit's nut to securely fasten in place.

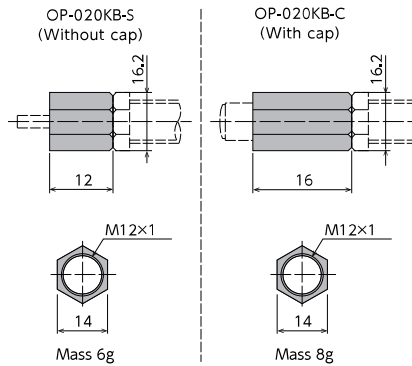


Mass 15g

Stopper nut OP-020KB-□

Model
OP-020KB-S
OP-020KB-C

- Adjust so that it stops 1mm before the stroke end, and fasten with the main unit's nut until secured.

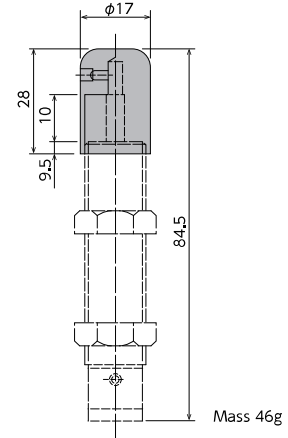


Note) When attaching, make sure that the side without a bearing chamfer is the impact surface.

Liquid-proof cap F□□-1210M□□-C-060

Model
FA-1210MB-C-060
FA-1210MD-C-060
FWM-1210MBD-C-060

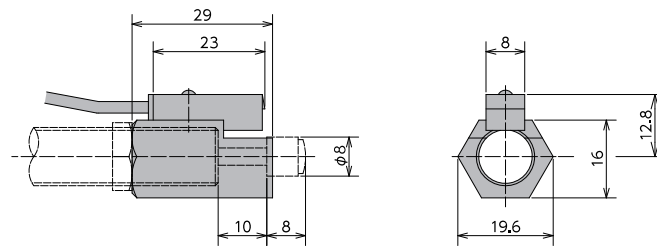
- Ideal for use in environments where oil splatter poses a problem.
- Ensure that the cap is facing upward. If the cap is facing sideways or downward, it cannot provide an effective means for liquid proofing.
- F□□-1210M□□-C-060
 - Model indication A or WM is inserted in □ of F□□.
 - Model indication B, D or BD is inserted in □ of M□□.



Mass 46g

Holder with a switch OP-030KB-2 (With a stopper function)

Model
OP-032KB



Mass 38g

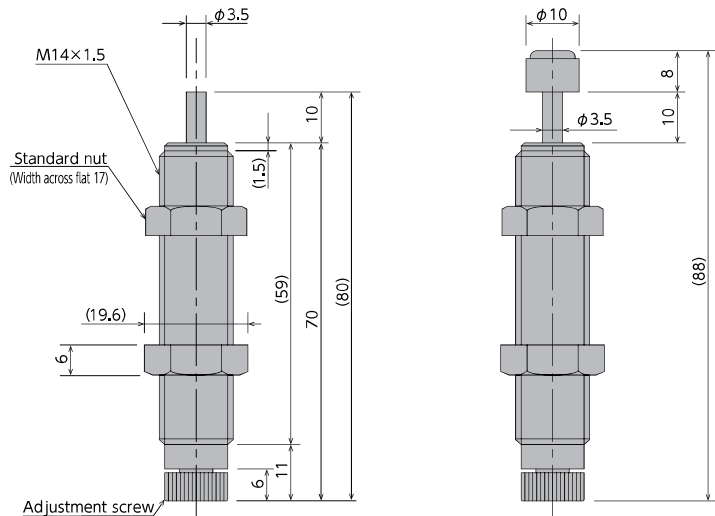
- Although a holder with a switch can be ordered on its own, we strongly recommend ordering one with the main unit. Please include the main unit's model number when placing an order.
- For switch specifications and precautions for use, please refer to page 23.

Standard nuts are sold separately as well.

Applicable Models	Model
FA-1210MB	M12 nut
FA-1210MD	
FWM-1210MBD	

Soft Absorber

FA-1410RB/FA-1410RD/FWM-1410RBD Series



Specifications

Model	Stroke mm	Max. absorption energy J (kgf·m)	Max. equivalent mass kg (kgf)	Range of impact rate m/s	Orifice type			
FA-1410RB-S	10	3.92 (0.4)	30 (30)	0.3~1	Single-orifice type			
FA-1410RB-C								
FA-1410RD-S		5.88 (0.6)	4.5 (4.5)	0.7~3	Multiple-orifice type			
FA-1410RD-C								
FWM-1410RBD-S						35 (35)	0.3~2	Multiple-varying orifice type
FWM-1410RBD-C								

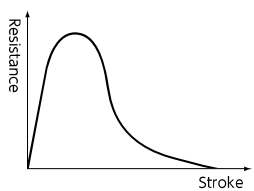
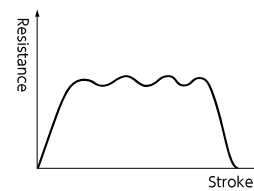
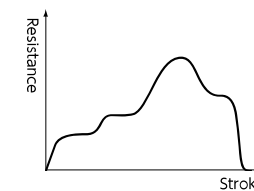
Note) To place an order without a cap, put -S at the end of the model number, and to place an order with a cap, put -C at the end of the model number.

Common Specifications

Max. drag	N (kgf)	1,813 (185)	Operating temperature	°C	-5~70
Max. cycle rate	cycle/min	60	Mass : S type	g	68
Max. absorption energy per minute	J/min (kgf·m/min)	147 (15)	: C type	g	73
Recovering power of the piston rod	N (kgf)	9.8 (1.0) or lower			

Selection Guideline

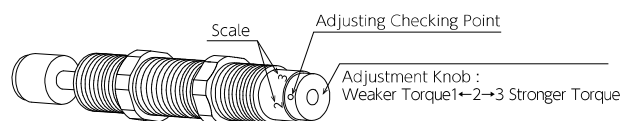
The FA-1410 series has the following three patterns of absorption characteristics depending on the orifice type. Please use the following information as a guideline when making your selection.

Orifice type	Single-orifice type	Multiple-orifice type	Multiple-varying orifice type
Model number	FA-1410RB series	FA-1410RD series	FWM-1410RBD series
Application	For low-speed	For high-speed	For medium speed, in particular with a pneumatic cylinder
Absorbance Properties			

Precautions for Use

- * Do not use this product without carefully reading the attached owner's manual.
- * Ensure that an external stopper (Stopper nut OP-020RB) is also used.
- * Do not turn the oil inlet screw located at the bottom of the main unit.
- * Ensure that sufficient mounting strength is secured for this product. (As a guideline, it should be 2 to 3 times the maximum drag listed in the catalogue.)
- * Do not use this product in a vacuum or a location where it may come in contact with oil.
- * Ensure that an eccentric load is not applied to the soft absorber (Allowable eccentric angle: within $\pm 2.5^\circ$)

Adjustment Method



- * To adjust, turn the adjustment knob located at the bottom of the main unit.
- * Because the adjustment can be done in an analog manner, a value between two integers on the indicator can be set.
- * Once the adjustment is complete, secure with a lock screw using a hex wrench.

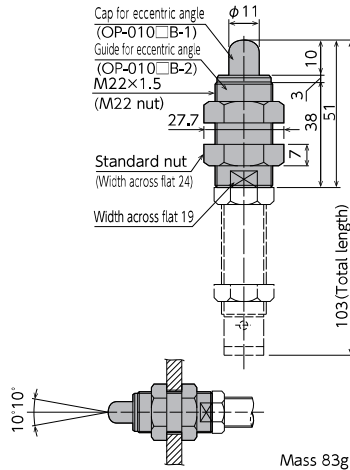
●Products specification might be changed without notice.

Optional Parts

Eccentric angle adaptor OP-010RB

Model
OP-010RB

- Screw the eccentric angle adaptor into the main unit until the cap for the eccentric angle and the piston rod form a tight connection. While maintaining this position, fasten the main unit's nut until secured.
- Use the eccentric angle adaptor when the eccentric angle is 2.5° or larger.
- The main unit can also be used as a stopper.
- Use it with a capless soft absorber.
- The maximum operating eccentric angle with an eccentric angle adaptor is ±10°.
- The caps and the guides for inclined use are not unbundled.



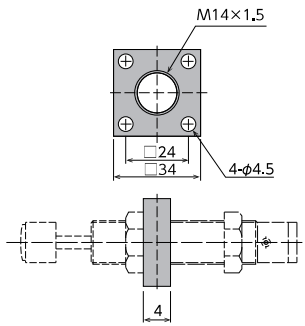
Mass 83g

Note) Material of cap for eccentric angle: POM

Square flange OP-040RB

Model
OP-040RB

- Once the attachment site is determined, use the main unit's nut to securely fasten in place.

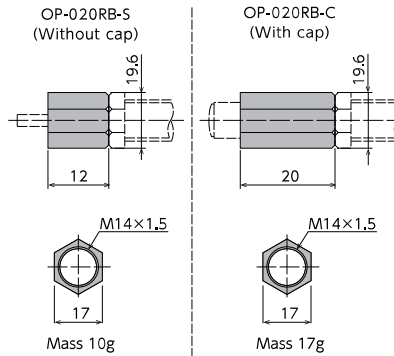


Mass 30g

Stopper nut OP-020RB-□

Model
OP-020RB-S
OP-020RB-C

- Adjust so that it stops 1mm before the stroke end, and fasten with the main unit's nut until secured.

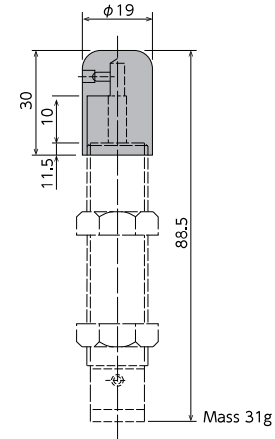


Note) When attaching, make sure that the side without a bearing chamfer is the impact surface.

Liquid-proof cap F□□-1410R □□-C-060

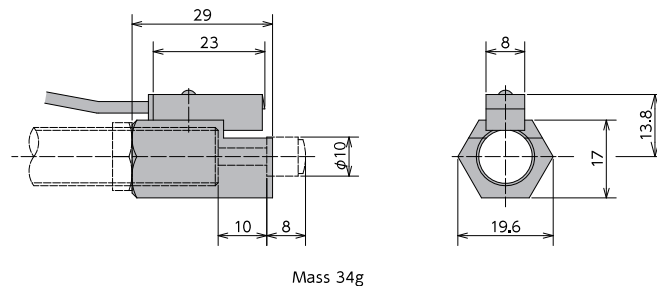
Model
FA-1410RB-C-060
FA-1410RD-C-060
FWM-1410RBD-C-060

- Ideal for use in environments where oil splatter poses a problem.
- Ensure that the cap is facing upward. If the cap is facing sideways or downward, it cannot provide an effective means for liquid proofing.
- F□□-1410M□□-C-060
 - Model indication A or WM is inserted in □ of F□□.
 - Model indication B, D or BD is inserted in □ of M□□.



Holder with a switch OP-030RB-2 (With a stopper function)

Model
OP-032RB



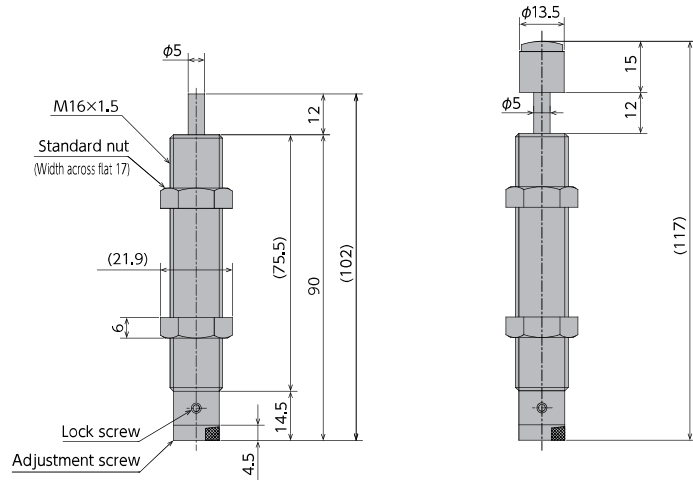
- Although a holder with a switch can be ordered on its own, we strongly recommend ordering one with the main unit. Please include the main unit's model number when placing an order.
- For switch specifications and precautions for use, please refer to page 23.

Standard nuts are sold separately as well.

Applicable Models	Model
FA-1410RB	M14 nut
FA-1410RD	
FWM-1410RBD	

Soft Absorber

FA-1612XB/FA-1612XD/FWM-1612XBD Series



Specifications

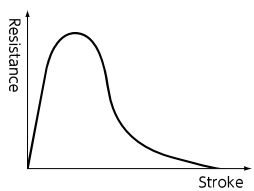
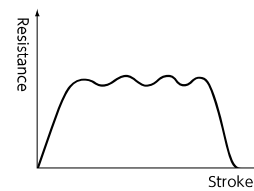
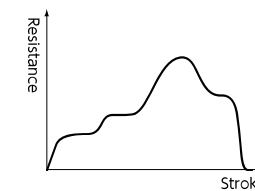
Model	Stroke mm	Max. absorption energy J (kgf·m)	Max. equivalent mass kg (kgf)	Range of impact rate m/s	Orifice type
FA-1612XB-S	12	9.8(1.0)	50(50)	0.3~1	Single-orifice type
FA-1612XB-C					Multiple-orifice type
FA-1612XD-S			10(10)	0.7~3	Multiple-orifice type
FA-1612XD-C					Multiple-orifice type
FWM-1612XBD-S			50(50)	0.3~2	Multiple-varying orifice type
FWM-1612XBD-C					Multiple-varying orifice type

Note) To place an order without a cap, put -S at the end of the model number, and to place an order with a cap, put -C at the end of the model number.

Common Specifications

Max. drag	N(kgf)	2,646(270)	Operating temperature	°C	-5~70
Max. cycle rate	cycle/min	60	Mass : S type	g	108
Max. absorption energy per minute	J/min (kgf·m/min)	235(24)	: C type	g	117
Recovering power of the piston rod	N(kgf)	14.7(1.5) or lower			

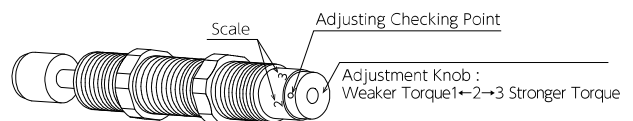
Selection Guideline The FA-1612 series series has the following three patterns of absorption characteristics depending on the orifice type. Please use the following information as a guideline when making your selection.

Orifice type	Single-orifice type	Multiple-orifice type	Multiple-varying orifice type
Model number	FA-1612XB series	FA-1612XD series	FWM-1612XBD series
Application	For low-speed	For high-speed	For medium speed, in particular with a pneumatic cylinder
Absorption characteristics			

Precautions for Use

- * Do not use this product without carefully reading the attached owner's manual.
- * Ensure that an external stopper (Stopper nut OP-020HB) is also used.
- * Do not turn the oil inlet screw located at the bottom of the main unit.
- * Ensure that sufficient mounting strength is secured for this product. (As a guideline, it should be 2 to 3 times the maximum drag listed in the catalogue.)
- * Do not use this product in a vacuum or a location where it may come in contact with oil.
- * Ensure that an eccentric load is not applied to the soft absorber (Allowable eccentric angle: within $\pm 2.5^\circ$)

Adjustment Method



- * To adjust, turn the adjustment knob located at the bottom of the main unit.
- * Because the adjustment can be done in an analog manner, a value between two integers on the indicator can be set.
- * Once the adjustment is complete, secure with a lock screw using a hex wrench.

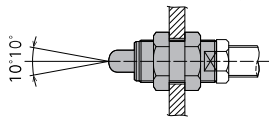
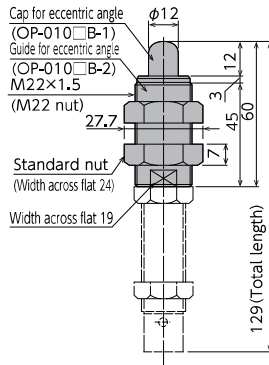
●Products specification might be changed without notice.

Optional Parts

Eccentric angle adaptor OP-010XB

Model
OP-010XB

- Screw the eccentric angle adaptor into the main unit until the cap for the eccentric angle and the piston rod form a tight connection. While maintaining this position, fasten the main unit's nut until secured.
- Use the eccentric angle adaptor when the eccentric angle is 2.5° or larger.
- The main unit can also be used as a stopper.
- Use it with a capless soft absorber.
- The maximum operating eccentric angle with an eccentric angle adaptor is ±10°.
- The caps and the guides for inclined use are not unbundled.



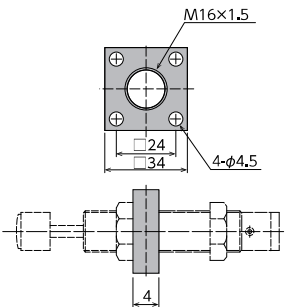
Mass 81g

Note) Material of cap for eccentric angle: POM

Square flange OP-040XB

Model
OP-040XB

- Once the attachment site is determined, use the main unit's nut to securely fasten in place.

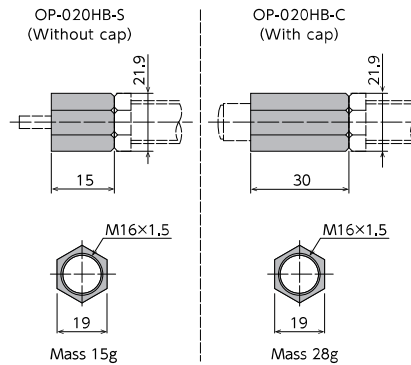


Mass 29g

Stopper nut OP-020HB

Model
OP-020HB-S
OP-020HB-C

- Adjust so that it stops 1mm before the stroke end, and fasten with the main unit's nut until secured.

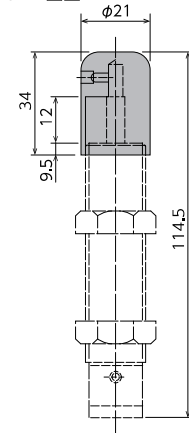


Note) When attaching, make sure that the side without a bearing chamfer is the impact surface.

Liquid-proof cap F□□-1612X□□-C-060

Model
FA-1612XB-C-060
FA-1612XD-C-060
FWM-1612XBD-C-060

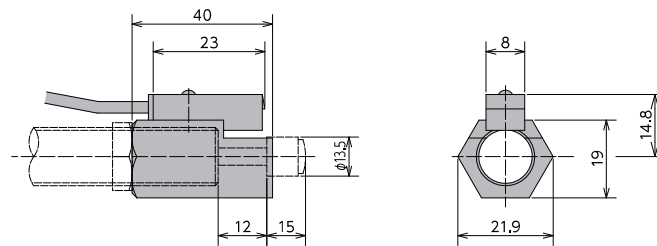
- A drip-proof cap is fitted on the unit on delivery.
- Liquid-proof caps are not sold separately.
- Ensure that the cap is facing upward. If the cap is facing sideways or downward, it cannot provide an effective means for liquid proofing.
- F□□-16120M□□-C-060
 - Model indication A or WM is inserted in □ of F□□.
 - Model indication B, D or BD is inserted in □ of M□□.



Mass 46g

Holder with a switch OP-030HB-□

Model
OP-032HB



Mass 46g

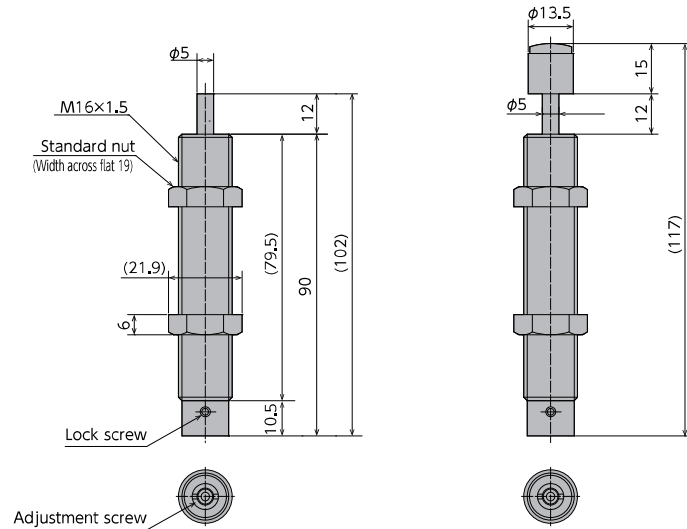
- Although a holder with a switch can be ordered on its own, we strongly recommend ordering one with the main unit. Please include the main unit's model number when placing an order.
- For switch specifications and precautions for use, please refer to page 23.

Standard nuts are sold separately as well.

Applicable Models	Model
FA-1612XB	M16 nut
FA-1612XD	
FWM-1612XBD	

Soft Absorber

FA-1612X Series



Specifications

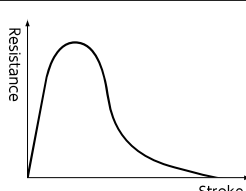
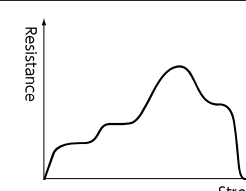
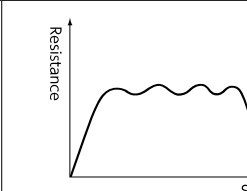
Model	Stroke mm	Max. absorption energy J (kgf·m)	Max. equivalent mass kg (kgf)	Range of impact rate m/s	Orifice type
FA-1612X1-S	12	14.7	200 (200)	0.3~1	Single-orifice type
FA-1612X1-C					
FA-1612X2-S			120 (120)	0.3~2	Multiple-varying orifice type
FA-1612X2-C					
FA-1612X3-S			35 (35)	0.7~3	Multiple-orifice type
FA-1612X3-C					

Note) To place an order without a cap, put -S at the end of the model number, and to place an order with a cap, put -C at the end of the model number.

Common Specifications

Max. drag	N (kgf)	3,528 (360)	Operating temperature	℃	-5~70
Max. cycle rate	cycle/min	60	Mass : S type	g	98
Max. absorption energy per minute	J/min (kgf·m/min)	235 (24)	: C type	g	107
Recovering power of the piston rod	N (kgf)	19.6 (2.0) or lower			

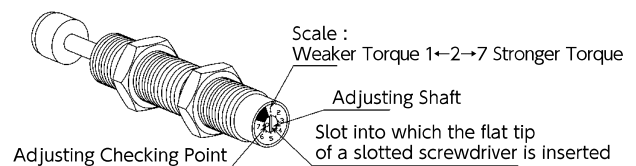
Selection Guideline The FA-1612-FWM series has the following three patterns of absorption characteristics depending on the orifice type. Please use the following information as a guideline when making your selection.

Orifice type	Single-orifice type	Multiple-varying orifice type	Multiple-orifice type
Model number	FA-1612X1 series	FA-1612X2 series	FA-1612X3 series
Application	For low-speed	For medium speed, in particular with a pneumatic cylinder	For high-speed
Absorption characteristics			

Precautions for Use

- * Do not use this product without carefully reading the attached owner's manual.
- * Ensure that an external stopper (Stopper nut OP-020HB) is also used.
- * Do not turn the oil inlet screw located at the bottom of the main unit.
- * Ensure that sufficient mounting strength is secured for this product. (As a guideline, it should be 2 to 3 times the maximum drag listed in the catalogue.)
- * Do not use this product in a vacuum or a location where it may come in contact with oil.
- * Ensure that an eccentric load is not applied to the soft absorber (Allowable eccentric angle: within $\pm 2.5^\circ$)

Adjustment Method



- * To adjust, turn the adjustment knob with a slotted screw driver.
- * Because the adjustment can be done in an analog manner, a value between two integers on the indicator can be set.
- * It does not have a lock screw for locking the adjusted setting.

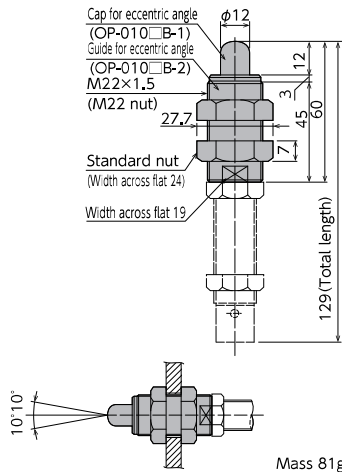
●Products specification might be changed without notice.

Optional Parts

Eccentric angle adaptor OP-010XB

Model
OP-010XB

- Screw the eccentric angle adaptor into the main unit until the cap for the eccentric angle and the piston rod form a tight connection. While maintaining this position, fasten the main unit's nut until secured.
- Use the eccentric angle adaptor when the eccentric angle is 2.5° or larger.
- The main unit can also be used as a stopper.
- Use it with a capless soft absorber.
- The maximum operating eccentric angle with an eccentric angle adaptor is ±10°.
- The caps and the guides for inclined use are not unbundled.

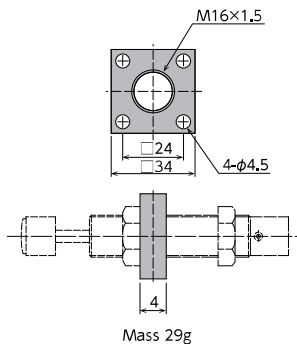


Note) Material of cap for eccentric angle: POM

Square flange OP-040XB

Model
OP-040XB

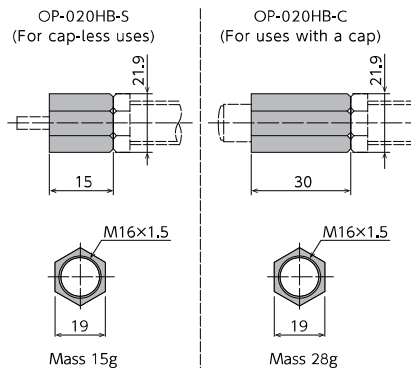
- Once the attachment site is determined, use the main unit's nut to securely fasten in place.



Stopper nut OP-020HB

Model
OP-020HB-S
OP-020HB-C

- Adjust so that it stops 1mm before the stroke end, and fasten with the main unit's nut until secured.

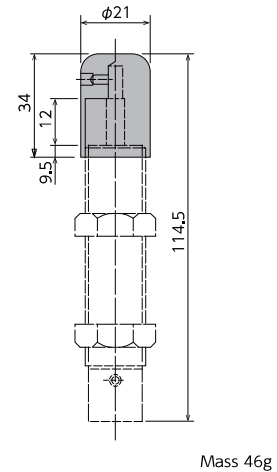


Note) When attaching, make sure that the side without a bearing chamfer is the impact surface.

Liquid-proof cap FA-1612X-C-060

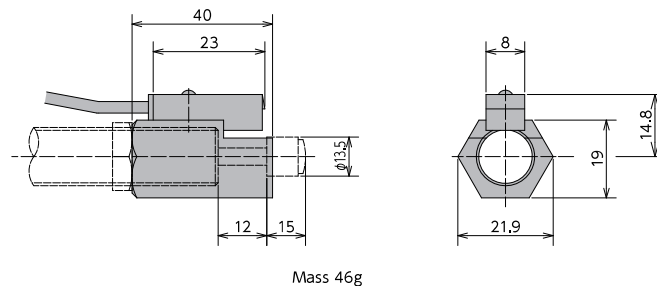
Model
FA-1612X-C-060

- A drip-proof cap is fitted on the unit on delivery.
- Liquid-proof caps are not sold separately.
- Ensure that the cap is facing upward. If the cap is facing sideways or downward, it cannot provide an effective means for liquid proofing.
- F□□-16120M□□-C-060
 - The model number 1, 2, or 3 is inserted in the □ of X□.



Holder with a switch OP-032HB (With a stopper function)

Model
OP-032HB



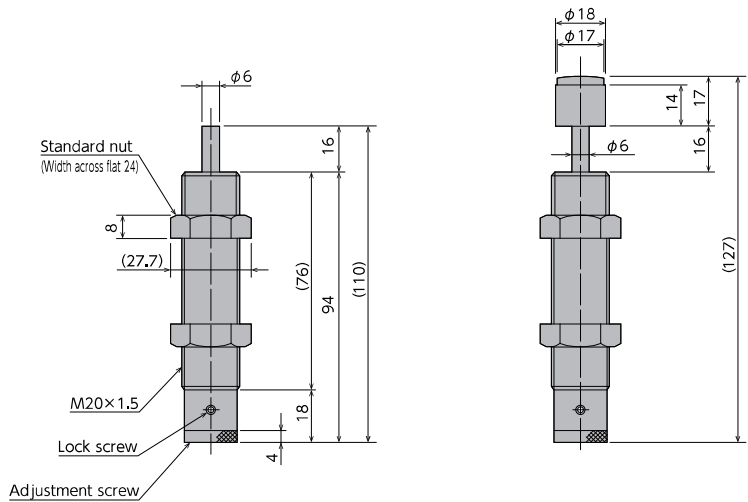
- Although a holder with a switch can be ordered on its own, we strongly recommend ordering one with the main unit. Please include the main unit's model number when placing an order.
- For switch specifications and precautions for use, please refer to page 23.

Standard nuts are sold separately as well.

Applicable Models	Model
FA-1612X	M16 nut

Soft Absorber

FA-2016EB/FA-2016ED/FWM-2016EBD Series



Specifications

Model	Stroke mm	Max. absorption energy J (kgf·m)	Max. equivalent mass kg (kgf)	Range of impact rate m/s	Orifice type
FA-2016EB-S	16	29.4 (3.0)	300 (300)	0.3~1	Single-orifice type
FA-2016EB-C					
FA-2016ED-S					
FA-2016ED-C			120 (120)	0.7~3	Multiple-orifice type
FWM-2016EBD-S					
FWM-2016EBD-C					

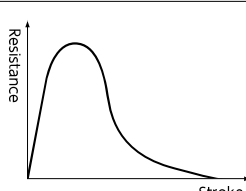
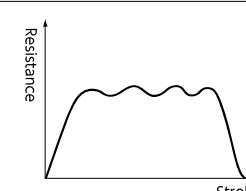
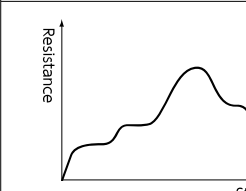
Note) To place an order without a cap, put -S at the end of the model number, and to place an order with a cap, put -C at the end of the model number.

Common Specifications

Max. drag	N (kgf)	3,528 (360)	Operating temperature	°C	-5~70
Max. cycle rate	cycle/min	60	Mass : S type	g	180
Max. absorption energy per minute	J/min (kgf·m/min)	343 (35)	: C type	g	202
Recovering power of the piston rod	N (kgf)	18.1 (1.84) or lower			

Selection Guideline

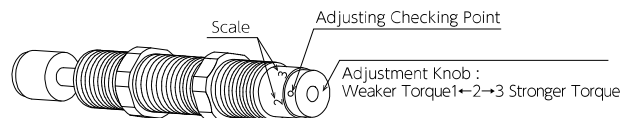
The FA-2016 series has the following three patterns of absorption characteristics depending on the orifice type. Please use the following information as a guideline when making your selection.

Orifice type	Single-orifice type	Multiple-orifice type	Multiple-varying orifice type
Model number	FA-2016EB series	FA-2016ED series	FWM-2016EBD series
Application	For low-speed	For high-speed	For medium speed, in particular with a pneumatic cylinder
Absorption characteristics			

Precautions for Use

- * Do not use this product without carefully reading the attached owner's manual.
- * Ensure that an external stopper (Stopper nut OP-020EB) is also used.
- * Do not turn the oil inlet screw located at the bottom of the main unit.
- * Ensure that sufficient mounting strength is secured for this product. (As a guideline, it should be 2 to 3 times the maximum drag listed in the catalogue.)
- * Do not use this product in a vacuum or a location where it may come in contact with oil.
- * Ensure that an eccentric load is not applied to the soft absorber (Allowable eccentric angle: within $\pm 2.5^\circ$)

Adjustment Method



- * To adjust, turn the adjustment knob located at the bottom of the main unit.
- * Because the adjustment can be done in an analog manner, a value between two integers on the indicator can be set.
- * Once the adjustment is complete, secure with a lock screw using a hex wrench.

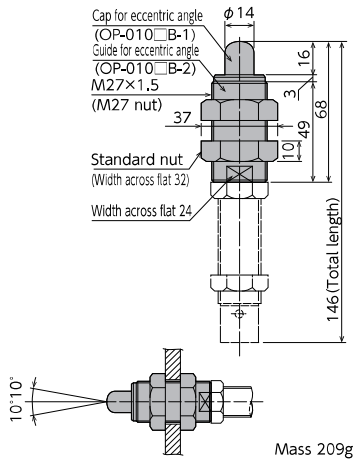
●Products specification might be changed without notice.

Optional Parts

Eccentric angle adaptor OP-010EB

Model
OP-010EB

- Screw the eccentric angle adaptor into the main unit until the cap for the eccentric angle and the piston rod form a tight connection. While maintaining this position, fasten the main unit's nut until secured.
- Use the eccentric angle adaptor when the eccentric angle is 2.5° or larger.
- The main unit can also be used as a stopper.
- Use it with a capless soft absorber.
- The maximum operating eccentric angle with an eccentric angle adaptor is ±10°.
- The caps and the guides for inclined use are not unbundled.

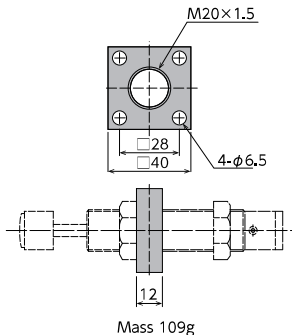


Note) Material of cap for eccentric angle: Metal

Square flange OP-040EB

Model
OP-040EB

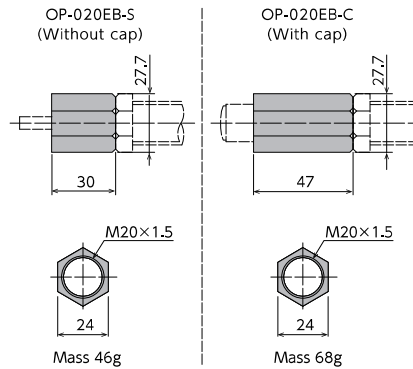
- Once the attachment site is determined, use the main unit's nut to securely fasten in place.



Stopper nut OP-020EB-□

Model
OP-020EB-S
OP-020EB-C

- Adjust so that it stops 1mm before the stroke end, and fasten with the main unit's nut until secured.

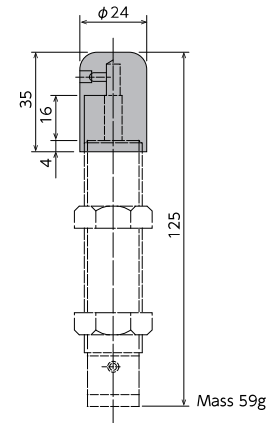


Note) When attaching, make sure that the side without a bearing chamfer is the impact surface.

Liquid-proof cap FA-2016E□-C-060

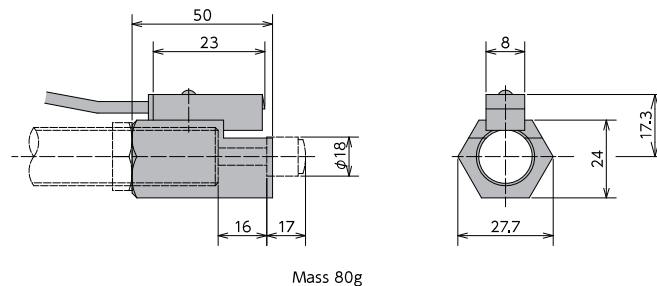
Model
FA-2016EB-C-060
FA-2016ED-C-060
FWM-2016EBD-C-060

- A drip-proof cap is fitted on the unit on delivery.
- Liquid-proof caps are not sold separately.
- Ensure that the cap is facing upward. If the cap is facing sideways or downward, it cannot provide an effective means for liquid proofing.
- F□□-16120M□□-C-060
 - Model indication A or WM is inserted in □ of F□□.
 - Model indication B, D or BD is inserted in □ of M□□.



Holder with a switch OP-030EB-□

Model
OP-032EB



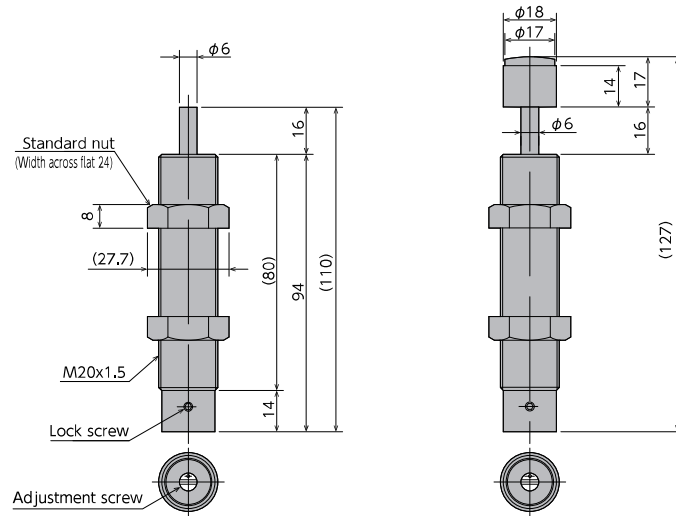
- Although a holder with a switch can be ordered on its own, we strongly recommend ordering one with the main unit. Please include the main unit's model number when placing an order.
- For switch specifications and precautions for use, please refer to page 23.

Standard nuts are sold separately as well.

Applicable Models	Model
FA-2016EB	M20 nut
FA-2016ED	
FWM-2016EBD	

Soft Absorber

FA-2016E Series



Specifications

Model	Stroke mm	Max. absorption energy J (kgf·m)	Max. equivalent mass kg (kgf)	Range of impact rate m/s	Orifice type
FA-2016E1-S	16	35 (3.57)	300 (300)	0.3~1	Single-orifice type
FA-2016E1-C					Multiple-varying orifice type
FA-2016E2-S			200 (200)	0.3~2	Multiple-orifice type
FA-2016E2-C					Multiple-orifice type
FA-2016E3-S			120 (120)	0.7~3	Multiple-orifice type
FA-2016E3-C					Multiple-orifice type

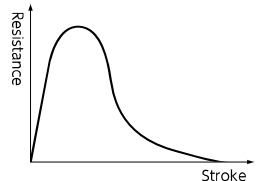
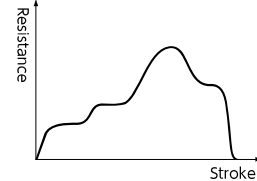
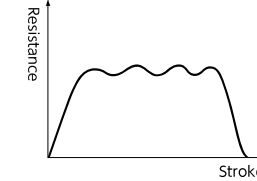
Note) To place an order without a cap, put -S at the end of the model number, and to place an order with a cap, put -C at the end of the model number.

Common Specifications

Max. drag	N (kgf)	6,370 (650)	Operating temperature	°C	-5~70
Max. cycle rate	cycle/min	60	Mass : S type	g	185
Max. absorption energy per minute	J/min (kgf·m/min)	343 (35)	: C type	g	207
Recovering power of the piston rod	N (kgf)	18.1 (1.84) or lower			

Selection Guideline

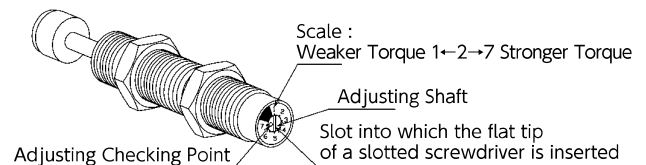
The FA-2016 series has the following three patterns of absorption characteristics depending on the orifice type. Please use the following information as a guideline when making your selection.

Orifice type	Single-orifice type	Multiple-varying orifice type	Multiple-orifice type
Model number	FA-2016E1 series	FA-2016E2 series	FA-2016E3 series
Application	For low-speed	For medium speed, in particular with a pneumatic cylinder	For high-speed
Absorption characteristics			

Precautions for Use

- * Do not use this product without carefully reading the attached owner's manual.
- * Ensure that an external stopper (Stopper nut OP-020EB) is also used.
- * Do not turn the oil inlet screw located at the bottom of the main unit.
- * Ensure that sufficient mounting strength is secured for this product. (As a guideline, it should be 2 to 3 times the maximum drag listed in the catalogue.)
- * Do not use this product in a vacuum or a location where it may come in contact with oil.
- * Ensure that an eccentric load is not applied to the soft absorber (Allowable eccentric angle: within $\pm 2.5^\circ$)

Adjustment Method



- * To adjust, turn the adjustment knob with a slotted screw driver.
- * Because the adjustment can be done in an analog manner, a value between two integers on the indicator can be set.
- * It does not have a lock screw for locking the adjusted setting.

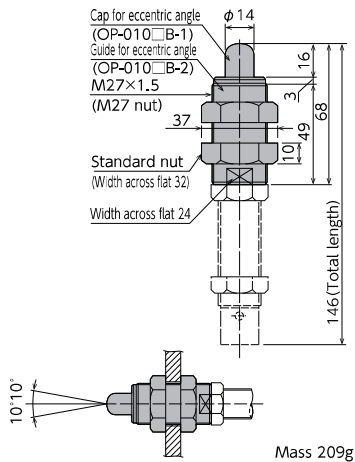
●Products specification might be changed without notice.

Optional Parts

Eccentric angle adaptor OP-010EB

Model
OP-010EB

- Screw the eccentric angle adaptor into the main unit until the cap for the eccentric angle and the piston rod form a tight connection. While maintaining this position, fasten the main unit's nut until secured.
- Use the eccentric angle adaptor when the eccentric angle is 2.5° or larger.
- The main unit can also be used as a stopper.
- Use it with a capless soft absorber.
- The maximum operating eccentric angle with an eccentric angle adaptor is ±10°.
- The caps and the guides for inclined use are not unbundled.

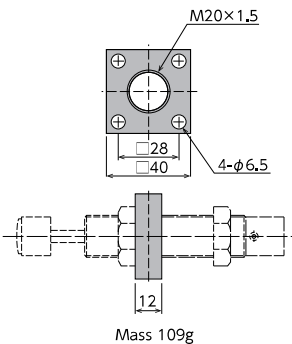


Note) Material of cap for eccentric angle: Metal

Square flange OP-040EB

Model
OP-040EB

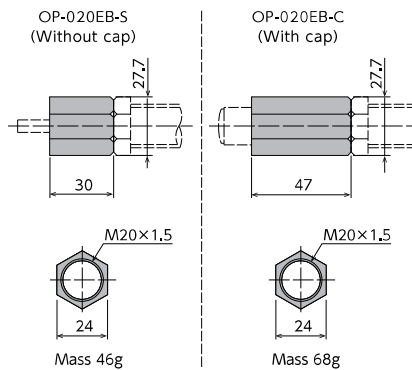
- Once the attachment site is determined, use the main unit's nut to securely fasten in place.



Stopper nut OP-020EB-□

Model
OP-020EB-S
OP-020EB-C

- Adjust so that it stops 1mm before the stroke end, and fasten with the main unit's nut until secured.

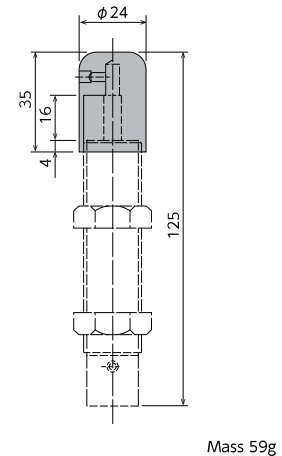


Note) When attaching, make sure that the side without a bearing chamfer is the impact surface.

Liquid-proof cap FA-2016E□-C-060

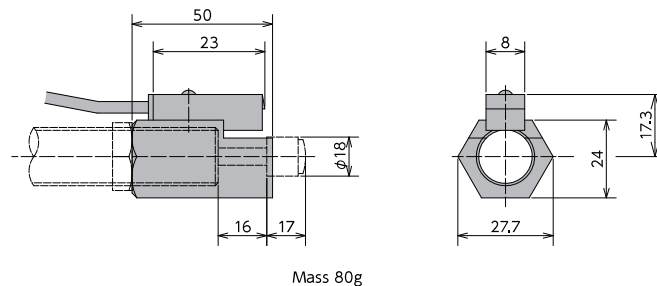
Model
FA-2016E□-C-060

- A drip-proof cap is fitted on the unit on delivery.
- Liquid-proof caps are not sold separately.
- Ensure that the cap is facing upward. If the cap is facing sideways or downward, it cannot provide an effective means for liquid proofing.
- F□□-16120M□□-C-060
 - The model number 1, 2, or 3 is inserted in the □ of X□.



Holder with a switch OP-030EB-□

Model
OP-032EB



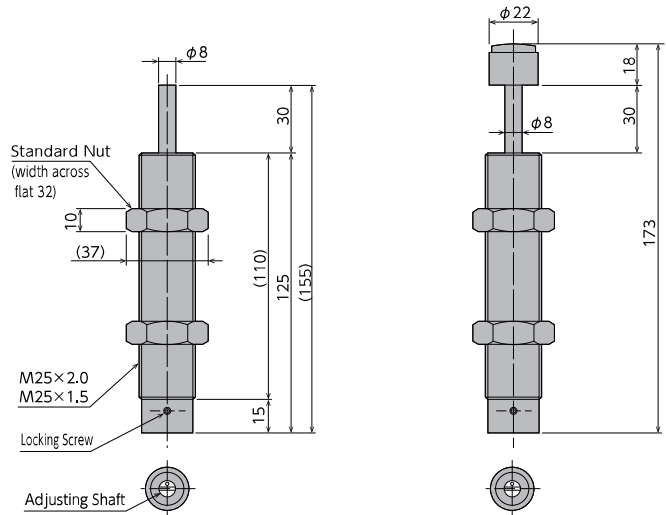
- Although a holder with a switch can be ordered on its own, we strongly recommend ordering one with the main unit. Please include the main unit's model number when placing an order.
- For switch specifications and precautions for use, please refer to page 23.

Standard nuts are sold separately as well.

Applicable Models	Model
FA-2016E	M20 nut

Soft Absorber

FA-2530GB/FA-2530GD/FWM-2530GBD Series



Specifications

Model	Stroke mm	Max. absorption energy J (kgf·m)	Max. equivalent mass kg (kgf)	Range of impact rate m/s	Orifice type
FA-2530GB-S ▲	30	49 (5.0)	400 (400)	0.3~1	Single-orifice type
FA-2530GB-C ▲					Multiple-orifice type
FA-2530GD-S ▲					
FA-2530GD-C ▲			300 (300)	0.3~2	Multiple-varying orifice type
FWM-2530GBD-S ▲					
FWM-2530GBD-C ▲					

▲ Thread pitch P2.0 is supplied as well.

Note) To place an order without a cap, put -S at the end of the model number, and to place an order with a cap, put -C at the end of the model number.

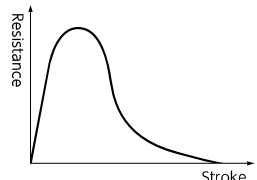
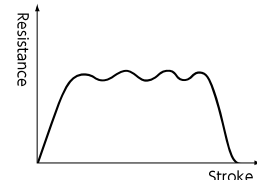
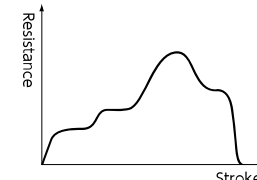
Note: M25 x 2.0 is included in main unit thread pitch specification for FA-2530. A designation shall include the model symbols such as FA-2530GB- * -P2.0, FA-2530GD- * -P2.0, FWM-2530GBD- * -P2.0, etc. for ordering. Note: "*" will be filled in with "S" or "C"

Common Specifications

Max. drag	N (kgf)	3,920 (400)	Operating temperature	°C	-5~70
Max. cycle rate	cycle/min	60	Mass : S type	g	406
Max. absorption energy per minute	J/min (kgf·m/min)	490 (50)	: C type	g	436
Recovering power of the piston rod	N (kgf)	33.2 (3.38) or lower			

Selection Guideline

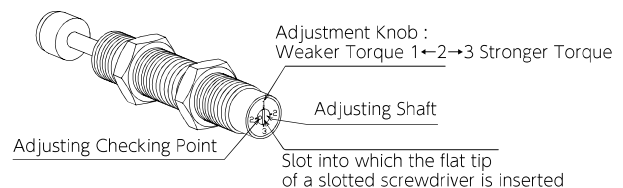
The FA-2530 series has the following three patterns of absorption characteristics depending on the orifice type. Please use the following information as a guideline when making your selection.

Orifice type	Single-orifice type	Multiple-orifice type	Multiple-varying orifice type
Model number	FA-2530GB series	FA-2530GD series	FWM-2530GBD series
Application	For low-speed	For high-speed	For medium speed, in particular with a pneumatic cylinder
Absorption characteristics			

Precautions for Use

- * Do not use this product without carefully reading the attached owner's manual.
- * Ensure that an external stopper (Stopper nut OP-020GB) is also used.
- * Do not turn the oil inlet screw located at the bottom of the main unit.
- * Ensure that sufficient mounting strength is secured for this product. (As a guideline, it should be 2 to 3 times the maximum drag listed in the catalogue.)
- * Do not use this product in a vacuum or a location where it may come in contact with oil.
- * Ensure that an eccentric load is not applied to the soft absorber (Allowable eccentric angle: within $\pm 2.5^\circ$)

Adjustment Method



- * To adjust, turn the adjustment knob with a slotted screw driver.
- * Because the adjustment can be done in an analog manner, a value between two integers on the indicator can be set.
- * It does not have a lock screw for locking the adjusted setting.

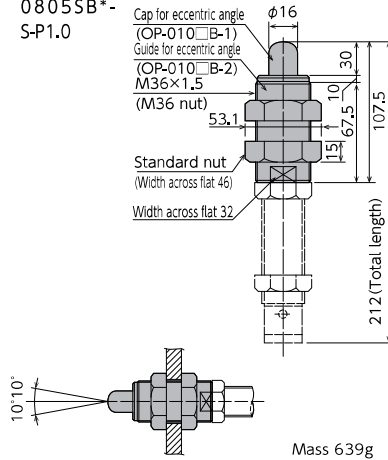
●Products specification might be changed without notice.

Optional Parts

Eccentric angle adaptor OP-010GB

Model
OP-010GB

- Screw the eccentric angle adaptor into the main unit until the cap for the eccentric angle and the piston rod form a tight connection. While maintaining this position, fasten the main unit's nut until secured.
- Use the eccentric angle adaptor when the eccentric angle is 2.5° or larger.
- The main unit can also be used as a stopper.
- Use it with a capless soft absorber.
- The maximum operating eccentric angle with an eccentric angle adaptor is ±10°.
- The caps and the guides for inclined use are not unbundled.
- The inclined adapter is not available for FA-0805SB*-S-P1.0

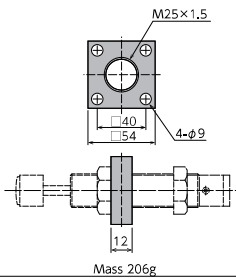


Note) Material of cap for eccentric angle: Metal

Square flange OP-040GB

Model
OP-040GB

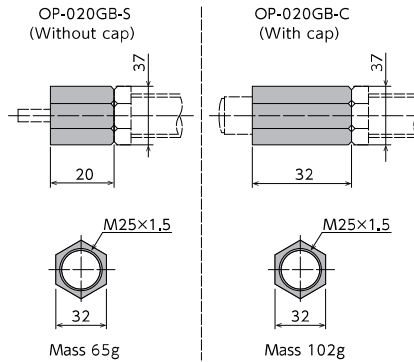
- Once the attachment site is determined, use the main unit's nut to securely fasten in place.



Stopper nut OP-020GB-□

Model
OP-020GB-S
OP-020GB-C

- Adjust so that it stops 1mm before the stroke end, and fasten with the main unit's nut until secured.

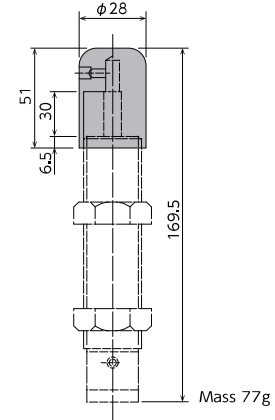


Note) When attaching, make sure that the side without a bearing chamfer is the impact surface.
M25 X 2.0 is also available as a screw pitch specification.
Model number is either OP-020GB-S or C-P2.0

Liquid-proof cap F□□-2530G□□-C-060

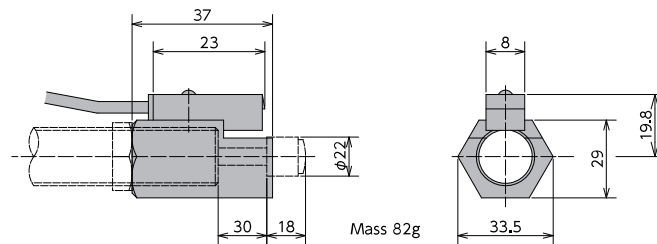
Model
FA-2530GB-C-060
FA-2530GD-C-060
FWM-2530GBD-C-060

- A drip-proof cap is fitted on the unit on delivery.
- Liquid-proof caps are not sold separately.
- Ensure that the cap is facing upward. If the cap is facing sideways or downward, it cannot provide an effective means for liquid proofing.
- F□□-2530G□□-C-060
 - Model indication A or WM is inserted in □ of F□□.
 - Model indication B, D or BD is inserted in □ of M□□.



Holder with a switch OP-030GB-□

Model
OP-032GB



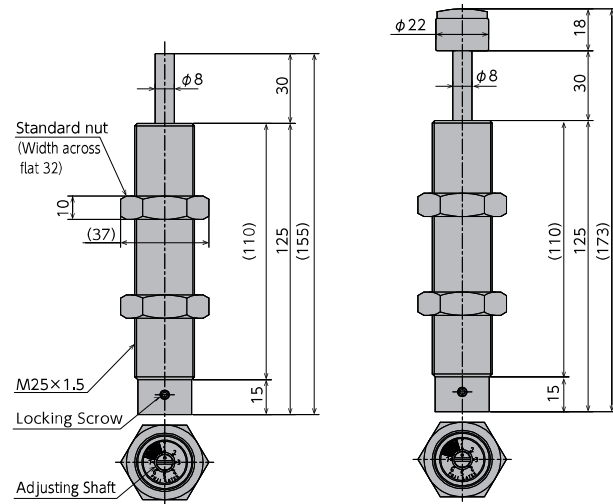
- Although a holder with a switch can be ordered on its own, we strongly recommend ordering one with the main unit. Please include the main unit's model number when placing an order.
- For switch specifications and precautions for use, please refer to page 23.

Standard nuts are sold separately as well.

Applicable Models	Model
FA-2530GB	M25 nut
FA-2530GD	
FWM-2530GBD	
FA-2530GB P2.0	M25-P2 nut
FA-2530GD P2.0	
FWM-2530GBD P2.0	

Soft Absorber

FA-2530G/FA-2530SL Series



Specifications

Model	Stroke mm	Max. absorption energy J (kgf·m)	Max. equivalent mass kg (kgf)	Range of impact rate m/s	Orifice type
FA-2530G1-S	30	49 (5.0)	400 (400)	0.3~1	Single-orifice type
FA-2530G1-C					
FA-2530G2-S		58.8 (6.0)	300 (300)	0.3~2	Multiple-varying orifice type
FA-2530G2-C					
FA-2530G3-S					
FA-2530G3-C		49 (5.0)	4,150 (4,150)	0.05~0.5	Multiple-varying orifice type
FA-2530SL-S					
FA-2530SL-C					

Note) To place an order without a cap, put -S at the end of the model number, and to place an order with a cap, put -C at the end of the model number.

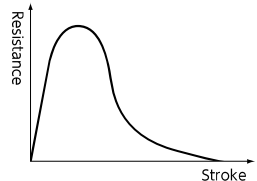
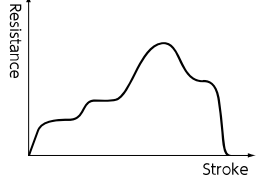
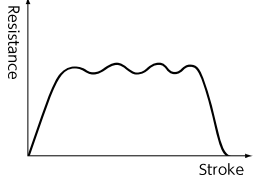
Common Specifications

Max. drag	N (kgf)	6,370 (650)	Operating temperature	°C	-5~70
Max. cycle rate	cycle/min	60	Mass : S type	g	388
Max. absorption energy per minute	J/min (kgf·m/min)	490 (50)	: C type	g	418
Recovering power of the piston rod	N (kgf)	30.8 (3.14) or lower			

Note) M25 X 2.0 is also available as the main unit's screw pitch specifications for the FA-2530 series. Please your order using the model number FA-2530G*⁻S-P2.0 or FA-2530G*⁻C-P2.0, pitch specifications for the FA-2530 series. Please your order using the model number FA-2530G*⁻S-P2.0 or FA-2530G*⁻C-P2.0.

Selection Guideline

The FA-2530 series has the following three patterns of absorption characteristics depending on the orifice type. Please use the following information as a guideline when making your selection.

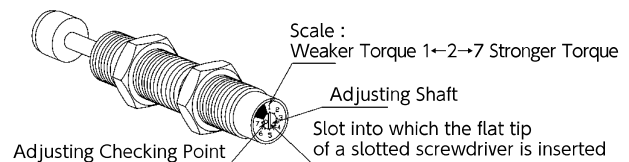
Orifice type	Single-orifice type	Multiple-varying orifice type	Multiple-orifice type
Model number	FA-2530G1 series	FA-2530G2, SL series	FA-2530G3 series
Application	For low-speed	For medium speed, in particular with a pneumatic cylinder	For high-speed
Absorption characteristics			

* The super low speed models are applicable for a lower collision speed range than low speed models.

Precautions for Use

- * Do not use this product without carefully reading the attached owner's manual.
- * Ensure that an external stopper (Stopper nut OP-020GB) is also used.
- * Do not turn the oil inlet screw located at the bottom of the main unit.
- * Ensure that sufficient mounting strength is secured for this product. (As a guideline, it should be 2 to 3 times the maximum drag listed in the catalogue.)
- * Do not use this product in a vacuum or a location where it may come in contact with oil.
- * Ensure that an eccentric load is not applied to the soft absorber (Allowable eccentric angle: within $\pm 2.5^\circ$)

Adjustment Method



- * To adjust, turn the adjustment knob with a slotted screw driver.
- * Because the adjustment can be done in an analog manner, a value between two integers on the indicator can be set.
- * It does not have a lock screw for locking the adjusted setting.

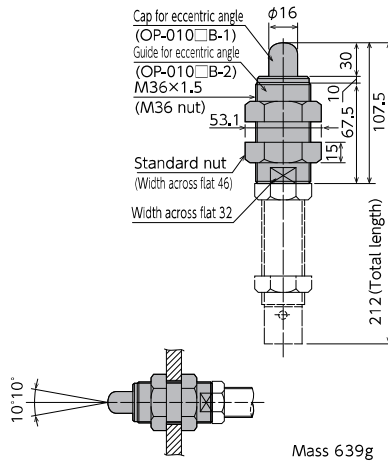
●Products specification might be changed without notice.

Optional Parts

Eccentric angle adaptor OP-010GB

Model
OP-010GB

- Screw the eccentric angle adaptor into the main unit until the cap for the eccentric angle and the piston rod form a tight connection. While maintaining this position, fasten the main unit's nut until secured.
- Use the eccentric angle adaptor when the eccentric angle is 2.5° or larger.
- The main unit can also be used as a stopper.
- Use it with a capless soft absorber.
- The maximum operating eccentric angle with an eccentric angle adaptor is ±10°.
- The caps and the guides for inclined use are not unbundled.

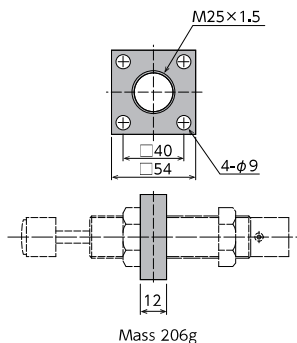


Note) Material of cap for eccentric angle: Metal

Square flange OP-040GB

Model
OP-040GB

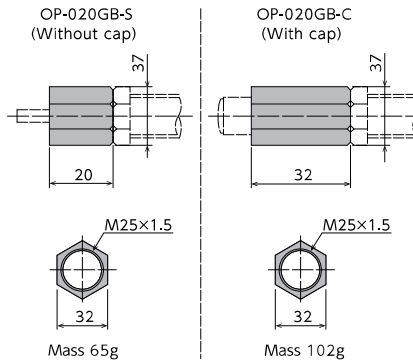
- Once the attachment site is determined, use the main unit's nut to securely fasten in place.



Stopper nut OP-020GB-

Model
OP-020GB-S
OP-020GB-C

- Adjust so that it stops 1mm before the stroke end, and fasten with the main unit's nut until secured.

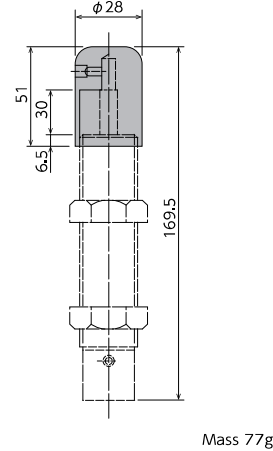


Note) When attaching, make sure that the side without a bearing chamfer is the impact surface.

Liquid-proof cap F-2530G-C-060

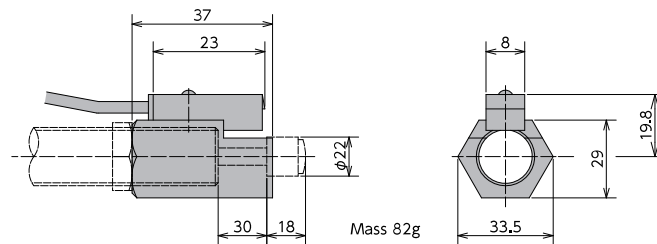
Model
FA-2530G1-C-060
FA-2530G2-C-060
FA-2530G3-C-060
FA-2530SL-C-060

- A drip-proof cap is fitted on the unit on delivery.
- Liquid-proof caps are not sold separately.
- Ensure that the cap is facing upward. If the cap is facing sideways or downward, it cannot provide an effective means for liquid proofing.
- FA-2530G-C-060
 - The model number 1, 2, or 3 is inserted in the of X.



Holder with a switch OP-030GB-

Model
OP-032GB



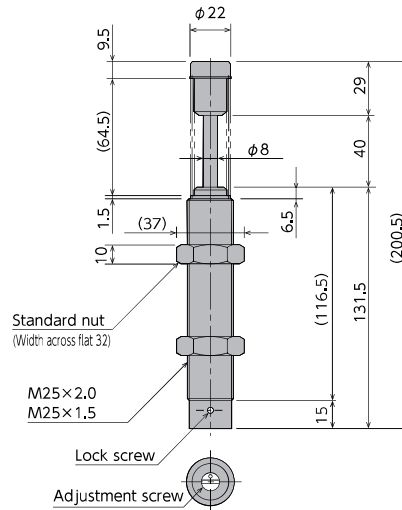
- Although a holder with a switch can be ordered on its own, we strongly recommend ordering one with the main unit. Please include the main unit's model number when placing an order.
- For switch specifications and precautions for use, please refer to page 23.

Standard nuts are sold separately as well.

Applicable Models	Model
FA-2530G	M25 nut
FA-2530SL	M25 nut

Soft Absorber

FA-2540LB/FA-2540LD/FWM-2540LBD Series



Specifications

Model	Stroke mm	Max. absorption energy J (kgf·m)	Max. equivalent mass kg (kgf)	Range of impact rate m/s	Orifice type
FA-2540LB-C ▲	40	63.7 (6.5)	500 (500)	0.3~1	Single-orifice type
FA-2540LD-C ▲			200 (200)	0.7~3	Multiple-orifice type
FWM-2540LBD-C ▲			350 (350)	0.3~2	Multiple-varying orifice type

▲ Thread pitch P2.0 is supplied as well.

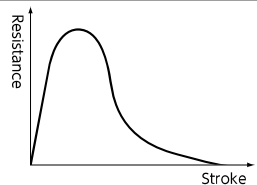
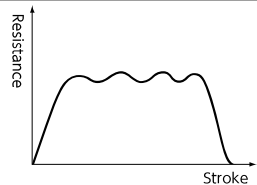
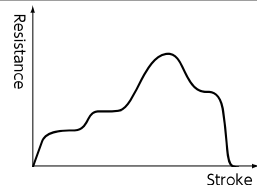
Common Specifications

Max. drag	N (kgf)	3,920 (400)	Operating temperature	℃	-5~70
Max. cycle rate	cycle/min	60	Mass : C type	g	475.1
Max. absorption energy per minute	J/min (kgf·m/min)	637 (65)			
Recovering power of the piston rod	N (kgf)	71.4 (7.29) or lower			

Note) M25 X 2.0 is also available as the main unit's screw pitch specifications for the FA-2540 series. Please order using the model number FA-2540L*-C-P.2.0. However, please note that there are no optional parts for it.

Selection Guideline

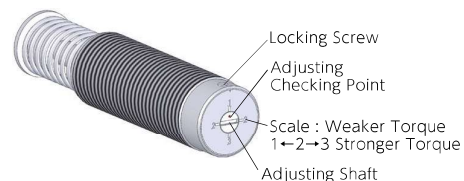
The FA-FWM-2540 series series has the following three patterns of absorption characteristics depending on the orifice type. Please use the following information as a guideline when making your selection.

Orifice type	Single-orifice type	Multiple-orifice type	Multiple-varying orifice type
Model number	FA-2540LB series	FA-2540LD series	FWM-2540LBD series
Application	For low-speed	For high-speed	For medium speed, in particular with a pneumatic cylinder
Absorption characteristics			

Precautions for Use

- * Do not use this product without carefully reading the attached owner's manual.
- * Ensure that an external stopper (Stopper nut OP-020LB) is also used.
- * Do not turn the oil inlet screw located at the bottom of the main unit.
- * Ensure that sufficient mounting strength is secured for this product. (As a guideline, it should be 2 to 3 times the maximum drag listed in the catalogue.)
- * Do not use this product in a vacuum or a location where it may come in contact with oil.
- * Ensure that an eccentric load is not applied to the soft absorber (Allowable eccentric angle: within $\pm 2.5^\circ$)

Adjustment Method



- * To adjust, turn the adjustment knob with a slotted screw driver.
- * Because the adjustment can be done in an analog manner, a value between two integers on the indicator can be set.
- * It does not have a lock screw for locking the adjusted setting.

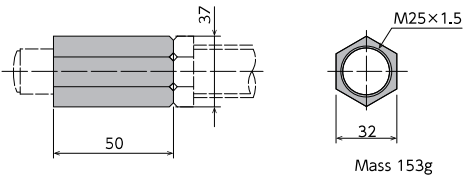
●Products specification might be changed without notice.

Optional Parts

Stopper nut OP-020LB

Model
OP-020LB

- Adjust so that it stops 1mm before the stroke end, and fasten with the main unit's nut until secured.

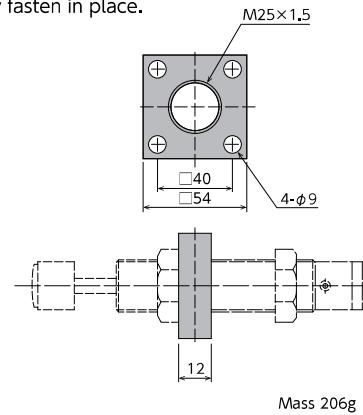


Note) When attaching, make sure that the side without a bearing chamfer is the impact surface.

Square flange OP-040GB

Model
OP-040GB

- Once the attachment site is determined, use the main unit's nut to securely fasten in place.

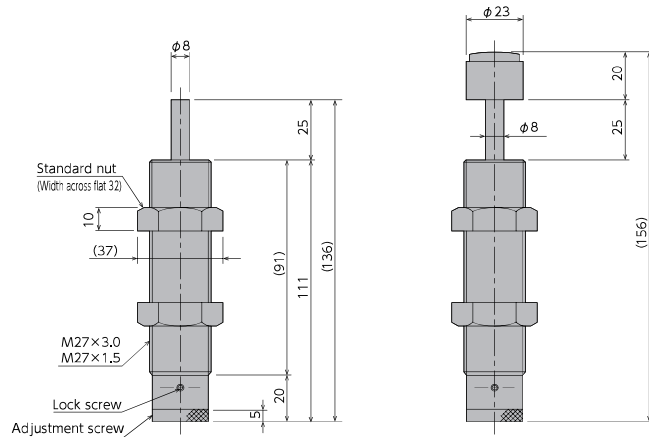


Standard nuts are sold separately as well.

Applicable Models	Model
FA-2540LB	M25 nut
FA-2540LD	
FWM-2540LBD	
FA-2540LB P2.0	M25-P2 nut
FA-2540LD P2.0	
FWM-2540LBD P2.0	

Soft Absorber

FA-2725FB/FA-2725FD/FWM-2725FBD/FA-2725SL Series



Specifications

Model	Stroke mm	Max. absorption energy J (kgf·m)	Max. equivalent mass kg (kgf)	Range of impact rate m/s	Orifice type
FA-2725FB-S ▲	25	79.3(8.1)	650 (650)	0.3~1	Single-orifice type
FA-2725FB-C ▲					Multiple-orifice type
FA-2725FD-S ▲			300 (300)	0.7~3	Multiple-orifice type
FA-2725FD-C ▲					Multiple-varying orifice type
FWM-2725FBD-S ▲			450 (450)	0.3~2	Multiple-varying orifice type
FWM-2725FBD-C ▲					Multiple-varying orifice type
FA-2725SL-S ▲			5,000 (5,000)	0.05~0.5	Multiple-varying orifice type
FA-2725SL-C ▲					Multiple-varying orifice type

▲ Thread pitch P3.0 is supplied as well.

Common Specifications

Max. drag	N (kgf)	6,370 (650)	Operating temperature	°C	-5~70
Max. cycle rate	cycle/min	60	Mass : S type	g	411
Max. absorption energy per minute	J/min (kgf·m/min)	539 (55)	: C type	g	460
Recovering power of the piston rod	N (kgf)	27.3 (2.78) or lower			

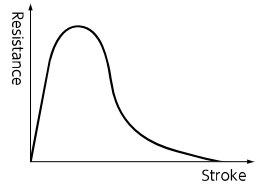
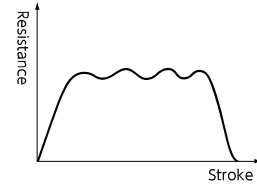
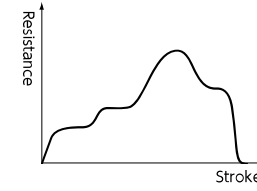
Note) M27X3.0 is also available as the main unit's screw pitch specification for the FA-2725 series. Please order using the model number FA-2725F*-S-P3.0 or FA-2725F*-C-P3.0.

Note: "*" will be filled in with "S" or "C".

Note: The maximum operation cycle of FA-2725SL is 30 (cycle/min). Note: The piston rod returning force of FA-2725SL is lower than 40.6N (4.14 kgf).

Selection Guideline

The FA-FWM-2725 series series has the following three patterns of absorption characteristics depending on the orifice type. Please use the following information as a guideline when making your selection.

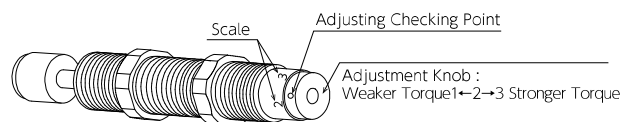
Orifice type	Single-orifice type	Multiple-orifice type	Multiple-varying orifice type
Model number	FA-2725FB series	FA-2725FD series	FWM-2725FBD, FA-2725SL series
Application	For low-speed	For high-speed	For medium speed, in particular with a pneumatic cylinder
Absorption characteristics			

* The super low speed models are applicable to a collision speed range lower than that of low speed models.

Precautions for Use

- * Do not use this product without carefully reading the attached owner's manual.
- * Ensure that an external stopper (Stopper nut OP-020FB) is also used.
- * Do not turn the oil inlet screw located at the bottom of the main unit.
- * Ensure that sufficient mounting strength is secured for this product. (As a guideline, it should be 2 to 3 times the maximum drag listed in the catalogue.)
- * Do not use this product in a vacuum or a location where it may come in contact with oil.
- * Ensure that an eccentric load is not applied to the soft absorber (Allowable eccentric angle: within $\pm 2.5^\circ$)

Adjustment Method



To adjust, turn the adjustment knob located at the bottom of the main unit.

- * Because the adjustment can be done in an analog manner, a value between two integers on the indicator can be set.
- * Once the adjustment is complete, secure with a lock screw using a hex wrench.

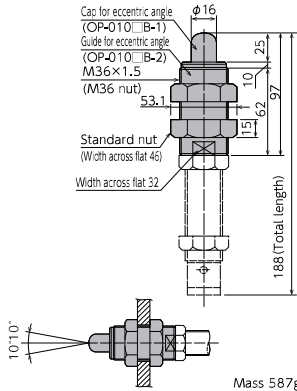
● Products specification might be changed without notice.

Optional Parts

Eccentric angle adaptor OP-010FB

Model
OP-010FB

- Screw the eccentric angle adaptor into the main unit until the cap for the eccentric angle and the piston rod form a tight connection. While maintaining this position, fasten the main unit's nut until secured.
- Use the eccentric angle adaptor when the eccentric angle is 2.5° or larger.
- The main unit can also be used as a stopper.
- Use it with a capless soft absorber.
- The maximum operating eccentric angle with an eccentric angle adaptor is ±10°.
- The caps and the guides for inclined use are not unbundled.

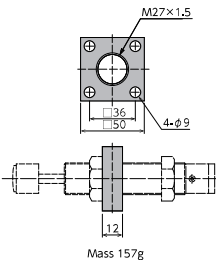


Note) Material of cap for eccentric angle: Metal

Square flange OP-040FB

Model
OP-040FB

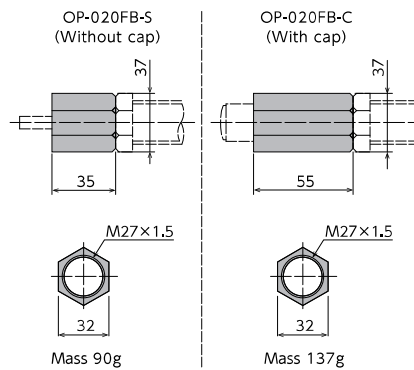
- Once the attachment site is determined, use the main unit's nut to securely fasten in place.



Stopper nut OP-020FB-□

Model
OP-020FB-S
OP-020FB-C

- Adjust so that it stops 1mm before the stroke end, and fasten with the main unit's nut until secured.

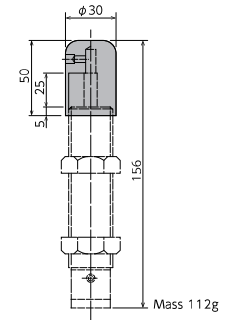


Note) When attaching, make sure that the side without a bearing chamfer is the impact surface. M27 X 3,0 is also available as a screw pitch specification. Model number is either OP-020FB-S or C-P3.0

Liquid-proof cap F□□-2725F□□-C-060

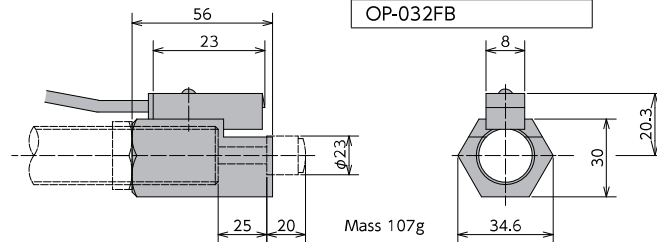
Model
FA-2725FB-C-060
FA-2725FD-C-060
FWM-2725FBD-C-060
FA-2725SL-C-060

- A drip-proof cap is fitted on the unit on delivery.
- Liquid-proof caps are not sold separately.
- Ensure that the cap is facing upward. If the cap is facing sideways or downward, it cannot provide an effective means for liquid proofing.
- F□□-2725F□□-C-060
 - Model indication A or WM is inserted in □ of F□□.
 - Model indication B, D or BD is inserted in □ of M□□.



Holder with a switch OP-030FB-□

Model
OP-032FB



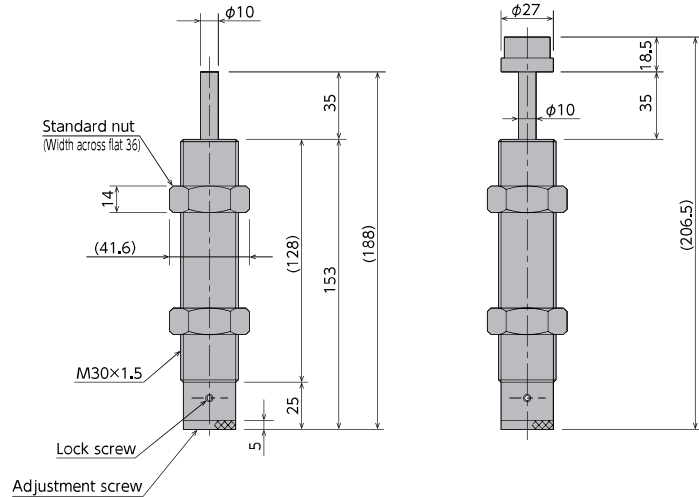
- Although a holder with a switch can be ordered on its own, we strongly recommend ordering one with the main unit. Please include the main unit's model number when placing an order.
- For switch specifications and precautions for use, please refer to page 23.

Standard nuts are sold separately as well.

Applicable Models	Model
FA-2725FB	M27 nut
FA-2725FD	
FWM-2725FBD	
FA-2725SL	
FA-2725FB P3.0	M27-P3 nut
FA-2725FD P3.0	
FWM-2725FBD P3.0	
FA-2725SL P3.0	

Soft Absorber

FA-3035TD/FWM-3035TBD/FA-3035SL Series



Specifications

Model	Stroke mm	Max. absorption energy J(kgf·m)	Max. equivalent mass kg(kgf)	Range of impact rate m/s	Orifice type
FA-3035TD-S	35	196(20)	700(700)	0.7~3	Multiple-orifice type
FA-3035TD-C					
FWM-3035TBD-S			1,300(1,300)	0.3~2	Multiple-varying orifice type
FWM-3035TBD-C					
FA-3035SL-S			30,000(30,000)	0.05~0.5	Multiple-varying orifice type
FA-3035SL-C					

Note) To place an order without a cap, put -S at the end of the model number, and to place an order with a cap, put -C at the end of the model number.

Common Specifications

Max. drag	N(kgf)	16,660(1,700)	Operating temperature	°C	-5~70
Max. cycle rate	cycle/min	30	Mass : S type	g	710
Max. absorption energy per minute	J/min(kgf·m/min)	1,176(120)	: C type	g	760
Recovering power of the piston rod	N(kgf)	60(6.1) or lower			

Note: The maximum operation cycle of FA-3035SL is 15 (cycle/min).

Selection Guideline

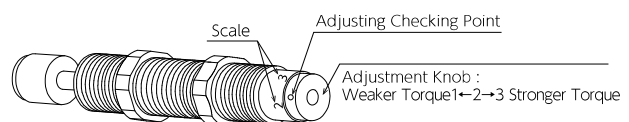
FA-3035 series has the following three patterns of absorption characteristics depending on the orifice type. Please use the following information as a guideline when making your selection.

Orifice type	Multiple-orifice type	Multiple-varying orifice type
Model number	FA-3035TD series	FWM-3035TBD, FA-3035SL series
Application	For high-speed	For medium speed, in particular with a pneumatic cylinder
Absorption characteristics		

Precautions for Use

- * Do not use this product without carefully reading the attached owner's manual.
- * Ensure that an external stopper (Stopper nut OP-020TB) is also used.
- * Do not turn the oil inlet screw located at the bottom of the main unit.
- * Ensure that sufficient mounting strength is secured for this product. (As a guideline, it should be 2 to 3 times the maximum drag listed in the catalogue.)
- * Do not use this product in a vacuum or a location where it may come in contact with oil.
- * Ensure that an eccentric load is not applied to the soft absorber (Allowable eccentric angle: within $\pm 2.5^\circ$)

Adjustment Method



To adjust, turn the adjustment knob located at the bottom of the main unit.

- * Because the adjustment can be done in an analog manner, a value between two integers on the indicator can be set.
- * Once the adjustment is complete, secure with a lock screw using a hex wrench.

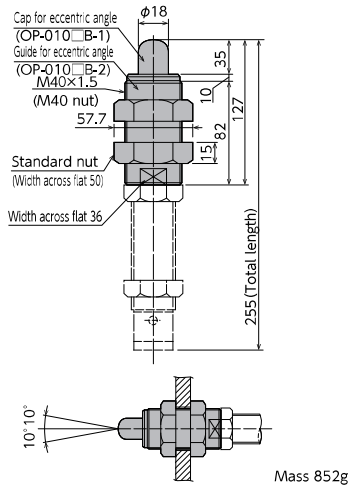
●Products specification might be changed without notice.

Optional Parts

Eccentric angle adaptor OP-010TB

Model
OP-010TB

- Screw the eccentric angle adaptor into the main unit until the cap for the eccentric angle and the piston rod form a tight connection. While maintaining this position, fasten the main unit's nut until secured.
- Use the eccentric angle adaptor when the eccentric angle is 2.5° or larger.
- The main unit can also be used as a stopper.
- Use it with a capless soft absorber.
- The maximum operating eccentric angle with an eccentric angle adaptor is ±10°.
- The caps and the guides for inclined use are not unbundled.

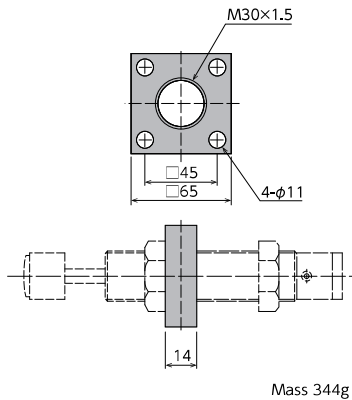


Note) Material of cap for eccentric angle: Metal

Square flange OP-040TB

Model
OP-040TB

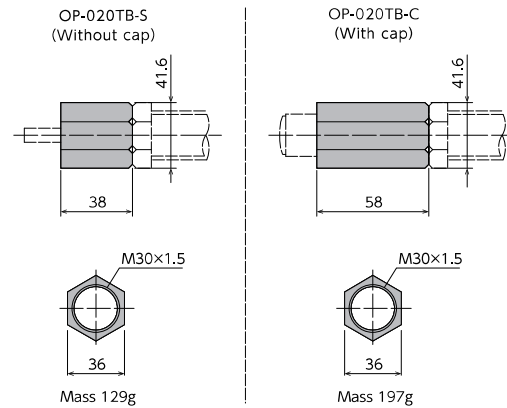
- Once the attachment site is determined, use the main unit's nut to securely fasten in place.



Stopper nut OP-020TB-□

Model
OP-020TB-S
OP-020TB-C

- Adjust so that it stops 1mm before the stroke end, and fasten with the main unit's nut until secured.

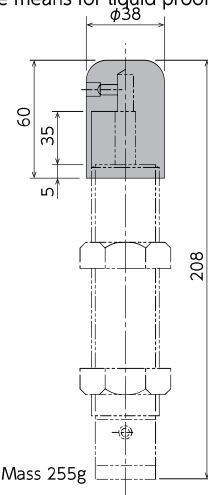


Note) When attaching, make sure that the side without a bearing chamfer is the impact surface.

Liquid-proof cap F □□-3035T □□-C-060

Model
FA-3035TD-C-060
FWM-3035TBD-C-060

- Supplied in assembly
- Ideal for use in environments where oil splatter poses a problem.
- Ensure that the cap is facing upward. If the cap is facing sideways or downward, it cannot provide an effective means for liquid proofing.
- F□□-3035T□□-C-060
- Model indication A or WM is inserted in □ of F□□.
- Model indication D or BD is inserted in □ of T□□.



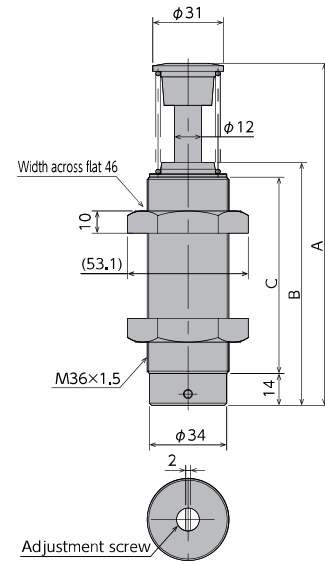
Note) Liquid-proof caps are not sold separately

Standard nuts are sold separately as well.

Applicable Models	Model
FA-3035TD	M30 nut
FWM-3035TBD	
FA-3035SL	

Soft Absorber

FA-3625A/FA-3650A/FA-3625SL/FA-3650SL Series



Dimensions

Model	A	B	C
FA-3625A1/A3/SL-C	150	106.5	86
FA-3650A2/A3/SL-C	217	148.5	128

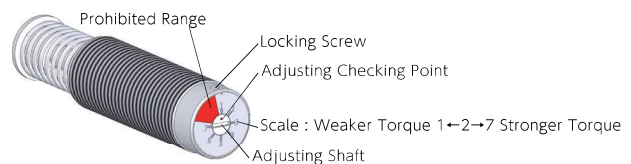
Specifications

Model	Stroke mm	Max. absorption energy J (kgf·m)	Max. equivalent mass kg (kgf)	Range of impact rate m/s	Max. drag N (kgf)	Max. cycle rate cycle/min	Absorption energy per minute J/min (kgf·m/min)	recovering power of the piston rod N (kgf)	Operating temperature °C	Mass g
FA-3625A1-C	25	200 (20.4)	2,000 (2,000)	0.3~1.0	25,000 (2,551)	30	1,500 (153)	100 (10.2) or lower	-5~70	780
FA-3625A3-C			700 (700)	0.7~3.0		15				
FA-3625SL-C			62,500 (62,500)	0.05~0.5		15				
FA-3650A2-C	50	400 (40.8)	2,700 (2,700)	0.3~2.0		30	2,352 (240)	120 (12.2) or lower		
FA-3650A3-C			1,400 (1,400)	0.7~3.0		15				
FA-3650SL-C			124,800 (124,800)	0.05~0.5		15				

Precautions for Use

- * Do not use this product without carefully reading the attached owner's manual.
- * Ensure that an external stopper (Stopper nut OP-020M36) is also used.
- * Do not turn the oil inlet screw located at the bottom of the main unit.
- * Ensure that sufficient mounting strength is secured for this product. (As a guideline, it should be 2 to 3 times the maximum drag listed in the catalogue.)
- * Do not use this product in a vacuum or a location where it may come in contact with oil.
- * Ensure that an eccentric load is not applied to the soft absorber (Allowable eccentric angle: within $\pm 2.5^\circ$)

Adjustment Method



- * To adjust, turn the adjustment knob with a slotted screw driver.
- * Because the adjustment can be done in an analog manner, a value between two integers on the indicator can be set.
- * It does not have a lock screw for locking the adjusted setting.

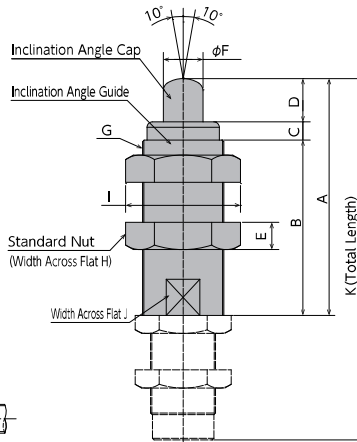
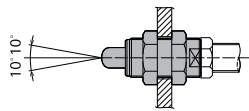
●Products specification might be changed without notice.

Optional Parts

Inclination angle Adapter OP-010-M3625/M3650

Model
OP-010-M3625
OP-010-M3650

- Screw an inclination angle adapter in the main unit until the backlash between the inclination angle cap and the piston rod is eliminated, and securely tighten the nut for the main unit at that position.
- For an inclination angle $2.5^{\circ} \leq$
- The inclination angle guide can be used as a stopper as well
- The soft absorber cannot be used with an optional urethane cap on.
- The maximum inclination angle for use with inclination angle adapter is $\pm 10^{\circ}$
- The caps and the guides for inclined use are not unbundled.

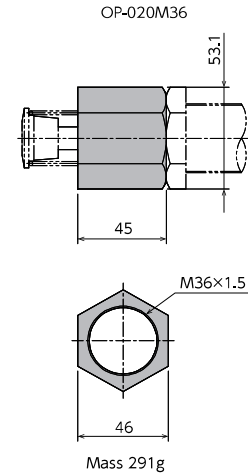


Model	A	B	C	D	ϕF	E	K	G	H	I	J	Mass g
OP-010-M3625	131	107	10	24	22	15	200	M45×1.5	55	63.5	41	880
OP-010-M3650	201	152	10	29	22	15	312	M45×1.5	55	63.5	41	1,270

Stopper nut OP-020M36

Model
OP-020M36

- Adjust so that it stops 1mm before the stroke end, and fasten with the main unit's nut until secured.

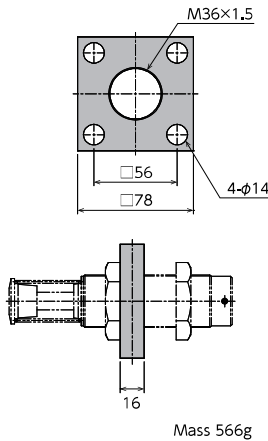


Note) When attaching, make sure that the side without a bearing chamfer is the impact surface.

Square flange OP-040UB

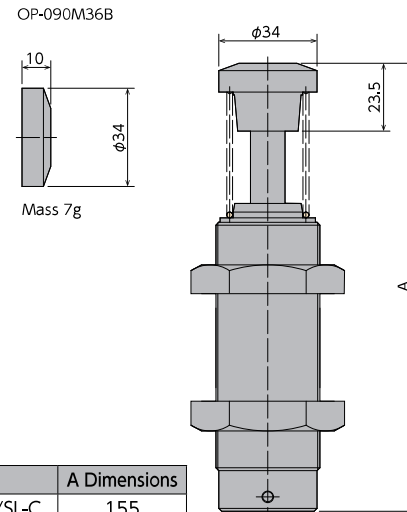
Model
OP-040UB

- Once the attachment site is determined, use the main unit's nut to securely fasten in place.



Urethane cap OP-090M36B

Model
OP-090M36B



Model	A Dimensions
FA-3625A1/A3/SL-C	155
FA-3650A2/A3/SL-C	222

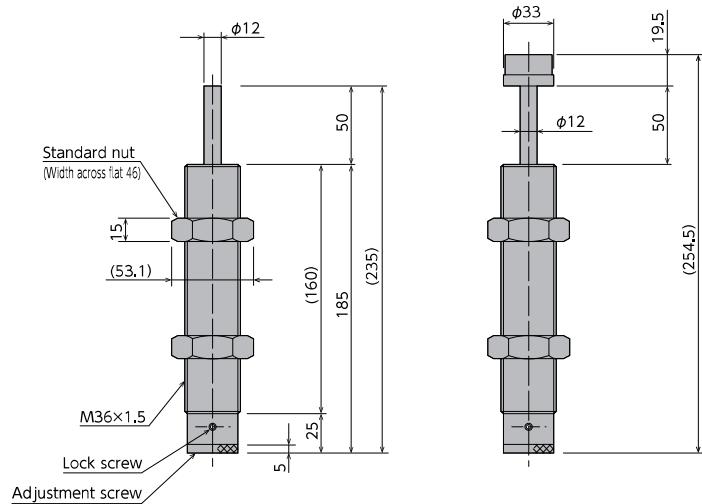
Dimensions with urethane cap attached

Standard nuts are sold separately as well.

Applicable Models	Model
FA-3625A	M36A nut
FA-3625SL	
FA-3650A	
FA-3650SL	

Soft Absorber

FA-3650UD/FWM-3650UBD Series



Specifications

Model	Stroke mm	Max. absorption energy J (kgf·m)	Max. equivalent mass kg (kgf)	Range of impact rate m/s	Orifice type
FA-3650UD-S	50	392 (40)	1,400 (1,400)	0.7~3	Single-orifice type
FA-3650UD-C					
FWM-3650UBD-S			2,700 (2,700)	0.3~2	Multiple-varying orifice type
FWM-3650UBD-C					

Note) To place an order without a cap, put -S at the end of the model number, and to place an order with a cap, put -C at the end of the model number.

Common Specifications

Max. drag	N (kgf)	23,520 (2,400)	Operating temperature	°C	-5~70
Max. cycle rate	cycle/min	30	Mass : S type	g	1,330
Max. absorption energy per minute	J/min (kgf·m/min)	2,352 (240)	: C type	g	1,410
Recovering power of the piston rod	N (kgf)	68.6 (7.0) or lower			

Selection Guideline

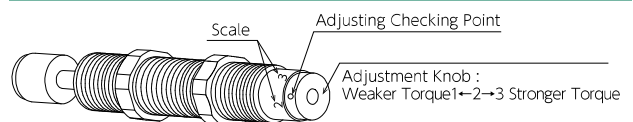
FA-3650 series has the following three patterns of absorption characteristics depending on the orifice type. Please use the following information as a guideline when making your selection.

Orifice type	Multiple-orifice type	Multiple-varying orifice type
Model number	FA-3650UD series	FWM-3650UBD series
Application	For high-speed	For medium speed, in particular with a pneumatic cylinder
Absorption characteristics		

Precautions for Use

- * Do not use this product without carefully reading the attached owner's manual.
- * Ensure that an external stopper (Stopper nut OP-020UB) is also used.
- * Do not turn the oil inlet screw located at the bottom of the main unit.
- * Ensure that sufficient mounting strength is secured for this product. (As a guideline, it should be 2 to 3 times the maximum drag listed in the catalogue.)
- * Do not use this product in a vacuum or a location where it may come in contact with oil.
- * Ensure that an eccentric load is not applied to the soft absorber (Allowable eccentric angle: within $\pm 2.5^\circ$)

Adjustment Method



To adjust, turn the adjustment knob located at the bottom of the main unit.

- * Because the adjustment can be done in an analog manner, a value between two integers on the indicator can be set.
- * Once the adjustment is complete, secure with a lock screw using a hex wrench.

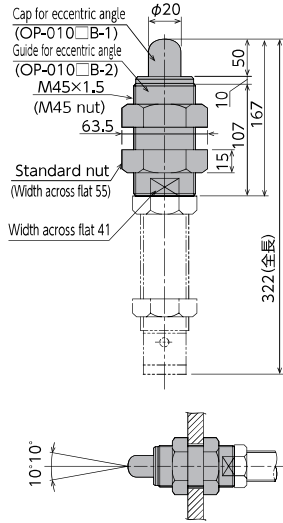
●Products specification might be changed without notice.

Optional Parts

Eccentric angle adaptor OP-010UB

Model
OP-010UB

- Screw the eccentric angle adaptor into the main unit until the cap for the eccentric angle and the piston rod form a tight connection. While maintaining this position, fasten the main unit's nut until secured.
- Use the eccentric angle adaptor when the eccentric angle is 2.5° or larger.
- The main unit can also be used as a stopper.
- Use it with a capless soft absorber.
- The maximum operating eccentric angle with an eccentric angle adaptor is $\pm 10^\circ$.
- The caps and the guides for inclined use are not unbundled.



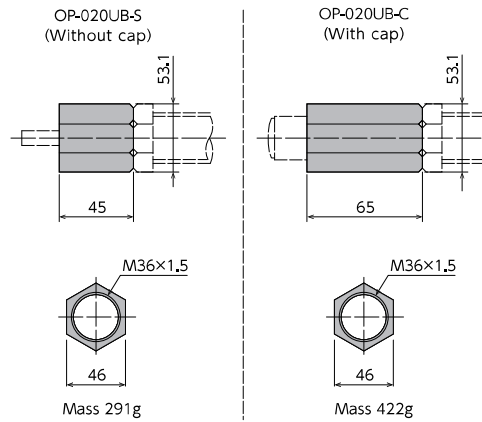
Mass 1,273g

Note) Material of cap for eccentric angle: Metal

Stopper nut OP-020UB-□

Model
OP-020UB-S
OP-020UB-C

- Adjust so that it stops 1mm before the stroke end, and fasten with the main unit's nut until secured.

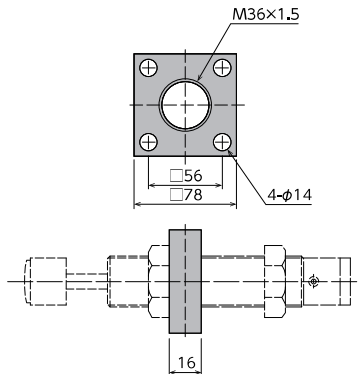


Note) When attaching, make sure that the side without a bearing chamfer is the impact surface.

Square flange OP-040UB

Model
OP-040UB

- Once the attachment site is determined, use the main unit's nut to securely fasten in place.



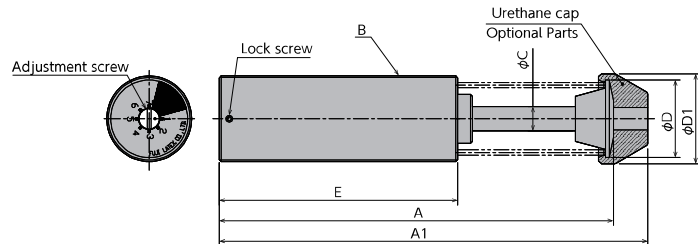
Mass 566g

Standard nuts are sold separately as well.

Applicable Models	Model
FA-3650UD	M36 nut
FWM-3650UBD	

Soft Absorber

FA-4225B/FA-4250B/FA-4225SL/FA-4250SL/FA-4275B Series



*The absorber's main unit does not come with nuts.

Dimensions

Model	A	A1	B	C	D	D1	E
FA-4225B3/SL-C	144	162	M42×1.5	12	38	44	92
FA-4250B3/SL-C	195	213					118
FA-4275B3-C	246	264					143

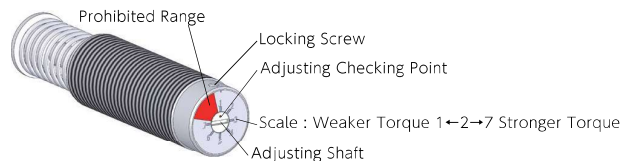
Specifications

Model	Stroke mm	Max. absorption energy J (kgf·m)	Max. equivalent mass kg (kgf)	Range of impact rate m/s	Max. drag N (kgf)	Max. cycle rate cycle/min	Absorption energy per minute J/min (kgf·m/min)	recovering power of the piston rod N (kgf)	Operating temperature °C	Mass g
FA-4225B3-C	25	260 (26.5)	3,400 (3,400)	0.3~3.0	31,590 (3,223)	20	1,858 (190)	120 (12.2)	-5~70	795
FA-4225SL-C			81,400 (81,400)	0.05~0.5		10				
FA-4250B3-C	50	520 (53.1)	6,500 (6,500)	0.3~3.0		10	2,372 (242)			
FA-4250SL-C			162,700 (162,700)	0.05~0.5		5				
FA-4275B3-C	75	780 (79.6)	9,700 (9,700)	0.3~3.0		6	3,345 (341)			1,240

Precautions for Use

- * Do not use this product without carefully reading the attached owner's manual.
- * Ensure that an external stopper (Stopper nut OP-020M42) is also used.
- * Do not turn the oil inlet screw located at the bottom of the main unit.
- * Ensure that sufficient mounting strength is secured for this product. (As a guideline, it should be 2 to 3 times the maximum drag listed in the catalogue.)
- * Do not use this product in a vacuum or a location where it may come in contact with oil.
- * Ensure that an eccentric load is not applied to the soft absorber (Allowable eccentric angle: within $\pm 2.5^\circ$)
- * The urethane caps are consumables. Please replace them when necessary.

Adjustment Method



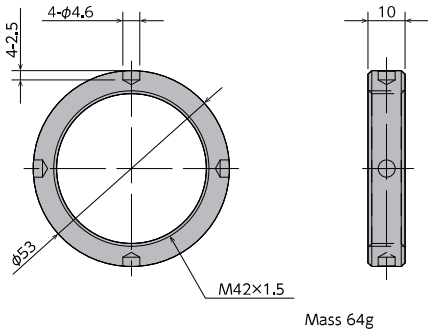
- * To adjust, turn the adjustment knob located at the bottom of the main unit.
- * Because the adjustment can be done in an analog manner, a value between two integers on the indicator can be set.
- * Once the adjustment is complete, secure with a lock screw using the attached hex wrench.

● Products specification might be changed without notice.

Optional Parts

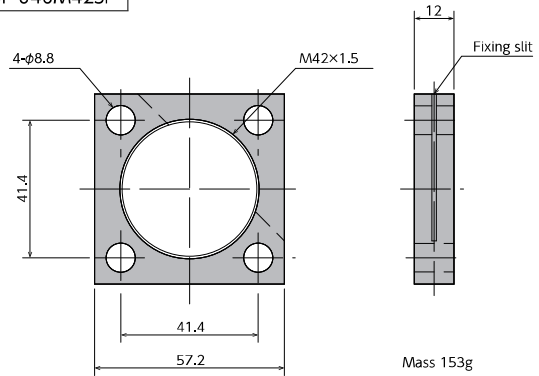
Nut OP-M42

Model
OP-M42



Square flange OP-040 M42SF

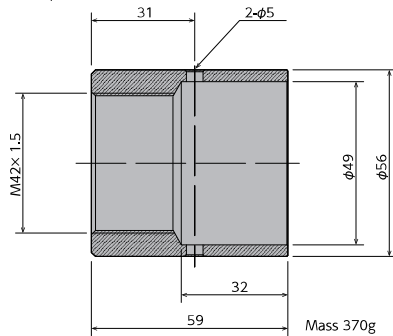
Model
OP-040M42SF



Stopper nut OP-020 M42

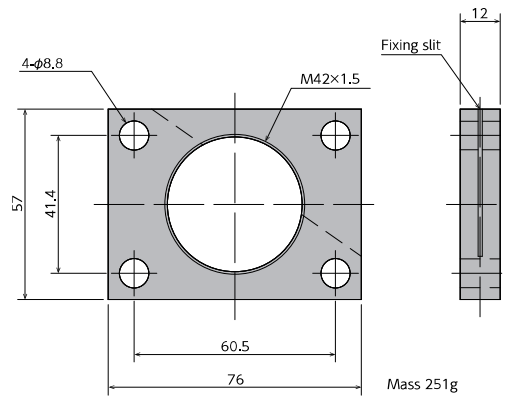
Model
OP-020M42

● Once the attachment site is determined, use the main unit's nut to securely fasten in place.



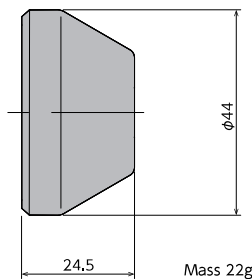
Rectangle flange OP-040 M42RF

Model
OP-040M42RF



Urethane cap OP-090 M42A

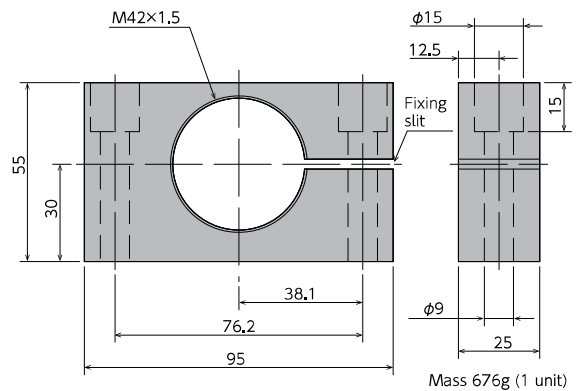
Model
OP-090M42A



Side mount OP-M42SM

Model
OP-M42SM

* Side mount is sold as a set of two.
* Recommended bolt: M8 X 50 hexagon socket head bolt



Soft Absorber

Fixed Type Adjustable type Self-adjusting

FA-4225B/FA-4225SL/FA-4250B/FA-4250SL Series

RoHS Compliant

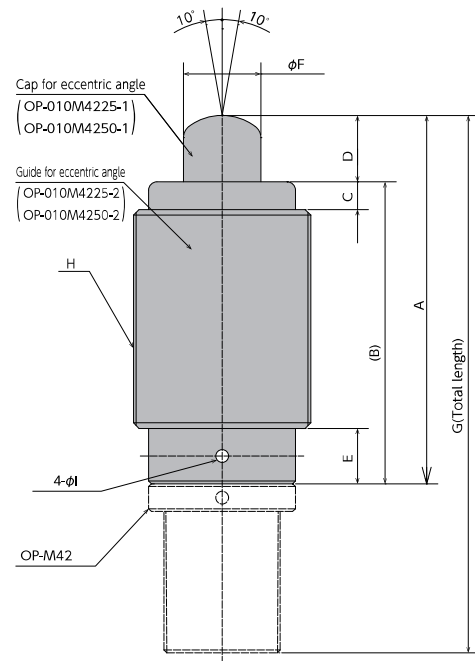
● Products specification might be changed without notice.

Optional Parts

Eccentric angle adaptor OP-010M4225/M4250

Model
OP-010M4225
OP-010M4250

- Screw the eccentric angle adaptor into the main unit until the cap for the eccentric angle and the piston rod form a tight connection. While maintaining this position, fasten the main unit's nut until secured.
- Use the eccentric angle adaptor when the eccentric angle is 2.5° or larger.
- The main unit can also be used as a stopper.
- Use it with a capless soft absorber.
- The maximum operating eccentric angle with an eccentric adaptor is $\pm 10^\circ$.
- Nut for unit is not inclusive.
- Not usable for FA-4250YD-C, FWM-4250YBD-C.
- The caps and the guides for inclined use are not unbundled.

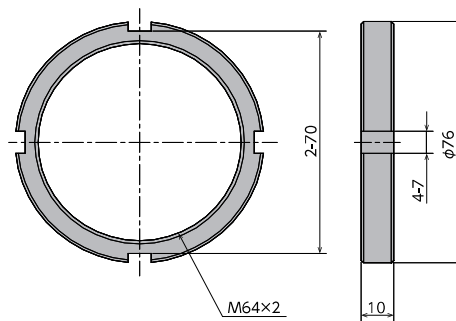


Model	A	B	C	D	E	ϕF	G	H	ϕI	Weight g
OP-010M4225	133	109	10	24	20	28	194	M64×2	4.6	1,600
OP-010M4250	203	154		49			290			2,500

Nut OP-M64

Model
OP-M64

- Usable as the nut for eccentric adaptor



Mass 100g

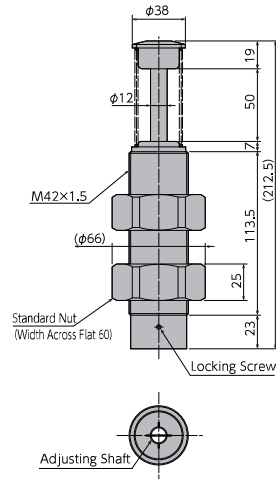
Soft Absorber

Fixed Type **Adjustable type** Self-adjusting

FA-4250YD/FWM-4250YBD Series

RoHS Compliant

●Products specification might be changed without notice.



Specifications

Model	Stroke mm	Max. absorption energy J (kgf·m)	Max. equivalent mass kg (kgf)	Range of impact rate m/s	Orifice type
FA-4250YD-C	50	441 (45)	390 (390)	0.7~3	Multiple-orifice type
FWM-4250YBD-C			3,500 (3,500)	0.3~2	Multiple-varying orifice type

Common Specifications

Max. drag	N(kgf)	27,030 (2,758)	Operating temperature	℃	-5~70
Max. cycle rate	cycle/min	10	Mass : C type	g	1,940
Max. absorption energy per minute	J/min (kgf·m/min)	2,744 (280)			
Recovering power of the piston rod	N(kgf)	83.3 (8.5) or lower			

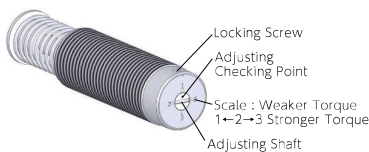
Selection Guideline FA-4250 series has the following three patterns of absorption characteristics depending on the orifice type. Please use the following information as a guideline when making your selection.

Orifice type	Multiple-orifice type	Multiple-varying orifice type
Model number	FA-4250YD series	FWM-4250YBD series
Application	For high-speed	For medium speed, in particular with a pneumatic cylinder
Absorption characteristics		

Precautions for Use

- * Do not use this product without carefully reading the attached owner's manual.
- * We recommend that you use it with an external stopper.
- * Ensure that sufficient mounting strength is secured for this product. (As a guideline, it should be 2 to 3 times the maximum drag listed in the catalogue.)
- * Do not use this product in a vacuum or a location where it may come in contact with oil.
- * Ensure that an eccentric load is not applied to the soft absorber. (Allowable eccentric angle: $\pm 2.5^\circ$)

Adjustment Method

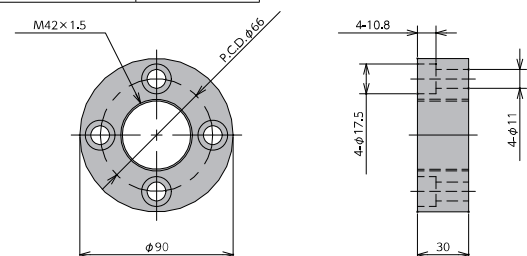


- * To adjust, turn the adjustment knob with a slotted screw driver.
- * Because the adjustment can be done in an analog manner, a value between two integers on the indicator can be set.
- * It does not have a lock screw for locking the adjusted setting.

Optional Parts

Square flange OP-040YB

Applicable Models	Model
FA-4250YD	OP-040YB
FWM-4250YBD	

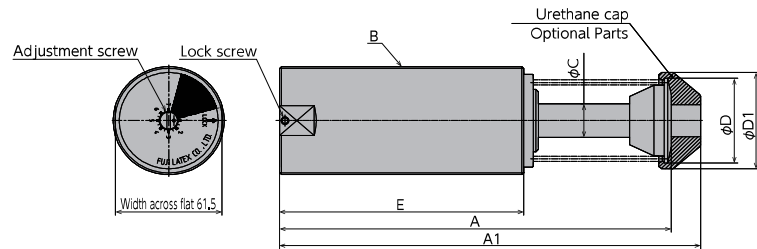


Standard nuts are sold separately as well.

Applicable Models	Model
FA-4250YD	M42 nut
FWM-4250YBD	

Soft Absorber

FA-6450/FA64100/FA64150 Series



* The absorber's main unit does not come with nuts.

Dimensions

Model	A	A1	B	C	D	D1	E
FA-6450□-C	226	243	M64×2	20	50.2	57	141
FA-64100□-C	328	345			191		
FA-64150□-C	456	473			60		241

* A1 and D1 are dimensions with the optional urethane cap attached. (Urethane cap type: OP-090M64A)

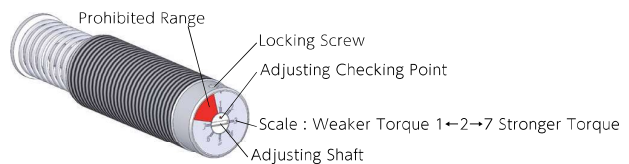
Specifications

Model	Stroke mm	Max. absorption energy J (kgf·m)	Max. equivalent mass kg (kgf)	Range of impact rate m/s	Max. drag N (kgf)	Max. cycle rate cycle/min	Absorption energy per minute J/min (kgf·m/min)	Recovering power of the piston rod N (kgf)	Operating temperature °C	Mass g	Allowable eccentric angle
FA-6450Z-C	50	2,300 (234.7)	10,000~110,000 (10,000~110,000)	0.02~0.3	90,000 (9,184)	3	164,608 (16,797)	150 (15.3)	-5~70	2.5	±2.5
FA-6450L-C			1,000~11,000 (1,000~11,000)	0.3~1.0		15					
FA-6450H-C			200~1,800 (200~1,800)	0.3~3.6		15					
FA-64100L-C	100	4,550 (464.3)	2,000~38,000 (2,000~38,000)	0.3~1.0		10	214,118 (21,849)	180 (18.4)			
FA-64100H-C			250~2,500 (250~2,500)	0.3~3.6		10					
FA-64150L-C	150	6,800 (693.9)	4,000~52,000 (4,000~52,000)	0.3~1.0		8	275,556 (28,118)	370 (37.8)			
FA-64150H-C			300~5,500 (300~5,500)	0.3~3.6	8						

Precautions for Use

- * Do not use this product without carefully reading the attached owner's manual.
- * We recommend that you use it with an external stopper (Stopper nut OP-020M64).
- * Ensure that sufficient mounting strength is secured for this product. (As a guideline, it should be 2 to 3 times the maximum drag listed in the catalogue.)
- * Do not use this product in a vacuum or a location where it may come in contact with oil.
- * Ensure that an eccentric load is not applied to the soft absorber.
- * The urethane caps are consumables. Please replace them when necessary. (Allowable eccentric angle: within ±2.5°)

Adjustment Method



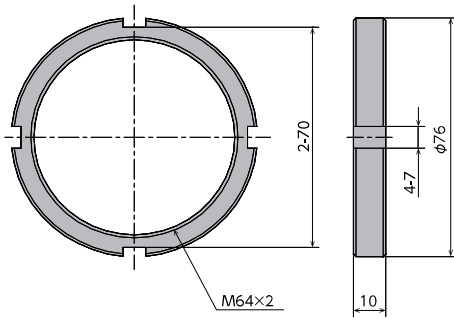
- * To adjust, turn the adjustment knob located at the bottom of the main unit.
- * Because the adjustment can be done in an analog manner, a value between two integers on the indicator can be set.
- * Once the adjustment is complete, secure with a lock screw using a hex wrench.

●Products specification might be changed without notice.

Optional Parts

Nut OP-M64

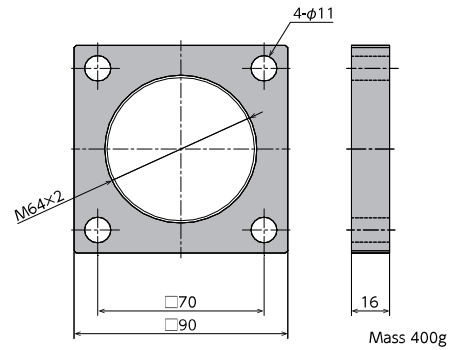
Model
OP-M64



Mass 100g

Square flange OP-040 M64SF

Model
OP-040M64SF

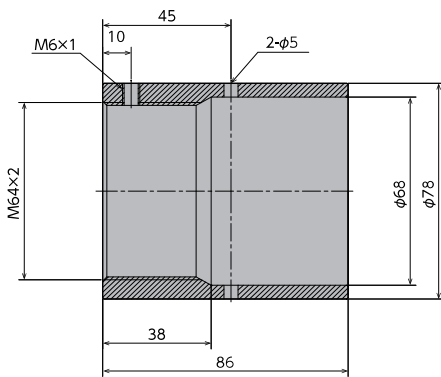


Mass 400g

Stopper nut S OP-020 M64S

Model
OP-020M64S

● Adjust so that it stops 1mm before the stroke end, and fasten with the main unit's nut until secured.

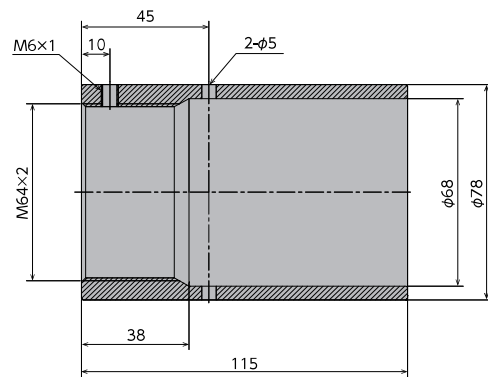


Mass 850g

Stopper nut L OP-020 M64L * Exclusive for FA (FK) -64150

Model
OP-020M64L

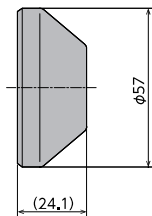
● Adjust so that it stops 1mm before the stroke end, and fasten with the main unit's nut until secured.



Mass 1,150g

Urethane cap OP-090 M64A

Model
OP-090M64A

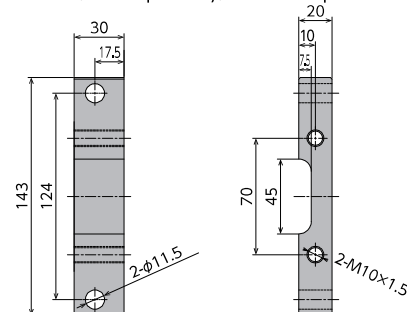


Mass 35g

Foot mount OP-M64FM

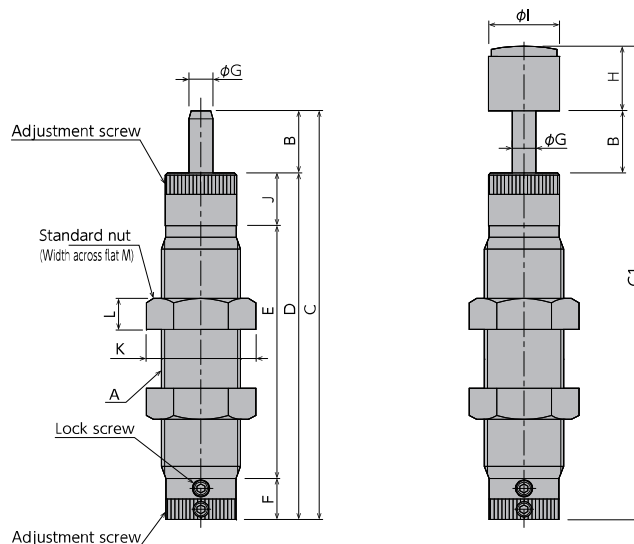
Model
OP-M64FM

- 1 set consists of 2 mounts.
- 4 hexagon socket head cap screws of M10x1.5 are contained in the set.
- The mount is common to the FA series and the FK series.
- 2 nuts OP-M64 (sold separately) will be required.



Soft Absorber

FA-2016EA/FA-2725FA Series



Dimensions

Model	A	B	C	C1	D	E	F	ϕG	H	ϕI	J	K	L	M
FA-2016EA-S/C	M20×1.5	16	105	122	89	65	10.5	6	17	18	13.5	27.7	8	24
FA-2725FA-S/C	M27×1.5	25	136	156	111	86.5	10.5	8	20	23	14	37	10	32

Note) To place an order without a cap, put -S at the end of the model number; to place an order with a cap, put -C at the end of the model number; and to place an order for a crevice type, put -U at the end of the model number.

Specifications

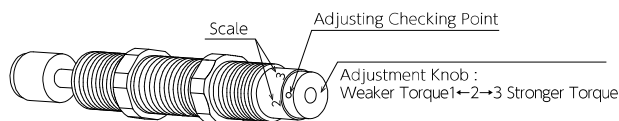
Model	Stroke mm	Max. absorption energy J (kgf·m)	Max. equivalent mass kg (kgf)	Range of impact rate m/s	Max. drag N (kgf)	Max. cycle rate cycle/min	Absorption energy per minute J/min (kgf·m/min)	recovering power of the piston rod N (kgf)	Operating temperature °C	Mass g	Allowable eccentric angle
FA-2016EA-S	16	25.4 (2.6)	200 (200)	0.15~3.0	3,610	60	343 (35)	35.2 (3.59) or lower	-5~70	173	±2.5
191											
FA-2725FA-S	25	79.3 (8.1)	500 (500)	0.15~3.0	7,200	60	539 (55)	44.2 (4.51) or lower	-5~70	402	±2.5
446											

※ FA-2725FA-□シリーズは偏角度アダプター、防滴キャップはご使用できません。

Precautions for Use

- * Do not use this product without carefully reading the attached owner's manual.
- * We recommend that you use it with an external stopper (Stopper nut OP-020EB).
- * Ensure that sufficient mounting strength is secured for this product. (As a guideline, it should be 2 to 3 times the maximum drag listed in the catalogue.)
- * Do not use this product in a vacuum or a location where it may come in contact with oil.
- * Ensure that an eccentric load is not applied to the soft absorber.
- * The urethane caps are consumables. Please replace them when necessary.

Adjustment Method



- * To adjust, turn the adjustment knob located at the bottom of the main unit.
- * Because the adjustment can be done in an analog manner, a value between two integers on the indicator can be set.
- * Once the adjustment is complete, secure with a lock screw using a hex wrench.

RoHS Compliant

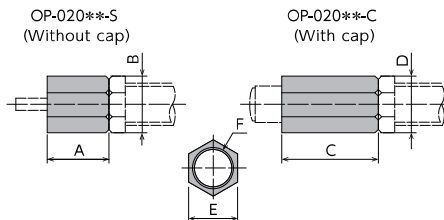
● Products specification might be changed without notice.

Optional Parts

Stopper nut OP-020EB、OP-020FB

Model
OP-020EB-S
OP-020EB-C
OP-020FB-S
OP-020FB-C

- Adjust so that it stops 1mm before the stroke end, and fasten with the main unit's nut until secured.



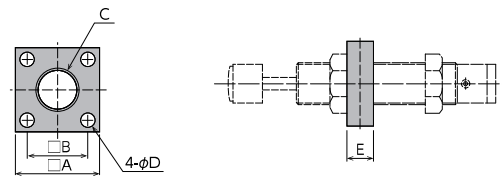
Note) When attaching, make sure that the side without a bearing chamfer is the impact surface.

Model	A	B	C	D	E	F	Mass g	
OP-020EB-*	30	27.7	47	27.7	24	M20X1.5	S	46
							C	68
OP-020FB-*	35	37	55	37	32	M27X1.5	S	90
							C	137

Square flange OP-040EB、OP-040FB

Model
OP-040EB
OP-040FB

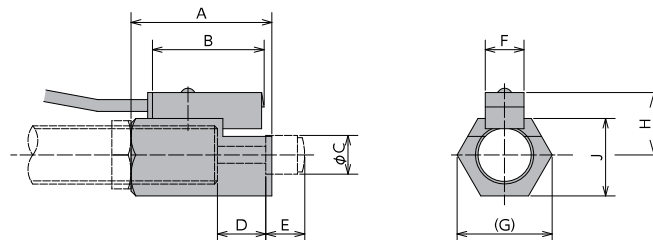
- Once the attachment site is determined, use the main unit's nut to securely fasten in place.



Model	A	B	C	φD	E	Mass g
OP-040EB	40	28	M20×1.5	6.5	12	109
OP-040FB	50	36	M27×1.5	9	12	157

Holder with a switch OP-032** (With stopper function)

Model
OP-032EB
OP-032FB



Model	A	B	C	D	E	F	G	H	J	Mass g
OP-032EB	50	21	18	16	17	8	28	18	24	80
OP-032FB	56	21	23	25	20	8	34.6	21	30	107

- Although a holder with a switch can be ordered on its own, we strongly recommend ordering one with the main unit. Please include the main unit's model number when placing an order.
- For switch specifications and precautions for use, please refer to page 23.

Standard nuts are sold separately as well.

Applicable Models	Model
FA-2016EA	M20 nut
FA-2725FA	M27 nut

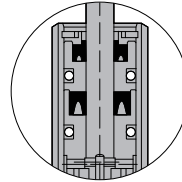
Soft Absorber

FA-S Series (Dust Seal Specifications)

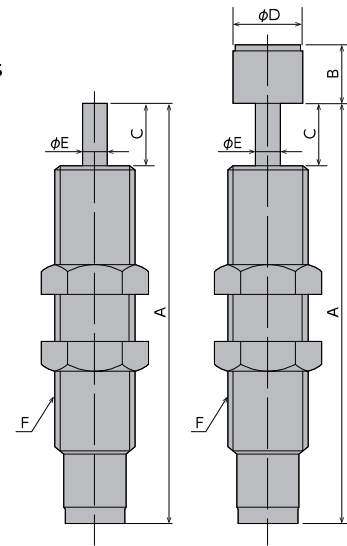
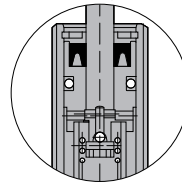
● Products specification might be changed without notice.



Dust seal specifications



Standard product



Dimensions

Model	A	B	C	D	E	F	Mass g	Specification Page
FA-S1210M□-S	76	8	10	8	3.5	M12×1	41	50
FA-S1210M□-C							44	50
FA-S1410R□-S	80	8	10	10	3.5	M14×1.5	63	52
FA-S1410R□-C							68	52
FA-S1612X□-S	102	15	12	13.5	5	M16×1.5	105	54
FA-S1612X□-C							114	54
FA-S2016E□-S	120	17	16	18	6	M20×1.5	196	58
FA-S2016E□-C							218	58
FA-S2530G□-S	155	18	30	22	8	M25×1.5	396	62
FA-S2530G□-C							427	62
FA-S2540L□-C	171.5	29	40	22.5	8	M27×1.5	475	66
FA-S2725F□-S	136	20	25	24	8	M27×1.5	402	68
FA-S2725F□-C							451	68
FA-S3035TD-S	188	18.5	35	27	10	M30×1.5	708	70
FA-S3035TD-C							755	70
FA-S3650UD-S	235	19.5	50	33	12	M36×1.5	1330	74
FA-S3650UD-C							1410	74

Note) B or D is inserted in the □. Insert B for a single-orifice type, and insert D for a multiple-orifice type.

Specifications

* The specification is identical with the standard models for each type

Precautions for Use

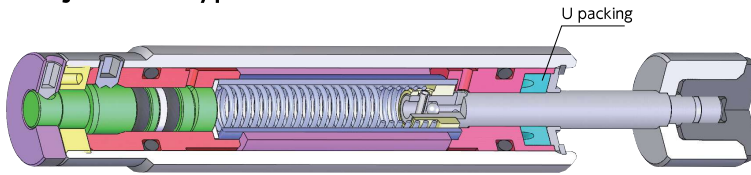
- * Do not use this product in places where it may come in contact with oil as it does not have a liquid-proof structure.
- * Please contact our sales department when the use of optional parts is planned.

- * Although the dimensions are identical to those of the FA series standard products (adjustable), the FA-S2016 series has a longer overall length (dimension A).

●Products specification might be changed without notice.

Overview

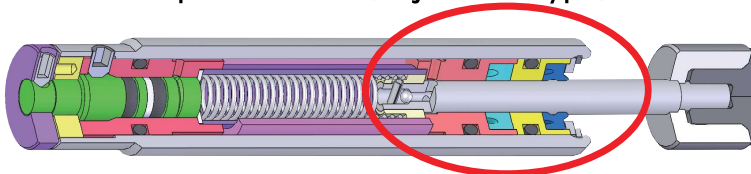
Adjustable type



In the case of a normal absorber, dust that has adhered to it may intrude the inside with each stroke. This can damage the seal and may lead to a defect such as oil leakage.



Dust seal specifications (adjustable type)



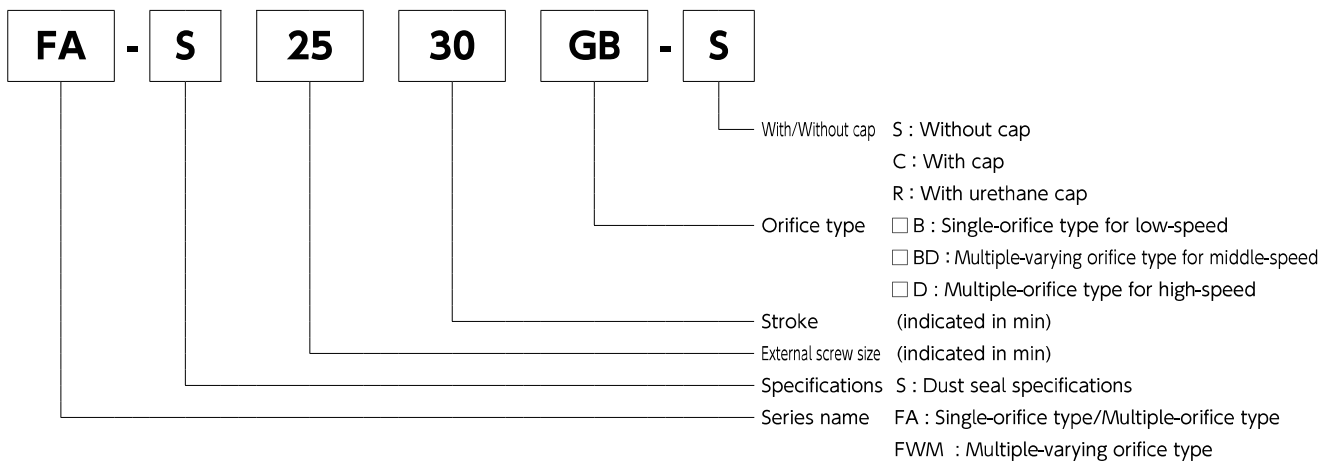
In the case of a product with dust-seal specifications, since double internal U-packings are used, thus having a structure that prevents the dust that has adhered from entering the inside.

Our original double packing structure

Specifications

*The specifications is identical with the standard models for each model (refer to the relevant page in the specifications listed in the dimensions table on the previous page).

Key to Model Number



Precautions for use

- * Since the absorber is not designed to have a drip-proof structure, avoid its use in an environment where oils are splashed.
- * If you use the optional parts, please contact our sales department.

- * Although the dimensions are the same as those of the FA series (adjustable type) with the standard specifications, only the FA-S2016/FWM-2016 series have a greater overall length (dimension A).

Soft Absorber

Multiple-varying orifice
Fixed Type Adjustable type Self-adjusting

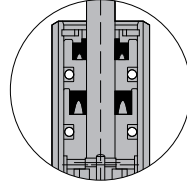
FWM-S Series (Dust Seal Specifications)

RoHS Compliant

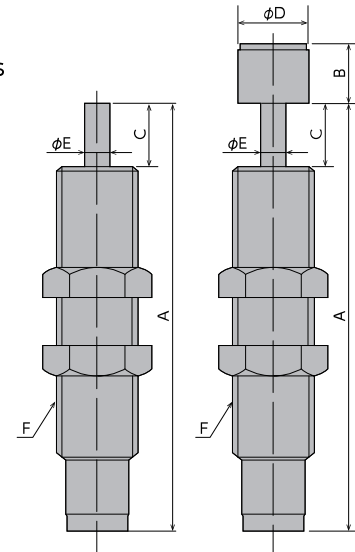
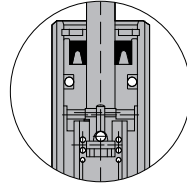
●Products specification might be changed without notice.



Dust seal specifications



Standard product



Dimensions

Model	A	B	C	D	E	F	Mass g	Specification Page
FWM-S1210MBD-S	76	8	10	8	3.5	M12×1	41	50
FWM-S1210MBD-C							44	50
FWM-S1410RBD-S	80	8	10	10	3.5	M14×1.5	63	52
FWM-S1410RBD-C							68	52
FWM-S1612XBD-S	102	15	12	13.5	5	M16×1.5	105	54
FWM-S1612XBD-C							114	54
FWM-S2016EBD-S	120	17	16	18	6	M20×1.5	196	58
FWM-S2016EBD-C							218	58
FWM-S2530GBD-S	155	18	30	22	8	M25×1.5	396	62
FWM-S2530GBD-C							427	62
FWM-S2540LBD-C	171.5	29	40	22.5	8	M27×1.5	475	66
FWM-S2725FBD-S	136	20	25	24	8	M27×1.5	402	68
FWM-S2725FBD-C							451	68
FWM-S3035TBD-S	188	18.5	35	27	10	M30×1.5	708	70
FWM-S3035TBD-C							755	70
FWM-S3650UBD-S	235	19.5	50	33	12	M36×1.5	1330	74
FWM-S3650UBD-C							1410	74

Specifications

* The specification is identical with the standard models for each type

Precautions for Use

- * Do not use this product in places where it may come in contact with oil as it does not have a liquid-proof structure.
- * Please contact our sales department when the use of optional parts is planned.

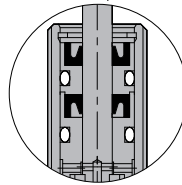
- * Although the dimensions are identical to those of the FA series standard products (adjustable), the FWM-S2016 series has a longer overall length (dimension A).

Soft Absorber

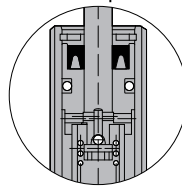
FA-F/FWM-F Series



Anti-coolant specifications

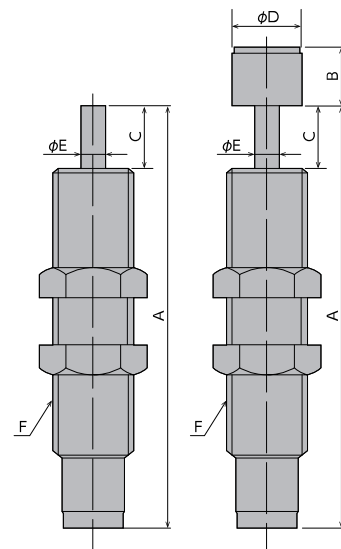


Standard product



No cap (-S)

With a cap (-C)



Dimensions

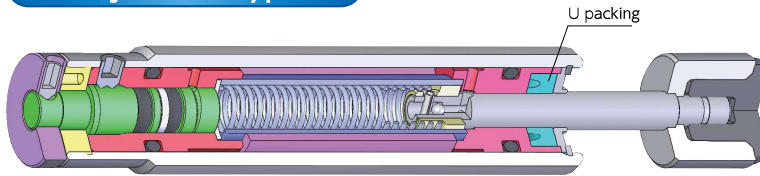
Model	A	B	C	D	E	F	Weight g	Specification Page
FA-F0806-S	59	—	6	—	2.5	M8×0.75	14	58
FA-F0806-C		5		6				
FA-F1008V□-S	73.2	—	8	—	2.4	M10×1	31	60
FA-F1008V□-C		6.3		6			32	
FWM-F1008VBD-S		—		—			31	
FWM-F1008VBD-C		6.3		6			32	
FA-F1210M□-S	82.6	—	10	—	3.5	M12×1	48	62
FA-F1210M□-C		8		8			51	
FWM-F1210MBD-S		—		—			48	
FWM-F1210MBD-C		8		8			51	
FA-F1410RB-S	98.2	—	10	—	4	M14×1.5	84	64
FA-F1410RB-C		10		10			87	
FA-F1410RD-S		—		—			84	
FA-F1410RD-C		10		10			87	
FWM-F1410RBD-S		—		—			84	
FWM-F1410RBD-C		10		10			87	
FA-F1612XB-S	107.7	—	12	—	5	M16×1.5	111	66
FA-F1612XB-C		15		13.5			120	
FA-F1612XD-S		—		—			111	
FA-F1612XD-C		15		13.5			120	
FWM-F1612XBD-S		—		—			111	
FWM-F1612XBD-C		15		13.5			120	
FA-F2016E□-S	120	—	16	—	6	M20×1.5	195	70
FA-F2016E□-C		17		18			218	
FWM-F2016EBD-S		—		—			195	
FWM-F2016EBD-C		17		18			218	
FA-F2530G□-S	168	—	30	—	8	M25×1.5	441	74
FA-F2530G□-C		18		22			471	
FWM-F2530GBD-S		—		—			441	
FWM-F2530GBD-C		18		22			471	
FA-F2725F□-S	148.2	—	25	—	8	M27×1.5	455	80
FA-F2725F□-C		20		23			504	
FWM-F2725FBD-S		—		—			455	
FWM-F2725FBD-C		20		23			504	

Note) B or D is inserted in the □. Insert B for a single-orifice type, and insert D for a multiple-orifice type.

●Products specification might be changed without notice.

Overview

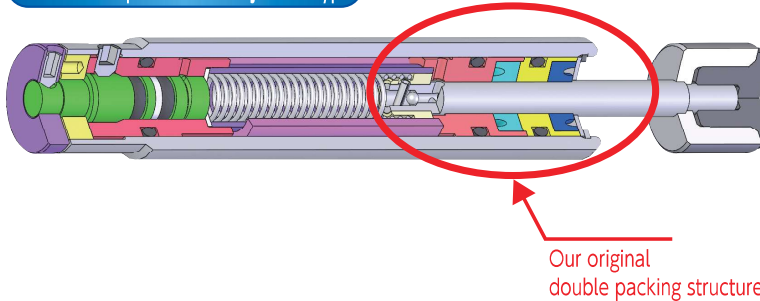
Adjustable type



In a normal absorber, adhering liquid is pushed inside with each stroke. This can block the accumulator and the flow of oil, ultimately preventing the rod from inserting or causing other trouble.



Anti-coolant specifications (adjustable type)



In the anti-coolant specifications, two internal U-packings are used (double packing structure) to form a wiper seal structure that prevents the adhering liquid from being pushed inside.

Specifications

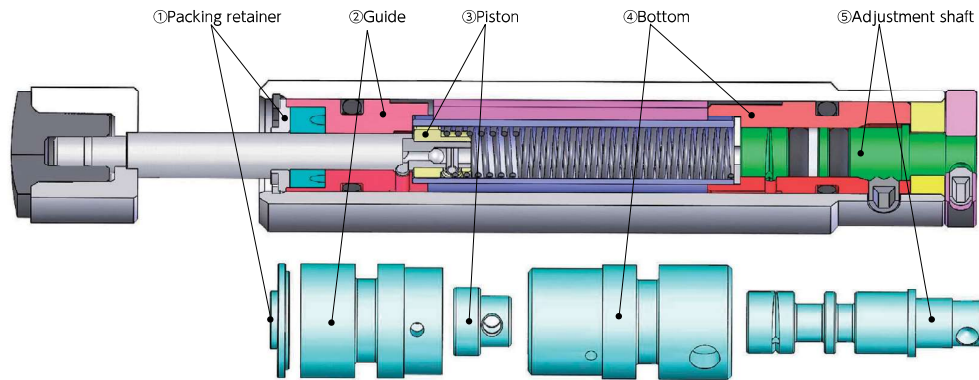
* The specifications is identical with the standard models for each model (refer to the relevant page in the specifications listed in the dimensions table on the previous page).

Precautions for Use

- * This product may not offer sufficient durability, depending on the liquid you use or its quantity. It is recommended to perform tests for adequacy in advance.
- * When the piston rod is not pressed all the way down to the stroke end during operation, stop use and exchange the product for the product life. If the product is used continuously, damage of the product may be caused.
- * This product has a unique packing structure. Because of this, using this product in places where the piston rod remains dry may cause the inside oil to leak early on in its product life.
- * If you use the optional parts, please contact our sales department.

Soft Absorber

FA/FWM-B Series



In many production lines of lithium ion batteries, use of the copper-containing materials is unacceptable, so Fuji Latex has developed the product that can be used under such condition.

Product Features

- The product is not made from copper-containing materials at all and can be used in an environment where copper ion is unacceptable.
- Models of M8 to M27 in external diameter with the FA/FWM adjusting function are available.
- It is very easy to replace the product because the external diameter of the product is the same as that of the standard specifications.

About Model

Please add "B" to the model of the standard specifications.

Example: FWM-B1008VBD-S (Model of the standard specification: FWM-1008VBD-S)

[List of materials of main parts changed * When FA-2016 is changed to FA-B2016] (): surface treatment

	Standard product FA-2016	Copper-free absorber FA-B2016
① Packing retainer	Brass(*1)	Free-cutting steel (electroless nickel plating)
② Guide	Phosphor bronze(*1)	Free-cutting steel (blackening)
③ Piston	Brass(*1)	Cast iron (*1)
④ Bottom	Brass(*1)	Free-cutting steel (blackening)
⑤ Adjustment shaft	Brass(*1)	Free-cutting steel (electroless nickel plating)

*1 Without surface treatment

Dimensions and Specifications

* The dimensions and specifications are similar to those of the standard products of the FA/FWM series.

Precautions for Use

* If you use the optional part, please contact our sales department.

●Products specification might be changed without notice.

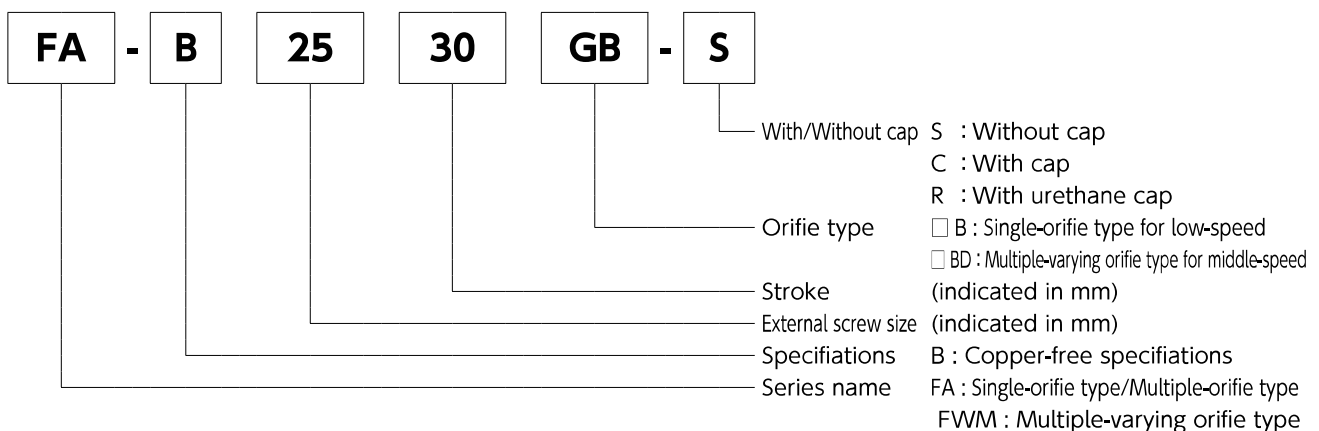
Specifications

Model	Stroke mm	Max. absorption energy J(kgf·m)	Max. equivalent mass kg(kgf)	Range of impact rate m/s	Orifice type	Specification Page
FA-B0806-□	6	1.4	15	0.3~2	Single-orifice type	54
FA-B1008VB-□	8	1.47	10	0.3~1	Single-orifice type	56
FA-B1008VD-□		1.76	2.5	0.7~3	Multiple-orifice type	
FWM-B1008VBD-□			10	0.3~2	Multiple-varying orifice type	
FA-B1210MB-□	10	2.94	30	0.3~1	Single-orifice type	58
FA-B1210MD-□		4.9	4	0.7~3	Multiple-orifice type	
FWM-B1210MBD-□			30	0.3~2	Multiple-varying orifice type	
FA-B1410RB-□	10	3.92	30	0.3~1	Single-orifice type	60
FA-B1410RD-□		5.88	4.5	0.7~3	Multiple-orifice type	
FWM-B1410RBD-□			35	0.3~2	Multiple-varying orifice type	
FA-B1612XB-□	12	9.8	50	0.3~1	Single-orifice type	62
FA-B1612XD-□			10	0.7~3	Multiple-orifice type	
FWM-B1612XBD-□			50	0.3~2	Multiple-varying orifice type	
FA-B2016EB-□	16	29.4	300	0.3~1	Single-orifice type	66
FA-B2016ED-□			120	0.7~3	Multiple-orifice type	
FWM-B2016EBD-□			200	0.3~2	Multiple-varying orifice type	
FA-B2530GB-□	30	49	400	0.3~1	Single-orifice type	70
FA-B2530GD-□			150	0.7~3	Multiple-orifice type	
FWM-B2530GBD-□			300	0.3~2	Multiple-varying orifice type	
FA-B2540LB-C	40	63.7	500	0.3~1	Single-orifice type	74
FA-B2540LD-C			200	0.7~3	Multiple-orifice type	
FWM-B2540LBD-C			350	0.3~2	Multiple-varying orifice type	
FA-B2725FB-□	25	79.3	650	0.3~1	Single-orifice type	76
FA-B2725FD-□			300	0.7~3	Multiple-orifice type	
FWM-B2725FBD-□			450	0.3~2	Multiple-varying orifice type	

Note 1) S (without tip cap) or C (with tip cap) is inserted in*.

Note 2) For the specifications and external dimensions, please see the pages of detailed specifications.

Key to Model Number



Soft Absorber

FK Series (M4~M16)



Characteristics

- With a fixed, specially-designed orifice structure, an optimal impact absorption can be achieved, even under variable operating conditions. (FK-0404 and FK-0604 series have a groove orifice structure.)
- We have three available types to accommodate various speeds.
For low-speed: L, for medium-speed: M, for high-speed: H
- Urethane cap specification is also available.
- 2 or more of this product can be used in parallel.
- This product can also be custom-designed for optimal impact absorption.

Specifications

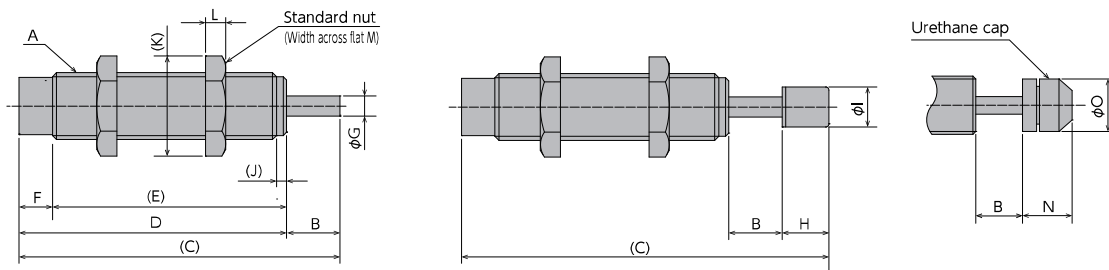
Model	Stroke mm	Max. absorption energy J (kgf·m)	Max. equivalent mass kg (kgf)	Range of impact rate m/s	Max. drag N (kgf)	Max. cycle rate cycle/min	Max. absorption energy per minute J/min (kgf·m/min)	recovering power of the piston rod N (kgf)	Operating temperature °C	Mass Type g (Ctype g)	Urethane Cap Specification (Type-R)
FK-0404L-□	4	0.1 (0.01)	1 (1)	0.3~1	214 (21.8)	45	4.5 (0.46)	2.5 (0.25) or lower	-5~70	2.4 (2.5)	×
FK-0404H-□		0.3 (0.03)	3 (3)				13.5 (1.38)				
FK-0604L-□	4	0.1 (0.01)	1 (1)	0.3~1	363 (37)	45	4.5 (0.46)	3 (0.3) or lower	-5~70	4.1 (4.2)	×
FK-0604H-□		0.5 (0.05)	3 (3)				22.5 (2.29)				
FK-1008L-□	8	2.94 (0.3)	20 (20)	0.3~1	1,078 (110)	60	58.8 (6.0)	4.9 (0.5) or lower	-5~70	20 (21)	○
FK-1008M-□			6 (6)	0.3~2							
FK-1008H-□			2.5 (2.5)	0.3~3							
FK-1210L-□	10	6.86 (0.7)	50 (50)	0.3~1	1,960 (200)	60	98 (10)	9.8 (1.0) or lower	-5~70	36 (37)	○
FK-1210M-□			14 (14)	0.3~2							
FK-1210H-□			6 (6)	0.3~3							
FK-1412L-□	12	9.8 (1.0)	75 (75)	0.3~1	2,156 (220)	60	176 (18)	8.9 (0.9) or lower	-5~70	55 (57)	○
FK-1412M-□			20 (20)	0.3~2							
FK-1412H-□			8 (8)	0.3~3							
FK-1417L-□	17	14.7 (1.5)	110 (110)	0.3~1	2,646 (270)	60	235 (24)	8.9 (0.9) or lower	-5~70	76 (77)	○
FK-1417M-□			30 (30)	0.3~2							
FK-1417H-□			13 (13)	0.3~3							
FK-1612L-□	12	14.7 (1.5)	110 (110)	0.3~1	2,940 (300)	60	235 (24)	9.8 (1.0) or lower	-5~70	76 (82)	○
FK-1612M-□			30 (30)	0.3~2							
FK-1612H-□			13 (13)	0.3~3							

Note) Insert S in the □ to order without a cap, and insert C in the □ to order with a cap (R if ordering urethane cap).

Precautions for Use

- * Do not use this product without carefully reading the attached owner's manual.
- * Do not turn the oil inlet screw located at the bottom of the main unit.
- * Ensure that sufficient mounting strength is secured for this product. (As a guideline, it should be 2 to 3 times the maximum drag listed in the catalogue.)
- * Urethane caps are consumable goods that need to be replaced with new ones if necessary.
- * Do not use this product in a vacuum or a location where it may come in contact with oil.
- * Ensure that an eccentric load is not applied to the soft absorber. (Allowable eccentric angle: $\pm 2.5^\circ$)
- * Ensure that an external stopper (OP-020**) is also used. (The FK-0404 and FK-0604 series can be used without a stopper.)

●Products specification might be changed without notice.

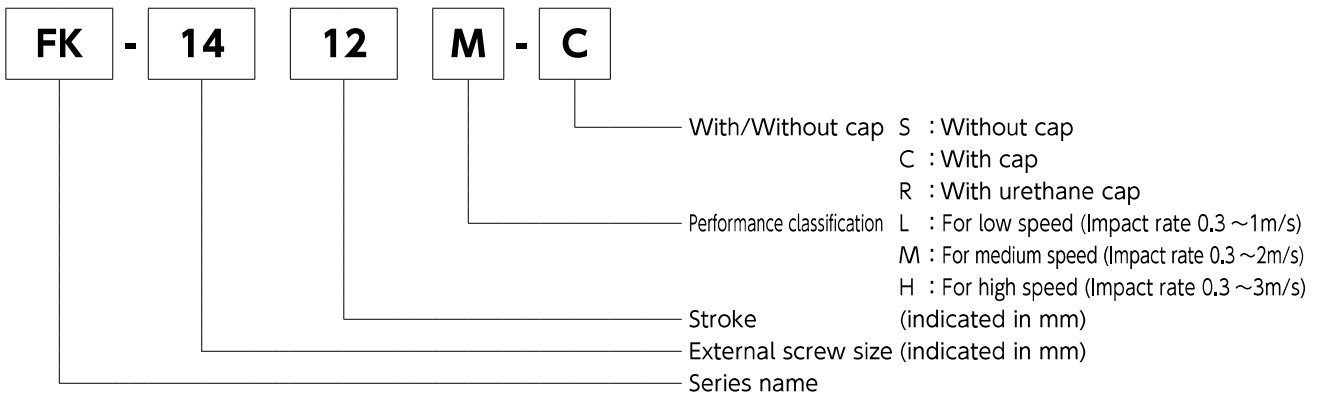


Dimensions

Model	A	B	C	D	E	F	ϕG	H	ϕI	J	K	L	M	N	ϕO
FK-0404□-S	M4×0.5	4	28.6	24.6	20.1	4.5	1.2	—	—	—	8.1	2	7	—	—
FK-0404□-C			32.6					4	3					—	—
FK-0604□-S	M6×0.75	4	29	25	20.5	4.5	1.8	—	—	—	9.2	2	8	—	—
FK-0604□-C			33					4	4.6					—	—
FK-1008□-S	M10×1.0	8	48	40	34.5	5.5	3	—	—	1.5	15	3	13	—	—
FK-1008□-C			55					7	6					—	—
FK-1210□-S	M12×1.0	10	63	53	47.5	5.5	3.5	—	—	—	16.2	4	14	—	—
FK-1210□-C			71					8	8					—	—
FK-1412□-S	M14×1.5	12	70	58	52.5	5.5	3.5	—	—	—	19.6	6	17	—	—
FK-1412□-C			78					8	10					—	—
FK-1417□-S	M14×1.5	17	97	80	74.5	5.5	4	—	—	1.5	19.6	6	17	—	—
FK-1417□-C			107					10	10					—	—
FK-1612□-S	M16×1.5	12	75	63	57.5	5.5	5	—	—	—	21.9	6	19	—	—
FK-1612□-C			90					15	13.5					—	—

Note) Urethane cap specification is not available for FK-0404 and FK0604.

Key to Model Number



Please refer to pages 112-115 for optional parts.

Soft Absorber

FK Series (M20~M25)



Characteristics

- With a fixed, specially-designed orifice structure, an optimal impact absorption can be achieved, even under variable operating conditions.
- The main unit can also be used as a stopper. (No external stopper required)
- We have three available types to accommodate various speeds.
For low-speed: L, for medium-speed: M, for highspeed:H
- Urethane cap specification is also available.
- 2 or more of this product can be used in parallel.
- This product can also be custom-designed for optimal impact absorption.

Specifications

Model	Stroke mm	Max. absorption energy J (kgf·m)	Max. equivalent mass kg (kgf)	Range of impact rate m/s	Max. drag N (kgf)	Max.cycle rate cycle/min	Max. absorption energy per minute J/min (kgf·m/min)	recovering power of the piston rod N (kgf)	Operating temperature °C	Mass Type g (Ctype g)	Urethane Cap Specification (Type-R)
FK-2016L-□	16	29.4(3.0)	230(230)	0.3~1	3,528 (360)	60	343(35)	18.1(1.85) or lower	-5~70	147 (168)	○
FK-2016M-□			60(60)	0.3~2							
FK-2016H-□			25(25)	0.3~3							
FK-2022L-□	22	44.1(4.5)	73(73)	0.3~1	3,920 (400)	60	392(40)	39.2(4) or lower	-5~70	163 (178)	○
FK-2022M-□			30(30)	0.3~2							
FK-2022H-□			15(15)	0.3~3							
FK-2050L-R	50	98(10)	30(30)	0.3~2	4,900 (500)	30	490(50)	39.2(4) or lower	-5~70	294 (294)	○
FK-2050M-R			15(15)	0.3~3							
FK-2050H-R			8(8)	0.3~3							
FK-2530L-□	30	88.2(9.0)	390(390)	0.3~1	6,370 (650)	60	490(50)	29.4(3.0) or lower	-5~70	361 (391)	○
FK-2530M-□			175(175)	0.3~2							
FK-2530H-□			75(75)	0.3~3							
FK-2540L-□	40	117(12)	480(480)	0.3~1	6,370 (650)	60	490(50)	71.5(7.3) or lower	-5~70	437 (437)	○
FK-2540M-□			235(235)	0.3~2							
FK-2540H-□			30(30)	0.3~3							
FK-2550L-R	50	147(15)	100(100)	0.3~1.5	6,370 (650)	30	637(65)	39.2(4) or lower	-5~70	516 (516)	○
FK-2550M-R			50(50)	0.3~2							
FK-2550H-R			30(30)	0.3~3							

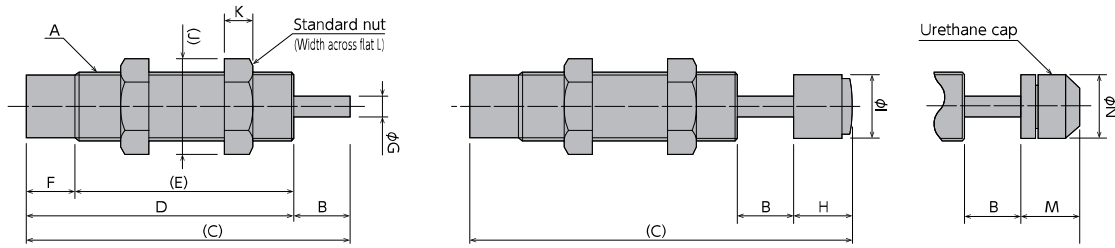
Note) Insert S in the □ to order without a cap, and insert C in the □ to order with a cap (R if ordering urethane cap). (-S is not available for FK-2540.)

Note) Urethane cap is the only available specification for FK-2022, 2050, and 2550 with a cap.

Precautions for Use

- * Do not use this product without carefully reading the attached owner's manual.
- * Do not turn the oil inlet screw located at the bottom of the main unit.
- * Ensure that sufficient mounting strength is secured for this product. (As a guideline, it should be 2 to 3 times the maximum drag listed in the catalogue.)
- * Do not use this product in a vacuum or a location where it may come in contact with oil.
- * Ensure that an eccentric load is not applied to the soft absorber. (Allowable eccentric angle: $\pm 2.5^\circ$) Allowable eccentric angle in FK-2050 and 2550: $\pm 1.0^\circ$
- * Urethane caps are consumable goods that need to be replaced with new ones if necessary

●Products specification might be changed without notice.

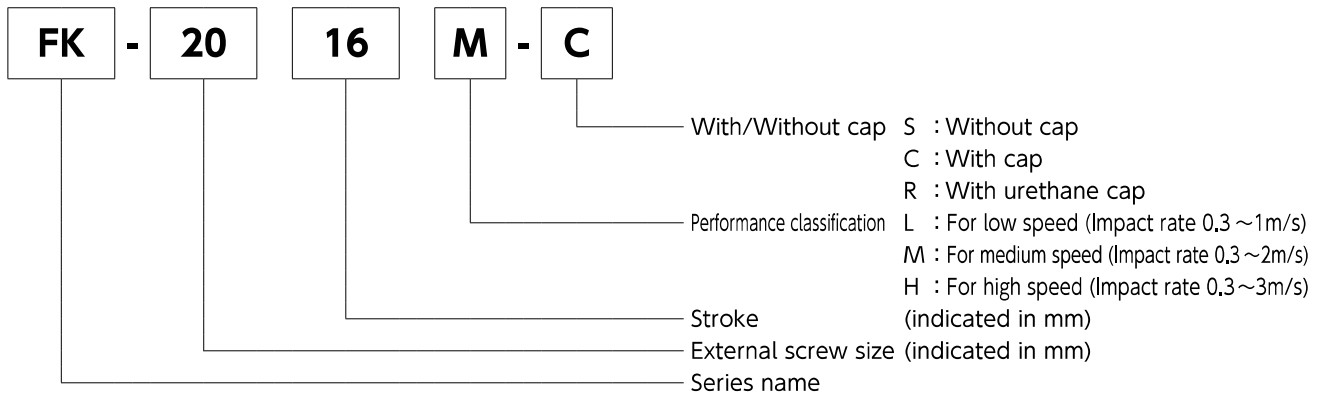


Dimensions

Model	A	B	C	D	E	F	φG	H	φI	J	K	L	M	φN
FK-2016□-S	M20×1.5	16	93	77	63	14	6	-	-	27.7	8	24	-	-
FK-2016□-C			110					17	18				17	18
FK-2022□-S	M20×1.5	22	112	90	76	14	6	-	-	27.7	8	24	-	-
FK-2022□-R			126.5					-	-				14.5	18
FK-2050□-R	M20×1.5	50	223.5	156.5	142.5	14	6	-	-	27.7	8	24	17	18
FK-2530□-S	M25×1.5	30	140	110	95	15	8	-	-	37	10	32	-	-
FK-2530□-C			158					18	22				18	22
FK-2540□-C	M25×1.5	40	185.5	124.5	109.5	15	8	21	22	37	10	32	26	22
FK-2550□-R	M25×2.0	50	228	160	145	15	8	-	-	37	10	32	18	22

Note) Urethane cap is the only available specification for FK-2022, 2050, and 2550 with a cap.

Key to Model Number



Please refer to pages 112-115 for optional parts.

Soft Absorber

FK Series (M27~M36)



Characteristics

- With a fixed, specially-designed orifice structure, an optimal impact absorption can be achieved, even under variable operating conditions.
- The main unit can also be used as a stopper. (No external stopper required, except for FK-3625A□)
- We have three available types to accommodate various speeds.
For low-speed: L, for medium-speed: M, for high-speed: H
- Urethane cap specification is also available.
- 2 or more of this product can be used in parallel.
- This product can also be custom-designed for optimal impact absorption.

Specifications

Model	Stroke mm	Max. absorption energy J (kgf·m)	Max. equivalent mass kg (kgf)	Range of impact rate m/s	Max. drag N (kgf)	Max. cycle rate cycle/min	Max. absorption energy per minute J/min (kgf·m/min)	Recovering power of the piston rod N (kgf)	Operating temperature °C	Mass Type g (Ctype g)	Urethane Cap Specification (Type-R)
FK-2725L-□	25	79 (8.1)	420 (420)	0.3~1	60	539 (55)	6,370 (650)	27.3 (2.78) or lower	-5~70	341 (385)	×
FK-2725M-□			105 (105)	0.3~2							
FK-2725H-□			47 (47)	0.3~3							
FK-3035L-□	35	196 (20)	1,560 (1,560)	0.3~1	30	1,176 (120)	14,700 (1,500)	47.1 (4.8) or lower	-5~70	628 (681)	○
FK-3035M-□			390 (390)	0.3~2							
FK-3035H-□			173 (173)	0.3~3							
FK-3625AL-C	25	150 (15.3)	2,000	0.3~1	30	1,500 (153)	25,000 (2,551)	100 (10.2) or lower	-5~70	— (900)	○
FK-3625AM-C			800	0.3~2							
FK-3625AH-C			150	0.3~3							
FK-3650AL-C	50	400	3,400	0.3~1	30	2,352 (240)	25,000 (2,551)	120 (12.2) or lower	-5~70	— (980)	○
FK-3650AM-C			1,400	0.3~2							
FK-3650AH-C			300	0.3~3							
FK-3650L-□	50	392 (40)	3,137 (3,137)	0.3~1	30	2,352 (240)	21,110 (2,154)	68.6 (7.0) or lower	-5~70	1,177 (1,259)	○
FK-3650M-□			784 (784)	0.3~2							
FK-3650H-□			306 (306)	0.3~3							

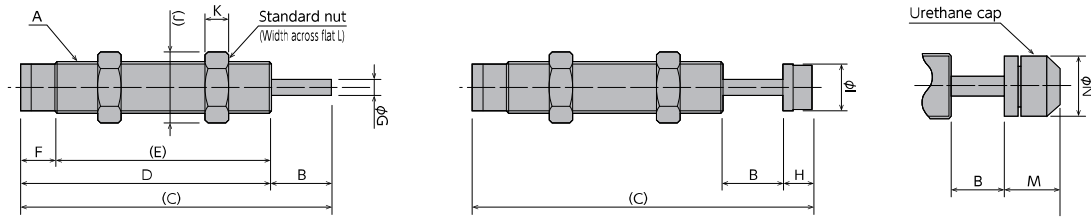
Note) Insert S in the □ to order without a cap, and insert C in the □ to order with a cap (R if ordering urethane cap). (-S is not available for FK-3625 □.)

Note : An additional urethane cap (OP-090M36B) can be mounted on FK-3625A□-C, FK-3650A□-C

Precautions for Use

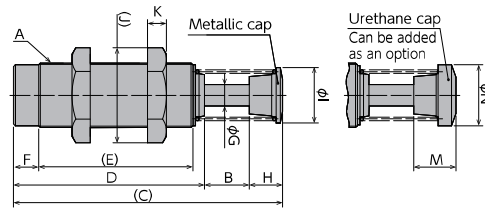
- * Do not use this product without carefully reading the attached owner's manual.
- * Do not turn the oil inlet screw located at the bottom of the main unit.
- * Ensure that sufficient mounting strength is secured for this product. (As a guideline, it should be 2 to 3 times the maximum drag listed in the catalogue.)
- * Do not use this product in a vacuum or a location where it may come in contact with oil.
- * Ensure that an eccentric load is not applied to the soft absorber. (Allowable eccentric angle: $\pm 2.5^\circ$)
- * We recommend that you use it with an external stopper (OP-020**).
- * Urethane caps are consumable goods that need to be replaced with new ones if necessary.

●Products specification might be changed without notice.



FK-3625A□

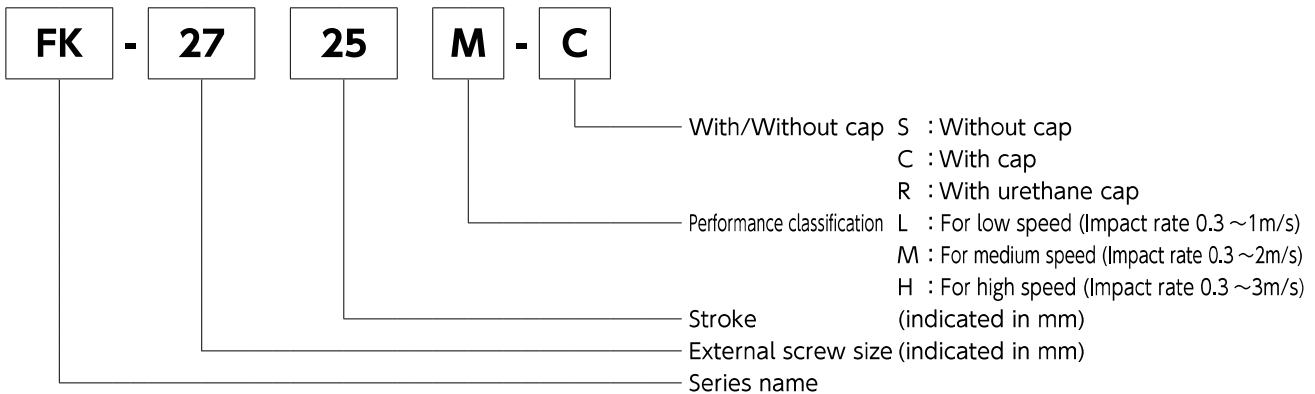
FK-3650A□



Dimensions

Model	A	B	C	D	E	F	φG	H	φI	J	K	L	M	φN
FK-2725□-S	M27×1.5	25	117.5	92.5	77.5	15	8	-	-	37	10	32	-	-
FK-2725□-C			137.5											
FK-3035□-S	M30×1.5	35	171.5	136.5	116.5	20	10	-	-	41.6	14	36	-	-
FK-3035□-C			190											
FK-3625A□-C	M36×1.5	25	150	106.5	86	14	12	18.5	31	53.1	10	46	23.5	34
FK-3650A□-C	M36×1.5	50	217	148.5	128	14	12	18.5	31	53.1	10	46	23.5	34
FK-3650□-S	M36×1.5	50	218.5	168.5	148.5	20	12	-	-	53.1	15	46	-	-
FK-3650□-C			238											

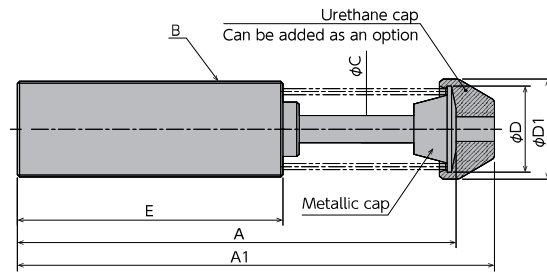
Key to Model Number



Please refer to pages 112-115 for optional parts.

Soft Absorber

FK-4225B/FK-4250B/FK-4275B Series



* The absorber's main unit does not come with nuts.

Dimensions

Model	A	A1	B	C	D	D1	E
FK-4225B□-C	144	162	M42×1,5	12	38	44	92
FK-4250B□-C	195	213					118
FK-4275B□-C	246	264					143

* A1 and D1 are the dimensions with a mounted urethane cap (optional). (Urethane Cap Type: OP-090M42A)

Specifications

Model	Stroke mm	Max. absorption energy J (kgf·m)	Max. equivalent mass kg (kgf)	Range of impact rate m/s	Max. drag N (kgf)	Max. cycle rate cycle/min	Max. absorption energy per minute J/min (kgf·m/min)	Recovering power of the piston rod N (kgf)	Operating temperature °C	Mass g	Allowable eccentric angle °
FK-4225BL-C	25	260 (26.5)	14,000	0.1~0.5	31,590 (3,223)	16	1,858 (190)	120 (12.2)	-5~70	795	±2.5
FK-4225BM-C			1,350	0.3~1.5		20					
FK-4225BH-C			200	0.3~3.6		8					
FK-4250BL-C	50	520 (53.1)	23,000	0.1~0.5		10	2,372 (242)				
FK-4250BM-C			2,800	0.3~1.5		5					
FK-4250BH-C			450	0.3~3.6		6					
FK-4275BL-C	75	780 (79.6)	30,000	0.1~0.5	3,345 (341)	1,240					
FK-4275BM-C			3,400	0.3~1.5							
FK-4275BH-C			670	0.3~3.6							

Precautions for Use

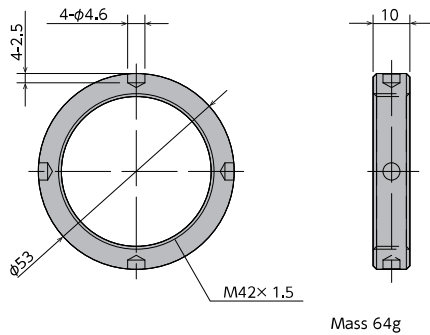
- * Do not use this product without carefully reading the attached owner's manual.
- * We recommend that you use it with an external stopper (Stopper nut OP-020M42).
- * Ensure that sufficient mounting strength is secured for this product. (As a guideline, it should be 2 to 3 times the maximum drag listed in the catalogue.)
- * Do not use this product in a vacuum or a location where it may come in contact with oil.
- * Ensure that an eccentric load is not applied to the soft absorber. (Allowable eccentric angle: ±2.5°)
- * Ensure that an eccentric load is not applied to the soft absorber.
- * Urethane caps are consumable goods that need to be replaced with new ones if necessary.

●Products specification might be changed without notice.

Optional Parts

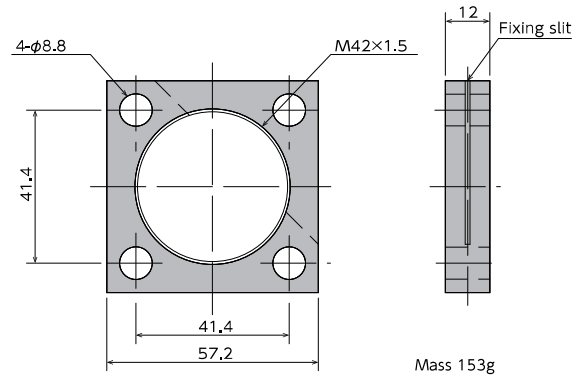
Nut OP-M42

Model
OP-M42



Square flange OP-040 M42SF

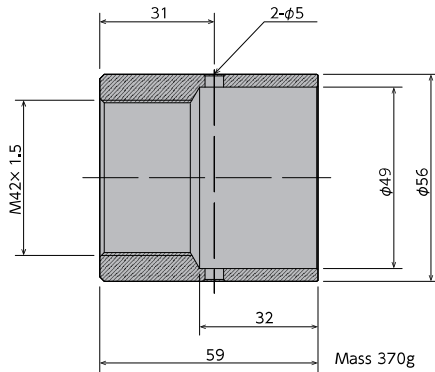
Model
OP-040M42SF



Stopper nut OP-020 M42

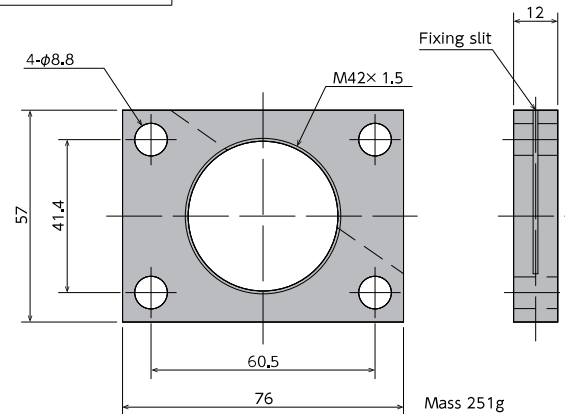
Model
OP-020M42

- Adjust so that it stops 1mm before the stroke end, and fasten with the main unit's nut until secured.



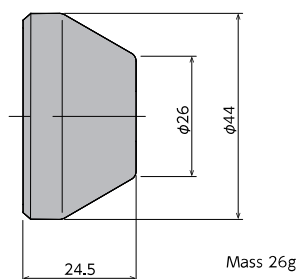
Rectangle flange OP-040 M42RF

Model
OP-040M42RF



Urethane cap OP-090 M42A

Model
OP-090M42A

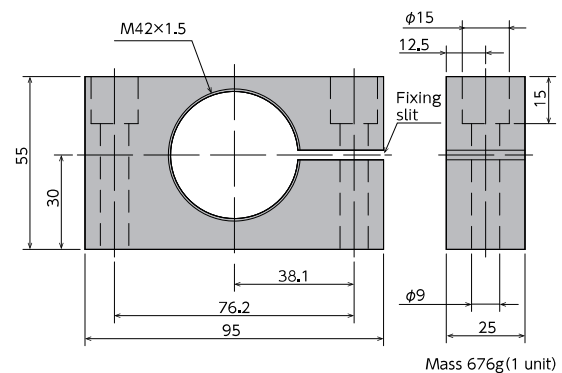


Side mount OP-M42SM

Model
OP-M42SM

*Side mount is sold as a set of two.

*Recommended bolt: M8 X 50 hexagon socket head bolt



Soft Absorber

Fixed Type Adjustable type Self-adjusting

FK-4225B/FK-4250B Series

RoHS Compliant

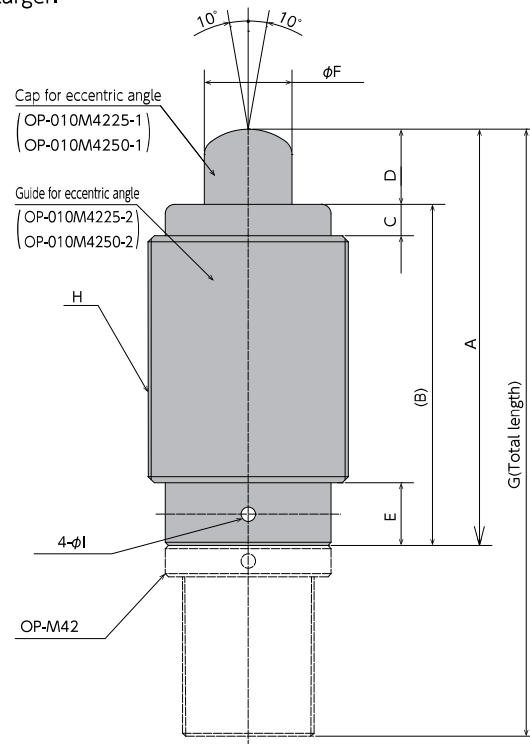
● Products specification might be changed without notice.

Optional Parts

Eccentric angle adaptor OP-010M4225/M4250

Model
OP-010M4225
OP-010M4250

- Screw the eccentric angle adaptor into the main unit until the cap for the eccentric angle and the piston rod form tight connection. While maintaining this position, fasten the main unit's nut until secured.
- Use the eccentric angle adaptor when the eccentric angle is 2.5° or larger.
- The main unit can also be used as a stopper.
- Use it with a capless soft absorber
- The maximum operating eccentric angle with an eccentric angle adaptor is $\pm 10^\circ$.
- Nut for unit is not inclusive.
- Not usable for FA-4250YD-C, FWM-4250YBD-C.

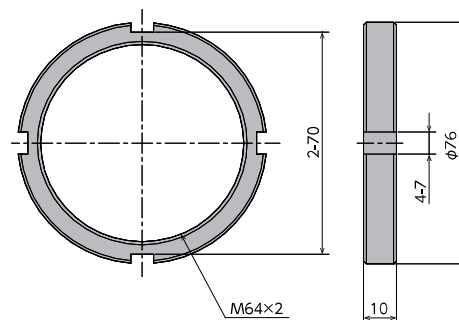


Model	A	B	C	D	E	ϕF	G	H	ϕI	Weight g
OP-010M4225	133	109	10	24	20	28	194	M64×2	4.6	1,600
OP-010M4250	203	154		49			290			2,500

Nut OP-M64

Model
OP-M64

- Usable as the nut for eccentric angle adaptor



Weight 100g

Soft Absorber

Fixed Type Adjustable type Self-adjusting

FK-6450/64100/64150/※64200 Series

RoHS Compliant

●Products specification might be changed without notice.



Specifications

Model	Stroke mm	Max. absorption energy J (kgf·m)	Max. equivalent mass kg (kgf)	Range of impact rate m/s	Max. drag N (kgf)	Max. cycle rate cycle/min	Max. absorption energy per minute J/min (kgf·m/min)	recovering power of the piston rod N (kgf)	Operating temperature °C	Mass kg	Allowable eccentric angle °				
FK-6450L-C	50	2,000 (204.7)	2,800~36,000(2,800~36,000)	0.1~0.5	90,000 (9,184)	10	164,608 (16,797)	150 (15.3)	-5~70	2.5	±2.5				
FK-6450M-C			390~4,000(390~4,000)	0.3~1.5		15									
FK-6450H-C			130~500(130~500)	0.3~3.6		15									
FK-64100L-C	100	4,000 (408.2)	4,000~40,000(4,000~40,000)	0.1~0.6		8	214,118 (21,849)			180 (18.4)		-5~70	3.2	±1.0	
FK-64100M-C			1,000~7,000(1,000~7,000)	0.3~1.5		10									
FK-64100H-C			250~1,300(250~1,300)	0.3~3.6		10									
FK-64150L-C	150	6,000 (612.2)	9,000~56,000(9,000~56,000)	0.1~0.6		6	275,556 (28,118)			370 (37.8)		-5~70	4.2		±1.0
FK-64150M-C			1,200~11,000(1,200~11,000)	0.3~1.5		8									
FK-64150H-C			350~2,200(350~2,200)	0.3~3.6		8									
FK-64200-C-□□□ Note 1	200	8,000(816.3)	—	—	—	—	400(40.8)	—	5.5	—					

Note 1) □ for FK-64200-C-□□□ will be filled in with a branch number. (made to order product)

Precautions for Use

- * Do not use this product without carefully reading the attached owner's manual.
- * Do not turn the oil inlet screw located at the bottom of the main unit.
- * We recommend that you use it with an external stopper (Stopper nut OP-020M64□).
- * Ensure that sufficient mounting strength is secured for this product. (As a guideline, it should be 2 to 3 times the maximum drag listed in the catalog.)
- * Do not use this product in a vacuum or a location where it may come in contact with oil.
- * Ensure that an eccentric load is not applied to the soft absorber.
- * The urethane caps are consumables. Please replace them when necessary.
- * FK-64200-C-□□□ is only for emergency stop; it is not designed for normal use. (Customized orders)

New products

1 Soft Absorber

2 Rotary Damper

3 Magnum Series

4 Speed Controller

5 Helical Isolator

6 Model Selection Form

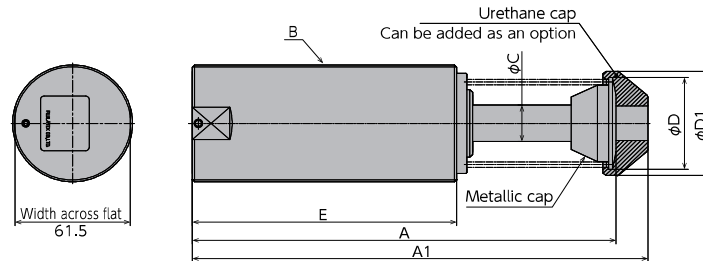
Soft Absorber

Fixed Type Adjustable type Self-adjusting

FK Series (M64)

RoHS Compliant

● Products specification might be changed without notice.



* The absorber's main unit does not come with nuts.

Dimensions

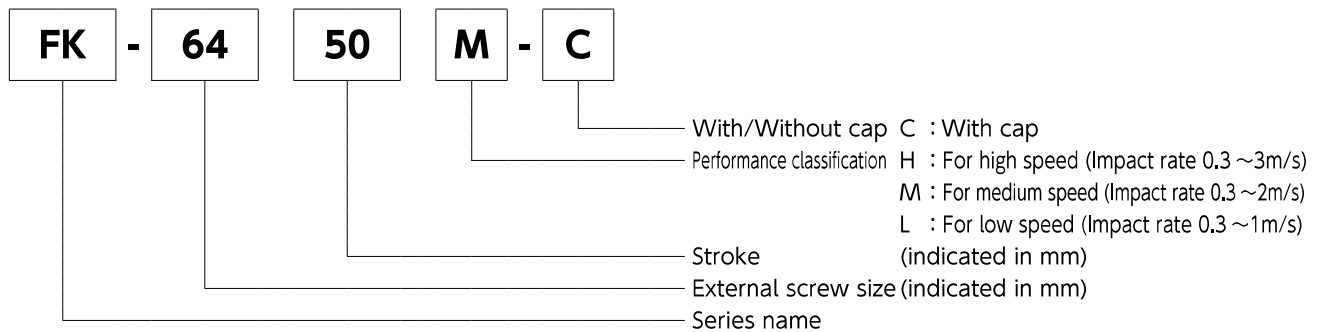
Model	A	A1	B	φC	φD	φD1	E
FK-6450□-C	226	243	M64×2	20	50.2	57	141
FK-64100□-C	328	345			191		
FK-64150□-C	456	473			241		
※FK-64200-C-□□□	556	573			291		

* A1 and D1 are dimensions with the optional urethane cap attached. (Urethane cap type: OP-090M64A)

* The optional parts are common with those of the adjustable type. Please refer to page 81.

* FK-64200-C-□□□ are made to order.

Key to Model Number



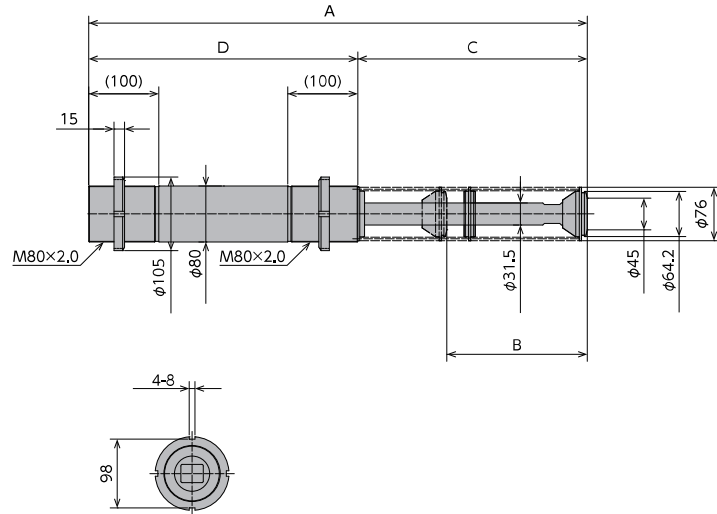
Soft Absorber

Customized orders For emergency stop
Fixed Type Adjustable type Self-adjusting

FK-80200-C-□□□□/FK-80300-C-□□□□/FK-80400-C-□□□□

RoHS Compliant

●Products specification might be changed without notice.



Dimensions

Model	A	B	C	D
FK-80200-C-□□□□	710.7	200	327	383.7
FK-80300-C-□□□□	910.7	300	427	483.7
FK-80400-C-□□□□	1,162.7	400	547	615.7

Specifications

Model	Stroke mm	Max. absorption energy J(kgf·m)	Range of impact rate m/s	Max. drag N(kgf)	Max. absorption energy per minute J/min	Max. cycle rate cycle/min	recovering power of the piston rod N(kgf)	Operating temperature °C	Mass kg
FK-80200-C-□□□□	200	19,000 (1,938.8)	0.1~5.5	149,226 (15,227.1)	11,680	1	400 (40.8)	-5~70	11
FK-80300-C-□□□□	300	28,900 (2,949)			17,770		510 (52)		14
FK-80400-C-□□□□	400	38,800 (3,959.2)			23,852		510 (52)		18

* □ will be filled in with a branch number of a custom model

New products

1 Soft Absorber

2 Rotary Damper

3 Magnum Series

4 Speed Controller

5 Helical Isolator

6 Model Selection Form

Soft Absorber

FK Series

RoHS Compliant

●Products specification might be changed without notice.

Optional Parts Compatibility Chart

Model	Eccentric angle adaptor	Stopper nut		Holder with a switch	Flange	Liquid-proof cap	Urethane cap	Nut
		Without cap	With cap					
FK-1008□-*	OP-010PB	OP-020PB-S	OP-020PB-C	—	OP-040PB	FK-1008□-C-060	OP-090M10A	—
FK-1210□-*	OP-010KB	OP-020KB-S	OP-020KB-C	OP-032KB	OP-040KB	FK-1210□-C-060	OP-090M12A	—
FK-1412□-*	OP-010RD	OP-020RB-S	OP-020RB-C	OP-032RB	OP-040RB	FK-1412□-C-060	OP-090M14A	—
FK-1417□-*	—	OP-020RB-S	OP-020RB-C	—	OP-040RB	—	OP-090M14B	—
FK-1612□-*	OP-010XB	OP-020HB-S	OP-020HB-C	OP-032HB	OP-040XB	FK-1612□-C-060	OP-090M16A	—
FK-2016□-*	OP-010EB	OP-020EB-S	OP-020EB-C	OP-032EB	OP-040EB	FK-2016□-C-060	OP-090M20A	—
FK-2022□-*	—	OP-020EB-S	OP-020EB-C	—	OP-040EB	—	OP-090M20A	—
FK-2050□-R	—	OP-020EB-S	OP-020EB-C	—	OP-040EB	—	OP-090M20A	—
FK-2530□-*	OP-010GB	OP-020GB-S	OP-020GB-C	OP-032GB	OP-040GB	FK-2530□-C-060	OP-090M25A	—
FK-2540□-*	—	OP-020LB	OP-020LB	—	OP-040GB	—	OP-090M25A	—
FK-2550□-R	—	—	—	—	—	—	OP-090M25A	—
FK-2725□-*	OP-010FB	OP-020FB-S	OP-020FB-C	OP-032FB	OP-040FB	FK-2725□-C-060	—	—
FK-3035□-*	OP-010TB	OP-020TB-S	OP-020TB-C	—	OP-040TB	FK-3035□-C-060	OP-090M30A	—
FK-3625A□-C	OP-010M3625	—	OP-020M36	—	OP-040UB	—	OP-090M36B	—
FK-3650A□-C	OP-010M3650	—	OP-020M36	—	OP-040UB	—	OP-090M36B	—
FK-3650□-*	OP-010UB	OP-020UB-S	OP-020UB-C	—	OP-040UB	—	OP-090M36A	—
FK-4225B□-C	OP-010M4225	—	OP-020M42	—	Square flange OP-040M42SF Rectangle flange OP-040M42RF	—	OP-090M42A	OP-M42
FK-4250B□-C	OP-010M4250	—	OP-020M42	—		—	OP-090M42A	OP-M42
FK-4275B□-C	—	—	OP-020M42	—		—	OP-090M42A	OP-M42
FK-6450□-C	—	—	OP-020M64S	—	Square flange OP-040M64SF	—	OP-090M64A	OP-M64
FK-64100□-C	—	—	OP-020M64S	—		—	OP-090M64A	OP-M64
FK-64150□-C	—	—	OP-020M64L	—		—	OP-090M64A	OP-M64

*Standard nuts are sold separately as well.

Applicable Models	Model
FK-0404	M04 nut
FK-0604	M06 nut
FK-1008	M10 nut
FK-1210	M12 nut
FK-1412	M14 nut
FK-1417	M14 nut
FK-1612	M16 nut
FK-2016	M20 nut
FK-2022	M20 nut
FK-2050	M20 nut
FK-2530	M25 nut
FK-2540	M25 nut
FK-2550 P2.0	M25-P2 nut
FK-2725	M27 nut
FK-3035	M30 nut
FK-3625A	M36A nut
FK-3650A	M36A nut
FK-3650	M36 nut

Soft Absorber

FK Series

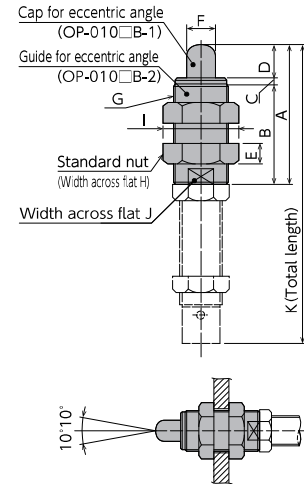
RoHS Compliant

● Products specification might be changed without notice.

Optional Parts

Eccentric angle adaptor OP-010

Model	A	B	C	D	E	F	G	H	I	J	K	Mass g
OP-010PB	38	28	2	8	6	8	M16×1.5	19	21.9	13	65	35
OP-010KB	48	35	3	10	5	10	M18×1.5	21	24.3	14	85	48
OP-010RD	53	38	3	12	7	11	M22×1.5	24	27.7	19	95	84
OP-010XB	60	45	3	12	7	12	M22×1.5	24	27.7	19	102	81
OP-010EB	68	49	3	16	10	14	M27×1.5	32	37	24	129	209
OP-010GB	107.5	67.5	10	30	15	16	M36×1.5	46	53.1	32	197.5	639
OP-010FB	97	62	10	25	15	16	M36×1.5	46	53.1	32	170	587
OP-010TB	127	82	10	35	15	18	M40×1.5	50	57.7	36	239	852
OP-010UB	167	107	10	50	15	20	M45×1.5	55	63.5	41	306	1,273
OP-010M3625	131	97	10	24	15	22	M45×1.5	55	63.5	41	200	880
OP-010M3650	201	142	10	49	15	22	M45×1.5	55	63.5	41	312	1,270
OP-010M4225	133	99	10	24	—	28	M64×2	—	—	—	194	1,600
OP-010M4250	203	144	10	49	—	28	M64×2	—	—	—	290	2,500



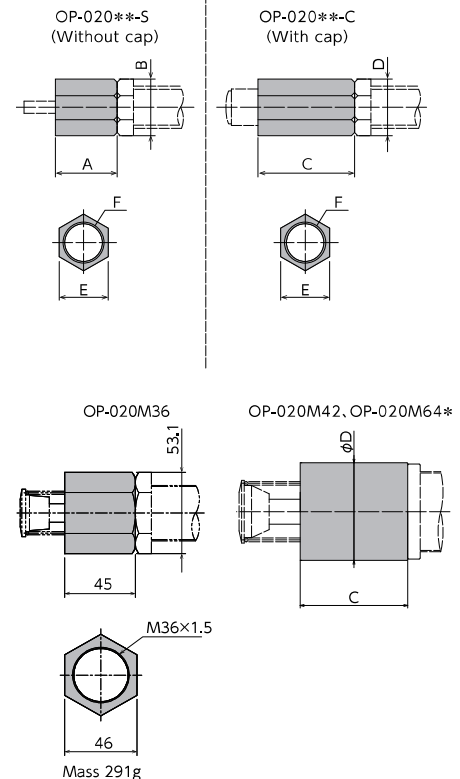
When attaching the eccentric angle adaptor, screw it into the main unit until the cap for eccentric angle and the piston rod form a tight connection. While maintaining this position, fasten the main unit's nut until secured.

* If the eccentric angle adaptor is secured without establishing a tight fit, a sufficient stroke cannot be obtained. Furthermore, if the eccentric angle adaptor is further screwed in, after it has formed a tight connection, and then secured in place, the cap for eccentric angle cannot be pushed all the way to the stroke end.

- The inclined adapter is not available for models with soft absorber cap (-C) and urethane cap (-R)
- The cap for eccentric angle and the guide for eccentric angle are not sold as single parts.
- The eccentric angle adaptors for M42 (OP-010M4225, OP-010M4250) are not provided with nuts. OP-M64 should be purchased separately.

Stopper nut OP-020

Model	Standard		With cap		Common dimensions		Mass g	
	OP-020□-S		OP-020□-C		E	F		
	A	B	C	D			S	C
OP-020PB-S-C	10	15	16	15	13	M10×1	6	9
OP-020KB-S-C	12	16.2	16	16.2	14	M12×1	6	8
OP-020RB-S-C	12	19.6	20	19.6	17	M14×1.5	10	17
OP-020HB-S-C	15	21.9	30	21.9	19	M16×1.5	15	28
OP-020EB-S-C	30	27.7	47	27.7	24	M20×1.5	46	68
OP-020GB-S-C	20	37	32	37	32	M25×1.5	65	102
OP-020LB	—	—	50	37	32	M25×1.5	153	
OP-020FB-S-C	35	37	55	37	32	M27×1.5	90	137
OP-020TB-S-C	38	41.6	58	41.6	36	M30×1.5	129	197
OP-020UB-S-C	45	53.1	65	53.1	46	M36×1.5	291	422
OP-020M36	—	—	45	53.1	46	M36×1.5	291	
OP-020M42	—	—	59	φ56	—	M42×1.5	370	
OP-020M64S	—	—	86	φ78	—	M64×2	850	
OP-020M64L	—	—	115	φ78	—	M64×2	1,150	



● Adjust so that it stops 1 mm before the stroke end, and fasten with the main unit's nut until secured.

Note) When attaching, make sure that the side without a bearing chamfer is the impact surface.

New products

1 Soft Absorber

2 Rotary Damper

3 Magnum Series

4 Speed Controller

5 Helical Isolator

6 Model Selection Form

Soft Absorber

FK Series

RoHS Compliant

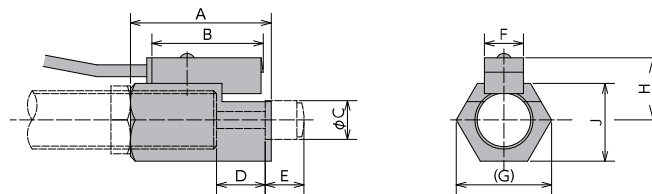
● Products specification might be changed without notice.

Optional Parts

Holder with a switch OP-032

Model	A	B	ϕC	D	E	F	(G)	H	J	Mass g
OP-032KB	29	23	8	10	8	8	19.6	12.8	16	38
OP-032RB	29	23	10	12	8	8	19.6	13.8	17	34
OP-032HB	40	23	13.5	12	15	8	21.9	14.8	19	46
OP-032EB	50	23	18	16	17	8	27.7	17.3	24	80
OP-032GB	37	23	22	30	18	8	33.5	19.8	29	82
OP-032FB	56	23	23	25	20	8	34.6	20.3	30	107

- Position the holder in such a way that the tip of the switch and one of the ends of the metal ring for the rod cap are separated more than 0.5 mm. Cause of malfunction.
- Please refer to below for the specification of switches and precautions for use.



Model GXL-8F specifications Manufactured by SUNX

Item	Summary	Specification
Detection distance	Standard detected object 15X15X1 (Iron)	2.1mm
Power voltage		12~24VDC \pm 10%
Consumption current		15mA or lower
	Behaviour form	NO type
	Output form	NPN open collector
	Output capacity (with 24VDC power voltage)	100mA or lower
	Protection feature	Comes with a surge absorption circuit
	Residual voltage At 100mA inflowing current	2V or lower
	<p>Input/Output circuit diagram</p> <p>Operation indicator light Red LED (lights up when the output is ON)</p>	
Response frequency		500Hz
Ambient operating temperature		-25~70°C
Ambient storage temperature		-40~85°C
Ambient operating humidity		35~85%RH
Ambient storage humidity		35~95%RH
Lead wire length		Approximately 1m
Mass	Including cable	Approximately 15g

- 1) Do not use when it is in a transient state after the power is turned on (approx.10ms).
- 2) Keep the cables as short as possible when using in places with a lot of noise.
Also, please take all precautions, such as avoiding the parallel wiring of electric lines and power lines, as well as wiring within the same conduit.
- 3) Ensure that the switch does not come in direct contact with thinner-type chemicals.
- 4) Because it does not have a short-circuit protection circuit, wiring must be done correctly.
- 5) Since copper wires are used in the cable, exercise caution when using the cable in an environment where copper ions are unacceptable.

Soft Absorber

FK Series

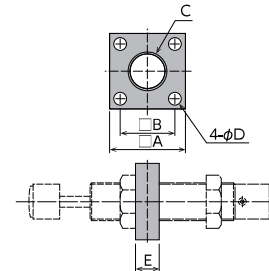
RoHS Compliant

● Products specification might be changed without notice.

Optional Parts

Flange OP-040

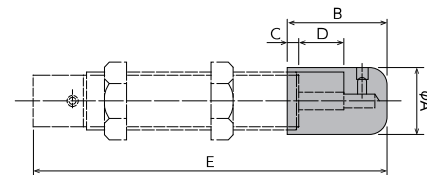
Model	A	B	C	D	E	Mass g
OP-040PB	25	18	M10×1	3,2	4	16
OP-040KB	25	18	M12×1	3,2	4	15
OP-040RB	34	24	M14×1,5	4,5	4	30
OP-040XB	34	24	M16×1,5	4,5	4	29
OP-040EB	40	28	M20×1,5	6,5	12	109
OP-040GB	54	40	M25×1,5	9	12	206
OP-040FB	50	36	M27×1,5	9	12	157
OP-040TB	65	45	M30×1,5	11	14	344
OP-040UB	78	56	M36×1,5	14	16	566



● This is a mounting fixture for soft absorbers.

Liquid-proof cap -060

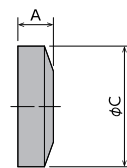
Model	A	B	C	D	E	Mass g
FK-1008□-C-060	13	18	3	8	55	10
FK-1210□-C-060	17	28	9,5	10	71,5	25
FK-1412□-C-060	19	30	9	12	78,5	31
FK-1612□-C-060	21	34	9,5	12	87,5	46
FK-2016□-C-060	24	35	4	16	108	59
FK-2530□-C-060	28	51	6,5	30	154,5	77
FK-2725□-C-060	30	50	5	25	137,5	112
FK-3035□-C-060	38	60	5	35	191,5	255



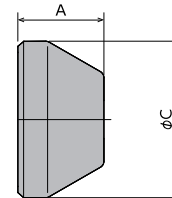
- The main unit is supplied in assembly
 - □ will be filled in with either one of L, M, or H indicated in the catalog.
 - Ideal for use in environments where oil splatter poses a problem.
 - Ensure that the cap is facing upward. If the cap is facing sideways or downward, it cannot provide an effective means for liquid proofing.
- Note) Liquid-proof caps are not sold separately.

Urethane cap OP-090

Model	A	C	Mass g
OP-090M36B	10	34	7
OP-090M42A	24,5	44	22
OP-090M64A	(24,1)	57	35



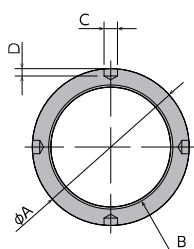
OP-090M36B



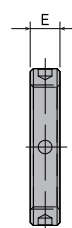
OP-090M42A
OP-090M64A

Nut

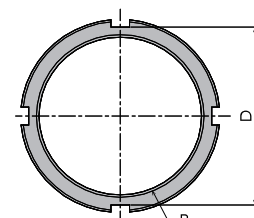
Model	A	B	C	D	E	Mass g
OP-M42	53	M42×1,5	4-φ4,6	4-2,5	10	64
OP-M64	76	M64×2,0	4-7	2-70	10	100



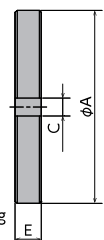
OP-M42



Mass 64g



OP-M64



Mass 100g

New products

1 Soft Absorber

2 Rotary Damper

3 Magnum Series

4 Speed Controller

5 Helical Isolator

6 Model Selection Form

Soft Absorber

Multiple-orifice type

Fixed Type

Adjustable type

Self-adjusting

FL Series (M12~M16)

RoHS Compliant

● Products specification might be changed without notice.



Characteristics

- With an adjustable multiple-orifice structure, an optimal impact absorption can be achieved by making adjustments, even under variable operating conditions.
- This product is a long-stroke type that is suitable for high-speed (3m/s) collisions.

Specifications

Model	Stroke mm	Max. absorption energy J (kgf·m)	Max. equivalent mass kg (kgf)	Range of impact rate m/s	Max. drag N (kgf)	Max. cycle rate cycle/min	Max. absorption energy per minute J/min (kgf·m/min)	Recovering power of the piston rod N (kgf)	Operating temperature °C	Mass g	
										S type	C type
FL-1214H-□	14	5.4 (0.55)	30 (30)	0.3~3	1,156 (118)	60	98 (10)	12.7 (1.3) or lower	-5~70	46	49
FL-1417H-□	17	14.7 (1.5)	50 (50)	0.3~3	2,646 (270)	60	176 (18)	15.7 (1.6) or lower	-5~70	80	85
FL-1620H-□	20	17.6 (1.8)	60 (60)	0.3~3	2,646 (270)	60	235 (24)	19.6 (2.0) or lower	-5~70	124	136

(Note) Insert S in the □ to order without a cap, and insert C in the □ to order with a cap (R if ordering urethane cap).

Key to Model Number

FL - 16 20 H - C

With/Without cap S : Without cap
C : With cap

Performance classification H : For high speed (Impact rate 0.3~3m/s)

Stroke (indicated in mm)

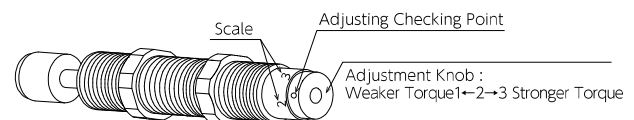
External screw size (indicated in mm)

Series name

Precautions for Use

- * Do not use this product without carefully reading the attached owner's manual.
- * We recommend that you use it with an external stopper (Stopper nut OP-020**).
- * Ensure that sufficient mounting strength is secured for this product. (As a guideline, it should be 2 to 3 times the maximum drag listed in the catalogue.)
- * Do not use this product in a vacuum or a location where it may come in contact with oil.
- * Ensure that an eccentric load is not applied to the soft absorber. (Allowable eccentric angle: $\pm 2.5^\circ$)

Adjustment Method



- * To adjust, turn the adjustment knob located at the bottom of the main unit.
- * Because the adjustment can be done in an analog manner, a value between two integers on the indicator can be set.
- * Once the adjustment is complete, secure with a lock screw using the attached hex wrench.

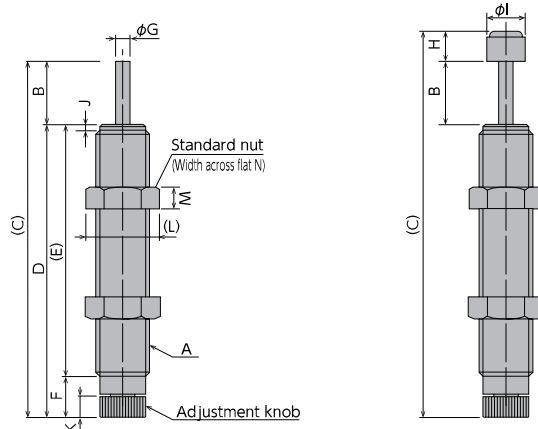
Soft Absorber

Fixed Type Adjustable type Self-adjusting

FL Series

RoHS Compliant

● Products specification might be changed without notice.



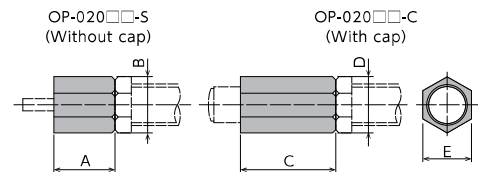
Dimensions

Model	A	B	C	D	E	F	φG	H	φl	J	K	L	M	N
FL-1214H-S	M12×1.0	14	84	70	59.5	10.5	3.5	—	—	1.5	5	16.2	4	14
FL-1214H-C			92					8	8					
FL-1417H-S	M14×1.5	17	105	88	77.8	10.2	4	—	—	1.5	5	19.6	6	17
FL-1417H-C			115					10	10					
FL-1620H-S	M16×1.5	20	128	108	93.5	14.5	5	—	—	—	4.4	21.9	6	19
FL-1620H-C			143					15	13.5					

Optional Parts

Stopper nut OP-020 □□ - □

Model	Without cap		With cap		E	Applicable model	Mass g	
	OP-020□□-S		P-020□□-C				S	C
	A	B	C	D				
OP-020KB-S-C	12	16.2	16	16.2	14	FL-1214H	S	6
							C	8
OP-020RB-S-C	12	19.6	20	19.6	17	FL-1417H	S	10
							C	17
OP-020HB-S-C	15	21.9	30	21.9	19	FL-1620H	S	15
							C	28

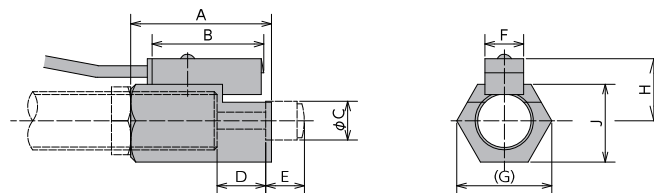


● Adjust so that it stops 1mm before the stroke end, and fasten with the main unit's nut until secured.
 Note) When attaching, make sure that the side without a bearing chamfer is the impact surface.

Holder with a switch OP-032 □□

Model	A	B	φC	D	E	F	(G)	H	J	Applicable model	Mass g
OP-032KB	29	23	8	14	8	8	19.6	12.8	16	FL-1214H-C	38
OP-032HB	40	23	13.5	20	15	8	21.9	14.8	19	FL-1620H-C	46

Note) For switch specifications and precautions for use, please refer to page 23.
 Note) A holder with a switch cannot be used with the FL-1417 series.



Standard nuts are sold separately as well.

Applicable model	Model
FL-1214H	M12 nut
FL-1417H	M14 nut
FL-1620H	M16 nut

New products

1 Soft Absorber

2 Rotary Damper

3 Magnum Series

4 Speed Controller

5 Helical Isolator

6 Model Selection Form

Soft Absorber

Double Direction Type Multiple-orifice type
Fixed Type Adjustable type Self-adjusting

FW Series (M12~M25)

RoHS Compliant

● Products specification might be changed without notice.



Characteristics

- This product is a double-rod type that can absorb impact from both directions.
- Because of its multiple-orifice structure, a smooth impact absorption is possible.
- Idea for small spaces.

Specifications

Model	Stroke mm	Max. absorption energy J (kgf·m)	Max. equivalent mass kg (kgf)	Range of impact rate m/s	Max. drag N (kgf)	Max. cycle rate cycle/min	Max. absorption energy per minute J/min (kgf·m/min)	Recovering power of the piston rod N (kgf)	Operating temperature °C	Mass g	
										S type	C type
FW-1212L-C	12	4.9(0.5)	39(39)	0.3~1	1,078(110)	60	41 (4.2)	7.8(0.8) or lower	-5~70	-	64
FW-1616M-□	16	13.7(1.4)	30(30)	0.3~2	2,646(270)	60	235 (24)	17.6(1.8) or lower	-5~70	130	142
FW-2025M-□	25	39.2(4.0)	87(87)	0.3~2	4,900(500)	60	343 (35)	24.5(2.5) or lower	-5~70	234	271
FW-2530M-□	30	62.7(6.4)	140(140)	0.3~2	6,370(650)	60	490 (50)	29.4(3.0) or lower	-5~70	460	527

Note) Insert S in the □ to order without a cap, and insert C in the □ to order with a cap (R if ordering urethane cap)..

Key to Model Number

FW - **12** **12** **L** - **C**

With/Without cap S : Without cap
C : With cap

Performance classification L : For low speed (Impact rate 0.3~1m/s)
M : For medium speed (Impact rate 0.3~2m/s)

Stroke (indicated in mm)

External screw size (indicated in mm)

Series name

Precautions for Use

- * Do not use this product without carefully reading the attached owner's manual.
- * Ensure that sufficient mounting strength is secured for this product. (As a guideline, it should be 2 to 3 times the maximum drag listed in the catalogue.)
- * It cannot absorb impact from both directions at the same time.
- * Do not use this product in a vacuum or a location where it may come in contact with oil.
- * Ensure that an eccentric load is not applied to the soft absorber. (Allowable eccentric angle: $\pm 2.5^\circ$)
- * Ensure that an external stopper is also used.

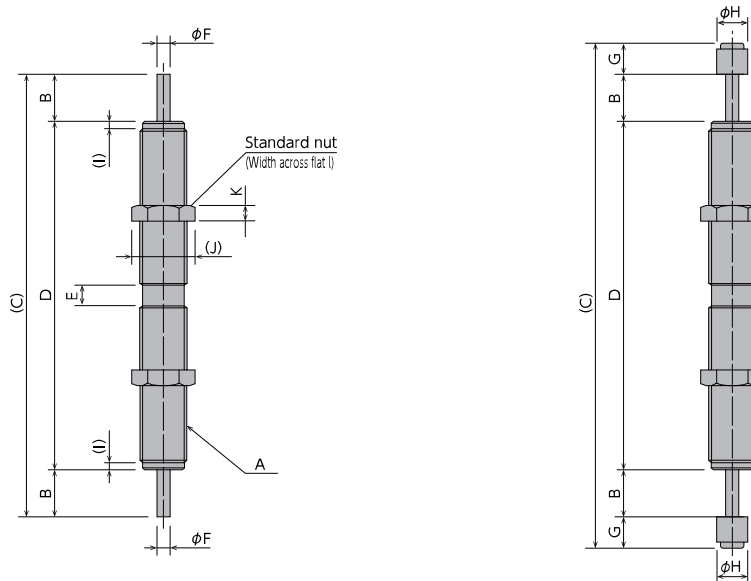
Soft Absorber

Double Direction Type Multiple-orifice type
Fixed Type Adjustable type Self-adjusting

FW Series (M12~M25)

RoHS Compliant

●Products specification might be changed without notice.



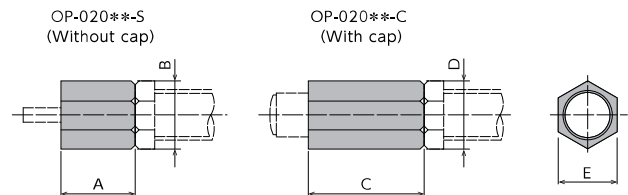
Dimensions

Model	A	B	C	D	E	φF	G	φH	I	J	K	L
FW-1212L-C	M12×1.0	12	130	90	5	3.5	8	8	2	16.2	4	14
FW-1616M-S	M16×1.5	16	134	102	-	5	-	-	6	21.9	6	19
FW-1616M-C			164				13.5	6				
FW-2025M-S	M20×1.5	25	170	120	-	6	-	-	6	27.7	8	24
FW-2025M-C			204				17	18	6			
FW-2530M-S	M25×1.5	30	205	145	-	8	-	-	6	37	10	32
FW-2530M-C			241				18	22	6			

Optional Parts

Stopper nut OP-020 ** - □

Model	A	B	C	Applicable model	Mass g
OP-020KB-C	16	16.2	14	FW-1212L-C	8
OP-020HB-S	15	21.9	19	FW-1616M-S	15
OP-020HB-C	30	21.9	19	FW-1616M-C	28
OP-020EB-S	30	27.7	24	FW-2025M-S	46
OP-020EB-C	47	27.7	24	FW-2025M-C	68
OP-020GB-S	20	37	32	FW-2530M-S	65
OP-020GB-C	32	37	32	FW-2530M-C	102



● Adjust so that it stops 1mm before the stroke end, and fasten with the main unit's nut until secured.
Note) When attaching, make sure that the side without a bearing chamfer is the impact surface.

Standard nuts are sold separately as well.

Applicable model	Model
FW-1212L	M12 nut
FW-1616M	M16 nut
FW-2025M	M20 nut
FW-2530M	M25 nut

New products

1 Soft Absorber

2 Rotary Damper

3 Magnum Series

4 Speed Controller

5 Helical Isolator

6 Model Selection Form

Soft Absorber

Short Stroke Type

Single-Orifice

Fixed Type

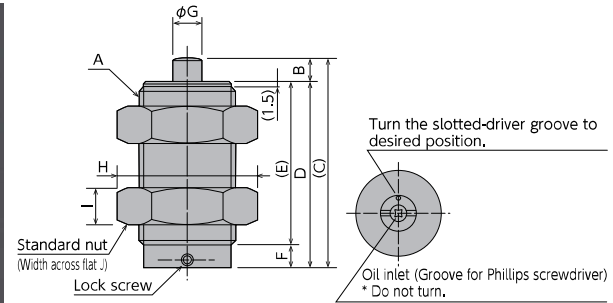
Adjustable type

Self-adjusting

FS Series

RoHS Compliant

● Products specification might be changed without notice.



Dimensions

Model	A	B	C	D	E	F	φG	H	I	J
FS-1406L-S	M14×1.5	6	55	49	41	8	4	19.6	6	17
FS-1606L-S	M16×1.5	6	55	49	41	8	5	21.9	6	19
FS-2006L-S	M20×1.5	6	55	49	43	6	6	27.7	8	24
FS-2506L-S	M25×1.5	6	55	49	43	6	8	37	10	32
FS-2706L-S	M27×1.5	6	55	49	43	6	8	37	10	32

Specifications

Model	Stroke mm	Max. absorption energy J (kgf·m)	Max. equivalent mass kg (kgf)	Range of impact rate m/s	Max. drag N (kgf)	Max. cycle rate cycle/min	Max. absorption energy per minute J/min (kgf·m/min)	Recovering power of the piston rod N (kgf)	Operating temperature °C	Mass g
FS-1406L-S	6	3.5 (0.36)	80 (80)	0.3~1	2,000 (204)	45	100 (10.2)	20 (2) or lower	-5~70	49
FS-1606L-S	6	4.8 (0.49)	120 (120)	0.3~1	2,700 (276)	45	130 (13.3)	20 (2) or lower	-5~70	63
FS-2006L-S	6	7.8 (0.8)	60 (60)	0.3~1	3,920 (400)	60	200 (20.4)	16.7 (1.7) or lower	-5~70	114
FS-2506L-S	6	11.7 (1.2)	90 (90)	0.3~1	5,880 (600)	60	300 (30.6)	19.6 (2.0) or lower	-5~70	210
FS-2706L-S	6	15.6 (1.6)	120 (120)	0.3~1	7,840 (800)	60	350 (35.7)	22.6 (2.3) or lower	-5~70	221

Key to Model Number

FS - **20** **06** **L** - **S**

With/Without cap S : Without cap
 Performance classification L : For low speed (Impact rate 0.3 ~ 1m/s)
 Stroke (indicated in mm)
 External screw size (indicated in mm)
 Series name

Precautions for Use

- * Do not use this product without carefully reading the attached owner's manual.
- * Ensure that an external stopper is also used.
- * Ensure that sufficient mounting strength is secured for this product. (As a guideline, it should be 2 to 3 times the maximum drag listed in the catalogue.)
- * Do not use this product in a vacuum or a location where it may come in contact with oil.
- * Ensure that an eccentric load is not applied to the soft absorber. (Allowable eccentric angle: $\pm 2.5^\circ$)
- * Do not turn the oil inlet screw located at the bottom of the main unit.

Characteristics

- * To adjust, turn the adjustment knob with a slotted screw driver
- * Because the adjustment can be done in an analog manner, a value between two integers on the indicator can be set.

Standard nuts are sold separately as well.

Applicable model	Model
FS-1406L	M14 nut
FS-1606L	M16 nut
FS-2006L	M20 nut
FS-2506L	M25 nut
FS-2706L	M27 nut

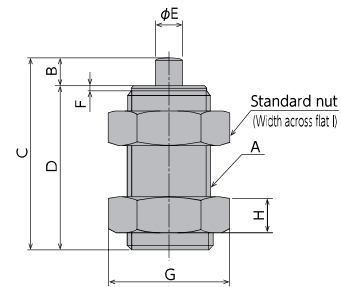
Soft Absorber

Short Stroke Type Multiple-orifice type
Fixed Type Adjustable type Self-adjusting

FV Series

RoHS Compliant

●Products specification might be changed without notice.



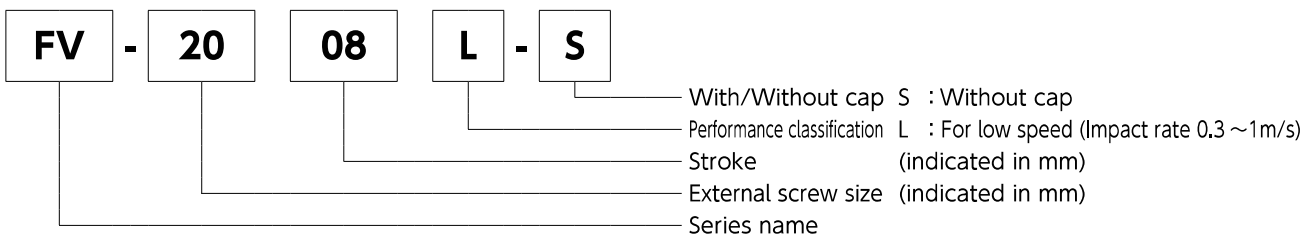
Dimensions

Model	A	B	C	D	φE	F	G	H	I
FV-1406L-S	M14×1.5	6	46	40	4	2	19.6	6	17
FV-1606L-S	M16×1.5	6	46	40	5	2	21.9	6	19
FV-2008L-S	M20×1.5	8	55	47	6	1.5	27.7	8	24
FV-2508L-S	M25×1.5	8	55	47	8	1.5	37	10	32
FV-2708L-S	M27×1.5	8	55	47	8	1.5	37	10	32

Specifications

Model	Stroke mm	Max. absorption energy J(kgf·m)	Max. equivalent mass kg (kgf)	Range of impact rate m/s	Max. drag N (kgf)	Max. cycle rate cycle/min	Max. absorption energy per minute J/min(kgf·m/min)	Recovering power of the piston rod N (kgf)	Operating temperature °C	Mass g
FV-1406L-S	6	4.5 (0.46)	80 (80)	0.3~1	2,000 (204)	45	100 (10.2)	15 (1.5)以下	-5~70	42
FV-1606L-S	6	5.5 (0.56)	120 (120)	0.3~1	2,700 (276)	45	130 (13.3)	20 (2)以下	-5~70	53
FV-2008L-S	8	8.8 (0.9)	70 (70)	0.3~1	3,430 (350)	60	200 (20.4)	14.7 (1.5)以下	-5~70	108
FV-2508L-S	8	13.7 (1.4)	110 (110)	0.3~1	5,390 (550)	60	300 (30.6)	21.6 (2.2)以下	-5~70	199
FV-2708L-S	8	19.6 (2.0)	150 (150)	0.3~1	7,350 (750)	60	350 (35.7)	23.5 (2.4)以下	-5~70	206.7

Key to Model Number



Precautions for Use

- * Do not use this product without carefully reading the attached owner's manual.
- * Do not turn the oil inlet screw located at the bottom of the main unit.
- * Ensure that sufficient mounting strength is secured for this product. (As a guideline, it should be 2 to 3 times the maximum drag listed in the catalogue.)
- * Do not use this product in a vacuum or a location where it may come in contact with oil.
- * Ensure that an eccentric load is not applied to the soft absorber. (Allowable eccentric angle: ±2.5°)
- * Ensure that an external stopper is also used.

Standard nuts are sold separately as well.

Applicable model	Model
FV-1406L	M14 nut
FV-1606L	M16 nut
FV-2008L	M20 nut
FV-2508L	M25 nut
FV-2708L	M27 nut

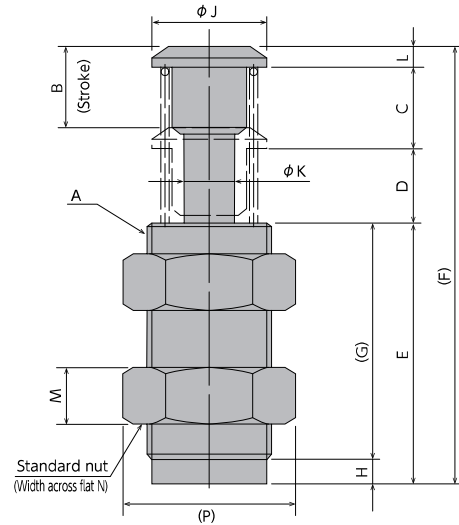
New products
1 Soft Absorber
2 Rotary Damper
3 Magnum Series
4 Speed Controller
5 Helical Isolator
6 Model Selection Form

Soft Absorber

Emergency Absorber Variable-Groove Orifice
Fixed Type Adjustable type Self-adjusting

FED Series

● Products specification might be changed without notice.



Dimensions

Model	A	B	C	D	E	F	G	H	J	K	L	M	N	P
FED-2010M-C	M20×1.5	10	11	14	37.5	62.5	30.5	7	16	8	3	8	24	27.7
FED-3020M-C	M30×1.5	20	25	18	64	107	58	6	28	12	5	14	36	41.6

Specifications

Model	Stroke mm	Max. absorption energy J (kgf·m)	Max. equivalent mass kg (kgf)	Range of impact rate m/s	Max. drag N (kgf)	Recovering power of the piston rod N (kgf)	Operating temperature °C	Mass g
FED-2010M-C	10	19.6(2.0)	30(30)	0.5~2	6,860(700)	41.2(4.2) or lower	-5~70	79
FED-3020M-C	20	98(10)	140(140)		11,760(1,200)	68.6(7.0) or lower		350

* This product is an affordable compact soft absorber for emergencies.

* Light weight - made of aluminum.

* As an emergency absorber, it will last for approximately 100 uses.

Precautions for Use

- * Do not use this product without carefully reading the attached owner's manual.
- * Ensure that sufficient mounting strength is secured for this product. (As a guideline, it should be 2 to 3 times the maximum drag listed in the catalogue.)
- * Never apply eccentric load to the piston rod. In particular, when using in a rotating motion, the distance between the rotational centre of the impacted part and the mounted soft

absorber should be at least 12 times the stroke length. The soft absorber should also be mounted so that it is perpendicular halfway through the stroke.

- * Do not over-tighten the standard nut. (Tightening torque: 14.7H·m)
- * Do not use this product in a vacuum or a location where it may come in contact with oil.
- * Please use with an external stopper

Standard nuts are sold separately as well.

Applicable model	Model
FED-2010M	M20 nut Black
FED-3020M	M30 nut Black

Soft Absorber

Multiple-Orifice (M12 is Single-Orifice)
Fixed Type Adjustable type Self-adjusting

FSB Series (M12, M14, M16)

RoHS Compliant

● Products specification might be changed without notice.



Characteristics

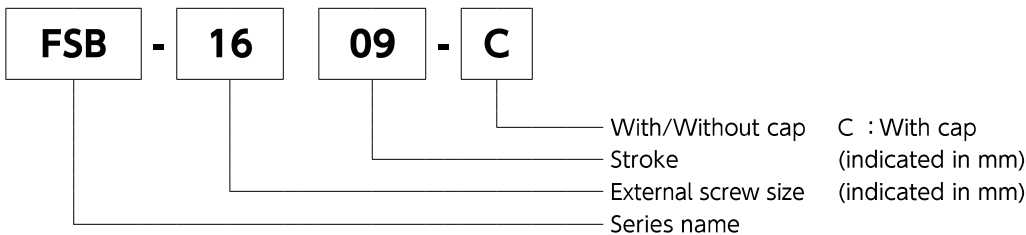
- High functionality stopper bolt (with an implemented absorber)
- Easy to mount external geometry

Material	Main unit	SUM
	Cap	Polyacetal
Surface treatment	Main unit	Nitriding treatment

Specifications

Model	Stroke mm	Max. absorption energy J (kgf·m)	Max. equivalent mass kg (kgf)	Range of impact rate m/s	Max. drag N (kgf)	Max. cycle rate cycle/min	Max. absorption energy per minute J/min (kgf·m/min)	Recovering power of the piston rod N (kgf)	Operating temperature °C	Mass g
FSB-1205-C	5	0.68 (0.07)	5 (5)	0.3~1.0	588 (60)	45	65 (6.63)	4.9 or lower (0.5)	-5~70	40
FSB-1407-C	7	2.5 (0.25)	20 (20)		1,078 (110)	60	120 (12.2)	4.9 or lower (0.5)		70
FSB-1609-C	9	6 (0.61)	50 (50)		1,960 (200)	60	200 (20.4)	9.8 or lower (1.0)		115

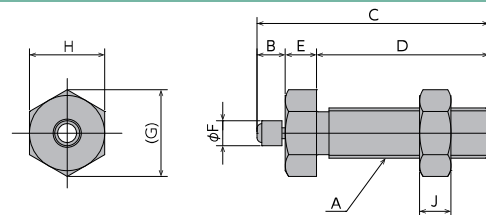
Key to Model Number



Dimensions

Model	A	B	C	D	E	F	G	H	J
FSB-1205-C	M12×1.75	5	43	30	8	6	21.9	19	7
FSB-1407-C	M14×2	7	56	40	9	6	25.4	22	8
FSB-1609-C	M16×2	9	74	55	10	8	27.7	24	10

● The thread pitch is different from other absorbers.



Precautions for Use

- * Do not use this product without carefully reading the attached owner's manual.
- * Ensure that sufficient mounting strength is secured for this product. (As a guideline, it should be 2 to 3 times the maximum drag listed in the catalogue.)
- * Do not use this product in a vacuum or a location where it may come in contact with oil.
- * Ensure that an eccentric load is not applied to the soft absorber. (Allowable eccentric angle: $\pm 2.5^\circ$)
- * Do not over-tighten the main unit and nuts. Please use the tightening torque as listed in the owner's manual.
- * Due to the structure of this product, using the absorber (piston rod side) in an upright position in a dusty environment causes the dust to collect on the absorber, which may affect the durability.

Standard nuts are sold separately as well.

Applicable model	Model
FSB-1205	FSB-1205 nut
FSB-1407	FSB-1407 nut
FSB-1609	FSB-1609 nut

New products

1 Soft Absorber

2 Rotary Damper

3 Magnum Series

4 Speed Controller

5 Helical Isolator

6 Model Selection Form

Soft Absorber

FES Series



Type Descriptions

F E S - 1 2 1 5

① ② ③

- ① Series name
- ② Mounting screw size (metric coarse screw thread)
- ③ Max. stroke

Product Description

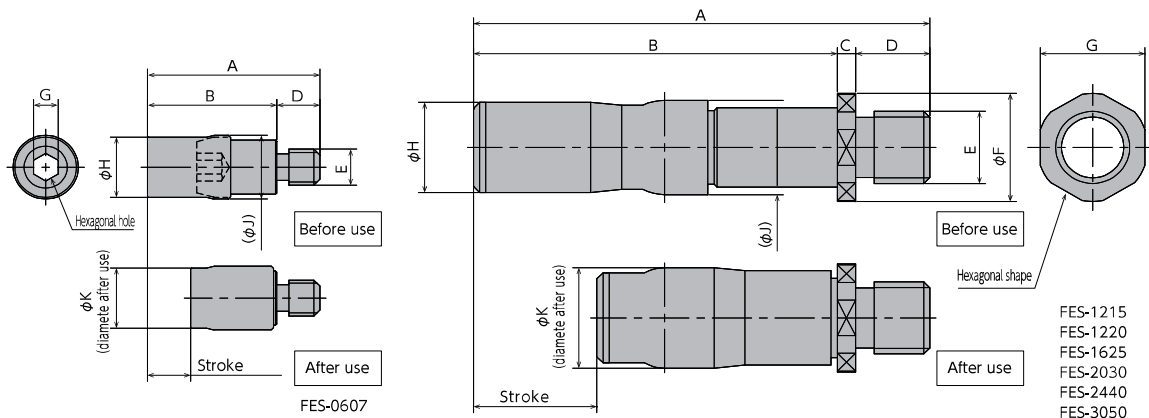
The emergency stopper, available for only one-time use, is designed to urgently stop in runway of the devices with an linear motor or servomotor. Absorbs the energy using the plastic deformation of metal. Differs from the general hydraulic pressure shock absorber, impervious to an oil leak. Designed more compact than a hydraulic pressure shock absorber with the similar absorption capacity. Also, a rebound, frequently seen in a rubber stopper, does not occur and the excellent absorption characteristics cause no damage to the device.

Specifications

Model	Max. absorption energy J(kgf·m)	Maximum stroke mm	Range of impact rate m/s	Max. drag N(kgf)	Range of operating temperature °C	Mass g
FES-0607	7(0.7)	7	3以下	2,500(255)	-25~60	9
FES-1215	45(4.6)	15		6,500(663)		50
FES-1220	80(8.2)	20		8,500(867)		70
FES-1625	160(16.3)	25		9,500(969)		100
FES-2030	450(45.9)	30		27,000(2,755)		300
FES-2440	1,000(102)	40		45,000(4,592)		650
FES-3050	1,800(183.7)	50		60,000(6,122)		1,200

Dimensions

Model	A	B	C	D	E	F	G	H	J	K
FES-0607	28	21	—	7	M6×1	—	4	10	10.6	10.6
FES-1215	62	47	3	12	M12×1.75	15	14	14	14.6	15.4
FES-1220	74	59	3	12	M12×1.75	18	17	15	15.7	16.7
FES-1625	89	70	3	16	M16×2	19	17	15	16.5	17.5
FES-2030	109	84	5	20	M20×2.5	30	27	26	27.8	28.8
FES-2440	138	107	6	25	M24×3	40	36	33	36.7	37.7
FES-3050	172	134	8	30	M30×3.5	50	46	41	45	46



FES-1215
FES-1220
FES-1625
FES-2030
FES-2440
FES-3050

●Products specification might be changed without notice.

Selection Method

- Based on the equations for the selection, please calculate the kinetic energy (E1) of the application to be used and tentatively select the model with greater maximum absorption energy than the calculated energy value.
* According to the expected number of units to be used (n), multiply the maximum absorption energy by n.
↓
- Calculate the stroke of the tentatively selected model (St) based on the stroke equations and the table of coefficient for each model, and calculate the thrusting energy (E2) using the equations for the selection.
↓
- Confirm that the total energy (E) and stroke (St) calculated above meet the specifications of the tentatively selected model. When the specifications are met, the selection is complete. If not, please calculate again with another model with greater maximum absorption energy.

Equations for the Selection

With thrust (horizontal)

$$E_1 = \frac{1}{2} MV^2 \quad E_2 = F \times St$$

$$St = \frac{1}{2} MV^2 \times \frac{1}{((\text{max. drag} \times n \times \text{coefficient}) - F)}$$

$$E = E_1 + E_2$$

Without thrust (horizontal)

$$E_1 = \frac{1}{2} MV^2$$

$$E = E_1$$

You can calculate the approximate stroke using the equations below (no need to use the equation of $E_2 = F \times St$).

$$St = \frac{1}{2} MV^2 \times \frac{1}{\text{max. drag} \times n \times \text{coefficient}}$$

For free fall

$$E_1 = M \cdot g \cdot H \quad E_2 = M \cdot g \cdot St$$

$$St = \frac{1}{2} MV^2 \times \frac{1}{((\text{max. drag} \times n \times \text{coefficient}) - (M \times g))}$$

$$E = E_1 + E_2$$

How to Mount

Tightening torque when attaching N·m (kg·f m)	
FES-0607	9(0.9)
FES-1215	61.4(6.26)
FES-1220	66.5(6.78)
FES-1625	107(10.9)
FES-2030	315(32.1)
FES-2440	564(57.6)
FES-3050	1,125(114.7)

- * Attach the product with tightening torque above using the hexagonal part of the main unit.
- * Using another part to attach the product causes insufficient tightening or damage.
- * When using in a place where vibration easily causes loosening, take measures so that loosening does not occur.

Equations to calculate a stroke

Equations to calculate St (stroke) of $E_2 = F \times St$

$$St = \frac{1}{2} MV^2 \times \frac{1}{\text{max. drag} \times n \times \text{coefficient} - F}$$

↓
↓
 Number of FES Thrust

Table of coefficient for each model

Model	Stroke mm	Max. absorption energy J	Max. drag N	Coefficient
FES-0607	7	7	2,500	0.5
FES-1215	15	45	6,500	0.7
FES-1220	20	80	8,500	0.7
FES-1625	25	160	9,500	0.7
FES-2030	30	450	27,000	0.6
FES-2440	40	1,000	45,000	0.7
FES-3050	50	1,800	60,000	0.7

Product Characteristics

- * Excellent absorption characteristic
- * Compact with large absorption capacity
- * Usable without an external stopper
- * Maintenance-free
- * Little changes in the characteristics with operating temperature

FES-0607		
Material	SUS	
Surface treatment	Main unit	Bright quenching

FES-1215, 1220, 1625, 2030, 2440, 3050		
Material	Carbon steel	
Surface treatment	Cap	Galvanized
	Main unit	Nitriding treatment

Precautions for Use

- * Do not use this product without carefully reading the attached owner's manual.
- * Ensure that sufficient mounting strength is secured for this product. (As a guideline, it should be 2 to 3 times the maximum drag listed in the catalog.)
- * 2 or more of this product can be used in parallel.
- * Ensure that an eccentric load is not applied to the product.
- * You can use the product only once. Not available repeatedly.

Rotary Damper

Fixed Type

Bi-Directional

Uni-Directional

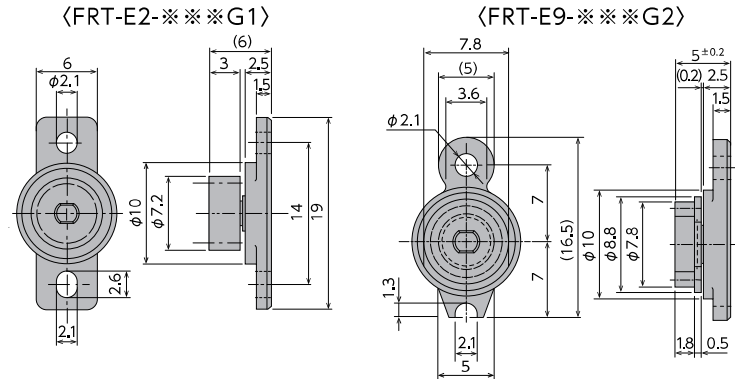
Adjustable type

Self-adjusting

FRT-E2/E9 Series

RoHS Compliant

●Products specification might be changed without notice.



Specifications

Model	Rated torque
FRT-E2-100G1	$(1 \pm 0.5) \times 10^{-3} \text{N} \cdot \text{m}$
FRT-E9-100G2	$10 \pm 5 \text{ gf} \cdot \text{cm}$
FRT-E2-200G1	$(2 \pm 0.7) \times 10^{-3} \text{N} \cdot \text{m}$
FRT-E9-200G2	$20 \pm 7 \text{ gf} \cdot \text{cm}$
FRT-E2-300G1	$(3 \pm 0.8) \times 10^{-3} \text{N} \cdot \text{m}$
FRT-E9-300G2	$30 \pm 8 \text{ gf} \cdot \text{cm}$
FRT-E2-400G1	$(4 \pm 1) \times 10^{-3} \text{N} \cdot \text{m}$
FRT-E9-400G2	$40 \pm 10 \text{ gf} \cdot \text{cm}$

* Max. rotation speed	50rpm
* Max. cycle rate	10cycle/min
* Operating temperature	0 ~ 50°C
* Weight	FRT-E2 : with gear : 0.41g FRT-E9 : with gear : 0.38g
* Body and cap material	Polycarbonate (PC)
* Rotating shaft material	Polyacetal (POM)
* Gear material	Polyacetal (POM)
* Oil type	Silicone oil

Note 1) Rated torque measured at a rotation speed of 20rpm at 23°C
 Note 2) Gear model number has G1 and G2 at the end

Note 3) Torque can be customized by changing the oil viscosity (see Customizable Torque Chart on page 178)
 Note 4) Model E9 is a customized product with a one-sided mounting

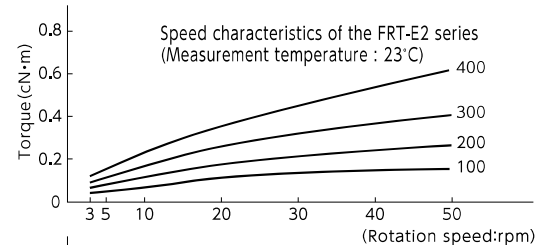
Gear Specifications

Model	G1 (for E2)	G2 (for E9)
Type	Standard spur gear	Standard spur gear
Tooth profile	Involute	
Module	0.6	
Pressure angle	20°	
Number of teeth	10	11
Pitch circle diameter	$\phi 6$	$\phi 6.6$

Damper Characteristics

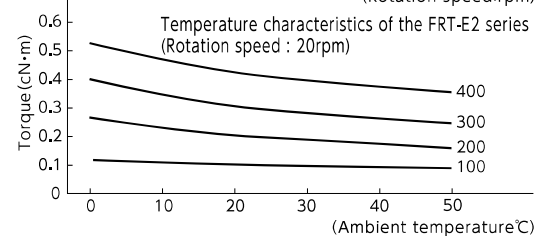
1. Speed characteristics

A rotary damper's torque varies according to the rotation speed. In general, as shown in the graph to the right, the torque increases as the rotation speed increases, and the torque decreases as the rotation speed decreases. In addition, please note that the starting torque slightly differs from the rated torque.



2. Temperature characteristics

A rotary damper's torque varies according to the ambient temperature. In addition, as shown in the graph to the right, the torque decreases as the ambient temperature increases, and the torque increases as the ambient temperature decreases. This is because the viscosity of the silicone oil inside the damper varies according to the temperature. When the temperature returns to normal, the torque will return to normal as well.



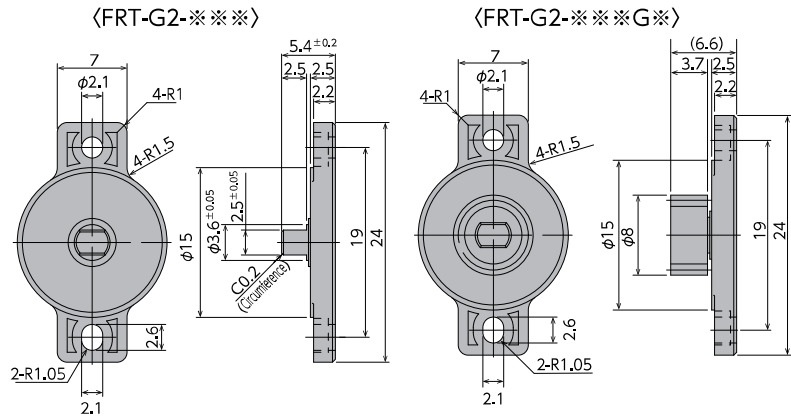
Rotary Damper

Fixed Type **Bi-Directional** Adjustable type **Uni-Directional**
Self-adjusting

FRT-G2 Series

RoHS Compliant

●Products specification might be changed without notice.



Specifications

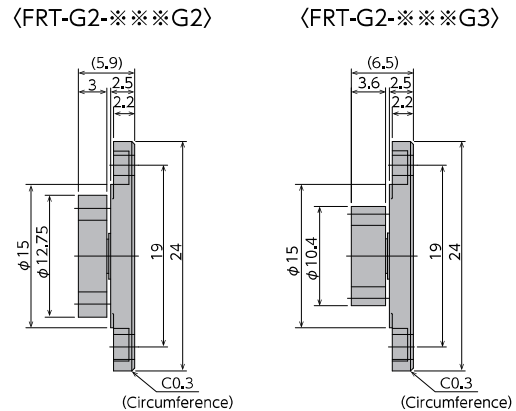
Model	Rated torque
FRT-G2-200(G*)	$(2\pm 0.7)\times 10^{-3}\text{N}\cdot\text{m}$ 20±7 gf·cm
FRT-G2-300(G*)	$(3\pm 0.8)\times 10^{-3}\text{N}\cdot\text{m}$ 30±8 gf·cm
FRT-G2-450(G*)	$(4.5\pm 1)\times 10^{-3}\text{N}\cdot\text{m}$ 45±10 gf·cm
FRT-G2-600(G*)	$(6\pm 1.2)\times 10^{-3}\text{N}\cdot\text{m}$ 60±12 gf·cm
FRT-G2-101(G*)	$(10\pm 2)\times 10^{-3}\text{N}\cdot\text{m}$ 100±20 gf·cm

- * Max. rotation speed 50rpm
- * Max. cycle rate 10cycle/min
- * Operating temperature 0~50°C
- * Weight 0.6g(with gear : G1 : 0.8g
G2 : 1.0g G3 : 0.9g)
- * Body and cap material Polycarbonate (PC)
- * Rotating shaft material Polyacetal (POM)
- * Gear material Polyacetal (POM)
- * Oil type Silicone oil

Note 1) Rated torque measured at a rotation speed of 20rpm at 23°C
 Note 2) Models with gear bears G1, G2, or G3 at the end of their model numbers
 Note 3) Torque can be customized by changing the oil viscosity (see Customizable Torque Chart on page 178)
 Note 4) The diagrams above are outline drawings of FRT-G2-***. Please refer to the diagrams at the right for G2 and G3.

Gear Specifications

	G1	G2	G3
Type	Standard spur gear	Profile shifted spur gear	Standard spur gear
Tooth profile	Involute		
Module	0.5	1.0	0.8
Pressure angle	20°		
Number of teeth	14	10	11
Pitch circle diameter	φ7	φ10	φ8.8
Addendum modification	-	+0.375	-



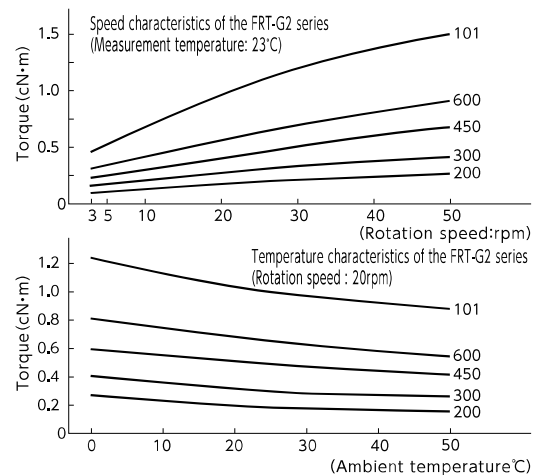
Damper Characteristics

1. Speed characteristics

A rotary damper's torque varies according to the rotation speed. In general, as shown in the graph to the right, the torque increases as the rotation speed increases, and the torque decreases as the rotation speed decreases. In addition, please note that the starting torque slightly differs from the rated torque.

2. Temperature characteristics

A rotary damper's torque varies according to the ambient temperature. In addition, as shown in the graph to the right, the torque decreases as the ambient temperature increases, and the torque increases as the ambient temperature decreases. This is because the viscosity of the silicone oil inside the damper varies according to the temperature. When the temperature returns to normal, the torque will return to normal as well.



New products
1 Soft Absorber
2 Rotary Damper
3 Magnum Series
4 Speed Controller
5 Helical Isolator
6 Model Selection Form

Rotary Damper

Fixed Type

Bi-Directional

Adjustable type

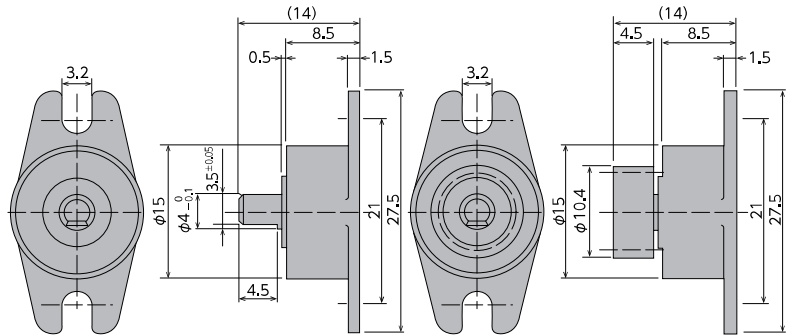
Uni-Directional

Self-adjusting

FRT/FRN-C2 Series

RoHS Compliant

● Products specification might be changed without notice.



Specifications

Model	Rated torque	Damping direction
FRT-C2-201 (G1)	$(20 \pm 6) \times 10^{-3} \text{N}\cdot\text{m}$ 200±60 gf·cm	Both directions
FRT-C2-301 (G1)	$(30 \pm 8) \times 10^{-3} \text{N}\cdot\text{m}$ 300±80 gf·cm	Both directions
FRN-C2-R301 (G1)	$(30 \pm 8) \times 10^{-3} \text{N}\cdot\text{m}$ 300±80 gf·cm	Clockwise
FRN-C2-L301 (G1)	$(30 \pm 8) \times 10^{-3} \text{N}\cdot\text{m}$ 300±80 gf·cm	Counter-clockwise

Note 1) Rated torque measured at a rotation speed of 20rpm at 23°C

Note 2) Gear model number has G1 at the end

Note 3) Torque can be customized by changing the oil viscosity (see Customizable Torque Chart on page 178)

● There are dampers that generate torque in both directions and one-way torque in the CW direction or CCW direction when the rotating axle is viewed from the top.

- * Max. rotation speed 50rpm
- * Max. cycle rate 10cycle/min
- * Operating temperature 0 ~ 50°C
- * Weight FRT-C2 : 2.1g (with gear : 2.4g)
FRN-C2 : 3.2g (with gear : 3.5g)
- * Body and cap material Polycarbonate (PC)
- * Rotating shaft material Polyacetal (POM)
metal (FRT: POM, FRN: SUS)
- * Gear material Polyacetal (POM)
- * Oil type Silicone oil

Gear Specifications

Type	Profile shifted spur gear
Tooth profile	Involute
Module	0.8
Pressure angle	20°
Number of teeth	11
Pitch circle diameter	φ8.8

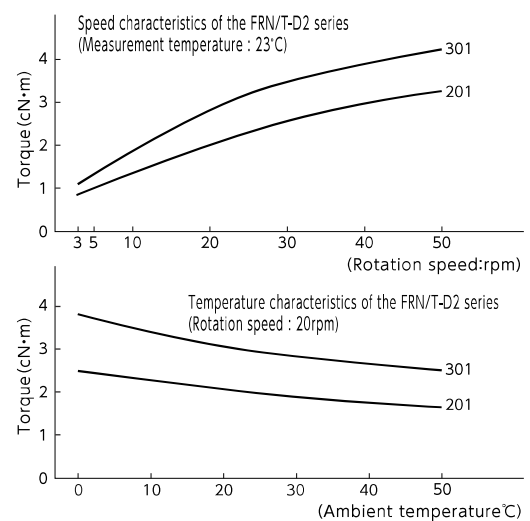
Damper Characteristics

1. Speed characteristics

A rotary damper's torque varies according to the rotation speed. In general, as shown in the graph to the right, the torque increases as the rotation speed increases, and the torque decreases as the rotation speed decreases. In addition, please note that the starting torque slightly differs from the rated torque.

2. Temperature characteristics

A rotary damper's torque varies according to the ambient temperature. In addition, as shown in the graph to the right, the torque decreases as the ambient temperature increases, and the torque increases as the ambient temperature decreases. This is because the viscosity of the silicone oil inside the damper varies according to the temperature. When the temperature returns to normal, the torque will return to normal as well.



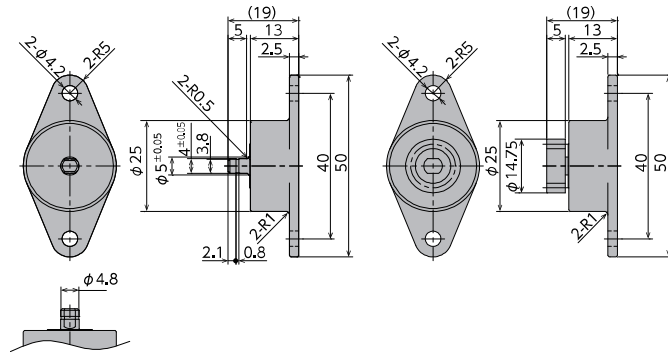
Rotary Damper

Fixed Type **Bi-Directional** Adjustable type **Uni-Directional**
Self-adjusting

FRT/FRN-D3 Series

RoHS Compliant

● Products specification might be changed without notice.



Specifications

Model	Rated torque	Damping direction
FRT-D3-501 (G1)	(50±10)×10 ⁻³ N·m 500±100 gf·cm	Both directions
FRT-D3-102 (G1)	(100±20)×10 ⁻³ N·m 1,000±200 gf·cm	Both directions
FRT-D3-152 (G1)	(150±30)×10 ⁻³ N·m 1,500±300 gf·cm	Both directions
FRT-D3-202 (G1)	(200±40)×10 ⁻³ N·m 2,000±400 gf·cm	Both directions
FRT-D3-252 (G1)	(250±50)×10 ⁻³ N·m 2,500±500 gf·cm	Both directions
FRN-D3-R501 (G1)	(50±10)×10 ⁻³ N·m	Clockwise
FRN-D3-L501 (G1)	500±100 gf·cm	Counter-clockwise
FRN-D3-R102 (G1)	(100±20)×10 ⁻³ N·m	Clockwise
FRN-D3-L102 (G1)	1,000±200 gf·cm	Counter-clockwise
FRN-D3-R152 (G1)	(150±30)×10 ⁻³ N·m	Clockwise
FRN-D3-L152 (G1)	1,500±300 gf·cm	Counter-clockwise
FRN-D3-R202 (G1)	(200±40)×10 ⁻³ N·m	Clockwise
FRN-D3-L202 (G1)	2,000±400 gf·cm	Counter-clockwise
FRN-D3-R252 (G1)	(250±50)×10 ⁻³ N·m	Clockwise
FRN-D3-L252 (G1)	2,500±500 gf·cm	Counter-clockwise

- * Max. rotation speed: 50rpm
- * Max. cycle rate: 10cycle/min
- * Operating temperature: 0~50°C
- * Weight: FRT-D3 : 8.3g (with gear : 9g)
FRN-D3 : 12.3g (with gear : 13g)
- * Body and cap material: * Oil type
- * Rotating shaft material: Polyacetal (POM)
metal (FRN : SUS)
- * Gear material: Polyacetal (POM)
- * Oil type: Silicone oil
- * Cap color: FRT : Gray
FRN (R) : Black
FRN (L) : White

Gear Specifications

Type	Profile shifted spur gear
Tooth profile	Involute
Module	1.0
Pressure angle	20°
Number of teeth	12
Pitch circle diameter	φ12
Rack shift coefficient	+0.375

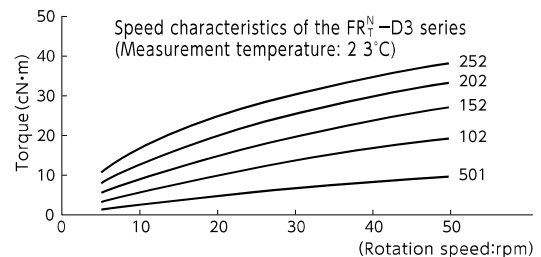
Note 1) Rated torque measured at a rotation speed of 20rpm at 23°C
Note 2) Gear model number has G1 at the end

Note 3) Torque can be customized by changing the oil viscosity (see Customizable Torque Chart on page 178)
● There are dampers that generate torque in both directions and one-way torque in the CW direction or CCW direction when the rotating axle is viewed from the top.

Damper Characteristics

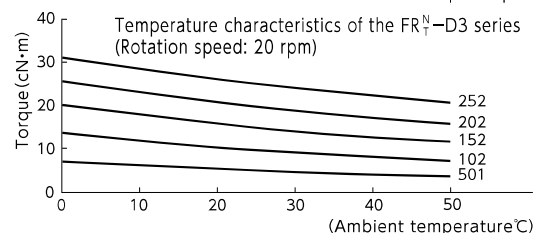
1. Speed characteristics

A rotary damper's torque varies according to the rotation speed. In general, as shown in the graph to the right, the torque increases as the rotation speed increases, and the torque decreases as the rotation speed decreases. In addition, please note that the starting torque slightly differs from the rated torque.



2. Temperature characteristics

A rotary damper's torque varies according to the ambient temperature. In addition, as shown in the graph to the right, the torque decreases as the ambient temperature increases, and the torque increases as the ambient temperature decreases. This is because the viscosity of the silicone oil inside the damper varies according to the temperature. When the temperature returns to normal, the torque will return to normal as well.



Rotary Damper

Fixed Type

Bi-Directional

Uni-Directional

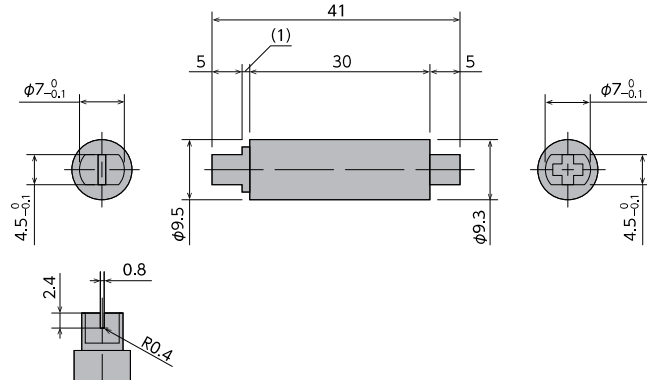
Adjustable type

Self-adjusting

FRT-S1 Series

RoHS Compliant

●Products specification might be changed without notice.



Specifications

Model	Rated torque
FRT-S1-201	$(20 \pm 6) \times 10^{-3} \text{N}\cdot\text{m}$ $200 \pm 60 \text{gf}\cdot\text{cm}$
FRT-S1-301	$(30 \pm 8) \times 10^{-3} \text{N}\cdot\text{m}$ $300 \pm 80 \text{gf}\cdot\text{cm}$

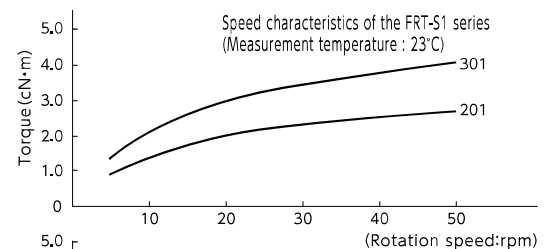
Note 1) Rated torque measured at a rotational speed of 20 rpm at 23°C
 Note 2) Torque can be customized by changing the oil viscosity.
 (See Customizable Torque Chart on page 178.)

- * Max. rotational speed 50rpm
- * Max. cycle rate 10cycle /min
- * Operating temperature 0 ~ 50°C
- * Weight 3g
- * Main body material Polyacetal(POM)
- * Rotating shaft material Polyacetal(POM)
- * Oil type Silicone oil

Damper Characteristics

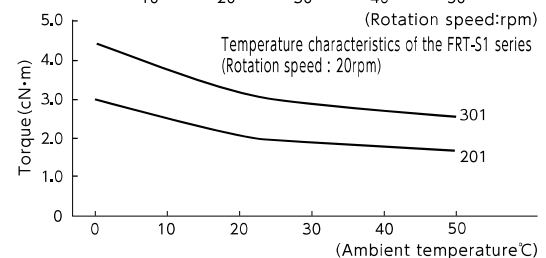
1. Speed characteristics

A rotary damper's torque varies according to the rotation speed. In general, as shown in the graph to the right, the torque increases as the rotation speed increases, and the torque decreases as the rotation speed decreases. In addition, please note that the starting torque slightly differs from the rated torque.



2. Temperature characteristics

A rotary damper's torque varies according to the ambient temperature. In addition, as shown in the graph to the right, the torque decreases as the ambient temperature increases, and the torque increases as the ambient temperature decreases. This is because the viscosity of the silicone oil inside the damper varies according to the temperature. When the temperature returns to normal, the torque will return to normal as well.



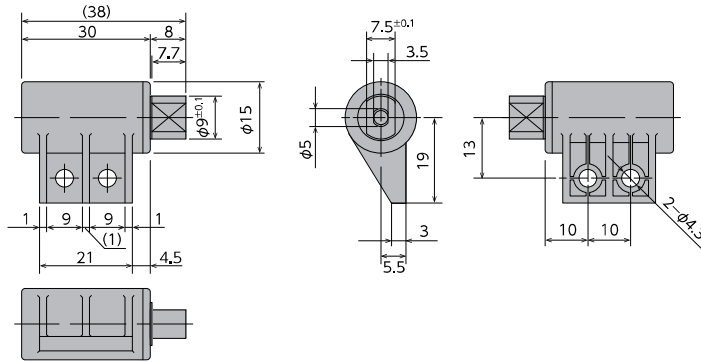
Rotary Damper

Fixed Type **Bi-Directional** Adjustable type **Uni-Directional** Self-adjusting

FRT-N1 Series

RoHS Compliant

●Products specification might be changed without notice.



Specifications

Model	Rated torque
FRT-N1-102	$(100 \pm 20) \times 10^{-3} \text{N}\cdot\text{m}$ 1,000 ± 200 gf·cm
FRT-N1-182	$(180 \pm 36) \times 10^{-3} \text{N}\cdot\text{m}$ 1,800 ± 360 gf·cm

Note 1) Rated torque measured at a rotational speed of 20 rpm at 23°C
 Note 2) Torque can be customized by changing the oil viscosity.
 (See Customizable Torque Chart on page 178.)

- * Max. rotational speed 50rpm
- * Max. cycle rate 10cycle /min
- * Operating temperature 0 ~ 50°C
- * Weight 8.2g
- * Main body material Polyacetal(POM)
- * Cap material Polyacetal(POM)
- * Rotating shaft material Polyacetal(POM)
- * Oil type Silicone oil

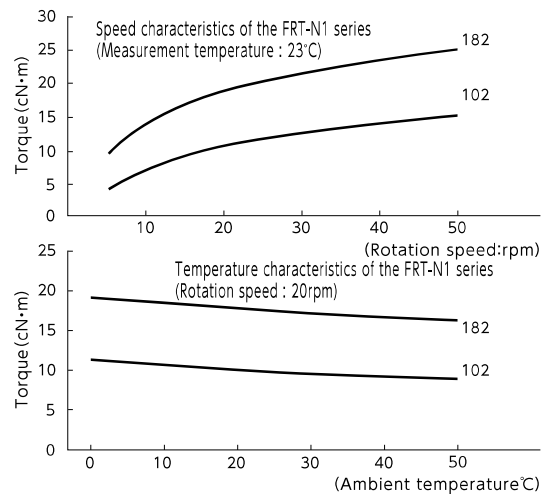
Damper Characteristics

1. Speed characteristics

A rotary damper's torque varies according to the rotation speed. In general, as shown in the graph to the right, the torque increases as the rotation speed increases, and the torque decreases as the rotation speed decreases. In addition, please note that the starting torque slightly differs from the rated torque.

2. Temperature characteristics

A rotary damper's torque varies according to the ambient temperature. In addition, as shown in the graph to the right, the torque decreases as the ambient temperature increases, and the torque increases as the ambient temperature decreases. This is because the viscosity of the silicone oil inside the damper varies according to the temperature. When the temperature returns to normal, the torque will return to normal as well.



New products

1 Soft Absorber

2 Rotary Damper

3 Magnum Series

4 Speed Controller

5 Helical Isolator

6 Model Selection Form

Rotary Damper

Fixed Type

Bi-Directional

Uni-Directional

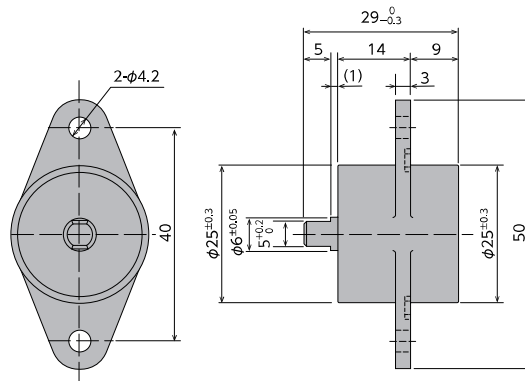
Adjustable type

Self-adjusting

FRT-L1 Series

RoHS Compliant

●Products specification might be changed without notice.



Specifications

Model	Rated torque
FRT-L1-202	$(200 \pm 40) \times 10^{-3} \text{ N}\cdot\text{m}$ $2,000 \pm 400 \text{ gf}\cdot\text{cm}$
FRT-L1-302	$(300 \pm 60) \times 10^{-3} \text{ N}\cdot\text{m}$ $3,000 \pm 600 \text{ gf}\cdot\text{cm}$

Note 1) Rated torque measured at a rotational speed of 20 rpm at 23°C
 Note 2) Torque can be customized by changing the oil viscosity.
 (See Customizable Torque Chart on page 178.)

*Max. rotational speed	50rpm
*Max. cycle rate	10cycle/min
*Operating temperature	0~50°C
*Weight	14,1g
*Main body material	Polycarbonate (PC)
*Rotating shaft material	Polyacetal (POM)
*Oil type	Silicone oil

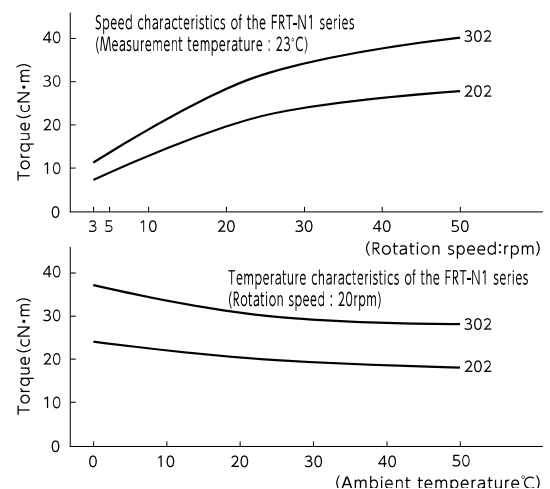
Damper Characteristics

1. Speed characteristics

A rotary damper's torque varies according to the rotation speed. In general, as shown in the graph to the right, the torque increases as the rotation speed increases, and the torque decreases as the rotation speed decreases. In addition, please note that the starting torque slightly differs from the rated torque.

2. Temperature characteristics

A rotary damper's torque varies according to the ambient temperature. In addition, as shown in the graph to the right, the torque decreases as the ambient temperature increases, and the torque increases as the ambient temperature decreases. This is because the viscosity of the silicone oil inside the damper varies according to the temperature. When the temperature returns to normal, the torque will return to normal as well.



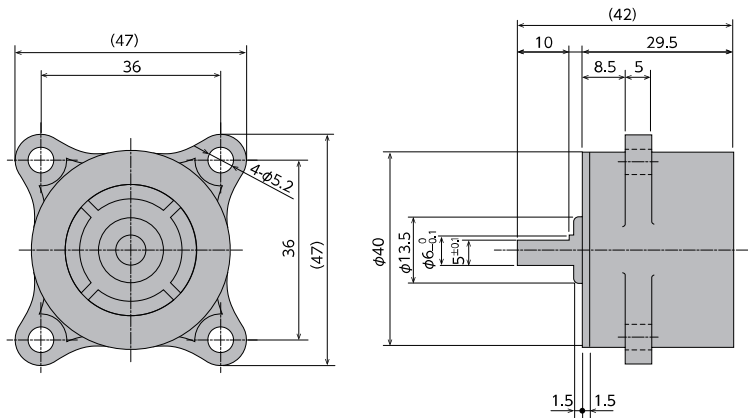
Rotary Damper

Fixed Type **Bi-Directional** Adjustable type **Uni-Directional**
Self-adjusting

FRT/FRN-K2 Series

RoHS Compliant

●Products specification might be changed without notice.



Specifications

Model	Rated torque	Damping direction
FRT-K2-103	1±0.2 N·m (10±2 kgf·cm)	Both directions
FRN-K2-R103	1±0.2 N·m	Clockwise
FRN-K2-L103	(10±2 kgf·cm)	Counter-clockwise

- * Max. rotational speed 50rpm
- * Max. cycle rate 10cycle /min
- * Operating temperature 0 ~50°C
- * Weight FRT-K2 : 78.3g
FRN-K2 : 56.6g
- * Main body material Polycarbonate + glass fiber
- * Rotating shaft material Metal (SUS)
- * Oil type Silicone oil

Note 1) Rated torque measured at a rotation speed of 20rpm at 23°C

Note 2) Torque can be customized by changing the oil viscosity
(see Customizable Torque Chart on page 178)

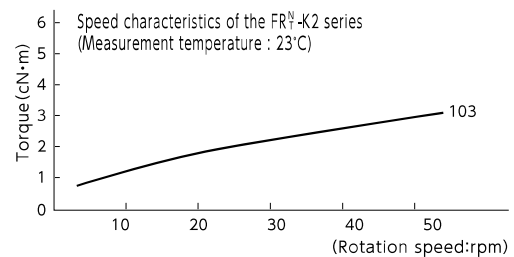
Note 3) Dampers with gear can also be custom ordered.

● An FRT type damper generates torque in both directions and an FRN type generates one-way torque in the CW direction (R) or CCW direction (L) when the rotating axle is viewed from the top.

Damper Characteristics

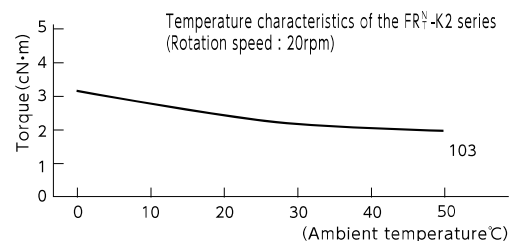
1. Speed characteristics

A rotary damper's torque varies according to the rotation speed. In general, as shown in the graph to the right, the torque increases as the rotation speed increases, and the torque decreases as the rotation speed decreases. In addition, please note that the starting torque slightly differs from the rated torque.



2. Temperature characteristics

A rotary damper's torque varies according to the ambient temperature. In addition, as shown in the graph to the right, the torque decreases as the ambient temperature increases, and the torque increases as the ambient temperature decreases. This is because the viscosity of the silicone oil inside the damper varies according to the temperature. When the temperature returns to normal, the torque will return to normal as well.



New products

1 Soft Absorber

2 Rotary Damper

3 Magnum Series

4 Speed Controller

5 Helical Isolator

6 Model Selection Form

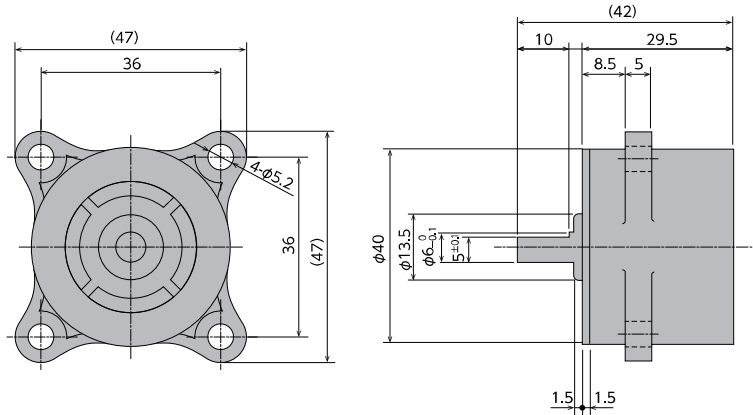
Rotary Damper

Fixed Type Bi-Directional Adjustable type Uni-Directional
Self-adjusting

FRT/FRN-F2 Series

RoHS Compliant

●Products specification might be changed without notice.



Specifications

Model	Rated torque	Damping direction
FRT-F2-203	2±0.4 N·m (20±4 kgf·cm)	Both directions
FRT-F2-303	3±0.8 N·m (30±8 kgf·cm)	Both directions
FRT-F2-403	4±1 N·m (40±10 kgf·cm)	Both directions
FRN-F2-R203	2±0.4 N·m	Clockwise
FRN-F2-L203	(20±4 kgf·cm)	Counter-clockwise

- * Max. rotational speed 50rpm
- * Max. cycle rate 10cycle /min
- * Operating temperature 0 ~50°C
- * Weight FRT-K2 : 115.6g
FRN-K2 : 93.2g
- * Main body material Polycarbonate + glass fiber
- * Rotating shaft material Metal (SUS)
- * Oil type Silicone oil

Note 1) Rated torque measured at a rotation speed of 20rpm at 23°C

Note 2) Torque can be customized by changing the oil viscosity
(see Customizable Torque Chart on page 178)

Note 3) Dampers with gear can also be custom ordered.

● An FRT type damper generates torque in both directions and an FRN type generates one-way torque in the CW direction (R) or CCW direction (L) when the rotating axle is viewed from the top.

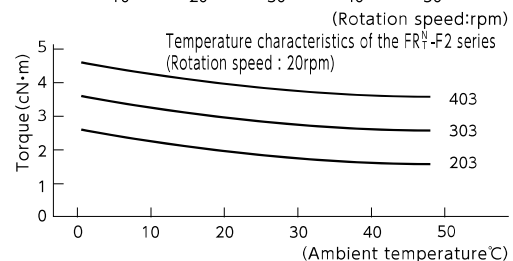
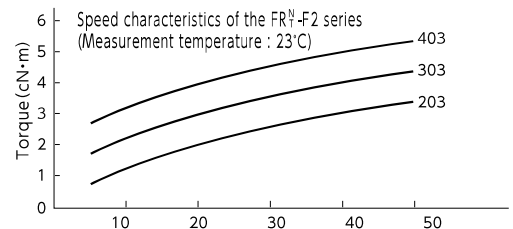
Damper Characteristics

1. Speed characteristics

A rotary damper's torque varies according to the rotation speed. In general, as shown in the graph to the right, the torque increases as the rotation speed increases, and the torque decreases as the rotation speed decreases. In addition, please note that the starting torque slightly differs from the rated torque.

2. Temperature characteristics

A rotary damper's torque varies according to the ambient temperature. In addition, as shown in the graph to the right, the torque decreases as the ambient temperature increases, and the torque increases as the ambient temperature decreases. This is because the viscosity of the silicone oil inside the damper varies according to the temperature. When the temperature returns to normal, the torque will return to normal as well.

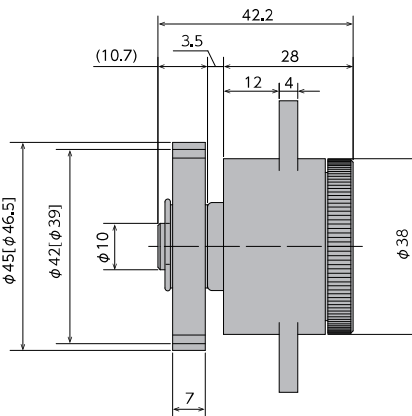
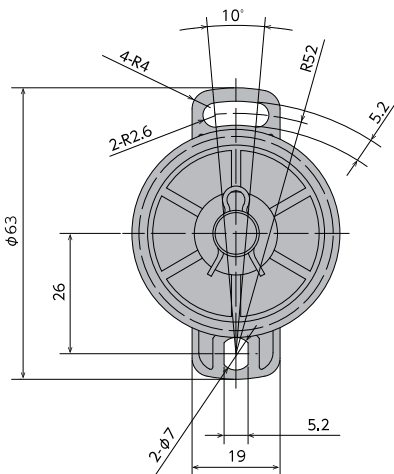


Rotary Damper

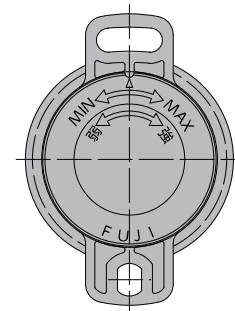
FRN-P2 Series(Adjustable Types: Variable Torque Models)



- * Max. rotation speed 50rpm
- * Max. cycle rate 10cycle/min
- * Operating temperature 0~50°C
- * Weight 64g
- * Body and cap material PBT
- * Rotating shaft material SUS
- * Gear, adjustment knob POM
- * Oil type Silicone oil



Dimensions of G2 gear are in []



Specifications

Model	Rated torque	Damping direction
FRN-P2-R501G*	0.05±0.01 N·m (0.5±0.1 kgf·cm)	Clockwise direction
FRN-P2-L501G*		Counter-clockwise direction
FRN-P2-R102G*	0.10±0.02 N·m (1.0±0.2 kgf·cm)	Clockwise direction
FRN-P2-L102G*		Counter-clockwise direction
FRN-P2-R202G*	0.20±0.04 N·m (2.0±0.4 kgf·cm)	Clockwise direction
FRN-P2-L202G*		Counter-clockwise direction

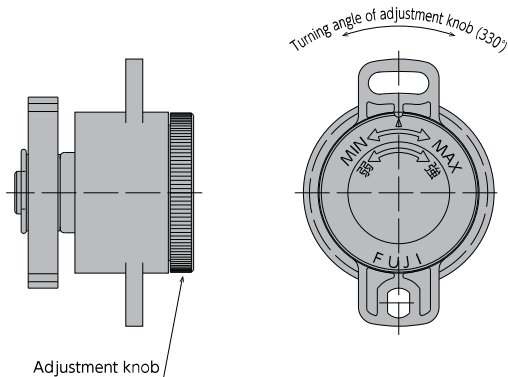
Note 1) Rated torque is measured at a rotation speed of 20rpm at 23°C (adjustment knob set at MAX)

- There are dampers that generate torque in the CW direction or CCW direction when the rotating axle is viewed from the top.

Gear Specifications

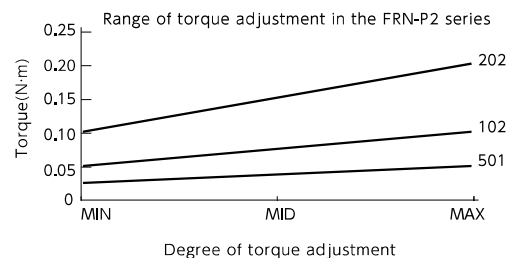
Model	G1	*G2
Type	Standard spur gear	Shifted spur gear
Tooth profile	Involute	
Module	1.5	3.0
Pressure angle	20°	
Number of teeth	28	13
Pitch circle diameter	φ42	φ39
Addendum modification coefficient	-	+0.25

How to Adjust Torque



Adjustment knob

Range of Torque Adjustment



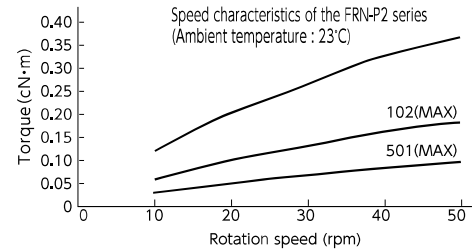
Turn the adjustment knob clockwise to increase damper torque and counterclockwise to decrease it.

●Products specification might be changed without notice.

Characteristics

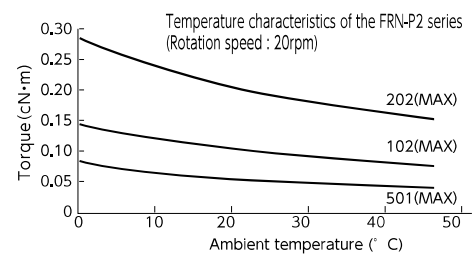
1. Speed characteristics

A rotary damper's torque varies according to the rotation speed. In general, as shown in the graph to the right, the torque increases as the rotation speed increases, and the torque decreases as the rotation speed decreases. In addition, please note that the starting torque slightly differs from the rated torque.

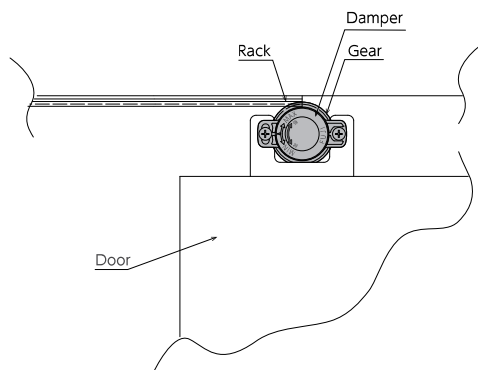


2. Temperature characteristics

A rotary damper's torque varies according to the ambient temperature. In addition, as shown in the graph to the right, the torque decreases as the ambient temperature increases, and the torque increases as the ambient temperature decreases. This is because the viscosity of the silicone oil inside the damper varies according to the temperature. When the temperature returns to normal, the torque will return to normal as well.



Example of Using a Damper



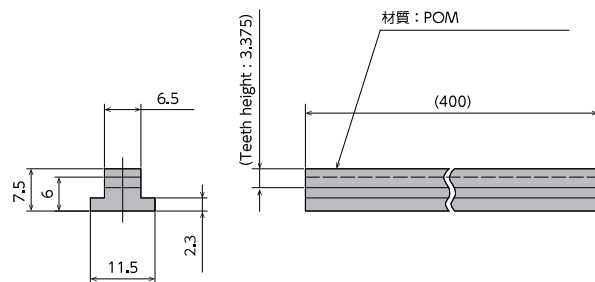
Application of the FRN-P2 Series

Option Rack

G1 Rack : ROP-020P2-1

Applicable Models	Model
FRN-P2	ROP-020P2-1

Rack specifications : m=1.5
Pressure angle 20° (full depth tooth)
Z=85



There is no provision for option racks complying with the gear specification G2 (shifted spur gear) of FRN-P2

Rotary Damper

Customized orders

Bi-Directional

Uni-Directional

Fixed Type

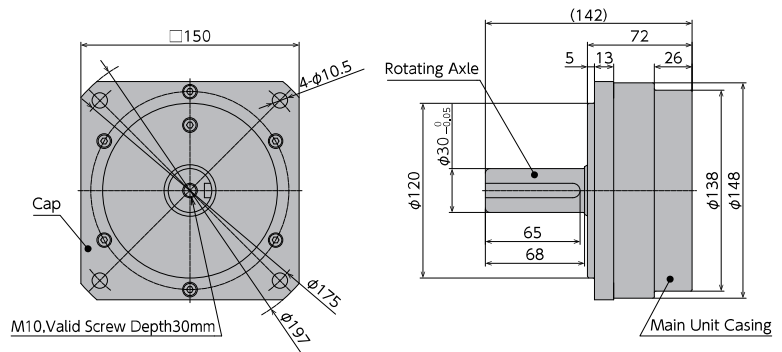
Adjustable type

Self-adjusting

FRT-W1

RoHS Compliant

●Products specification might be changed without notice.



Specifications

Model	Rated torque	Damping direction
FRT-W1-105	100±20N·m	Both directions
FRT-W1-185	180±40N·m	Both directions

Note 1) Rated torque measured at a rotation speed of 20rpm at 23°C

- * Max. rotation speed 50rpm
- * Max. cycle rate 1.5cycle /min
- * Operating temperature -20 ~60°C
- * Weight 6g
- * Main body material SUS304
- * Cap material A2017
- * Rotating (shaft) material SUS420
- * Oil type Silicone oil

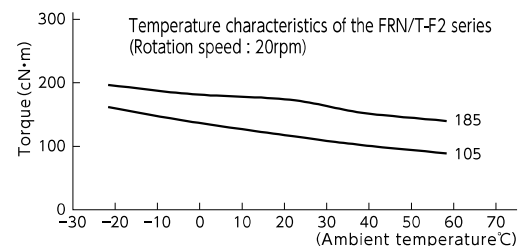
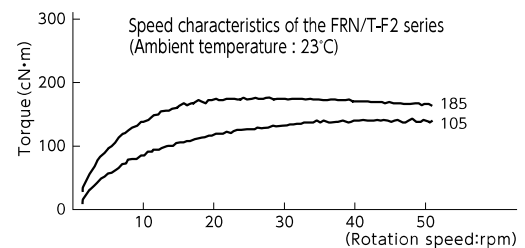
Damper Characteristics

1. Speed characteristics

A rotary damper's torque varies according to the rotation speed. In general, as shown in the graph to the right, the torque increases as the rotation speed increases, and the torque decreases as the rotation speed decreases. In addition, please note that the starting torque slightly differs from the rated torque.

2. Temperature characteristics

A rotary damper's torque varies according to the ambient temperature. In addition, as shown in the graph to the right, the torque decreases as the ambient temperature increases, and the torque increases as the ambient temperature decreases. This is because the viscosity of the silicone oil inside the damper varies according to the temperature. When the temperature returns to normal, the torque will return to normal as well.



Disk Damper

FDT-47A/FDN-47A Series

Fixed Type

Bi-Directional

Adjustable type

Uni-Directional

Self-adjusting

RoHS Compliant

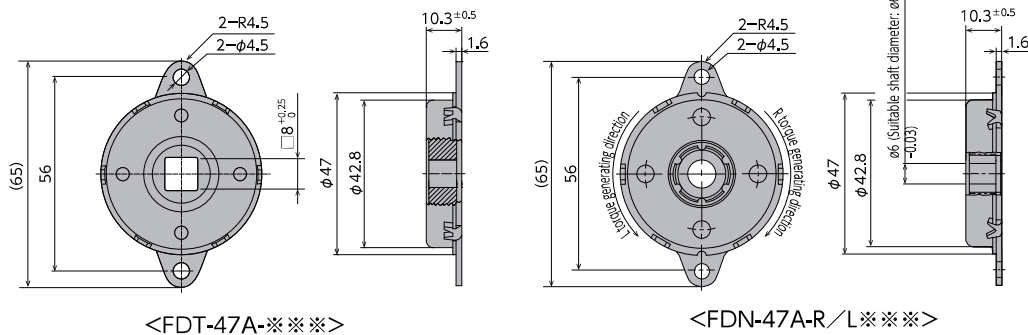
●Products specification might be changed without notice.



- * Max. rotation speed 50rpm
- * Max. cycle rate 12cycle /min
- * Operating temperature $-10\sim 50^{\circ}\text{C}$
- * Weight FDT- 47A : 50g
FDN- 47A : 55g
- * Main body material Iron (SPFC)
- * Rotating (shaft) material Nylon (with glass)
- * Oil typel Silicone oil

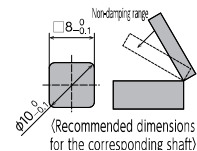
Specifications

Model	Rated torque	Damping direction
FDT-47A-502	$0.5\pm 0.15\text{ N}\cdot\text{m}$ ($5\pm 1.5\text{ kgf}\cdot\text{cm}$)	Both directions
FDT-47A-103	$1\pm 0.2\text{ N}\cdot\text{m}$ ($10\pm 2\text{ kgf}\cdot\text{cm}$)	Both directions
FDT-47A-163	$1.6\pm 0.3\text{ N}\cdot\text{m}$ ($16\pm 3\text{ kgf}\cdot\text{cm}$)	Both directions
FDT-47A-203	$2\pm 0.3\text{ N}\cdot\text{m}$ ($20\pm 3\text{ kgf}\cdot\text{cm}$)	Both directions
FDN-47A-R502	$0.5\pm 0.15\text{ N}\cdot\text{m}$ ($5\pm 1.5\text{ kgf}\cdot\text{cm}$)	Clockwise direction
FDN-47A-L502		Counter-clockwise direction
FDN-47A-R103	$1\pm 0.2\text{ N}\cdot\text{m}$ ($10\pm 2\text{ kgf}\cdot\text{cm}$)	Clockwise direction
FDN-47A-L103		Counter-clockwise direction
FDN-47A-R163	$1.6\pm 0.3\text{ N}\cdot\text{m}$ ($16\pm 3\text{ kgf}\cdot\text{cm}$)	Clockwise direction
FDN-47A-L163		Counter-clockwise direction
FDN-47A-R203	$2\pm 0.3\text{ N}\cdot\text{m}$ ($20\pm 3\text{ kgf}\cdot\text{cm}$)	Clockwise direction
FDN-47A-L203		Counter-clockwise direction

Note) Rated torque is measured at a rotation speed of 20rpm at $23^{\circ}\text{C}\pm 3^{\circ}\text{C}$ 

How to Use the Damper

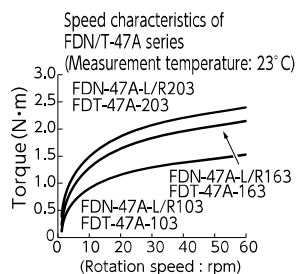
- Dampers may generate torque in both directions, clockwise, or counter-clockwise.
- Please make sure that a shaft attached to a damper has a bearing, as the damper itself is not fitted with one.
- Please refer to the recommended dimensions below when creating a shaft for FDN-47A. Not using the recommended shaft dimensions may cause the shaft to slip out.
- To insert a shaft into FDN-47A, insert the shaft while spinning it in the idling direction of the one-way clutch. (Do not force the shaft in from the regular direction. This may damage the oneway clutch.)
- When using FDT-47A, please ensure that a shaft with specified angular dimensions is inserted in the damper's shaft opening. A wobbling shaft and damper shaft may not allow the lid to slow down properly when closing. Please see the diagrams to the right for the recommended shaft dimensions for a damper.
- Please contact us when a continuous rotation is planned.



Damper Characteristics

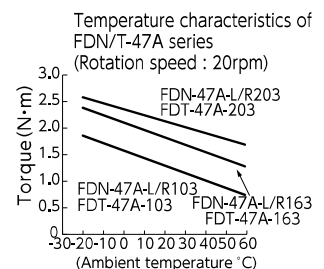
1. Speed characteristics

A disk damper's torque varies according to the rotation speed. In general, as shown in the graph to the right, the torque increases as the rotation speed increases, and the torque decreases as the rotation speed decreases. Torque at 20rpm is shown in this catalogue. In a closing lid, the rotation speed is slow when the lid begins to close, resulting in the generation of torque that is smaller than the rated torque.



2. Temperature characteristics

Damper torque (rated torque in this catalogue) varies according to the ambient temperature. As the temperature increases, the torque decreases, and as the temperature decreases, the torque increases. This is because the viscosity of the silicone oil inside the damper varies according to the temperature. The graph to the right illustrates the temperature characteristics



Disk Damper

Fixed Type Bi-Directional Adjustable type Uni-Directional Self-adjusting

FDT-57A/FDN-57A Series

RoHS Compliant

●Products specification might be changed without notice.

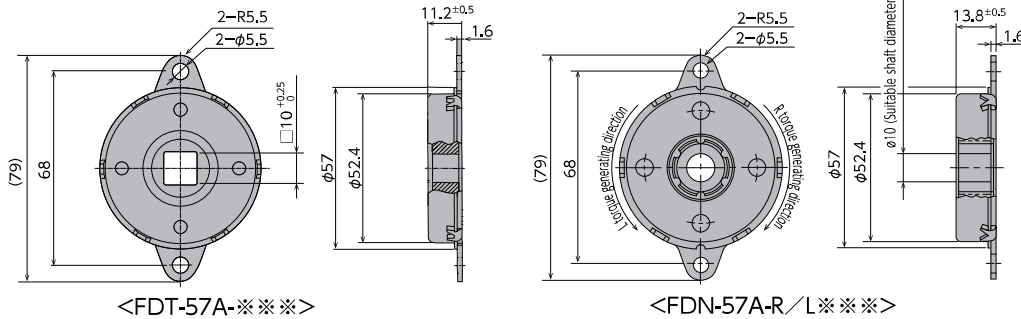


- * Max. rotation speed 50rpm
- * Max. cycle rate 12cycle /min
- * Operating temperature -10~50°C
- * Weight FDT-57A : 75g
FDN-57A : 94g
- * Main body material Iron (SPFC)
- * Rotating (shaft) material Nylon (with glass)
- * Oil type Silicone oil

Specifications

Model	Rated torque	Damping direction
FDT-57A-303	3±0.4 N·m (30±4 kgf·cm)	Both directions
FDT-57A-403	4±0.5 N·m (40±5 kgf·cm)	Both directions
FDT-57A-503	4.7±0.5 N·m (47±5 kgf·cm)	Both directions
FDN-57A-R303	3±0.4 N·m (30±4 kgf·cm)	Clockwise direction
FDN-57A-L303		Counter-clockwise direction
FDN-57A-R403	4±0.5 N·m (40±5 kgf·cm)	Clockwise direction
FDN-57A-L403		Counter-clockwise direction
FDN-57A-R553	5.5±0.6 N·m (55±6 kgf·cm)	Clockwise direction
FDN-57A-L553		Counter-clockwise direction

(Note) Rated torque is measured at a rotation speed of 20rpm at 23°C±3°C

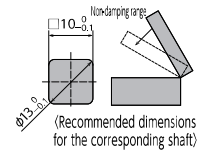


How to Use the Damper

- Dampers may generate torque in both directions, clockwise, or counter-clockwise.
- Please make sure that a shaft attached to a damper has a bearing, as the damper itself is not fitted with one.
- Please refer to the recommended dimensions below when creating a shaft for FDN-57A. Not using the recommended shaft dimensions may cause the shaft to slip out.

Shaft's external dimensions	$\phi 10_{-0.03}^0$
Surface hardness	HRC55 or higher
Quenching depth	0.5mm or higher
Surface roughness	1.0Z or lower
Chamfer end (Damper insertion side)	

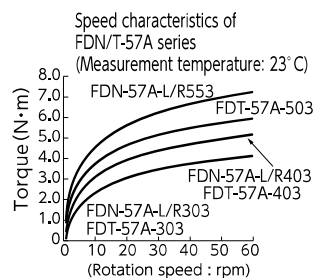
- To insert a shaft into FDN-57A, insert the shaft while spinning it in the idling direction of the one-way clutch. (Do not force the shaft from the regular direction. This may damage the oneway clutch.)
- When using FDT-57A, please ensure that a shaft with specified angular dimensions is inserted in the damper's shaft opening. A wobbling shaft and damper shaft may not allow the lid to slow down properly when closing. Please see the diagrams to the right for the recommended shaft dimensions for a damper.
- Please contact us when a continuous rotation is planned.



Damper Characteristics

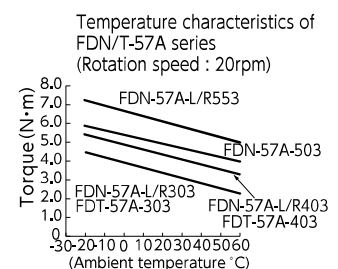
① 1. Speed characteristics

A disk damper's torque varies according to the rotation speed. In general, as shown in the graph to the right, the torque increases as the rotation speed increases, and the torque decreases as the rotation speed decreases. Torque at 20rpm is shown in this catalogue. In a closing lid, the rotation speed is slow when the lid begins to close, resulting in the generation of torque that is smaller than the rated torque.



② 2. Temperature characteristics

Damper torque (rated torque in this catalogue) varies according to the ambient temperature. As the temperature increases, the torque decreases, and as the temperature decreases, the torque increases. This is because the viscosity of the silicone oil inside the damper varies according to the temperature. The graph to the right illustrates the temperature characteristics



New products
1 Soft Absorber
2 Rotary Damper
3 Magnum Series
4 Speed Controller
5 Helical Isolator
6 Model Selection Form

Disk Damper

FDT-63A/FDN-63A Series

Fixed Type

Bi-Directional

Adjustable type

Uni-Directional

Self-adjusting

RoHS Compliant

●Products specification might be changed without notice.

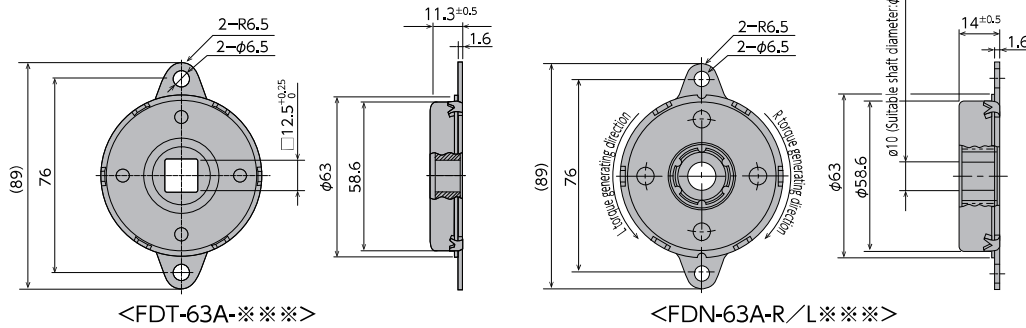


- * Max. rotation speed 50rpm
- * Max. cycle rate 12cycle /min
- * Operating temperature $-10\sim 50^{\circ}\text{C}$
- * Weight FDT-63A : 92g
FDN-63A : 115g
- * Main body material Iron (SPFC)
- * Rotating (shaft) material Nylon (with glass)
- * Oil type Silicone oil

Specifications

Model	Rated torque	Damping direction
FDT-63A-403	4 ± 0.5 N·m (40 ± 5 kgf·cm)	Both directions
FDT-63A-533	5.3 ± 0.6 N·m (53 ± 6 kgf·cm)	Both directions
FDT-63A-703 FDT-63B-703	6.7 ± 0.7 N·m (67 ± 7 kgf·cm)	Both directions
FDN-63A-R453 FDN-63A-L453	4.5 ± 0.5 N·m (45 ± 5 kgf·cm)	Clockwise direction Counter-clockwise direction
FDN-63A-R603 FDN-63A-L603	6 ± 0.6 N·m (60 ± 6 kgf·cm)	Clockwise direction Counter-clockwise direction
FDN-63A-R903 FDN-63A-L903	8.5 ± 0.8 N·m (85 ± 8 kgf·cm)	Clockwise direction Counter-clockwise direction

Note) Rated torque is measured at a rotation speed of 20rpm at $23^{\circ}\text{C}\pm 3^{\circ}\text{C}$
63B has a slotted rotating shaft opening

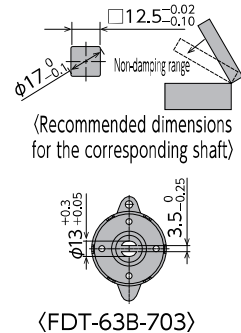


How to Use the Damper

- Dampers may generate torque in both directions, clockwise, or counter-clockwise.
- Please make sure that a shaft attached to a damper has a bearing, as the damper itself is not fitted with one.
- Please refer to the recommended dimensions below when creating a shaft for FDN-63A. Not using the recommended shaft dimensions may cause the shaft to slip out.
- To insert a shaft into FDN-63A, insert the shaft while spinning it in the idling direction of the one-way clutch. (Do not force the shaft in

Shaft's external dimensions	$\phi 10_{-0.023}^{0}$
Surface hardness	HRC55 or higher
Quenching depth	0.5mm or higher
Surface roughness	1.0Z or lower
Chamfer end (Damper insertion side)	$C0.2-C0.3$ ($R0.2-R0.3$)

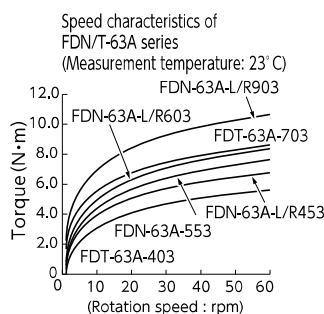
- from the regular direction. This may damage the one-way clutch.)
- When using FDT-63A, please ensure that a shaft with specified angular dimensions is inserted in the damper's shaft opening. A wobbling shaft and damper shaft may not allow the lid to slow down properly when closing. Please see the diagrams to the right for the recommended shaft dimensions for a damper.
- A damper shaft connecting to a part with slotted groove is also available. The slotted groove type is excellent for usage with spiral springs
- Please contact us when a continuous rotation is planned.



Damper Characteristics

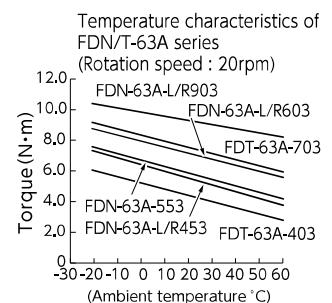
1. Speed characteristics

A disk damper's torque varies according to the rotation speed. In general, as shown in the graph to the right, the torque increases as the rotation speed increases, and the torque decreases as the rotation speed decreases. Torque at 20rpm is shown in this catalogue. In a closing lid, the rotation speed is slow when the lid begins to close, resulting in the generation of torque that is smaller than the rated torque.



2. Temperature characteristics

Damper torque (rated torque in this catalogue) varies according to the ambient temperature. As the temperature increases, the torque decreases, and as the temperature decreases, the torque increases. This is because the viscosity of the silicone oil inside the damper varies according to the temperature. The graph to the right illustrates the temperature characteristics



Disk Damper

Fixed Type **Bi-Directional** Adjustable type **Uni-Directional**
Self-adjusting

FDT-70A/FDN-70A Series

RoHS Compliant

●Products specification might be changed without notice.

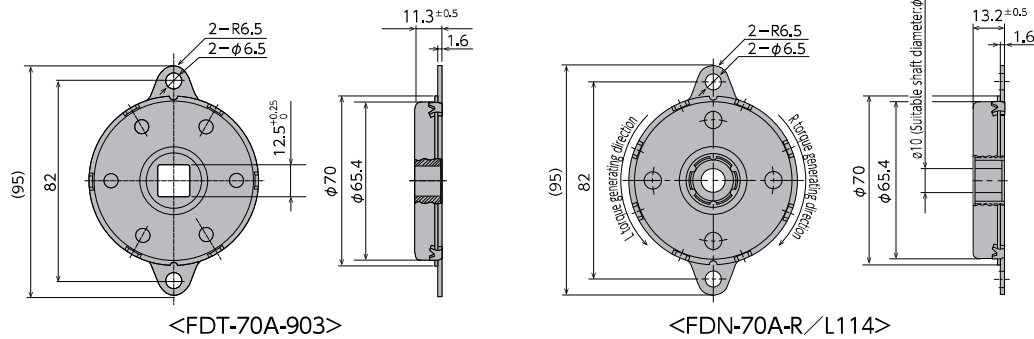


- * Max. rotation speed 50rpm
- * Max. cycle rate 12cycle /min
- * Operating temperature -10~50°C
- * Weight FDT-70A : 112g
FDN-70A : 136g
- * Main body material Iron (SPFC)
- * Rotating (shaft) material Nylon (with glass)
- * Oil type Silicone oil

Specifications

Model	Rated torque	Damping direction
FDT-70A-903	8.7±0.8 N·m (87±8 kgf·cm)	Both directions
FDT-70B-903		
FDN-70A-R114	11±1.1 N·m (110±11 kgf·cm)	Clockwise direction
FDN-70A-L114		Counter-clockwise direction

Note) Rated torque is measured at a rotation speed of 20rpm at 23°C±3°C
70B has a slotted rotating shaft opening

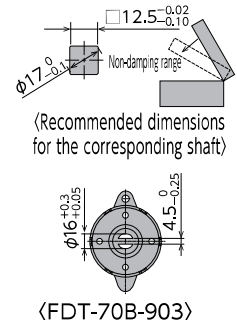


How to Use the Damper

- Dampers may generate torque in both directions, clockwise, or counter-clockwise.
- Please make sure that a shaft attached to a damper has a bearing, as the damper itself is not fitted with one.
- Please refer to the recommended dimensions below when creating a shaft for FDN-70A. Not using the recommended shaft dimensions may cause the shaft to slip out.
- To insert a shaft into FDN-70A, insert the shaft while spinning it in the idling direction of the one-way clutch. (Do not force the shaft in

Shaft's external dimensions	$\phi 10_{-0.03}^0$
Surface hardness	HRC55 or higher
Quenching depth	0.5mm or higher
Surface roughness	1.0Z or lower
Chamfer end (Damper insertion side)	

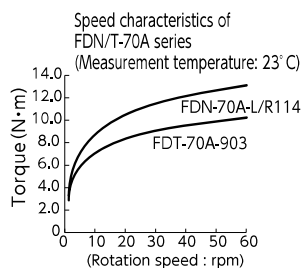
- from the regular direction. This may damage the one-way clutch.)
- When using FDT-70A, please ensure that a shaft with specified angular dimensions is inserted in the damper's shaft opening. A wobbling shaft and damper shaft may not allow the lid to slow down properly when closing. Please see the diagrams to the right for the recommended shaft dimensions for a damper.
- A damper shaft connecting to a part with slotted groove is also available. The slotted groove type is excellent for usage with spiral springs
- Please contact us when a continuous rotation is planned.



Damper Characteristics

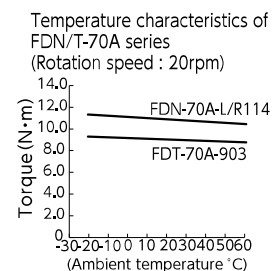
1. Speed characteristics

A disk damper's torque varies according to the rotation speed. In general, as shown in the graph to the right, the torque increases as the rotation speed increases, and the torque decreases as the rotation speed decreases. Torque at 20rpm is shown in this catalogue. In a closing lid, the rotation speed is slow when the lid begins to close, resulting in the generation of torque that is smaller than the rated torque.



2. Temperature characteristics

Damper torque (rated torque in this catalogue) varies according to the ambient temperature. As the temperature increases, the torque decreases, and as the temperature decreases, the torque increases. This is because the viscosity of the silicone oil inside the damper varies according to the temperature. The graph to the right illustrates the temperature characteristics



Vane Damper

FYN-M1 Series



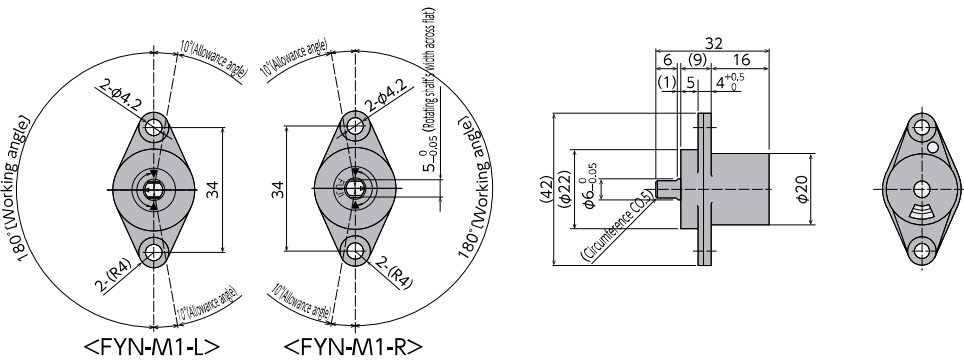
- * Max. angle 180°
- * Max. cycle rate 6cycle / min
- * Operating temperature -5~50°C
- * Weight 17±2g
- * Main body Polybutylene terephthalate (PBT)
- * Cap material Polybutylene terephthalate (PBT)

Specifications

Model	Max. torque	Reverse torque	Damping direction
FYN-M1-R152	0.15 N·m	0.1 N·m or lower	Clockwise
FYN-M1-L152	(1.5 kgf·cm)	(1kgf·cm or lower)	Counter-clockwise
FYN-M1-R252	0.25 N·m	0.2 N·m or lower	Clockwise
FYN-M1-L252	(2.5 kgf·cm)	(2 kgf·cm or lower)	Counter-clockwise
FYN-M1-R352	0.35 N·m	0.2 N·m or lower	Clockwise
FYN-M1-L352	(3.5 kgf·cm)	(2 kgf·cm or lower)	Counter-clockwise
FYN-M1-R602	0.60 N·m	0.4 N·m or lower	Clockwise
FYN-M1-L602	(6.0kgf·cm)	(4 kgf·cm or lower)	Counter-clockwise

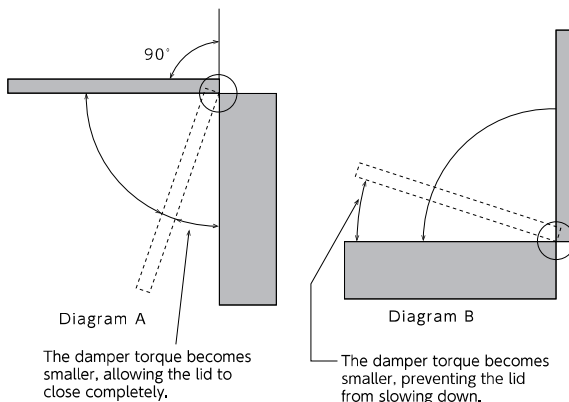
Note) Measured at 23°C±2°C

- * Rotating shaft material Zinc die-cast (ZDC)
- * Oil type Silicone oil
- * Cap colour R: Black L: Gray

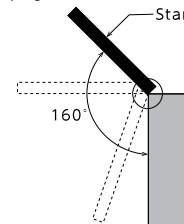
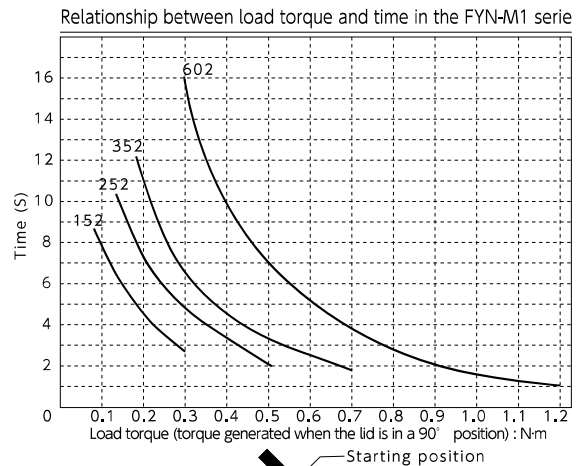


How to Use the Damper

- The FYN-M1 Series is designed to generate a large torque up to 90° in a closing lid, as shown in Diagram A, and the lid is able to close completely. However, when the lid is closed from a vertical position, as shown in Diagram B, the lid cannot be slowed down, as the torque becomes small just before the lid is completely closed.

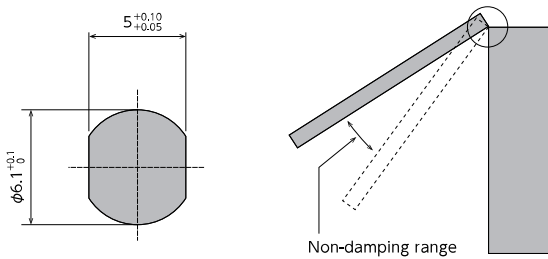


- Below is a graph showing the relationship between the load torque and the time when a lid is closed from a 160° angle, as shown in the diagram.



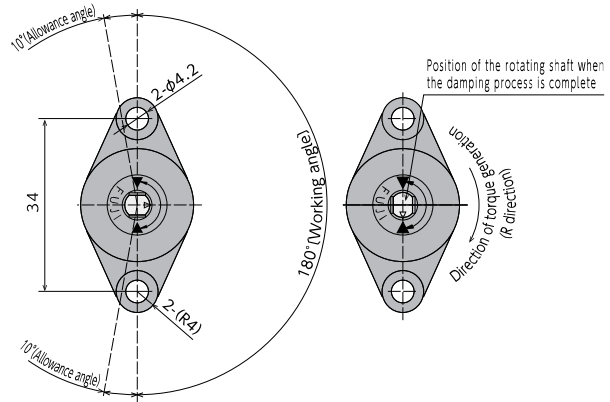
●Products specification might be changed without notice.

3. When connecting the rotating shaft to other parts, please ensure a tight fit between them. Without a tight fit, the lid will not slow down properly when closing.



<Recommended dimensions for a rotating shaft opening>

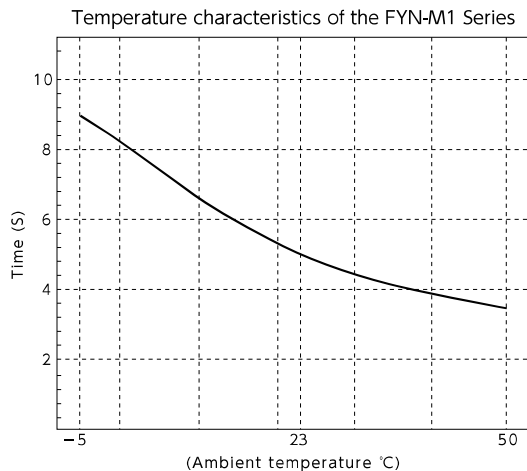
5. The standard for a damper's working angle is 180° with respect to the main body's attachment flange. Rotating the damper beyond this angle will cause damage to the damper. Please make sure that an external stopper is in place.



<FYN-M1-R>

4. The time it takes for a lid with a damper to close varies according to the ambient temperature. As the temperature increases, it takes less time, and as the temperature decreases, it will take longer for the lid to close. This is because the viscosity of the oil inside the damper changes according to the temperature. When the temperature returns to normal, the required time will return to normal as well. The temperature characteristics are shown in the graph below.

6. The direction in which torque is generated varies according to the model. Please select the appropriate model for your purpose.



Vane Damper

FYN-P1 Series

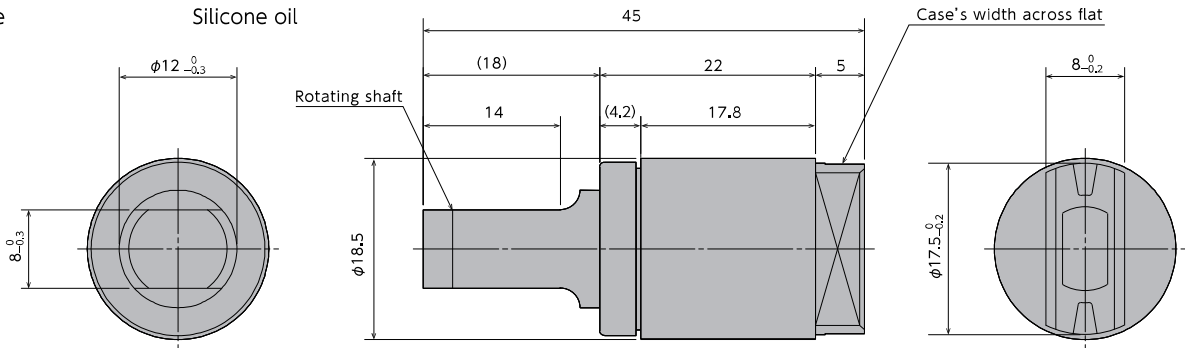


Specifications

Model	Max. torque	Reverse torque	Damping direction
FYN-P1-R103	1 N·m	0.3 N·m or lower	Clockwise
FYN-P1-L103	(10 kgf·cm)	(3 kgf·cm or lower)	Counter-clockwise
FYN-P1-R153	1.5 N·m	0.5 N·m or lower	Clockwise
FYN-P1-L153	(15 kgf·cm)	(5 kgf·cm or lower)	Counter-clockwise
FYN-P1-R183	1.8 N·m	0.8 N·m or lower	Clockwise
FYN-P1-L183	(18 kgf·cm)	(8 kgf·cm or lower)	Counter-clockwise

Note) Measured at 23°C±2°C

- * Max. angle 115°
- * Operating temperature -5~50°C
- * Weight 10.5±1g
- * Body and cap material Polybutylene terephthalate (PBT)
- * Rotating shaft material Polybutylene terephthalate (PBT)
- * Oil type Silicone oil



How to Use the Damper

1. FYN-P1 is designed to generate a large torque just before a lid closing from a vertical position, as shown in Diagram A, comes to a full closure. When a lid is closed from a horizontal position, as shown in Diagram B, a strong torque is generated just before the lid is fully closed, causing the lid to not close properly.

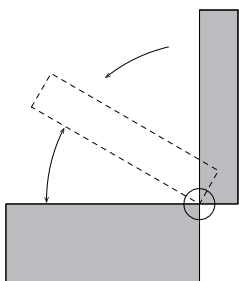


Diagram A

The damper torque becomes larger, preventing the lid from slowing down.

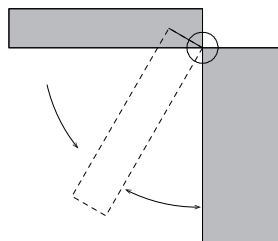


Diagram B

The damper torque becomes larger, preventing the lid from closing completely.

2. When using a damper on a lid, such as the one shown in the diagram, use the following selection calculation to determine the damper torque. Example)

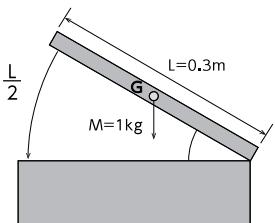
Lid mass M : 1kg

Lid dimensions L : 0.3m

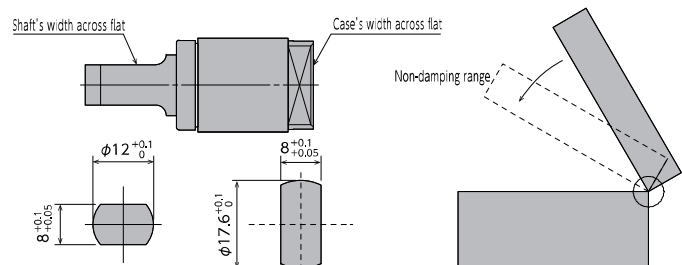
Gravity Center Position : Assumed as $\frac{1}{2}$

Load torque : $T=1 \times 9.8 \times 0.3 \div 2$
 $=1.47\text{N}\cdot\text{m}$

Based on the above calculation, FYN-P1-153 is selected.

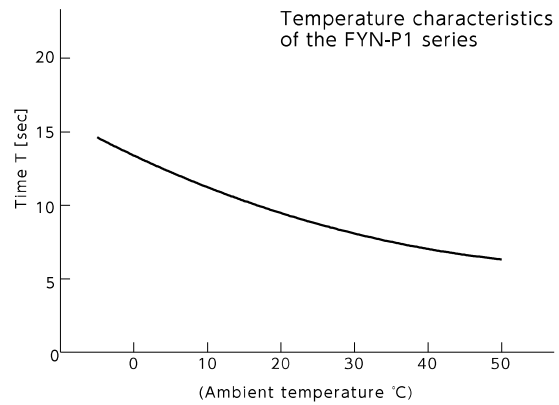


3. When connecting the rotating shaft to other parts, please ensure a tight fit between them. Without a tight fit, the lid will not slow down properly when closing. The corresponding dimensions for fixing the rotating shaft and the main body are as follows.

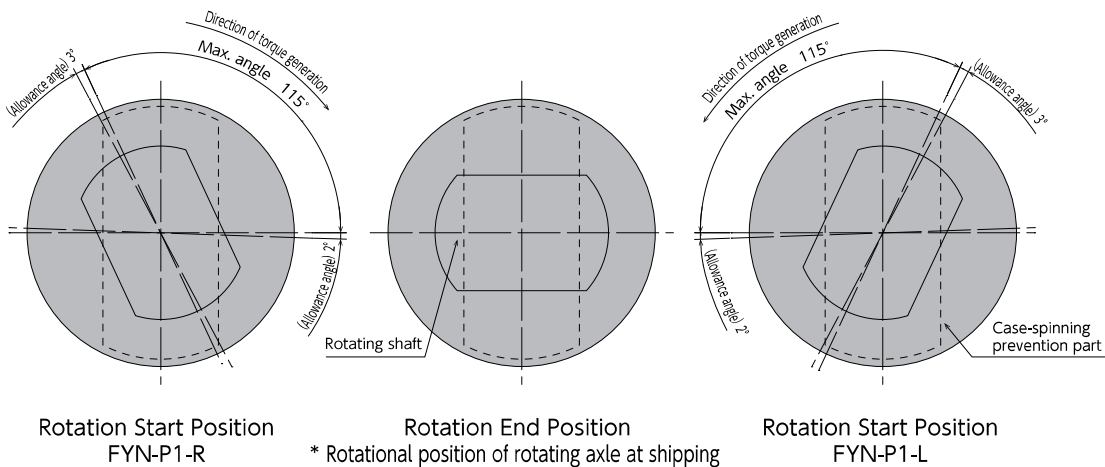


●Products specification might be changed without notice.

4. Damper characteristics vary according to the ambient temperature. In general, the damper characteristics become weaker as the temperature increases, and become stronger as the temperature decreases. This is because the viscosity of the oil inside the damper varies according to the temperature. When the temperature returns to normal, the damper characteristics will return to normal as well. The time it takes for the lid to close is shown in the graph to the right.



5. The damper's working angle is 115°, as shown below. Rotating the damper beyond this angle will cause damage to the damper. Please ensure that an external stopper is in place. The working angle is based on the width across flat for fixing, located towards the rear end of the main body. The position where the rotation is complete is at 90° with respect to the width across flat.



6. The direction in which torque is generated varies according to the model. Please select the appropriate model for your purpose.

Vane Damper

FYN-N2 Series



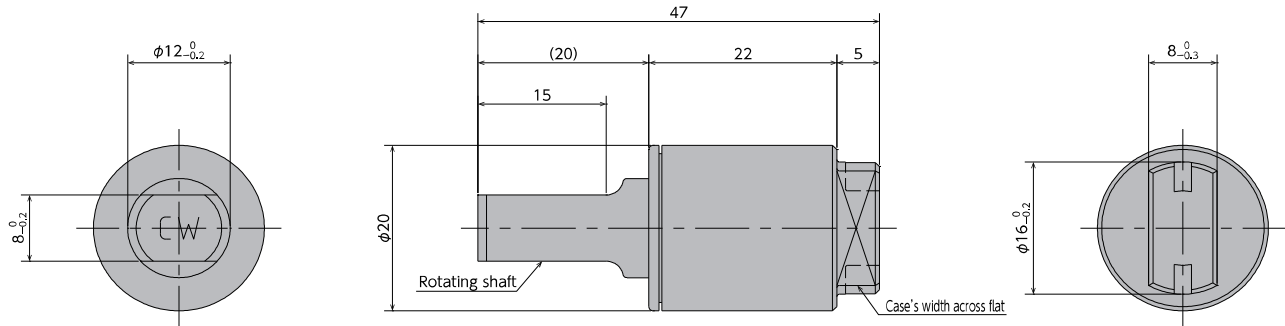
Specifications

Model	Max. torque	Reverse torque	Directions
FYN-N2-R103	1 N·m (10kgf·cm)	0.2 N·m or lower (2 kgf·cm or lower)	Clockwise (CW)
FYN-N2-L103			Counterclockwise (CCW)
FYN-N2-R203	2 N·m (20 kgf·cm)	0.4 N·m or lower (4 kgf·cm or lower)	Clockwise (CW)
FYN-N2-L203			Counterclockwise (CCW)
FYN-N2-R303	3 N·m (30 kgf·cm)	0.8 N·m or lower (8 kgf·cm or lower)	Clockwise (CW)
FYN-N2-L303			Counterclockwise (CCW)

Note) Measured at 23°C±2°C

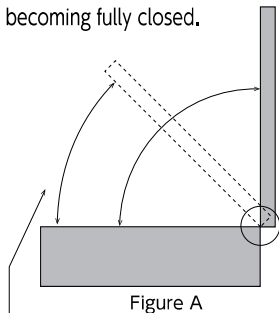
- * Max. angle 110°
- * Operating temperature -5~50°C
- * Weight 13±1g
- * Body and cap material Polybutylene terephthalate (PBT)

- * Rotating shaft material Polyamide (PA)
- * Oil type Silicone oil

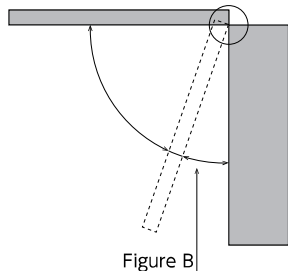


How to Use the Damper

1. FYN-N2 series has been designed so that when a lid is closing from a vertical position, as shown in Figure A, high torque is generated just before it closes completely. For a lid that closes from a horizontal position, as shown in Figure B, the strong torque generated just prior to a complete closure may prevent the lid from becoming fully closed.



Stronger damper torque allows the lid to close gently until it is fully closed.



Stronger damper torque prevents the lid from being fully closed.

2. When using a damper with a lid shown in the diagram, determine the damper torque based on the following selection calculation.

Example)

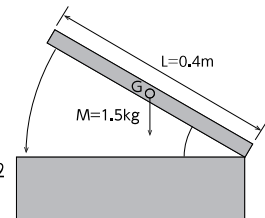
Lid weight M: 1.5 kg

Lid dimension L: 0.4 m

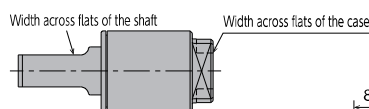
Gravity Center Position G: Assumed as $\frac{L}{2}$

Load torque: $T = 1.5 \times 9.8 \times 0.4 \div 2 = 2.94 \text{ N}\cdot\text{m}$

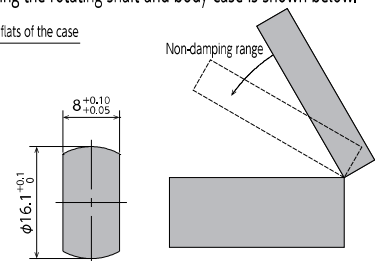
Based on the above calculation, select FYN-N2-*303.



3. When connecting parts that are joined to the rotating shaft, ensure a snug fit. The lid will not decelerate as designed when closing if these parts are not connected properly. The dimensional tolerance for fixing the rotating shaft and body case is shown below.



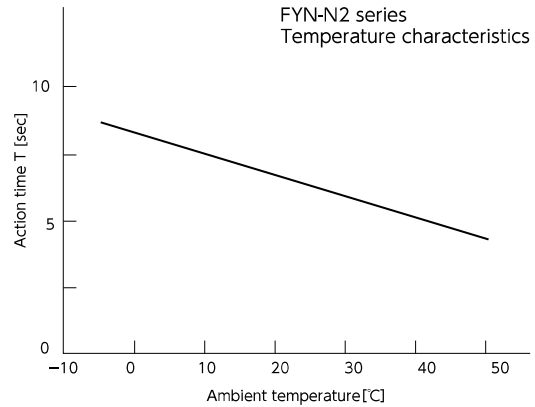
(Recommended dimensions for mounting the rotating shaft)



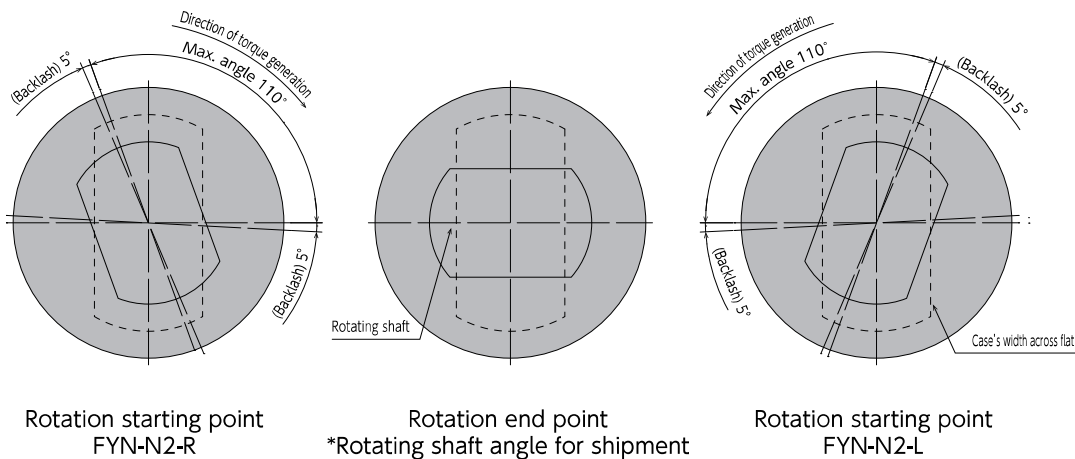
(Recommended dimensions for mounting the body case)

Products specification might be changed without notice.

4. Damper characteristics vary according to the ambient temperature. In general, damper characteristics weaken as the temperature goes up, and become stronger as the temperature goes down. This occurs because the viscosity of oil inside the damper is affected by the temperature change. Once the temperature returns to normal, so will the damper characteristics. Please refer to the right diagram for change in the action time for a free-closing lid.



5. The damper action angle is 110° as shown below. Rotating it beyond this angle will cause the damper to break. Ensure that an external stopper is in place. The action angle is based on the width across flats of the case on the back of the body. The rotation end point is at 90° on the basis of the width across flats of the case. (Refer to the figure below.)



6. There are dampers that generate torque in either the clockwise or counterclockwise direction when the rotating shaft is seen from the above. Select a model according to use.

Vane Damper

FYN-B1 Series

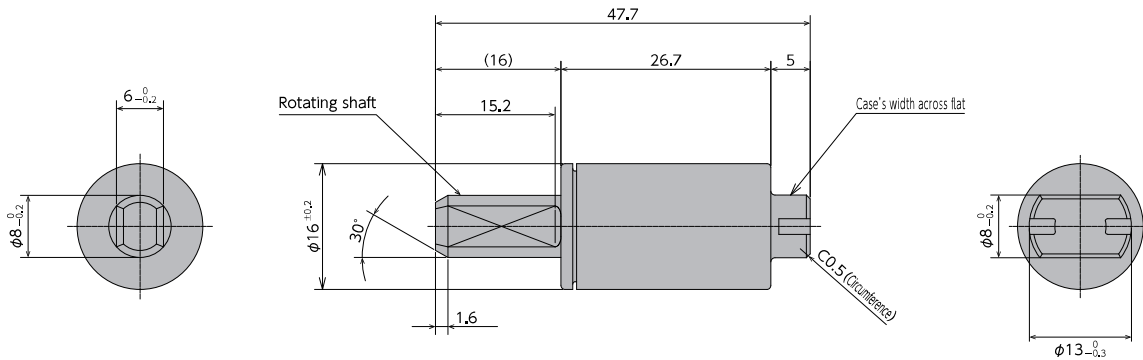


Specifications

Model	Max. torque	Reverse torque	Damping direction
FYN-B1-R502	0.5N·m (5kgf·cm)	0.3N·m or lower (3kgf·cm) or lower	Clockwise
FYN-B1-L502			Counter-clockwise
FYN-B1-R103	1N·m (10kgf·cm)	0.4N·m or lower (4kgf·cm) or lower	Clockwise
FYN-B1-L103			Counter-clockwise
FYN-B1-R153	1.5N·m (15kgf·cm)	0.5N·m or lower (5kgf·cm) or lower	Clockwise
FYN-B1-L153			Counter-clockwise

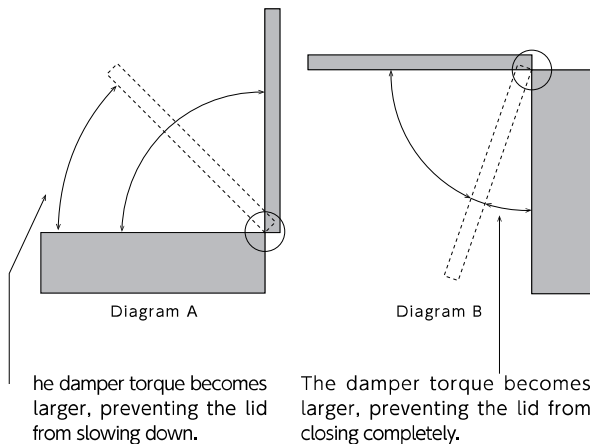
Note) Measured at 23°C±2°C

- *Max. angle 110°
- *Operating temperature -5~50°C
- *Weight 9±1g
- *Body and cap material Polybutylene terephthalate (PBT)
- *Rotating shaft material Polyphenylene Sulphide (PPS)
- *Oil type Silicone oil
- *R type has Black shaft / L type has white shaft



How to Use the Damper

1. FYN-B1 is designed to generate a large torque just before a lid closing from a vertical position, as shown in Diagram A, comes to a full closure. When a lid is closed from a horizontal position, as shown in Diagram B, a strong torque is generated just before the lid is fully closed, causing the lid to not close properly.



2. When using a damper on a lid, such as the one shown in the diagram, use the following selection calculation to determine the damper torque. Example)

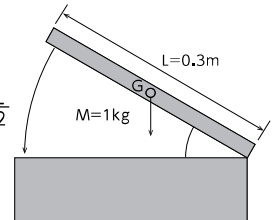
Lid mass M : 1kg

Lid dimensions L : 0.3m

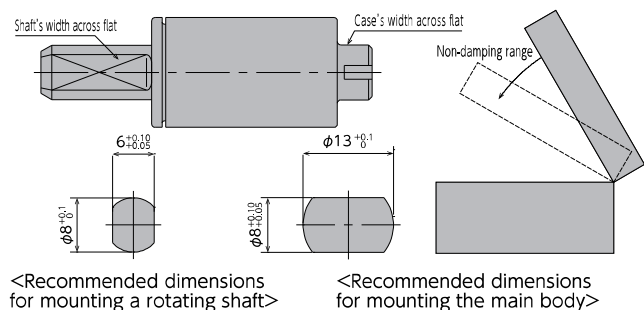
Gravity Center Position : Assumed as $\frac{L}{2}$

Load torque : $T = 1.5 \times 0.4 \times 9.8 \div 2 = 2.94 \text{ N}\cdot\text{m}$

Based on the above calculation, FYN-B1-*153 is selected.

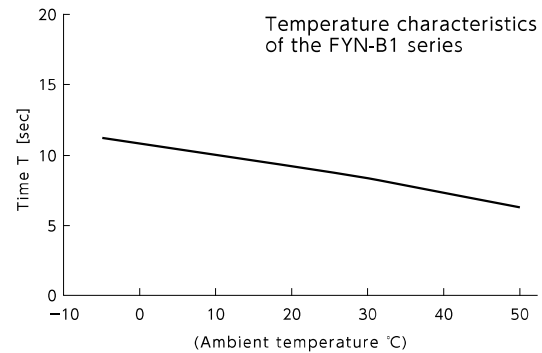


3. When connecting the rotating shaft to other parts, please ensure a tight fit between them. Without a tight fit, the lid will not slow down properly when closing. The corresponding dimensions for fixing the rotating shaft and the main body are as follows.

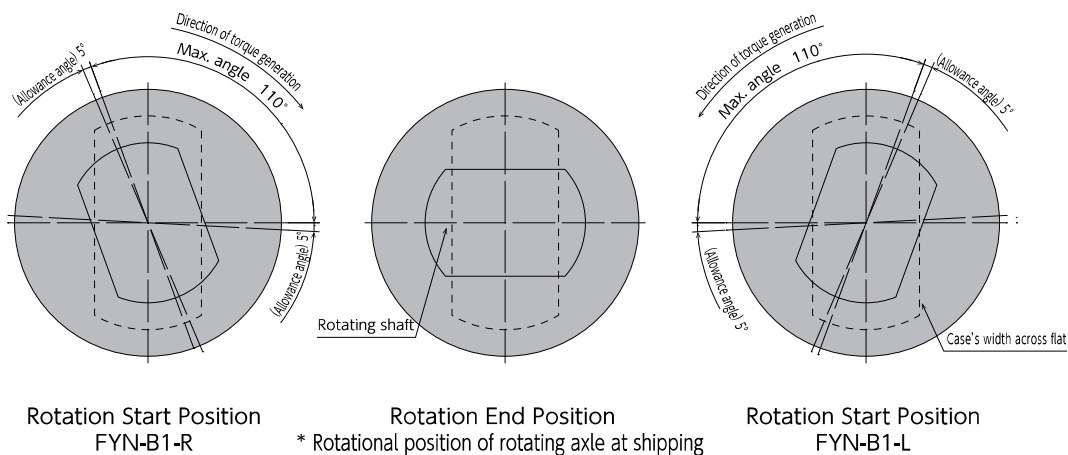


●Products specification might be changed without notice.

4. Damper characteristics vary according to the ambient temperature. In general, the damper characteristics become weaker as the temperature increases, and become stronger as the temperature decreases. This is because the viscosity of the oil inside the damper varies according to the temperature. When the temperature returns to normal, the damper characteristics will return to normal as well. The changes in the time it takes for the lid to close are shown in the graph to the right.



5. The damper's working angle is 110°, as shown below. Rotating the damper beyond this angle will cause damage to the damper. Please ensure that an external stopper is in place. The working angle is based on the width across flat for fixing, located towards the rear end of the main body. The position where the rotation is complete is at 90° with respect to the width across flat.



6. The direction in which torque is generated varies according to the model. Please select the appropriate model for your purpose.

Vane Damper

FYN-U1 Series



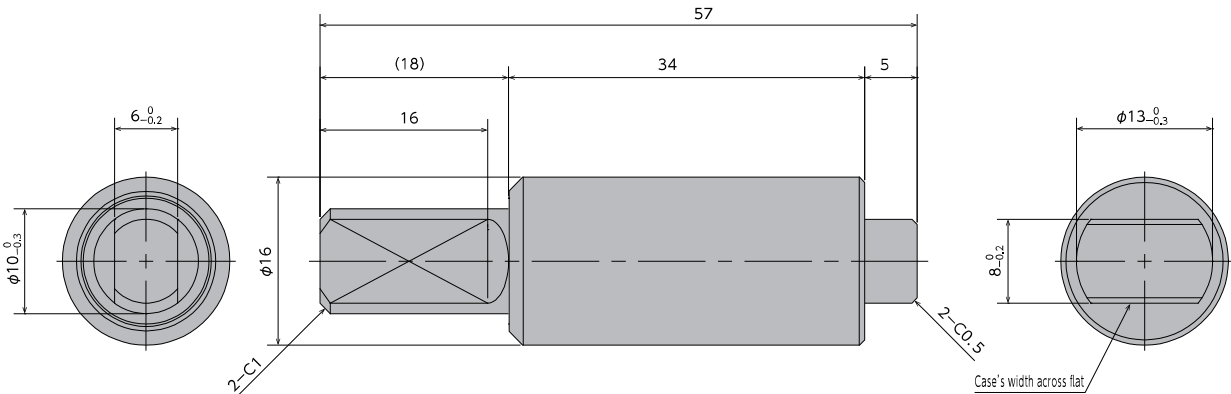
Specifications

Model	Max. torque	Reverse torque	Damping direction
FYN-U1-R103	1 N·m	0.5 N·m or lower	Clockwise
FYN-U1-L103	(10 kgf·cm)	(5 kgf·cm or lower)	Counter-clockwise
FYN-U1-R203	2 N·m	0.7 N·m or lower	Clockwise
FYN-U1-L203	(20 kgf·cm)	(7 kgf·cm or lower)	Counter-clockwise
FYN-U1-R303	3 N·m	0.9 N·m以下	Clockwise
FYN-U1-L303	(30 kgf·cm)	(9 kgf·cm or lower)	Counter-clockwise

Note) Measured at 23°C±2°C

- * Max. angle 115°
- * Operating temperature -5~50°C
- * Weight 40±4g
- * Main body, rotating shaft materials Zinc die-cast (ZDC)

- * Cap material Polyphenylene Sulphide (PPS)
- * Oil type Silicone oil



How to Use the Damper

1. FYN-U1 is designed to generate a large torque just before a lid closing from a vertical position, as shown in Diagram A, comes to a full closure. When a lid is closed from a horizontal position, as shown in Diagram B, a strong torque is generated just before the lid is fully closed, causing the lid to not close properly.

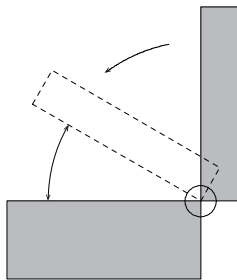


Diagram A

The damper torque becomes larger, preventing the lid from slowing down.

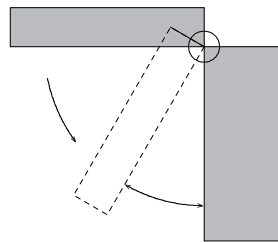


Diagram B

The damper torque becomes larger, preventing the lid from closing completely.

2. When using a damper on a lid, such as the one shown in the diagram, use the following selection calculation to determine the damper torque.

Example)

Lid mass M : 1.5kg

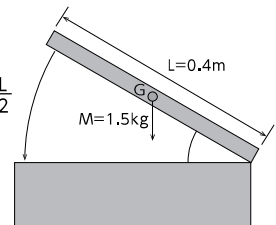
Lid dimensions L : 0.4m

Gravity Center Position : Assumed as $\frac{L}{2}$

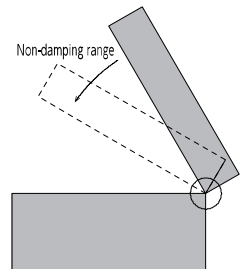
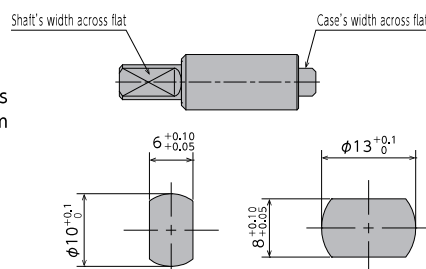
Load torque : $T = 1.5 \times 9.8 \times 0.4 \div 2$

$$= 2.94\text{N}\cdot\text{m}$$

Based on the above calculation, FYN-U1-*303 is selected.

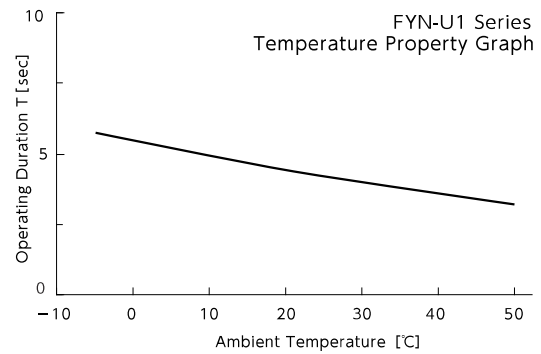


3. When connecting the rotating shaft to other parts, please ensure a tight fit between them. Without a tight fit, the lid will not slow down properly when closing. The corresponding dimensions for fixing the rotating shaft and the main body are as follows.

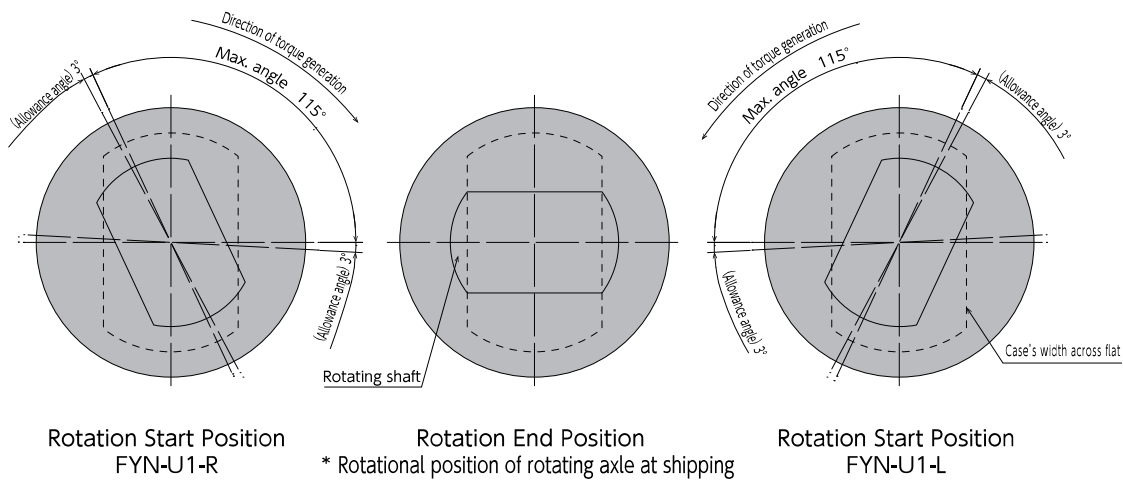


●Products specification might be changed without notice.

4. Damper characteristics vary according to the ambient temperature. In general, the damper characteristics become weaker as the temperature increases, and become stronger as the temperature decreases. This is because the viscosity of the oil inside the damper varies according to the temperature. When the temperature returns to normal, the damper characteristics will return to normal as well. The changes in the time it takes for the lid to close are shown in the graph to the right.



5. The damper's working angle is 110°, as shown below. Rotating the damper beyond this angle will cause damage to the damper. Please ensure that an external stopper is in place. The working angle is based on the width across flat for fixing, located towards the rear end of the main body. The position where the rotation is complete is at 90° with respect to the width across flat.



6. The direction in which torque is generated varies according to the model. Please select the appropriate model for your purpose.

Vane Damper

FYN-C1 Series



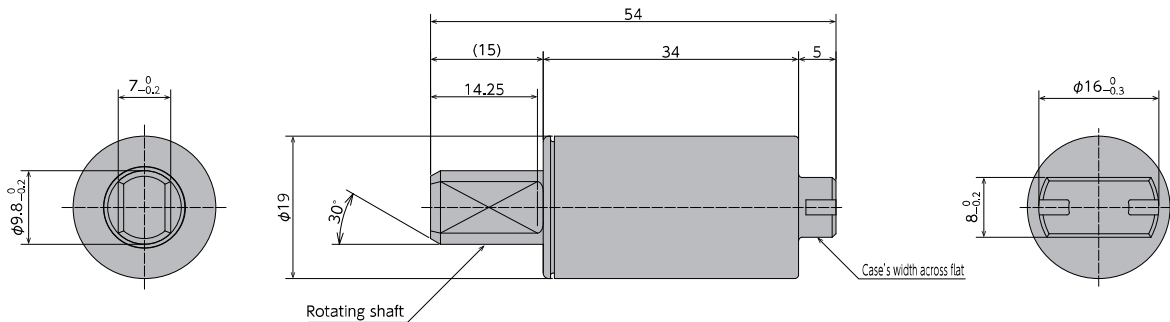
Specifications

Model	Max. torque	Reverse torque	Directions
FYN-C1-R203	2N·m (20kgf·cm)	0,3 N·m or lower (3 kgf·cm or lower)	Clockwise (CW)
FYN-C1-L203			Counterclockwise (CCW)
FYN-C1-R253	2,5N·m (25kgf·cm)	0,5 N·m or lower (5 kgf·cm or lower)	Clockwise (CW)
FYN-C1-L253			Counterclockwise (CCW)
FYN-C1-R303	3N·m (30kgf·cm)	0,7 N·m or lower (7 kgf·cm or lower)	Clockwise (CW)
FYN-C1-L303			Counterclockwise (CCW)
FYN-C1-R353	3,5N·m (35kgf·cm)	0,9 N·m or lower (9 kgf·cm or lower)	Clockwise (CW)
FYN-C1-L353			Counterclockwise (CCW)
FYN-C1-R403	4N·m (40kgf·cm)	1,1 N·m or lower (11 kgf·cm or lower)	Clockwise (CW)
FYN-C1-L403			Counterclockwise (CCW)

Note) Measured at 23°C±2°C

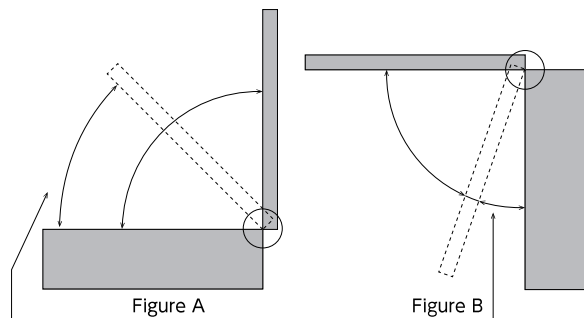
- * Max. angle 110°
- * Operating temperature -5~50°C
- * Weight 30±2g
- * Body and cap material Polybutylene terephthalate (PBT)

- * Rotating shaft material Zinc die-cast (ZDC)
- * Oil type Silicone oil



How to Use the Damper

- The FYN-C1 series has been designed so that when a lid is closing from a vertical position, as shown in Figure A, high torque is generated just before it closes completely. For a lid that closes from a horizontal position, as shown in Figure B, the strong torque generated just prior to a complete closure may prevent the lid from becoming fully closed.



Stronger damper torque allows the lid to close gently until it is fully closed.

Stronger damper torque prevents the lid from being fully closed.

- When using a damper with a lid shown in the diagram, determine the damper torque based on the following selection calculation.

Example)

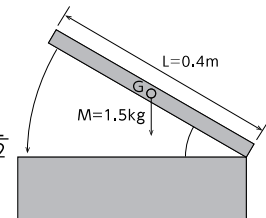
Lid weight M : 2kg

Lid dimension L : 0.4m

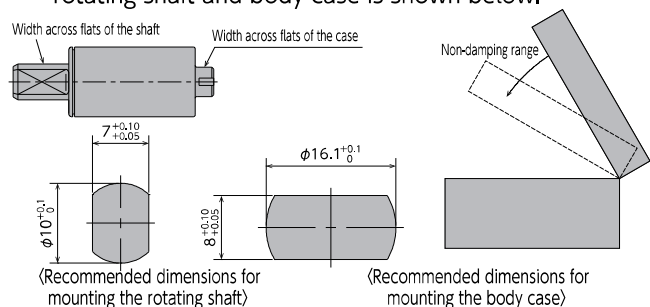
Gravity Center Position G: Assumed as $\frac{L}{2}$

Load torque : $T=2 \times 9,8 \times 0,4 \div 2$
 $=3,92\text{N}\cdot\text{m}$

Based on the above calculation, select FYN-C1-*403.

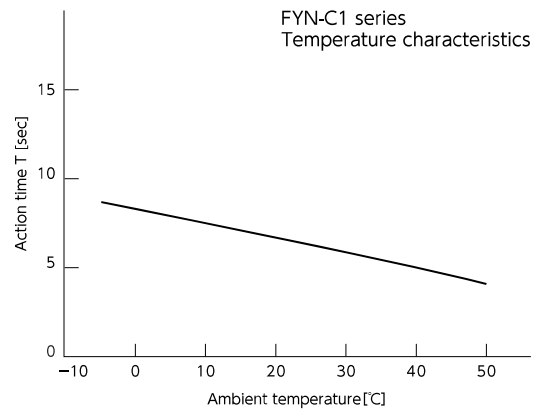


- When connecting parts that are joined to the rotating shaft, ensure a snug fit. The lid will not decelerate as designed when closing if these parts are not connected properly. The dimensional tolerance for fixing the rotating shaft and body case is shown below.

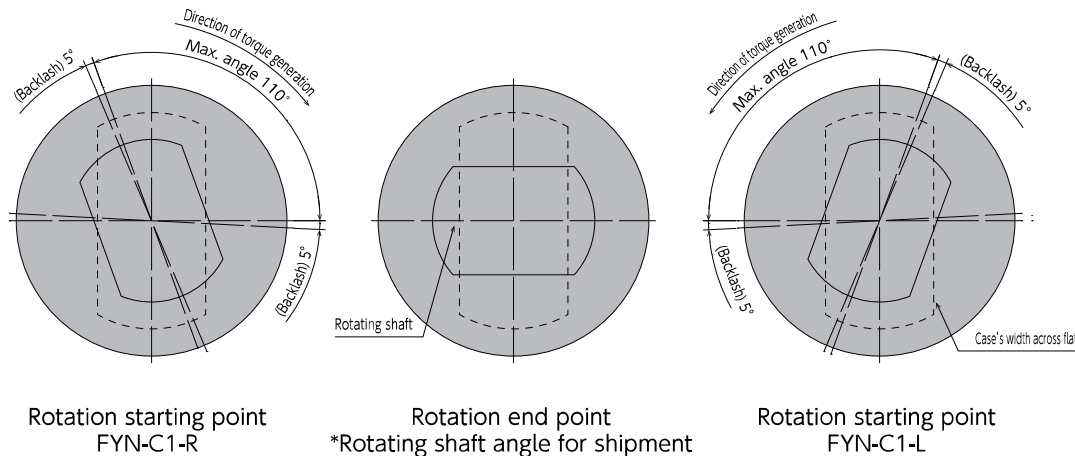


●Products specification might be changed without notice.

4. Damper characteristics vary according to the ambient temperature. In general, damper characteristics weaken as the temperature goes up, and become stronger as the temperature goes down. This occurs because the viscosity of oil inside the damper is affected by the temperature change. Once the temperature returns to normal, so will the damper characteristics. Please refer to the right diagram for change in the action time for a free-closing lid.



5. The damper action angle is 110° as shown below. Rotating it beyond this angle will cause the damper to break. Ensure that an external stopper is in place. The action angle is based on the width across flats of the case on the back of the body. The rotation end point is at 90° on the basis of the width across flats of the case. (Refer to the figure below.)



6. There are dampers that generate torque in either the clockwise or counterclockwise direction when the rotating shaft is seen from the above. Select a model according to use.

Vane Damper

FYN-D3 Series



Specifications

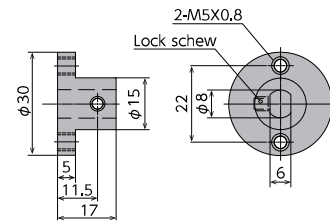
Model	Max. torque	Reverse torque	Damping direction
FYN-D3-R503	5 N·m	1 N·m or lower	Clockwise
FYN-D3-L503	(50 kgf·cm)	(10 kgf·cm or lower)	Counter-clockwise
FYN-D3-R703	7 N·m	1 N·m or lower	Clockwise
FYN-D3-L703	(70 kgf·cm)	(10 kgf·cm or lower)	Counter-clockwise
FYN-D3-R104	10 N·m	2 N·m or lower	Clockwise
FYN-D3-L104	(100 kgf·cm)	(20 kgf·cm or lower)	Counter-clockwise

- * Max. angle 180°
- * Operating temperature -5~50°C
- * Weight 215±10g
- * Body and cap material Zinc die-cast (ZDC)
- * Rotating shaft materia S25C
- * Oil type Silicone oil

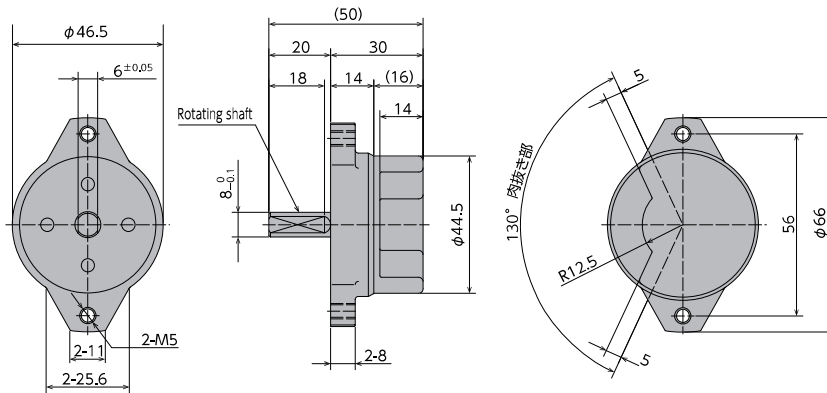
Optional Parts

Rotating shaft flange ROP-010H1

Applicable model	Model
FYN-D3	ROP-010H1

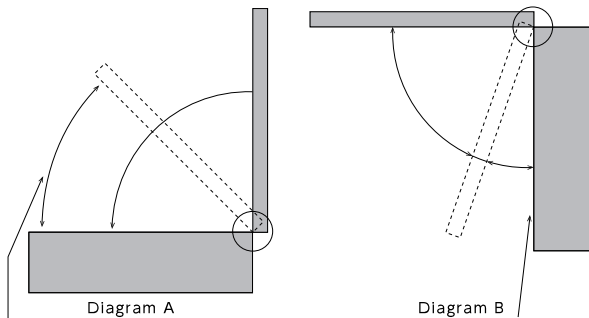


Rotating shaft flange
ROP-010H1



How to Use the Damper

- FYN-D3 is designed to generate a large torque just before a lid closing from a vertical position, as shown in Diagram A, comes to a full closure. When a lid is closed from a horizontal position, as shown in Diagram B, a strong torque is generated just before the lid is fully closed, causing the lid to not close properly.



The damper torque becomes larger, preventing the lid from slowing down.

The damper torque becomes larger, preventing the lid from closing completely.

The angle in which the damper torque becomes large can be customized by modifying the inside orifice.

- When using a damper on a lid, such as the one shown in the diagram, use the following selection calculation to determine the damper torque.
Example)

Lid mass M : 5kg

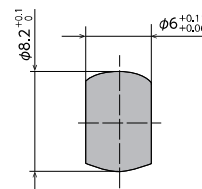
Lid dimensions L : 0.4m

Gravity Center Position : Assumed as $\frac{1}{2}$

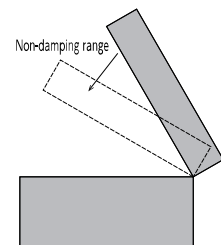
$$\text{Load torque} : T = 5 \times 9.8 \times 0.4 \div 2 = 9.8 \text{ N}\cdot\text{m}$$

Based on the above calculation, FYN-D3-*104 is selected.

- When connecting the rotating shaft to other parts, please ensure a tight fit between them. Without a tight fit, the lid will not slow down properly when closing. The corresponding dimensions for fixing the rotating shaft and the main body are as follows.

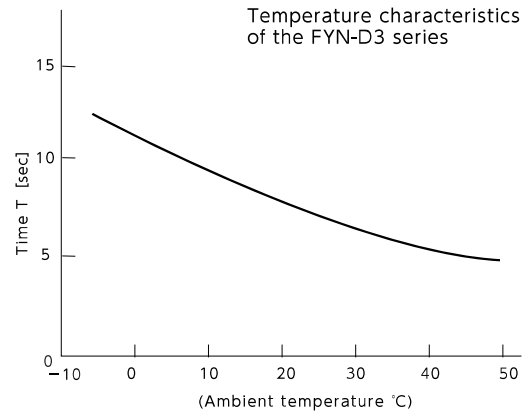


<Recommended dimensions for mounting a rotating shaft>

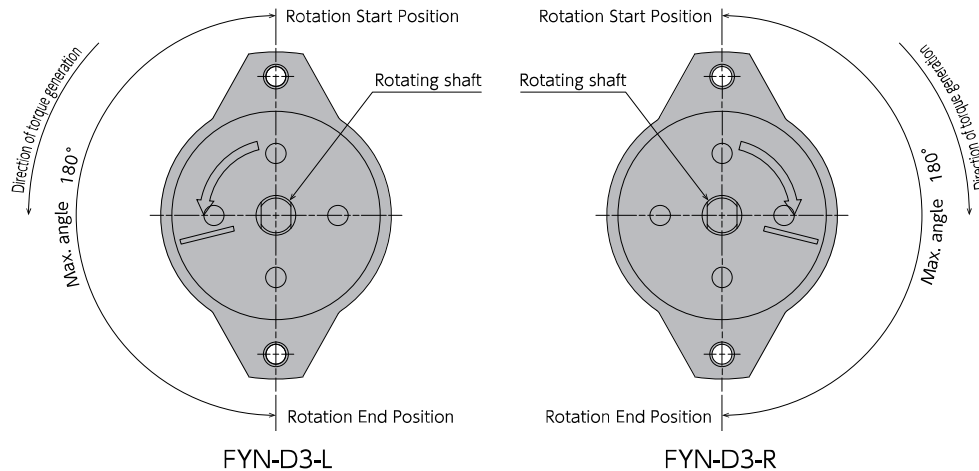


●Products specification might be changed without notice.

4. Damper characteristics vary according to the ambient temperature. In general, the damper characteristics become weaker as the temperature increases, and become stronger as the temperature decreases. This is because the viscosity of the oil inside the damper varies according to the temperature. When the temperature returns to normal, the damper characteristics will return to normal as well. The changes in the time it takes for the lid to close are shown in the graph to the right.



5. The damper's working angle is 110°, as shown below. Rotating the damper beyond this angle will cause damage to the damper. Please ensure that an external stopper is in place. The working angle is based on the width across flat for fixing, located towards the rear end of the main body. The position where the rotation is complete is at 90° with respect to the width across flat.



6. The direction in which torque is generated varies according to the model. Please select the appropriate model for your purpose.

Vane Damper

FYT/FYN-D1(D2) Series



Specifications

Model	Max. torque	Reverse torque	Damping direction
FYT-D1 (2)-104	10 N·m (100 kgf·cm)	—	Both directions
FYN-D1 (2)-R104	10 N·m (100 kgf·cm)	0.5 N·m or lower (5 kgf·cm or lower)	Clockwise
FYN-D1 (2)-L104	10 N·m (100 kgf·cm)	0.5 N·m or lower (5 kgf·cm or lower)	Counter-clockwise

Note) Measured at 23°C±2°C
The FYT/N-D2 series has a shorter shaft length.

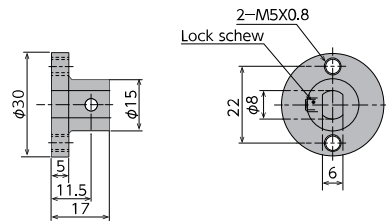
- * Max. angle 105°
- * Operating temperature -5~50°C
- * Weight D1 : 215±10g, D2 : 210±10g
- * Body and cap material Zinc die-cast (ZDC)

- * Rotating shaft material S25C
- * Oil type Silicone oil

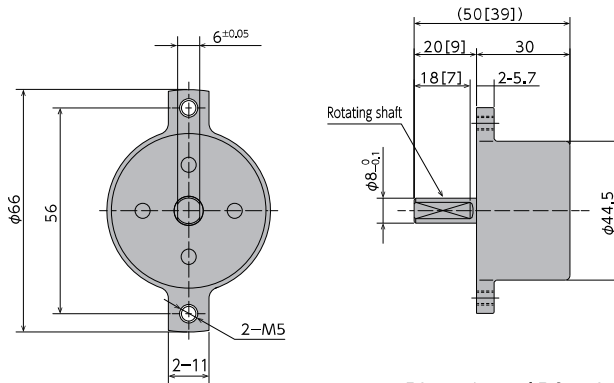
Optional Parts

Rotating shaft flange ROP-010H1

Model
ROP-010H1



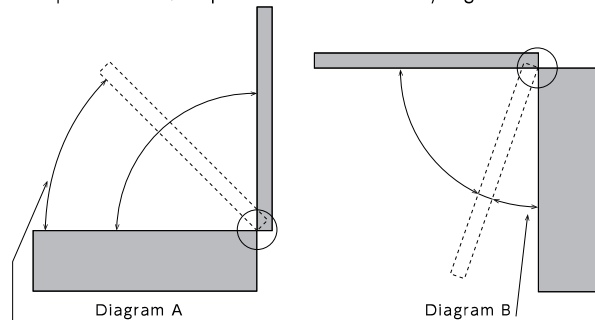
Rotating shaft flange
ROP-010H1



Dimensions of D2 series are in []

How to Use the Damper

- The uni-directional FYN-D1 is designed to generate a large torque just before a lid closing from a vertical position, as shown in Diagram A, comes to a full closure. When a lid is closed from a horizontal position, as shown in Diagram B, a strong torque is generated just before the lid is fully closed, causing the lid to not close properly. Torque is generated in both clockwise and counterclockwise directions in the FYT-D1 series. Unlike the FYN-D1 series, it does not have a fixed orifice for adjusting torque. Therefore, torque remains constant at any angle.



The damper torque becomes larger, preventing the lid from slowing down.

The damper torque becomes larger, preventing the lid from closing completely.

The angle in which the damper torque becomes large can be customized by modifying the inside orifice.

- When using a damper on a lid, such as the one shown in the diagram, use the following selection calculation to determine the damper torque. Example)

Lid mass M : 5kg

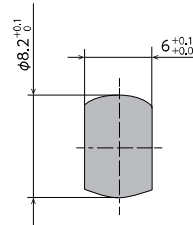
Lid dimensions L : 0.4m

Gravity Center Position : Assumed as $\frac{1}{2}$

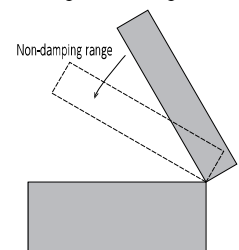
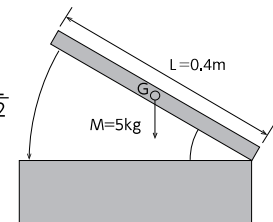
$$\text{Load torque : } T = 5 \times 9.8 \times 0.4 \div 2 = 9.8 \text{ N}\cdot\text{m}$$

Based on the above calculation, FYN-D1*104 is selected.

- When connecting the rotating shaft to other parts, please ensure a tight fit between them. Without a tight fit, the lid will not slow down properly when closing. The corresponding dimensions for fixing the rotating shaft and the main body are as follows.

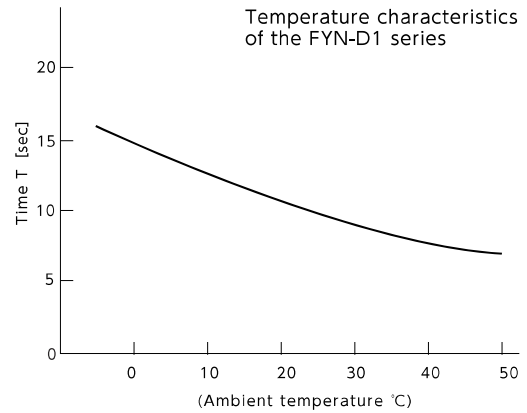


<Recommended dimensions for mounting a rotating shaft>

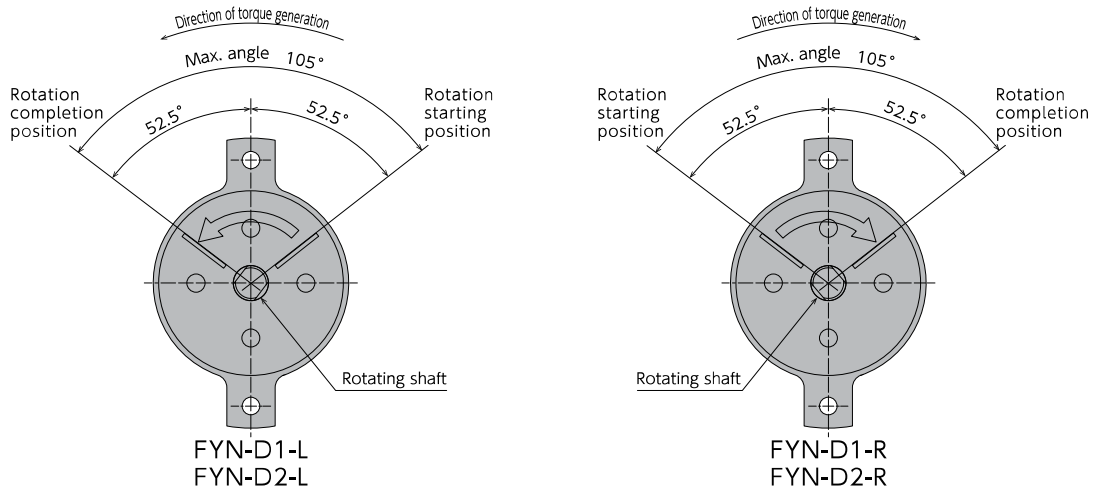


●Products specification might be changed without notice.

4. Damper characteristics vary according to the ambient temperature. In general, the damper characteristics become weaker as the temperature increases, and become stronger as the temperature decreases. This is because the viscosity of the oil inside the damper varies according to the temperature. When the temperature returns to normal, the damper characteristics will return to normal as well. The changes in the time it takes for the lid to close are shown in the graph to the right.



5. The damper's working angle is 110°, as shown below. Rotating the damper beyond this angle will cause damage to the damper. Please ensure that an external stopper is in place. The working angle is based on the width across flat for fixing, located towards the rear end of the main body. The position where the rotation is complete is at 90° with respect to the width across flat.



6. The FYN-D1 series is a fixed type; its torque is non-adjustable. However, a customized order for a torque between the range of 2 ~20N·m is possible by changing the oil viscosity.

7. The direction in which torque is generated varies according to the model. Please select the appropriate model for your purpose.

Vane Damper

FYT/FYN-H1(H2) Series



Specifications

Model	Max. torque	Reverse torque	Damping direction
FYT-H1 (2)-104	10 N·m (100 kgf·cm)	—	Both directions
FYN-H1 (2)-R104	10 N·m (100 kgf·cm)	0.5 N·m or lower (5 kgf·cm or lower)	Clockwise
FYN-H1 (2)-L104	10 N·m (100 kgf·cm)	0.5 N·m or lower (5 kgf·cm or lower)	Counter-clockwise

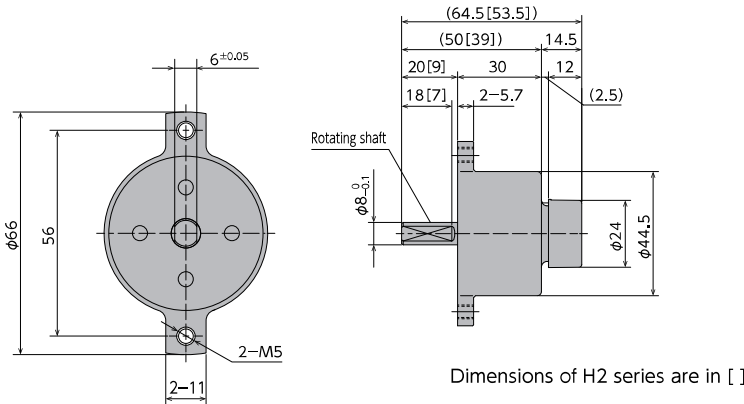
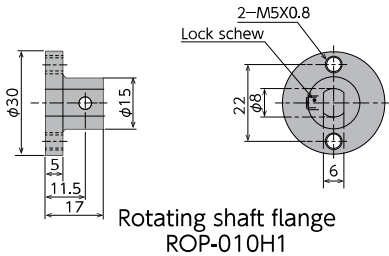
Note) Measured at 23° C ± 2° C
The FYT/N-H2 series has shorter shaft length.

- * Max. angle 105°
- * Operating temperature -5~50°C
- * Weight H1 : 240±10g, H2 : 235±10g
- * Body and cap material Zinc die-cast (ZDC)
- * Rotating shaft material S25C
- * Oil type Silicone oil

Optional Parts

Rotating shaft flange ROP-010H1

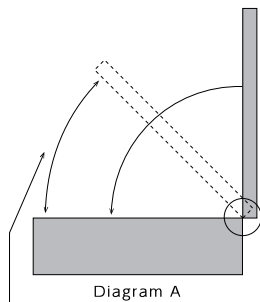
Model
ROP-010H1



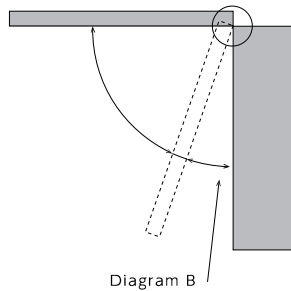
Dimensions of H2 series are in []

How to Use the Damper

- The uni-directional FYN-H1 is designed to generate a large torque just before a lid closing from a vertical position, as shown in Diagram A, comes to a full closure. When a lid is closed from a horizontal position, as shown in Diagram B, a strong torque is generated just before the lid is fully closed, causing the lid to not close properly. Torque is generated in both clockwise and counterclockwise directions in the FYT-H1 series. Unlike the FYN-H1 series, it does not have a fixed orifice for adjusting torque. Therefore, torque remains constant at any angle.



The damper torque becomes larger, preventing the lid from slowing down.



The damper torque becomes larger, preventing the lid from closing completely.

The angle in which the damper torque becomes large can be customized by modifying the inside orifice.

- When using a damper on a lid, such as the one shown in the diagram, use the following selection calculation to determine the damper torque.

Example)

Lid mass M : 5kg

Lid dimensions L : 0.4m

Gravity Center Position : Assumed as $\frac{L}{2}$

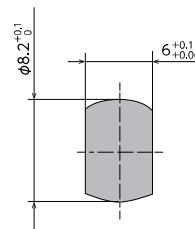
Load torque : $T = 5 \times 9.8 \times 0.4 \div 2$

$$= 9.8\text{N}\cdot\text{m}$$

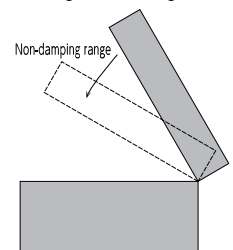
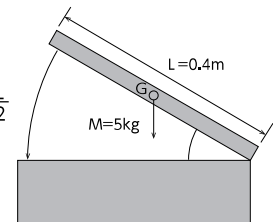
Based on the above calculation,

FYN-H1-104 is selected.

- When connecting the rotating shaft to other parts, please ensure a tight fit between them. Without a tight fit, the lid will not slow down properly when closing. The corresponding dimensions for fixing the rotating shaft and the main body are as follows.

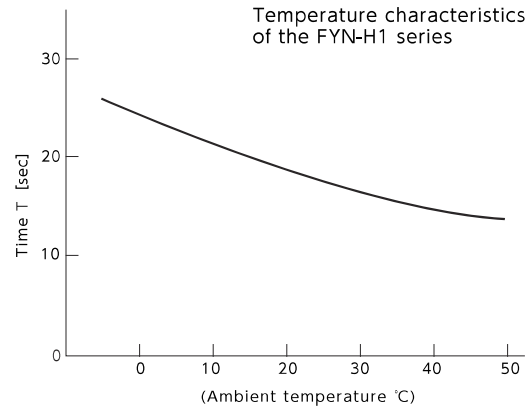


<Recommended dimensions for mounting a rotating shaft>

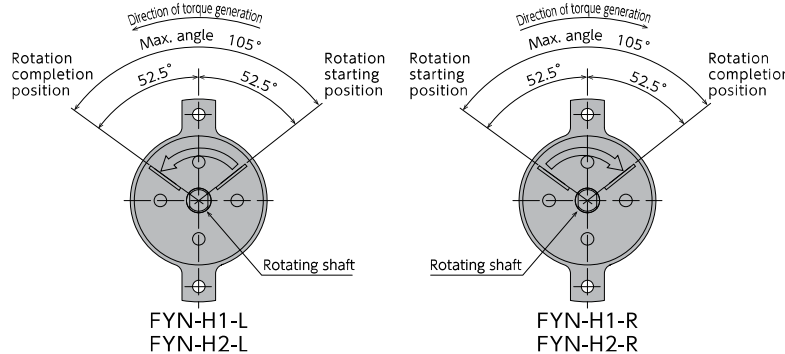


●Products specification might be changed without notice.

4. Damper characteristics vary according to the ambient temperature. In general, the damper characteristics become weaker as the temperature increases, and become stronger as the temperature decreases. This is because the viscosity of the oil inside the damper varies according to the temperature. When the temperature returns to normal, the damper characteristics will return to normal as well. The changes in the time it takes for the lid to close are shown in the graph to the right.

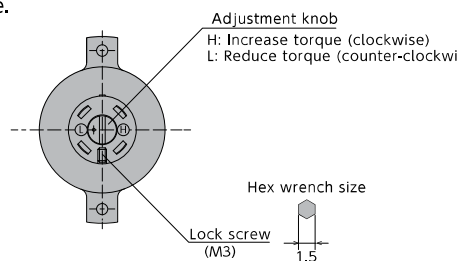


5. The damper's working angle is 110°, as shown below. Rotating the damper beyond this angle will cause damage to the damper. Please ensure that an external stopper is in place. The working angle is based on the width across flat for fixing, located towards the rear end of the main body. The position where the rotation is complete is at 90° with respect to the width across flat.



6. How to adjust the damper

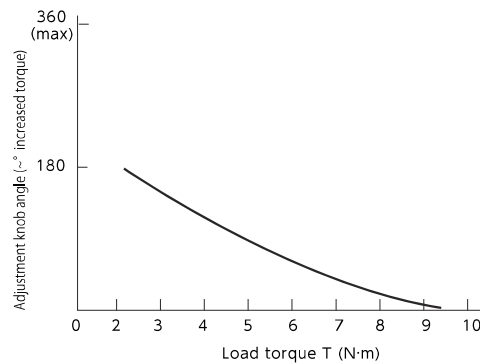
- 1) In the FYT-H1 (H2) and FYN-H1 (H2) series, the amount of generated torque can be adjusted with the adjustment knob located towards the rear of the main body. Insert a screwdriver in the minus groove to turn.
- 2) Turn the adjustment knob in the H direction to increase torque.
- 3) Turn the adjustment knob in the L direction to reduce torque.
- 4) Do not turn the adjustment knob more than 360°. Turning the knob more than 360° causes the adjustment shaft to slip out, resulting in oil leakage.
- 5) Once the adjustment is complete, secure with a lock screw. Using the damper without securing it may result in fluctuating torque.



7. The direction in which torque is generated varies according to the model. Please select the appropriate model for your purpose.

<Range of torque adjustment>

Please refer to the graph below for the relationship between torque and the adjustment knob.



Vane Damper

FYN-S1 Series

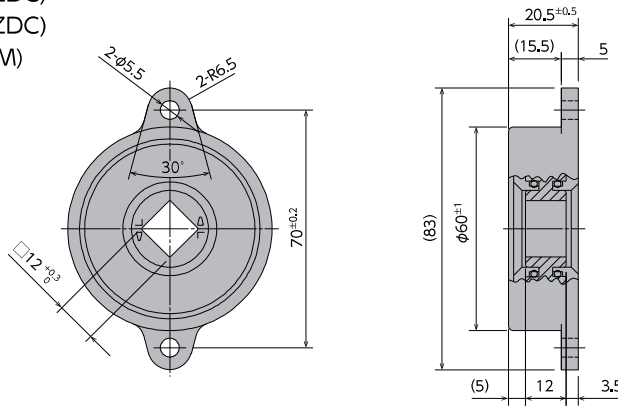


Specifications

Model	Max. torque	Reverse torque	Damping direction
FYN-S1-R104	10 N·m (100 kgf·cm)	1.5 N·m or lower (15 kgf·cm or lower)	Clockwise
FYN-S1-L104			Counter-clockwise

Note) Measured at 23° C ± 2° C

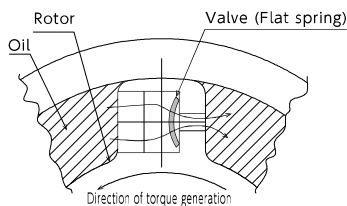
- * Max. angle 130°
- * Operating temperature -5~50°C
- * Weight 220±10g
- * Main body material Zinc die-cast (ZDC)
- * Cap material Zinc die-cast (ZDC)
- * Rotor material Polyacetal (POM)
- * Oil type Silicone oil



How to Use the Damper

1. Operating characteristics of self-adjusting oil pressure dampers

In a conventional vane damper, the damping strength (damping constant) does not change regardless of the load torque used. Because of this, its working speed is slower when the load torque is small, and faster when the load torque is large. However, because the self-adjusting FYN-S1 series is designed to self-adjust the damping force (damping constant) according to the applied load, the working speed fluctuates less compared to conventional dampers when the applied load is altered. The acceptable range of torque is 5 ~10N·m. Please select your damper by referring to the motion-time graph below.

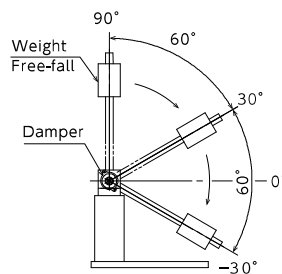
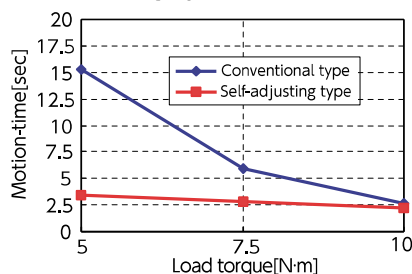


[Operating principles of the self-adjusting type]

As shown in the diagram to the left, by changing the shape of the valve (flat spring), the amount of oil flow is altered, adjusting the damper's generated torque. (PAT.P)

[Measurement conditions for the motion-time graph]

[Motion time graph]

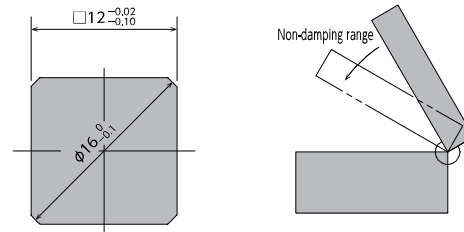


- Load torque T 5~10N·m
- Measured angle 30° ~ -30°
- Measurement temperature 23° C ± 2° C

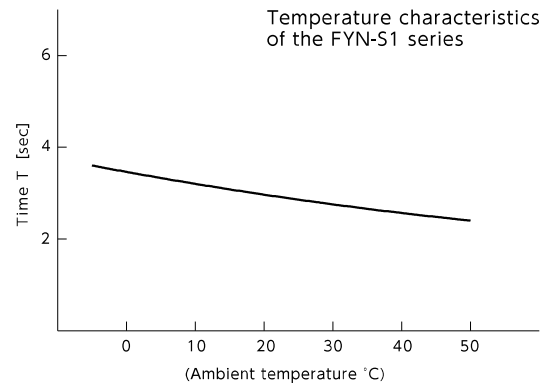
As the level of self-adjustment may vary depending on the range of the working angle of the actual work, please verify under actual working conditions before you select your damper.

●Products specification might be changed without notice.

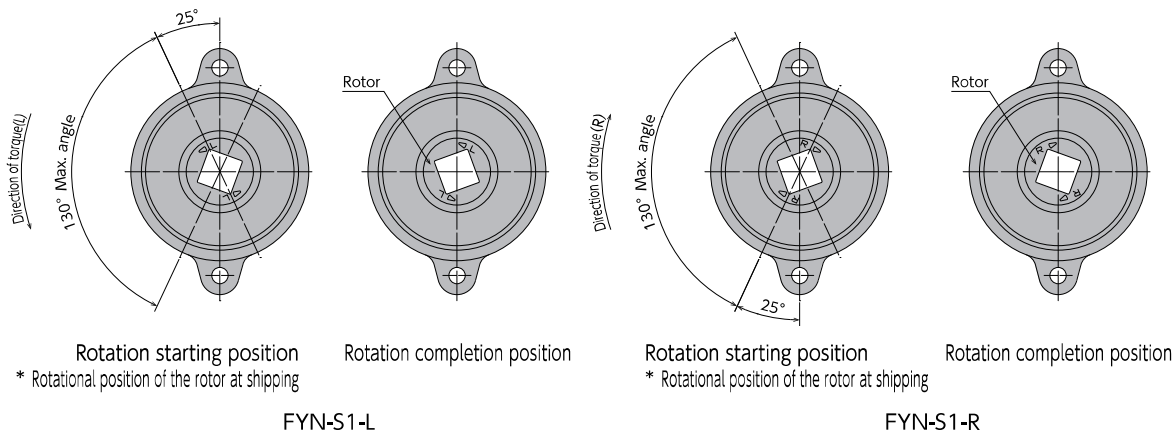
2. When using the damper, please ensure that a shaft with specified angular dimensions is inserted in the damper's shaft opening. Also, please ensure a tight fit between the shaft and the damper shaft's opening. Without a tight fit, the non-damping range becomes larger in a closing motion, etc., and it may not slow down properly. Please see the diagrams to the right for the recommended shaft dimensions for a damper.



3. Damper characteristics vary according to the ambient temperature. In general, the damper characteristics become weaker as the temperature increases, and become stronger as the temperature decreases. This is because the viscosity of the oil inside the damper varies according to the temperature. When the temperature returns to normal, the damper characteristics will return to normal as well. The time it takes for the lid to close is shown in the graph to the right.



4. The damper's working angle is 130°, as shown below. Rotating the damper beyond this angle will cause damage to the damper. Please ensure that an external stopper is in place.



5. Because the FYN-S1 series is a self-adjusting type, the torque cannot be adjusted manually. However, by altering the viscosity of the oil, its damper characteristics can be modified. (Please contact us, as this is a custom order.)

6. The direction in which torque is generated varies according to the model. Please select the appropriate model for your purpose.

Vane Damper

FYN-X2 Series

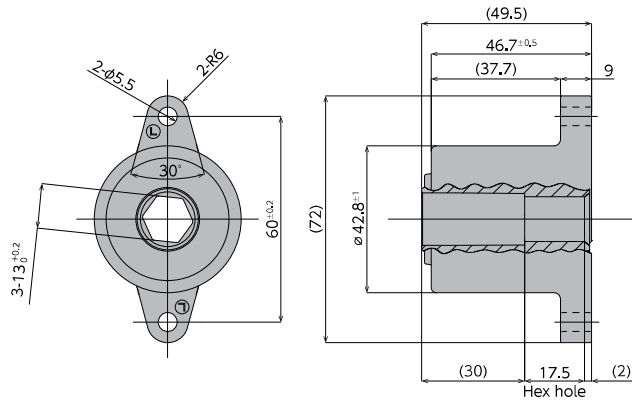


Specifications

Model	Max. torque	Reverse torque	Directions
FYN-X2-R154	15N·m (150kgf·cm)	2 N·m or lower (20kgf·cm)以下	Clockwise
FYN-X2-L154			Counterclockwise
FYN-X2-R254	25N·m (250kgf·cm)	3 N·m or lower (30 kgf·cm or lower)	Clockwise
FYN-X2-L254			Counterclockwise

Note) Measured at 23°C±2°C

- *Max. angle 106°
- *Operating temperature -5~50°C
- *Weight 287±10g
- *Body material Zinc die-cast (ZDC)
- *Cap material Zinc die-cast (ZDC)
- *Rotor material Zinc die-cast (ZDC)
- *Oil type Silicone oil



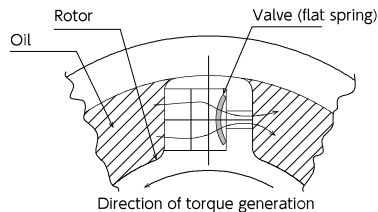
How to Use the Damper

1. Operating characteristics of self-adjusting oscillating dampers

In a conventional oscillating damper, the damping strength (damping constant) does not change regardless of the load torque used. Therefore, the operating speed is slower when the load torque is small, and faster when the load torque is large.

However, since the self-adjusting FYN-X2 series is designed to self-adjust the damping strength (damping constant) according to the applied load, its motion-time fluctuates less than that of conventional dampers when the load changes.

The acceptable range of torque is 10 to 15N·m or 20 to 25N·m, Please select your damper by referring to the motion-time graph below.

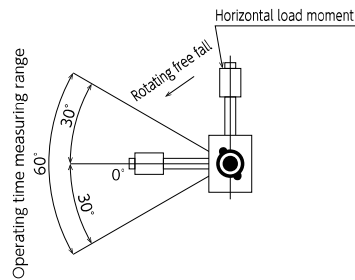
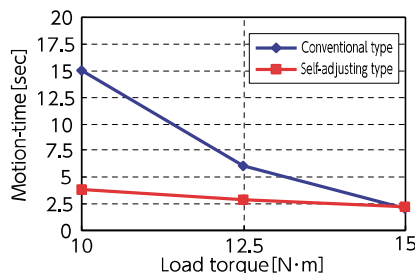
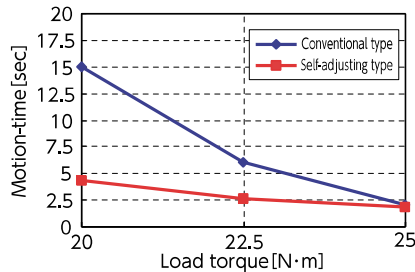


[Operating principles of the self-adjusting type]

As shown in the diagram to the left, by changing the shape of the valve (flat spring), the amount of oil flow is altered, adjusting the damper's generated torque. (PAT.P)

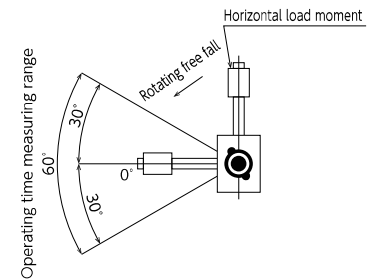
[Measurement conditions for the motion-time graph]

[Motion time graph]



FYN-X2 25N·m specification

- Measuring temperature : Room temperature (23±3°C)
- Load torque : 20~25N·m
- Measuring angle : +30°~-30°



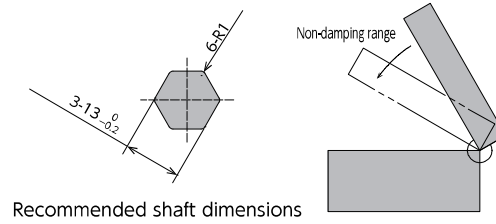
FYN-X2 15N·m specification

- Measuring temperature : Room temperature (23±3°C)
- Load torque : 10~15N·m
- Measuring angle : +30°~-30°

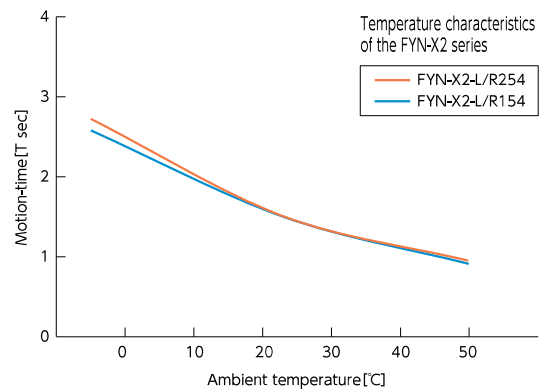
As the level of self-adjustment may vary depending on the range of the working angle of the actual work, please verify under actual working conditions before you select your damper.

●Products specification might be changed without notice.

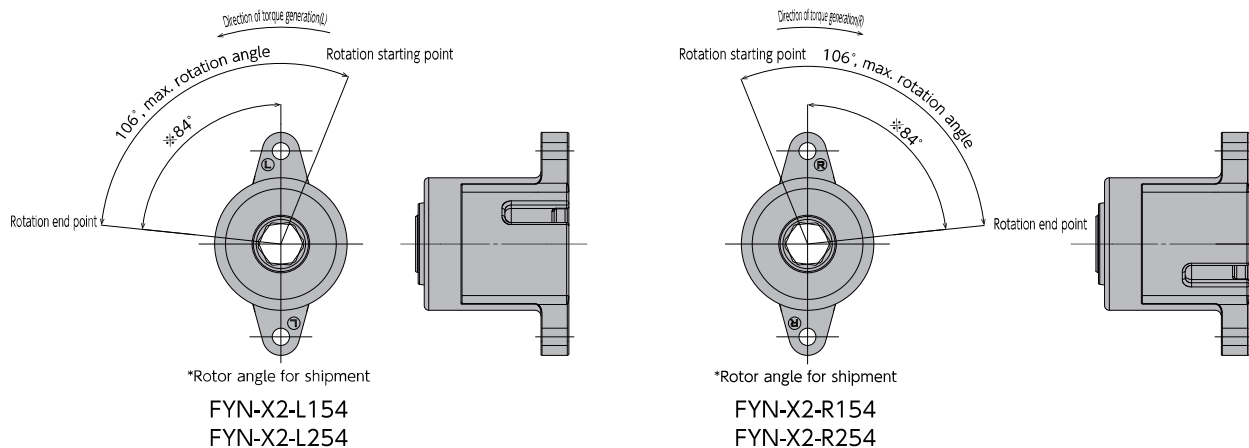
2. When using the damper, please ensure that a shaft with specified angular dimensions is inserted in the damper's shaft opening. Also, please ensure a tight fit between the shaft and the damper shaft's opening. Without a tight fit, the play becomes larger in a closing motion, etc., and the lid may not slow down properly. Please see the diagrams to the right for the recommended shaft dimensions for a damper.



3. Damper characteristics vary according to the ambient temperature. In general, the damper characteristics become weaker as the temperature increases, and become stronger as the temperature decreases. This is because the viscosity of the oil inside the damper varies according to the temperature. When the temperature returns to normal, the damper characteristics will return to normal as well. The time it takes for the lid to close is shown in the graph to the right.



4. The damper's working angle is 106° as shown below. Rotating the damper beyond this angle will cause the damage to the damper. Please ensure that an external stopper is in place.



5. Because the FYN-X2 series is a self-adjusting type, the torque cannot be adjusted manually. However, by altering the viscosity of the oil, its damper characteristics can be modified.

* Please contact us, as this is a custom order,

6. The direction in which torque is generated varies according to the model. Please select the appropriate model for your purpose.

Vane Damper

FYN-Z2 Series

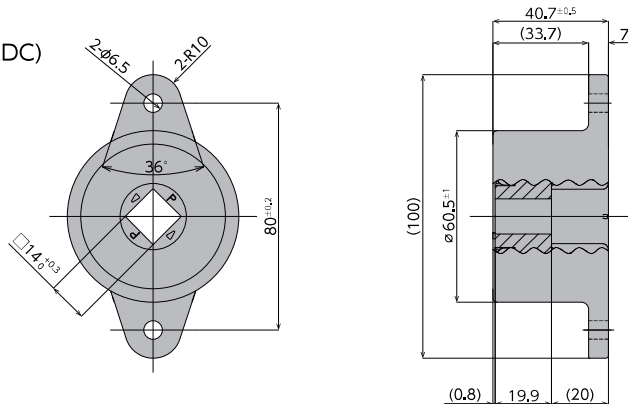
Specifications



Model	Max. torque	Reverse torque	Directions
FYN-Z2-R354	35N·m (350kgf·cm)	3 N·m or lower (30 kgf·cm or lower)	Clockwise
FYN-Z2-L354			Counterclockwise

Note) Measured at 23°C±2°C

- *Max. angle 94°
- *Operating temperature -5~50°C
- *Weight 506±10g
- *Body material Zinc die-cast (ZDC)
- *Cap material Iron (SPFC)
- *Rotor material Zinc die-cast (ZDC)
- *Oil type Silicone oil



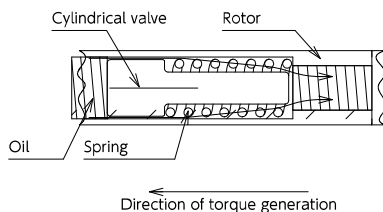
How to Use the Damper

1. Operating characteristics of self-adjusting oscillating dampers

In a conventional oscillating damper, the damping strength (damping constant) does not change regardless of the load torque used. Therefore, the operating speed is slower when the load torque is small, and faster when the load torque is large.

However, since the self-adjusting FYN-X2 series is designed to self-adjust the damping strength (damping constant) according to the applied load, its motion-time fluctuates less than that of conventional dampers when the load changes.

The acceptable range of torque is 20 to 35 N·m. Please select your damper by referring to the motion-time graph below.



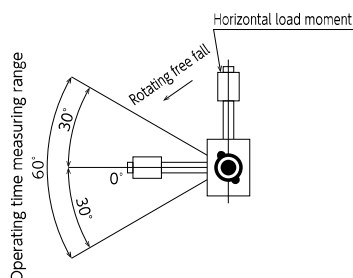
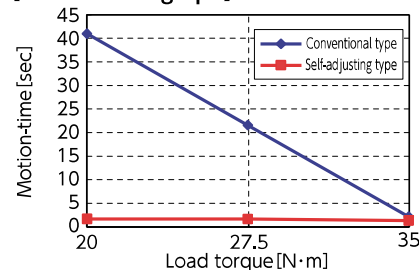
[Operating principles of the self-adjusting type]

As shown in the diagram to the left, the spring compressed by the movement of the cylindrical valve alters the amount of oil flow so as to adjust the generated torque of the damper. (Patent pending)

[Measurement conditions for the motion-time graph]

- Measuring temperature : Room temperature (23±3°C)
- Load torque : 20~35N·m
- Measuring angle : +30°~-30°

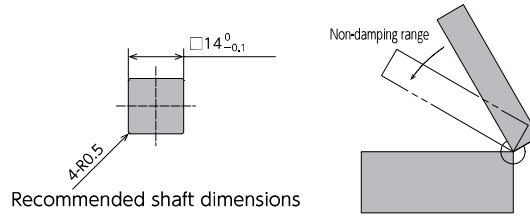
[Motion time graph]



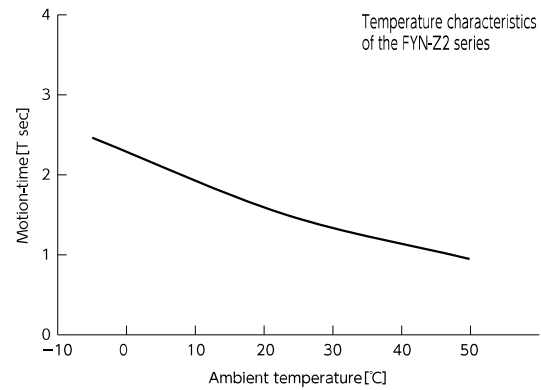
As the level of self-adjustment may vary depending on the range of the working angle of the actual work, please verify under actual working conditions before you select your damper.

●Products specification might be changed without notice.

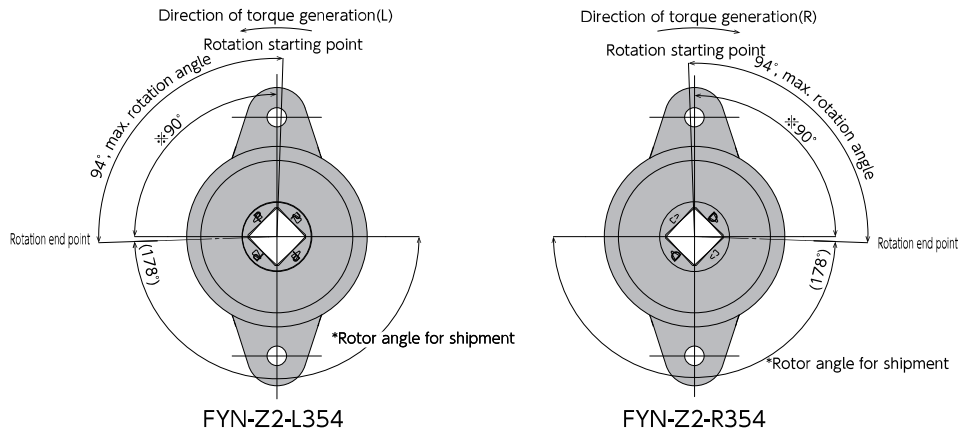
2. When using the damper, please ensure that a shaft with specified angular dimensions is inserted in the damper's shaft opening. Also, please ensure a tight fit between the shaft and the damper shaft's opening. Without a tight fit, the play becomes larger in a closing motion, etc., and the lid may not slow down properly. Please see the diagrams to the right for the recommended shaft dimensions for a damper.



3. Damper characteristics vary according to the ambient temperature. In general, the damper characteristics become weaker as the temperature increases, and become stronger as the temperature decreases. This is because the viscosity of the oil inside the damper varies according to the temperature. When the temperature returns to normal, the damper characteristics will return to normal as well. The time it takes for the lid to close is shown in the graph to the right.



4. The damper's working angle is 94° as shown below. Rotating the damper beyond this angle will cause the damage to the damper. Please ensure that an external stopper is in place.



5. Because the FYN-Z2 series is a self-adjusting type, the torque cannot be adjusted manually. However, by altering the viscosity of the oil, its damper characteristics can be modified.

* Please contact us, as this is a custom order,

6. The direction in which torque is generated varies according to the model. Please select the appropriate model for your purpose.

Vane Damper

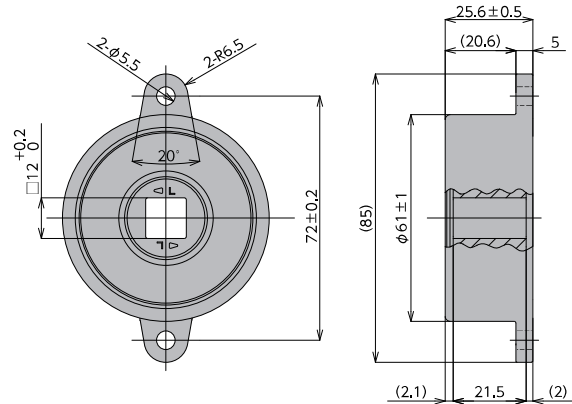
FYN-A2 Series



- * Max. angles 120°
- * Operating temperature -5 ~50° C
- * Weight 222 ± 11g
- * Body material Zinc die - cast (ZDC)
- * Cap material Zinc die - cast (ZDC)
- * Rotor material Zinc die - cast (ZDC)
- * Oil type Silicone oil
- * Rotary color L: Black R: White

Specifications

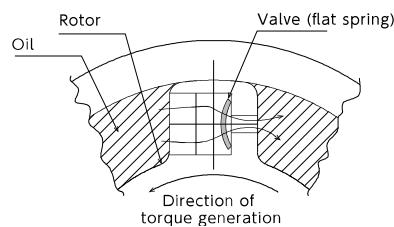
Model	Max. torque	Reverse torque	Directions
FYN-A2-R204	20N·m (200kgf·cm)	2N·m or lower (20kgf·cm lower)	Clockwise
FYN-A2-L204			Counterclockwise



How to Use the Damper

1. Operating characteristics of self-adjusting oscillating dampers
in a conventional oscillating damper, the damping strength (damping constant) does not change regardless of the load torque used.

Therefore, the operating speed is slower when the load torque is small, and faster when the load torque is large. However, since the self-adjusting FYN-A2 series is designed to self-adjustable the damping strength (damping constant) according to the applied load, its motion-time fluctuates less than that of conventional dampers when the load changes. The acceptable range of torque is 10 to 15N·m or 20 to 25N·m, Please select your damper by referring to the motion graph below.



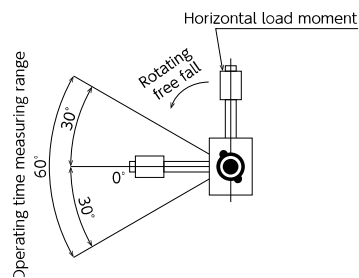
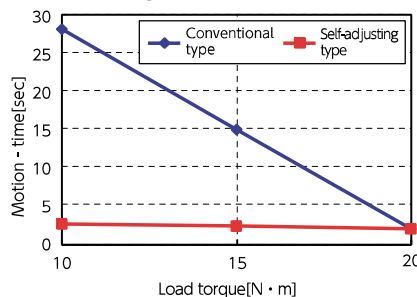
[Operating principles of the self-adjusting type]

As shown in the diagram to the left, by changing the shape of the valve (flat spring), the amount of oil flow is altered, adjusting the damper's generated torque. (PAT.P)

[Measurement conditions for the motion-time graph]

- Measuring temperature : Room temperature (23±3°C)
- Load torque : 10~20N·m
- Measuring angle : +30°~-30°

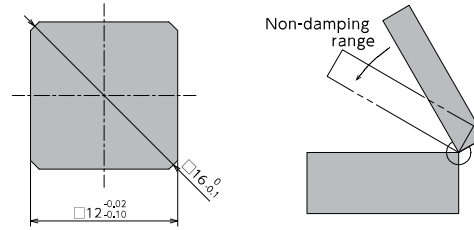
[Motion time graph]



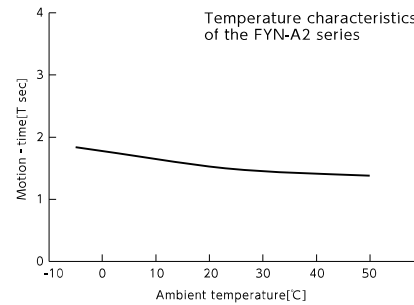
As the level of self-adjustment may vary depending on the range of the working angle of the actual work, please verify under actual working conditions before you select your damper.

●Products specification might be changed without notice.

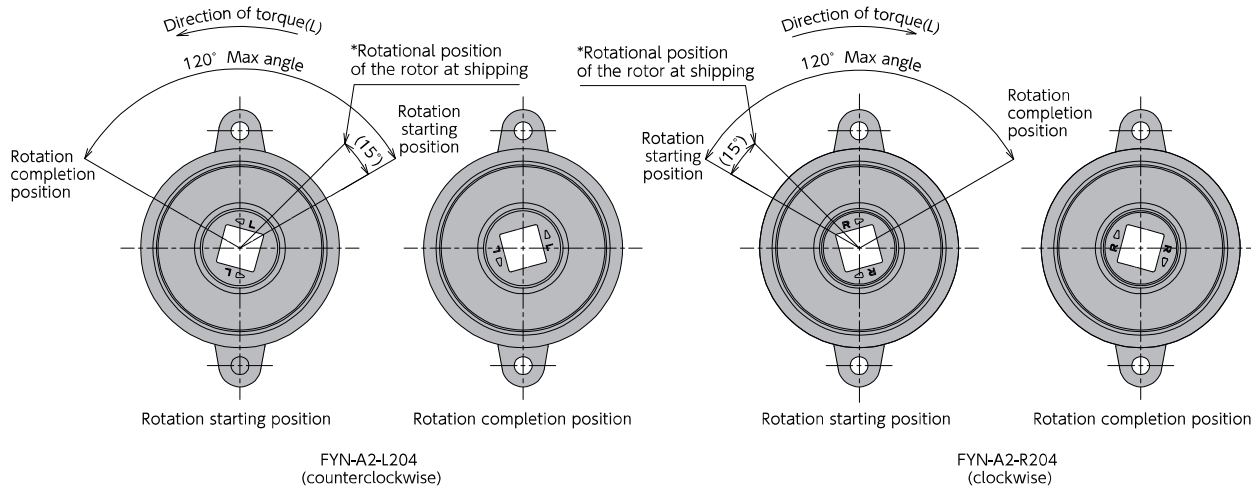
2. When using the damper, please ensure that a shaft with specified angular dimensions is inserted in the damper's shaft opening. Also, please ensure a tight fit between the shaft and the damper shaft's opening. Without a tight fit, the play becomes larger in a closing motion, etc., and the lid may not slow down properly. Please see the diagrams to the right for the recommended shaft dimensions for a damper.



3. Damper characteristics vary according to the ambient temperature. In general, the damper characteristics become weaker as the temperature decreases. This is because the viscosity of the temperature. When the temperature returns to normal, the damper characteristics will return to normal as well. The time it takes for the lid to close is shown in the graph to the right.



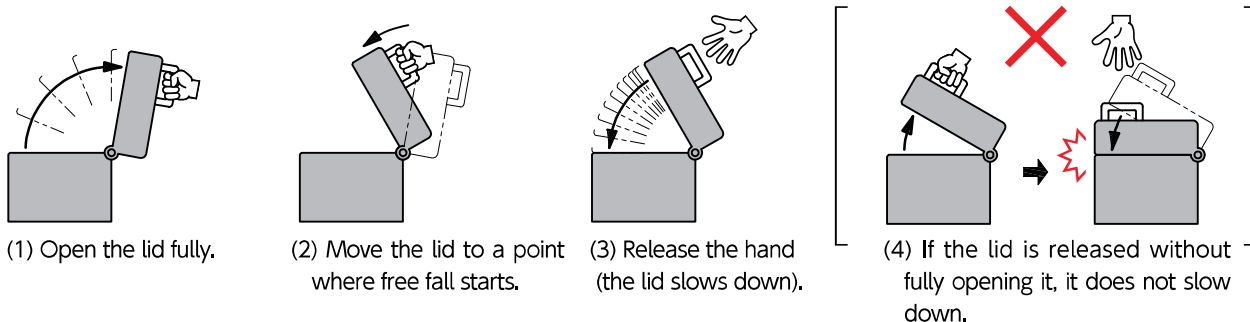
4. The damper's working angle is 120° as shown below. Rotating the damper beyond this angle will cause the damage to the damper. Please ensure that an external stopper is in place.



5. Because the FYN-A2 series is a self-adjusting type, the torque cannot be adjusted manually. However, by altering the viscosity of the oil, its damper characteristics can be modified. (Please contact us, as this is a custom order.)
6. The direction in which torque is generated varies according to the model. Please select the appropriate model for your purpose.

Precautions for Use

* When using the vane damper, ensure that after having fully opened the lid, move the lid to a point where free fall starts, and then release the hand from the lid. If the lid is slightly opened and in this state the hand is released, the lid may not be able to sufficiently slow down and the lid may be closed with force, which could result in an injury such as getting the hand caught by the lid.



Vane Damper

FYT/FYN-LA3 Series

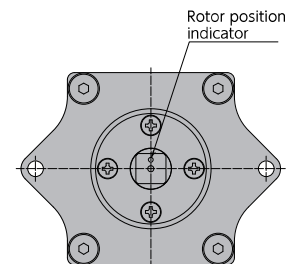
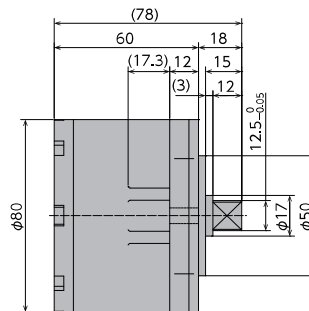
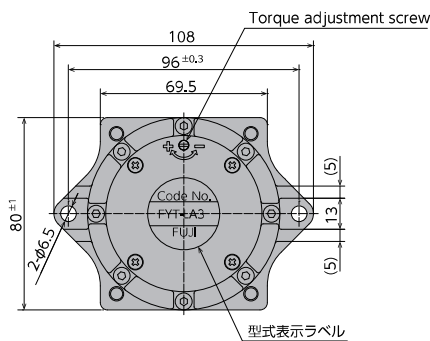


Specifications

Model	Max. torque	Damping constant	Damping direction
FYT-LA3	40N·m (400kgf·cm)	10~60N·m/(rad/sec)	Both directions
FYN-LA3-R			Clockwise
FYN-LA3-L			Counter-clockwise

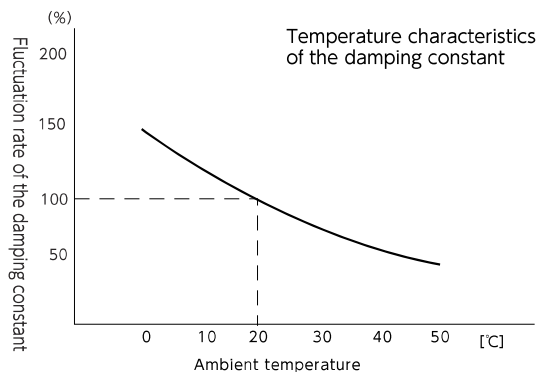
Note) Measured at 23°C±2°C

- * Max. angle 210°
- * Operating temperature 0~50°C
- * Weight 1.75k g
- * Body and cap material Zinc die-cast (ZDC)
- * Rotating shaft material Alloy steel
- * Oil type Silicone oil



How to Use the Damper

1. Damper characteristics vary according to the ambient temperature. In general, the damping constant decreases as the temperature increases, and the damping constant increases as the temperature decreases. This is because the viscosity of the oil inside the damper changes according to the temperature. When the temperature returns to normal, the damping constant will return to normal as well.



2. When using a damper on a lid, such as the one shown in the diagram, use the following selection calculation to determine the damper torque.

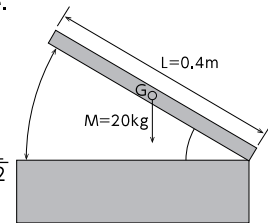
Example)

Lid mass M : 20kg

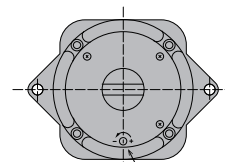
Lid dimensions L : 0.4m

Gravity Center Position : Assumed as $\frac{L}{2}$

Load torque : $T = 20 \times 0.4 \times 9.8 \div 2$
 $= 39.2\text{N}\cdot\text{m}$



3. FYT, FYN-LA3 series are torque-adjustable types. Turn the damping adjustment screw located on the back of the main body by inserting a slotted screwdriver. The damping constant increases when turned to the + direction (right). The damping constant decreases when turned to the - direction (left).

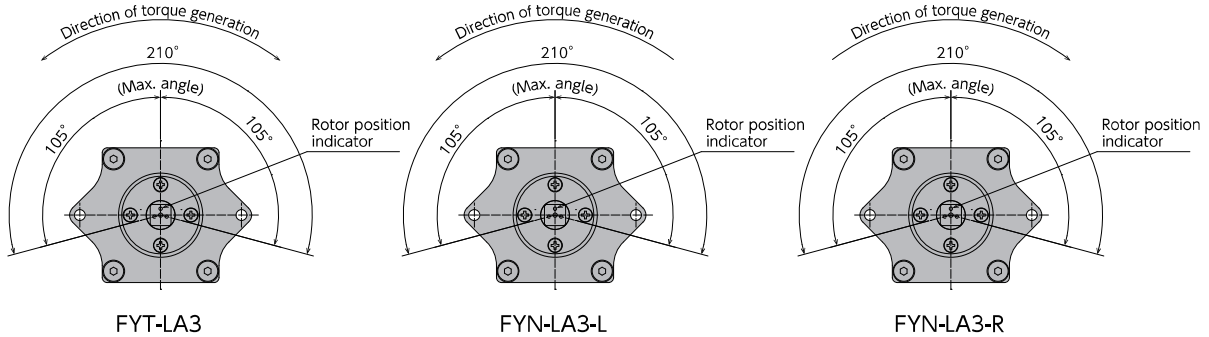
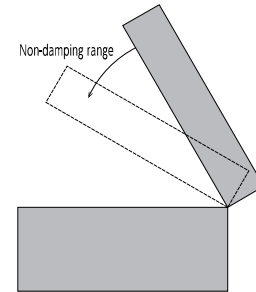


Torque adjustment screw

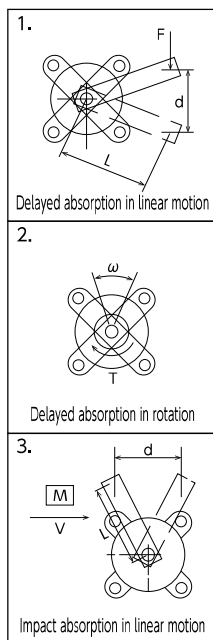
●Products specification might be changed without notice.

Instruction for Damper Attachment

- When attaching a rotating shaft to its corresponding part, ensure that they are firmly attached together by making the gap between them as small as possible. A large gap may affect the damper's non-damping range, preventing the lid from slowing down properly.
- The damper's working angle is $\pm 105^\circ$, as shown on the right (second diagram). Please determine where to attach it according to your needs.
- The direction in which torque is generated varies according to the model. Please select the appropriate model for your purpose.
- Do not use the damper as a stopper. An external stopper must be attached at the stopping position.
- In FYN-LA3-L and FYN-LA3-R, the angular velocity in the reverse direction (opposite to the direction of torque generation) should be 1 rad/sec or less.



How to Calculate the Damping Constant for Vane Dampers



1. Delayed absorption in linear motion

$$\text{Formula (N}\cdot\text{m/(rad/sec))} = \frac{FL^2t}{d}$$

F = Force or mass applied to the lever tip (N)
L = Distance between the centre of the damper shaft and the lever's point of application (m)
d = Distance travelled by lever (m)
t = Travelling time of the lever (sec)

2. Delayed absorption in rotation

$$\text{Formula (N}\cdot\text{m/(rad/sec))} = \frac{T}{\omega}$$

T = Torque applied to shaft (N·m)
 ω = Angular velocity(rad/sec)

3. Impact absorption in linear motion

$$\text{Formula (N}\cdot\text{m/(rad/sec))} = \frac{MVL^2}{d}$$

M = Mass(kg)
V = Velocity(m/sec)
L = Distance between the centre of the damper shaft and the lever's point of application (m)
d = Distance travelled by lever (m)

Hinge Damper

Fixed Type

Bi-Directional

Uni-Directional

Adjustable type

Self-adjusting

FHD-A1 Series

RoHS Compliant

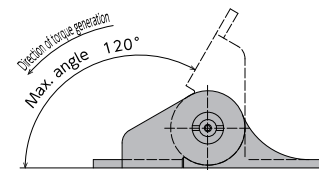
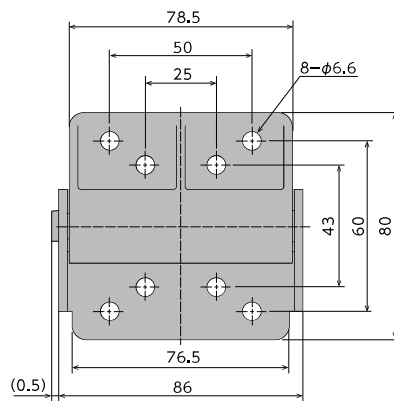
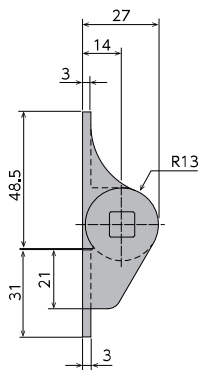
●Products specification might be changed without notice.



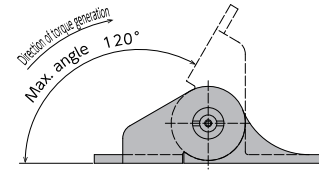
Specifications

Model	Max. torque	Max. reverse torque
FHD-A1-1-503	5N·m (50 kgf·cm)	0.6N·m or lower (6kgf·cm or lower)
FHD-A1-2-503		
FHD-A1-1-104	10N·m (100 kgf·cm)	1N·m or lower (10kgf·cm or lower)
FHD-A1-2-104		

* Max. angle	120°	* Main body material	Zinc die-cast (ZDC) + silver coating
* Operating temperature	-5~50°C	* Hinge material	SUS304
* Weight	410g	* Oil type	Silicone oil



<FHD-A1-1-***>

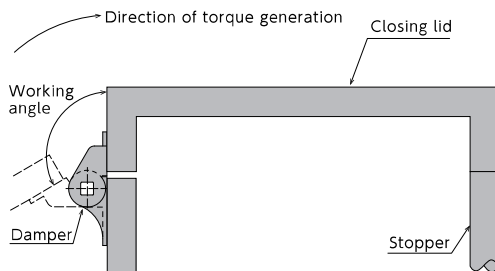


<FHD-A1-2-***>

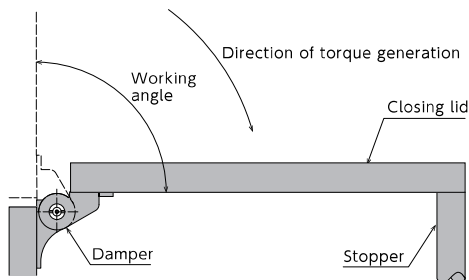
How to Use the Damper

1. There are two ways to attach the damper, as shown below.

○Attached externally(FHD-A1-1-***)



○Attached internally(FHD-A1-2-***)

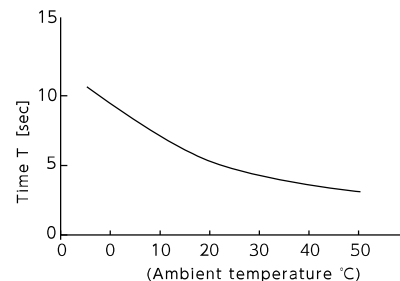


2. This damper is only for horizontal application. Please do not use this damper for vertical application.

Damper Characteristics

1. Temperature characteristics

Damper characteristics vary according to the ambient temperature. In general, the damper characteristics become weaker as the temperature increases, and become stronger as the temperature decreases. This is because the viscosity of the oil inside the damper varies according to the temperature. When the temperature returns to normal, the damper characteristics will return to normal as well.



2. The working angle of the hinge is 120° .

Operating the hinge beyond this angle will cause damage to the hinge. Please ensure that an external stopper is in place.

Friction Type Hinge Damper

Fixed Type Bi-Directional Adjustable type Uni-Directional Self-adjusting

FHD-B1/B2 Series

RoHS Compliant

●Products specification might be changed without notice.

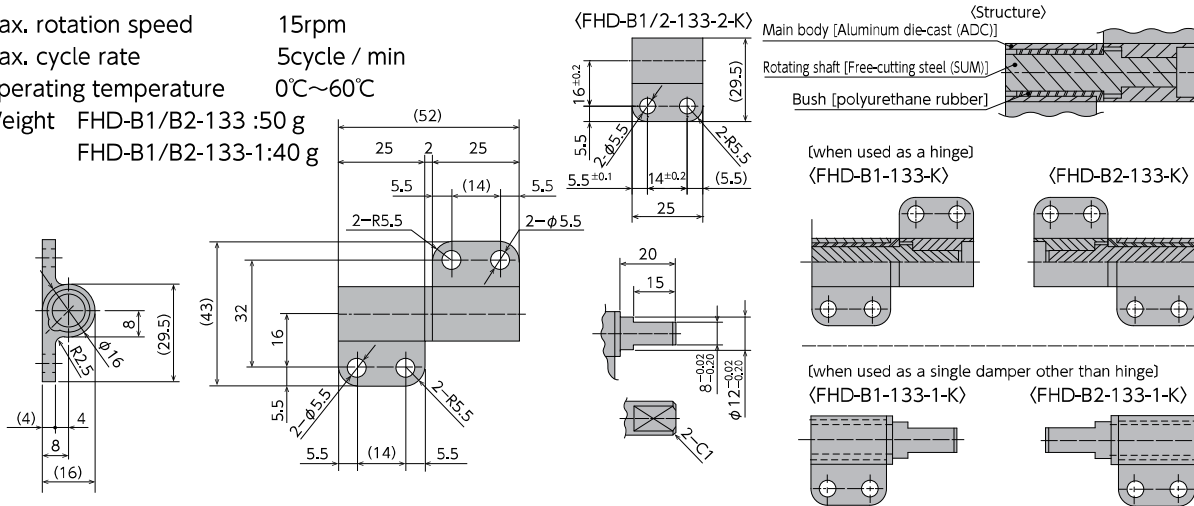


Specifications

Model	Max. torque
FHD-B1-133-K	1,35±0.34 N·m
FHD-B2-133-K	(13.5±3.4 kgf·cm)
FHD-B1-133-1-K	1,35±0.34 N·m
FHD-B2-133-1-K	(13.5±3.4 kgf·cm)
FHD-B1-133-2-K	
FHD-B2-133-2-K	

Note) Damper torque was measured at 25°C±2°C at 2rpm

- * Max. rotation speed 15rpm
- * Max. cycle rate 5cycle / min
- * Operating temperature 0°C~60°C
- * Weight FHD-B1/B2-133 :50 g
- FHD-B1/B2-133-1:40 g



How to Use the Damper

- The damper generates torque in both clockwise and counter-clockwise directions.
- A friction-type hinge damper can be used as a bearing.
- Friction-type hinge dampers have a long product life and do not require lubrication.
- Torque down will result if the damper part gets wet with water or oil.
- It cannot be used for continuous rotation. Please use it in a vane motion.
- Depending on the operating conditions, it can be used as a free-stop hinge. Please calculate the retention torque based on the following equation.

$$\text{Retention torque } \alpha = \frac{M \times 9.8 \times \frac{L}{2} \times \cos \theta}{0.65 \times \alpha \times N} \quad (\text{N} \cdot \text{m})$$

Retention temperature	α
Room temperature (25±5°C)	1.0
MAX40°C	0.75
MAX60°C	0.50

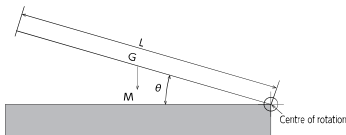
M : Mass of the retaining part

L : Distance between the tip of retaining part and the centre of rotation

θ : Retention angle from the retaining part's horizontal position

α : Temperature coefficient of the max. temperature

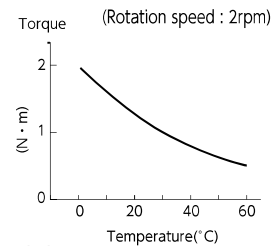
N : Number of dampers used



- This damper is only for horizontal application. Please do not use this damper for vertical application.

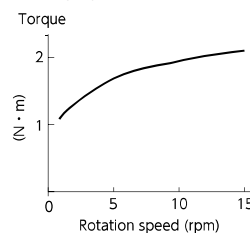
Damper Characteristics

- Temperature characteristics**
Damper characteristics vary according to the ambient temperature. In general, the damper characteristics become weaker as the temperature increases, and become stronger as the temperature decreases. This is because the temperature of the shaft bush inside the damper varies according to the temperature. When the temperature returns to normal, the damper characteristics will return to normal as well.



- Speed characteristics**
The speed characteristics of a friction-type hinge damper are shown in the graph below. The damper torque is determined based on the speed characteristics at 2rpm.

(Measurement temperature : 25°C±2°C)
(Working angle : 90°)



New products

1 Soft Absorber

2 Rotary Damper

3 Magnum Series

4 Speed Controller

5 Helical Isolator

6 Model Selection Form

Friction Damper

Fixed Type

Bi-Directional

Adjustable type

Uni-Directional

Self-adjusting

FFD-25FS/FW/SS/SW Series

RoHS Compliant

●Products specification might be changed without notice.

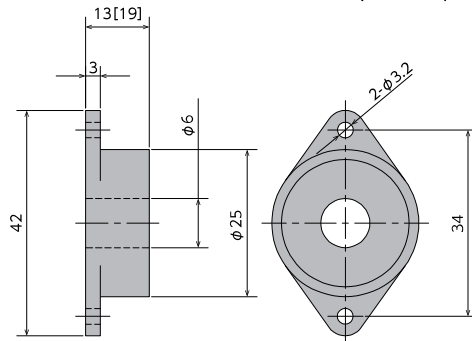


Specifications

Model	Max. torque	Max. reverse torque	Model	Max. torque	Max. reverse torque
FFD-25FS-R102	0.1±0.01 (N·m)	Clockwise	FFD-25SS-R102	0.1±0.01 (N·m)	Clockwise
FFD-25FS-L102	(1±0.1 kgf·cm)	Counter-clockwise	FFD-25SS-L102	(1±0.1 kgf·cm)	Counter-clockwise
FFD-25FS-R502	0.5±0.05 (N·m)	Clockwise	FFD-25SS-R502	0.5±0.05 (N·m)	Clockwise
FFD-25FS-L502	(5±0.5 kgf·cm)	Counter-clockwise	FFD-25SS-L502	(5±0.5 kgf·cm)	Counter-clockwise
FFD-25FS-R103	1±0.1 (N·m)	Clockwise	FFD-25SS-R103	1±0.1 (N·m)	Clockwise
FFD-25FS-L103	(10±1 kgf·cm)	Counter-clockwise	FFD-25SS-L103	(10±1 kgf·cm)	Counter-clockwise
FFD-25FW-R103	1±0.1 (N·m)	Clockwise	FFD-25SW-R103	1±0.1 (N·m)	Clockwise
FFD-25FW-L103	(10±1 kgf·cm)	Counter-clockwise	FFD-25SW-L103	(10±1 kgf·cm)	Counter-clockwise
FFD-25FW-R153	1.5±0.15 (N·m)	Clockwise	FFD-25SW-R153	1.5±0.15 (N·m)	Clockwise
FFD-25FW-L153	(15±1.5 kgf·cm)	Counter-clockwise	FFD-25SW-L153	(15±1.5 kgf·cm)	Counter-clockwise
FFD-25FW-R203	2±0.2 (N·m)	Clockwise	FFD-25SW-R203	2±0.2 (N·m)	Clockwise
FFD-25FW-L203	(20±2 kgf·cm)	Counter-clockwise	FFD-25SW-L203	(20±2 kgf·cm)	Counter-clockwise

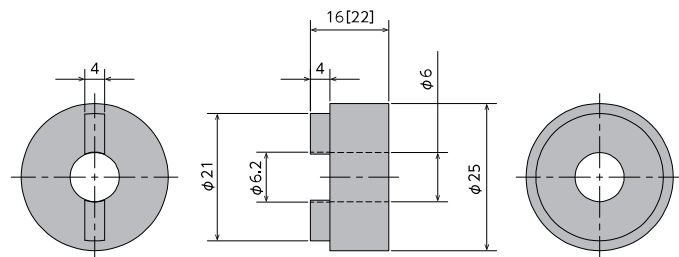
*) Rated torque is measured at a rotation speed of 20rpm at 20°25°C

*Max. rotation speed	30rpm	*Cap colour	R:Black L:White
*Max. cycle rate	13cycle/min	*Weight	FFD-25FS 13±2g
*Operating temperature	-10~60°C (90%RH)		FFD-25FW 24±2g
			FFD-25SS 12±2g
*Body and cap material	POM		FFD-25SW 23±2g



FFD-25FS-****

(Dimension of FFD-25FW-**** are in [])



FFD-25SS-****

(Dimension of FFD-25SW-**** are in [])

How to Use the Damper

- The damper generates torque in both the clockwise and counter-clockwise directions. (A one-way clutch is built inside the damper.)
- Please make sure that the shaft attached to a damper has a bearing, as the damper itself is not fitted with one.
- It can be used as a free-stop for a load that is smaller than the rated torque.
- Please refer to the recommended dimensions below when creating a shaft for attachment to the damper. Using a shaft outside of the recommended dimensions may cause the shaft to slip out.
- To insert a shaft into the damper, insert the shaft while spinning it in the opposite direction of the damper's direction of torque generation. (Do not force the shaft in from a regular direction. This may damage the built-in oneway clutch.)

Shaft's external dimensions	6.φ _{0.3}
Surface hardness	HRC55 or higher
Quenching depth	0.5mm or higher
Surface roughness	1.0Z or lower
Chamfer end (Damper insertion side)	

Friction Damper

Fixed Type Bi-Directional Adjustable type Uni-Directional Self-adjusting

FFD-28FS/FW/SS/SW Series

RoHS Compliant

●Products specification might be changed without notice.

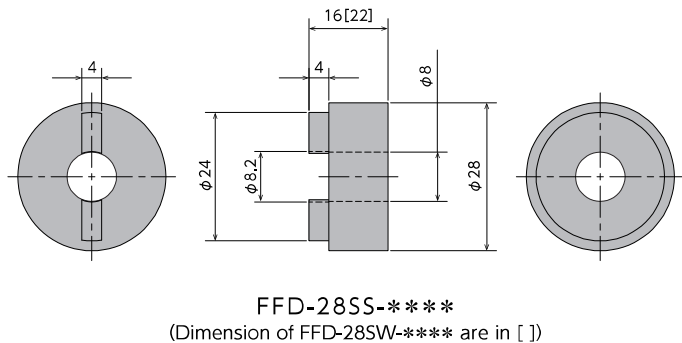
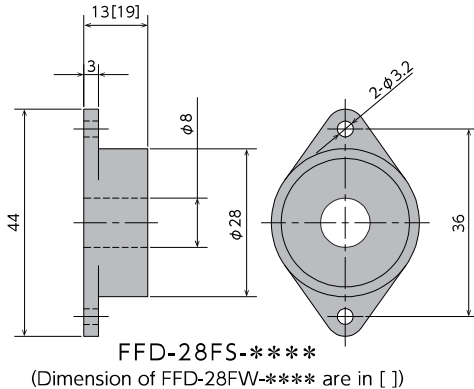


Specifications

Model	Max. torque	Max. reverse torque	Model	Max. torque	Max. reverse torque
FFD-28FS-R102	0.1±0.01 (N·m)	Clockwise	FFD-28SS-R102	0.1±0.01 (N·m)	Clockwise
FFD-28FS-L102	(1±0.1 kgf·cm)	Counter-clockwise	FFD-28SS-L102	(1±0.1 kgf·cm)	Counter-clockwise
FFD-28FS-R502	0.5±0.05 (N·m)	Clockwise	FFD-28SS-R502	0.5±0.05 (N·m)	Clockwise
FFD-28FS-L502	(5±0.5 kgf·cm)	Counter-clockwise	FFD-28SS-L502	(5±0.5 kgf·cm)	Counter-clockwise
FFD-28FS-R103	1±0.1 (N·m)	Clockwise	FFD-28SS-R103	1±0.1 (N·m)	Clockwise
FFD-28FS-L103	(10±1 kgf·cm)	Counter-clockwise	FFD-28SS-L103	(10±1 kgf·cm)	Counter-clockwise
FFD-28FW-R103	1±0.1 (N·m)	Clockwise	FFD-28SW-R103	1±0.1 (N·m)	Clockwise
FFD-28FW-L103	(10±1 kgf·cm)	Counter-clockwise	FFD-28SW-L103	(10±1 kgf·cm)	Counter-clockwise
FFD-28FW-R153	1.5±0.15 (N·m)	Clockwise	FFD-28SW-R153	1.5±0.15 (N·m)	Clockwise
FFD-28FW-L153	(15±1.5 kgf·cm)	Counter-clockwise	FFD-28SW-L153	(15±1.5 kgf·cm)	Counter-clockwise
FFD-28FW-R203	2±0.2 (N·m)	Clockwise	FFD-28SW-R203	2±0.2 (N·m)	Clockwise
FFD-28FW-L203	(20±2 kgf·cm)	Counter-clockwise	FFD-28SW-L203	(20±2 kgf·cm)	Counter-clockwise

*) Rated torque is measured at a rotation speed of 20rpm at 20°25°C

* Max. rotation speed	30rpm	* Cap colour	R:Black L:White
* Max. cycle rate	13cycle/min	* Weight	FFD-28FS 14 ± 2g
* Operating temperature	-10 ~ 60°C (90%RH)		FFD-28FW 27 ± 2g
			FFD-28SS 14 ± 2g
* Body and cap material	POM		FFD-28SW 25 ± 2g



How to Use the Damper

- The damper generates torque in both the clockwise and counter-clockwise directions. (A one-way clutch is built in inside the damper.)
- Please make sure that the shaft attached to a damper has a bearing, as the damper itself is not fitted with one.
- It can be used as a free-stop for a load that is smaller than the rated torque.
- Please refer to the recommended dimensions below when creating a shaft for attachment to the damper. Using a shaft outside of the recommended dimensions may cause the shaft to slip out.
- To insert a shaft into the damper, insert the shaft while spinning it in the opposite direction of the damper's direction of torque generation. (Do not force the shaft in from a regular direction. This may damage the built-in oneway clutch.)

Shaft's external dimensions	8-φ _{0.03}
Surface hardness	HRC55 or higher
Quenching depth	0.5mm or higher
Surface roughness	1.0Z or lower
Chamfer end (Damper insertion side)	 C0.2~C0.3 (orR0.2~R0.3)

New products

1 Soft Absorber

2 Rotary Damper

3 Magnum Series

4 Speed Controller

5 Helical Isolator

6 Model Selection Form

Friction Damper

Fixed Type

Bi-Directional

Adjustable type

Uni-Directional

Self-adjusting

FFD-30FS/FW/SS/SW Series

RoHS Compliant

●Products specification might be changed without notice.

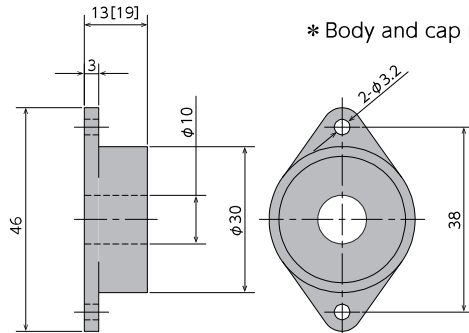


Specifications

Model	Max. torque	Max. reverse torque	Model	Max. torque	Max. reverse torque
FFD-30FS-R102	0.1±0.01 (N·m)	Clockwise	FFD-30SS-R102	0.1±0.01 (N·m)	Clockwise
FFD-30FS-L102	(1±0.1 kgf·cm)	Counter-clockwise	FFD-30SS-L102	(1±0.1 kgf·cm)	Counter-clockwise
FFD-30FS-R502	0.5±0.05 (N·m)	Clockwise	FFD-30SS-R502	0.5±0.05 (N·m)	Clockwise
FFD-30FS-L502	(5±0.5 kgf·cm)	Counter-clockwise	FFD-30SS-L502	(5±0.5 kgf·cm)	Counter-clockwise
FFD-30FS-R103	1±0.1 (N·m)	Clockwise	FFD-30SS-R103	1±0.1 (N·m)	Clockwise
FFD-30FS-L103	(10±1 kgf·cm)	Counter-clockwise	FFD-30SS-L103	(10±1 kgf·cm)	Counter-clockwise
FFD-30FS-R153	1.5±0.15 (N·m)	Clockwise	FFD-30SS-R153	1.5±0.15 (N·m)	Clockwise
FFD-30FS-L153	(15±1.5 kgf·cm)	Counter-clockwise	FFD-30SS-L153	(15±1.5 kgf·cm)	Counter-clockwise
FFD-30FW-R153	1.5±0.15 (N·m)	Clockwise	FFD-30SW-R153	1.5±0.15 (N·m)	Clockwise
FFD-30FW-L153	(15±1.5 kgf·cm)	Counter-clockwise	FFD-30SW-L153	(15±1.5 kgf·cm)	Counter-clockwise
FFD-30FW-R203	2±0.2 (N·m)	Clockwise	FFD-30SW-R203	2±0.2 (N·m)	Clockwise
FFD-30FW-L203	(20±2 kgf·cm)	Counter-clockwise	FFD-30SW-L203	(20±2 kgf·cm)	Counter-clockwise
FFD-30FW-R253	2.5±0.25 (N·m)	Clockwise	FFD-30SW-R253	2.5±0.25 (N·m)	Clockwise
FFD-30FW-L253	(25±2.5 kgf·cm)	Counter-clockwise	FFD-30SW-L253	(25±2.5 kgf·cm)	Counter-clockwise
FFD-30FW-R303	3±0.3 (N·m)	Clockwise	FFD-30SW-R303	3±0.3 (N·m)	Clockwise
FFD-30FW-L303	(30±3 kgf·cm)	Counter-clockwise	FFD-30SW-L303	(30±3 kgf·cm)	Counter-clockwise

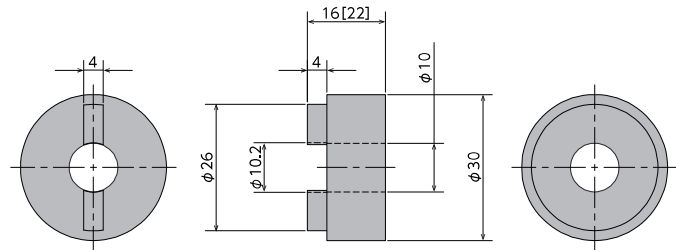
*) Rated torque is measured at a rotation speed of 20rpm at 20°25°C

* Max. rotation speed	30rpm	* Cap colour	R:Black L:White
* Max. cycle rate	13cycle/min	* Weight	FFD-30FS 17 ± 2g
* Operating temperature	- 10 ~ 60°C (90%RH)		FFD-30FW 31 ± 2g
			FFD-30SS 16 ± 2g
* Body and cap material	POM		FFD-30SW 30 ± 2g



FFD-30FS-****

(Dimension of FFD-30FW-**** are in [])



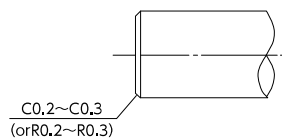
FFD-30SS-****

(Dimension of FFD-30SW-**** are in [])

How to Use the Damper

- The damper generates torque in both the clockwise and counter-clockwise directions. (A one-way clutch is built inside the damper.)
- Please make sure that the shaft attached to a damper has a bearing, as the damper itself is not fitted with one.
- It can be used as a free-stop for a load that is smaller than the rated torque.
- Please refer to the recommended dimensions below when creating a shaft for attachment to the damper. Using a shaft outside of the recommended dimensions may cause the shaft to slip out.

Shaft's external dimensions	$\phi 10_{-0.03}^{0.0}$
Surface hardness	HRC55 or higher
Quenching depth	0.5mm or higher
Surface roughness	1.0Z or lower

Chamfer end
(Damper insertion side)

- To insert a shaft into the damper, insert the shaft while spinning it in the opposite direction of the damper's direction of torque generation. (Do not force the shaft in from a regular direction. This may damage the built-in oneway clutch.)