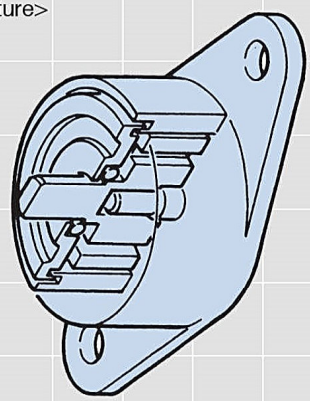
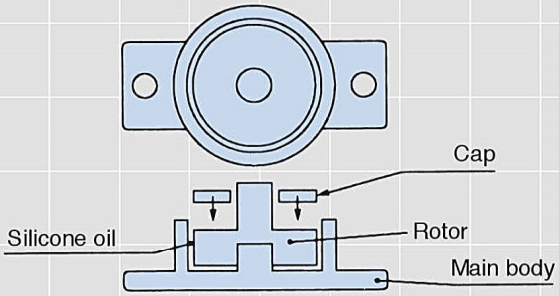
TK Dampers

Basic Structure and Principle

1. Rotary Damper

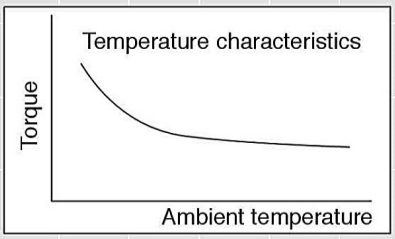
<Basic structure>



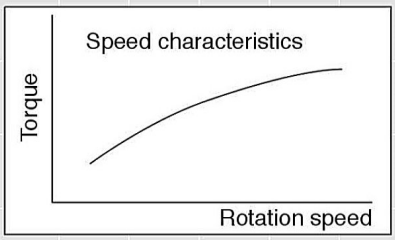


This is a rotary damper that utilizes the braking force generated by the oil's viscosity resistence. The braking force generated by oil viscosity, clearance between the rotor and the main body, and the oil's contact area varies based on the structure shown above.

1-1) Temperature characteristics
The torque of a rotary damper varies according to the ambient temperature. This is because the viscosity of the oil inside the damper changes according to the temperature.

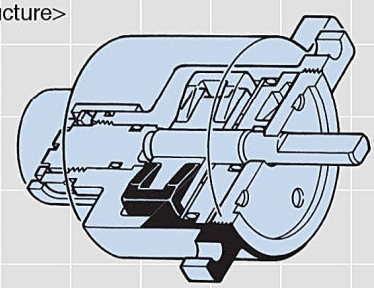


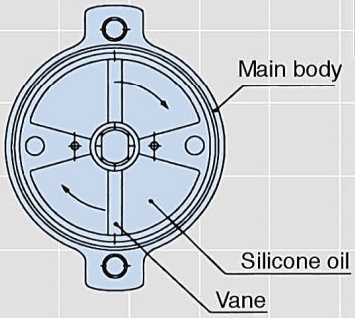
1-2) Speed characteristics
The braking torque of a rotary damper varies according to the cycle rate. In general, the torque increases when the cycle rate increases, and the torque decreases when the cycle rate decreases. The rated torque listed in the catalogue is the torque generated when the cycle rate is 20rpm.



2. Vane Damper

<Basic structure>

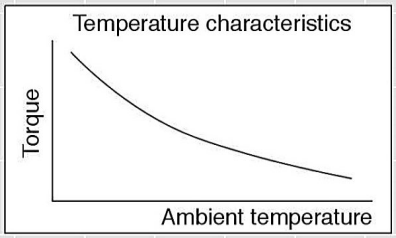


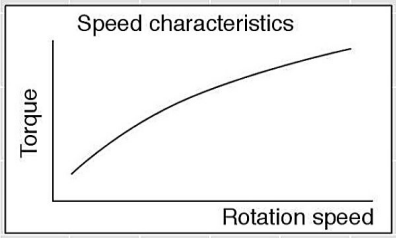


This is a rotating-type damper that utilizes the oil pressure. The braking force generated by oil viscosity, clearance between the rotor and the main body, and the vane's pressure-receiving area varies based on the structure shown above.

<Basic characteristics>

Similar to the rotary damper, the torque varies according to the ambient temperature. Its basic structure is a dashpot structure (single orifice). The internal pressure of a damper increases as the ratation speed increases, which consequently increases the torque.



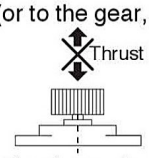


■Radial load to the shaft

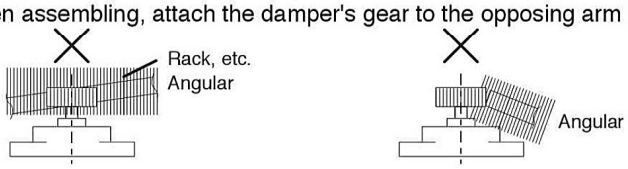
・Applying load to the rotating shaft (gear) in a radial direction may cause an oil leak, torque problems, and damage to the shaft (or to the gear if the gear is used).

■Thrust load to the shaft

・Applying load to the rotating shaft (gear) in a thrust direction may cause an oil leak, torque problems, and damage to the main unit (or to the gear, or cause the gear to become disengaged, if the gear is used).



★When assembling, attach the damper's gear to the opposing arm (gear) as parallel as possible.



■Using the product above its maximum rotations

・Using this product above its maximum rotations may cause an oil leak, torque problems, and damage to the rotating shaft.

★Please refer to the catalogue for the product's maximum rotations.

(*If you are going to exceed the maximum rotations when using this product, please contact our sales department.)

■Using the product outside its operating temperature range

・Using this product outside the operating temperature range may cause an oil leak and torque problems.

★Please refer to the catalogue for the product's operating temperature range.

(*If you are going to use this product outside its operating temperature range, please contact our sales department.)

■Using the product above its maximum cycles

・Using this product above its maximum cycles may cause torque down and an oil leak.

★Please refer to the catalogue for the product's maximum cycles.

(*If you are going to exceed the maximum rotations when using this product, please contact our sales department.)

■Over-tightening of mounting screws

・Over-tightening the mounting screws when installing a rotary damper may cause damage to the main unit.

★Based on the types and sizes of the screws used, please apply an appropriate tightening torque to tighten the screws.

TK is not responsible for any secondary accidents caused by a rotary damper.
The user should implement preventative measures against such secondary accidents.

Caution

Read these instructions before use

1. About these instructions

This manual contains various safety cautions regarding the proper handling of this product, and preventing danger to the operator as well as damage to the plant and the machine. Please read this manual thoroughly before using the product.

2. Definition of "Caution"

"Caution" applies to situations in which minor injuries or property damage may result if the operation or maintenance procedures are not strictly followed.

⚠ Caution

■Do not operate without sufficient mounting strength

- Operating with insufficient mounting strength may damage the main machine and cause injuries.
- Ensure sufficient mounting strength of load torque x safety factor

■Do not operate without an external stopper

- Use within the damper's range of operating angle. Do not use the damper itself as a stopper by setting the rotational limit position of the rotating shaft as the resting position of the rotating object. Using the damper itself as a stopper may damage the damper and consequently damage the main machine, and it may also result in injuries.
- Set the external stopper to the operating angle before use.

■Do not use when the maximum operating torque is exceeded

- Using this product beyond the maximum operating torque may cause an oil leak, reduced durability, and damage to the shaft. This may damage the damper and consequently damage the main machine, and it may also result in injuries. Do not exceed the maximum operating torque when using this product.

■Do not operate outside the operating temperature range

- Using this product outside the operating temperature range may cause an oil leak and torque problems. Use this product within the operating temperature range.

■Usage enviornment

- This product cannot be used in a vaccum or under high pressure, as this will cause damage to the main machine.
- Do not use in an environment where chips, cutting oil, water, etc. can come in contact with the linear damper. This will result in a malfunction due to an oil leak caused by damage.

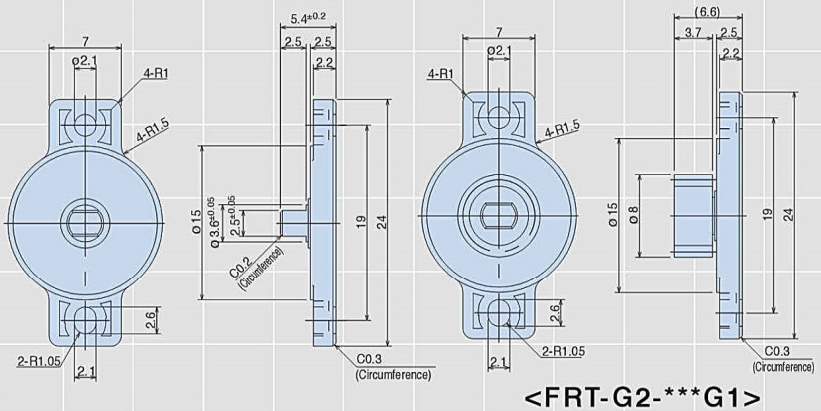
■Do not discard oil more than is necesssary

- Discarding the oil contained in dampers more than is necessary will pollute the environment.
- Dispose the oil according to laws concerning waste management and cleaning.

FRT-G2 Series

RoHS Compliant

Rotary Damper [Bi-Directional] Fixed



<FRT-G2-***G1>

<Specifications>

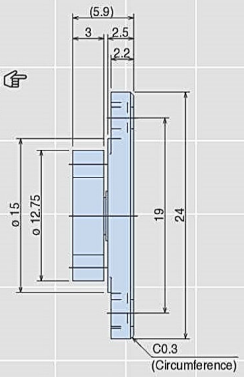
Model	Rated torque
FRT-G2-200(G*)	(2±0.7)X10⁻³ N·m (20±7 gf·cm)
FRT-G2-300(G*)	(3±0.8)X10⁻³ N·m (30±8 gf·cm)
FRT-G2-450(G*)	(4.5±1)X10⁻³ N·m (45±10 gf·cm)
FRT-G2-600(G*)	(6±1.2)X10⁻³ N·m (60±12 gf·cm)
FRT-G2-101(G*)	(10±2)X10⁻³ N·m (100±20 gf·cm)

*Max. rotation speed	50rpm
*Max. cycle rate	10 cycle/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

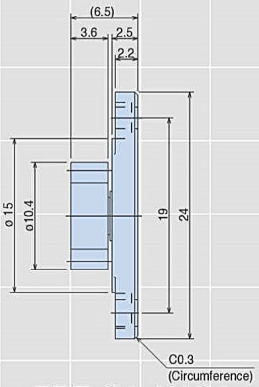
Note 1) Rated torque measured at a rotation speed of 20rpm at 23°C
Note 2) Models with gear bears G1, G2, or G3 at the end of their model numbers
Note 3) Torque can be customized by changing the oil viscosity (see Customizable Torque Chart on page 57) ☞
Note 4) The diagrams above are outline drawings 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	ø7	ø10	ø8.8
Addendum modification coefficient	–	+0.375	–



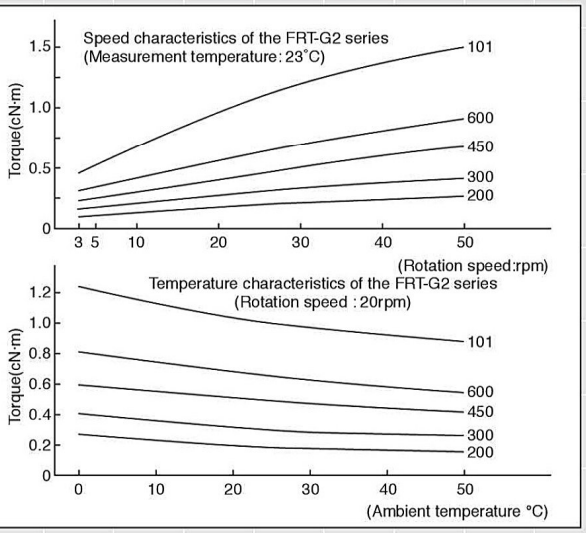
<FRT-G2-***G2>



<FRT-G2-***G3>

Damper Characteristics

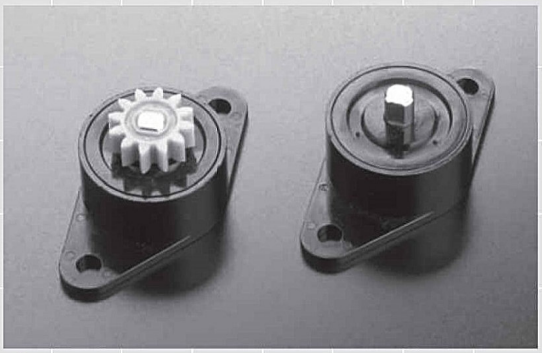
1. Speed characteristics
   A rotary damper's torque varies according to the rotation speed. In general, as shown in the graph to the right, the torque increases as the rotation speed increases, and the torque decreases as the rotation speed decreases. In addition, please note that the starting torque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

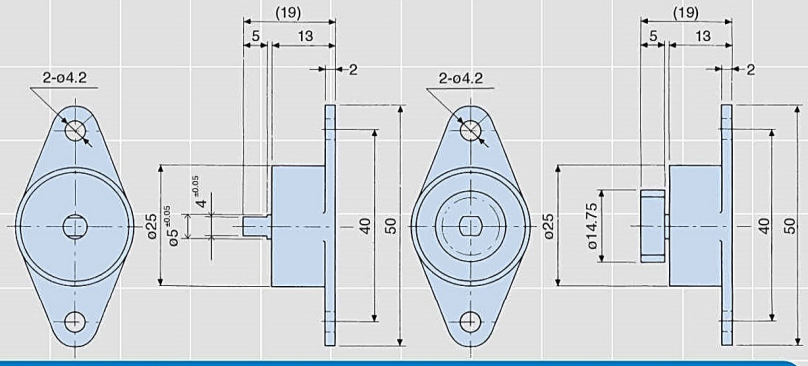


FRT/FRN-D2 Series

RoHS Compliant

Rotary Damper [Bi-Directional] [Uni-Directional] Fixed





<Specifications>

Model	Rated torque	Damping direction
FRT-D2-501(G2)	(50±10)X10⁻³ N·m (500±100 gf·cm)	Both directions
FRT-D2-102(G2)	(100±20)X10⁻³ N·m (1000±200 gf·cm)	Both directions
FRT-D2-152(G2)	(150±30)X10⁻³ N·m (1500±300 gf·cm)	Both directions
FRN-D2-R501(G2)	(50±10)X10⁻³ N·m (500±100 gf·cm)	Clockwise
FRN-D2-L501(G2)		Counter-clockwise
FRN-D2-R102(G2)	(100±20)X10⁻³ N·m (1000±200 gf·cm)	Clockwise
FRN-D2-L102(G2)		Counter-clockwise
FRN-D2-R152(G2)	(150±30)X10⁻³ N·m (1500±300 gf·cm)	Clockwise
FRN-D2-L152(G2)		Counter-clockwise

*Max. rotation speed	50rpm
*Max. cycle rate	10 cycle/min
*Operating temperature	0~50°C
*Weight	FRT-D2 : 8.3g, FRN-D2 : 11.8g (with gear : +0.6g)
*Body and cap material	Polycarbonate (PC)
*Rotating shaft material	Polyacetal, metal (FRT: POM, FRN: SUS)
*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 G2 at the end
Note 3) Torque can be customized by changing the oil viscosity (see Customizable Torque Chart on page 57)

Gear Specifications

Type	Profile shifted spur gear
Tooth profile	Involute
Module	1.0
Pressure angle	20°
Number of teeth	12
Pitch circle diameter	ø12
Addendum modification coefficient	+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.
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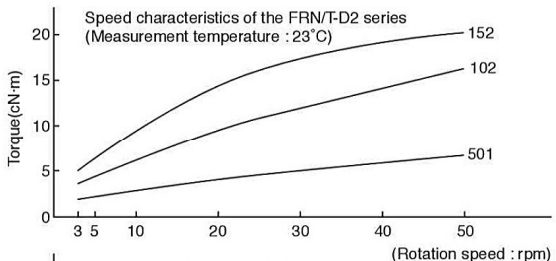
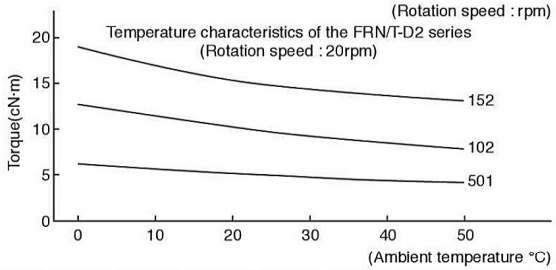
   A rotary damper's torque varies according to the ambient temperature. In addition, as shown in the graph to the right, the torque decreases as the ambient temperature increases, and the torque increases as the ambient temperature decreases. This is because the viscosity of the silicone oil inside the damper varies according to the temperature. When the temperature returns to normal, the torque will return to normal as well.





FDT-57A/FDN-57A Series

RoHS Compliant

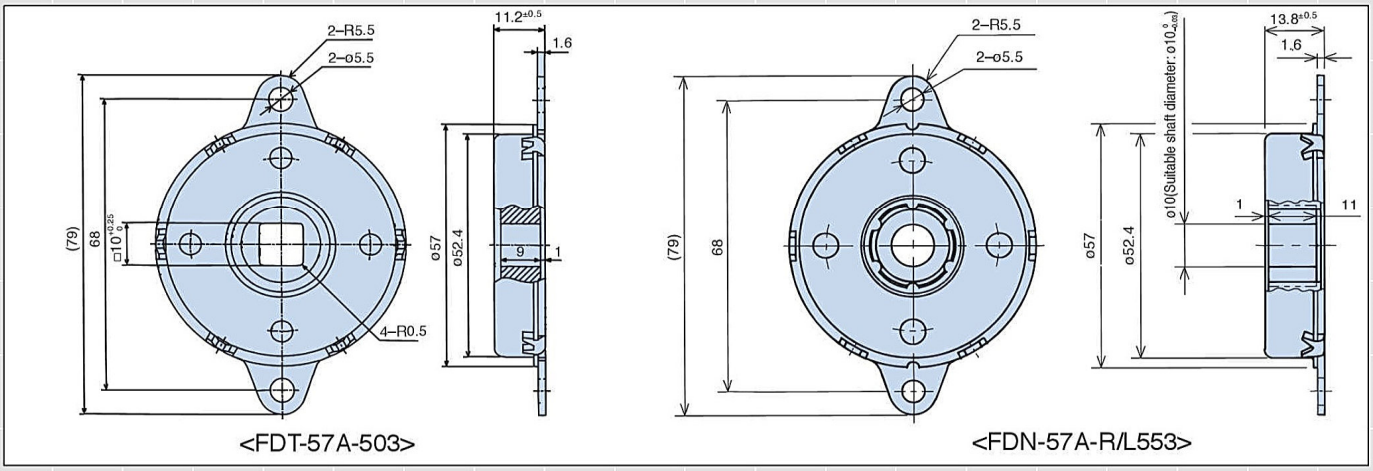
Disk Damper [Bi-Directional] [Uni-Directional] Fixed

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

<Specifications>

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

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

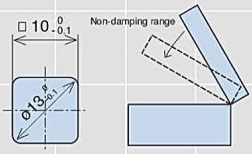


How to Use the Damper

1. Dampers may generate torque in both directions, clockwise, or counter-clockwise.
2. Please make sure that a shaft attached to a damper has a bearing, as the damper itself is not fitted with one.
3. 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	ø10 0 -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 (or R0.2~R0.3)

4. 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 in from the regular direction. This may damage the one-way clutch.)
5. 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.

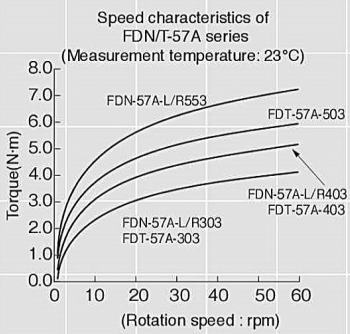


<Recommended dimensions for the corresponding shaft>

Damper Characteristics

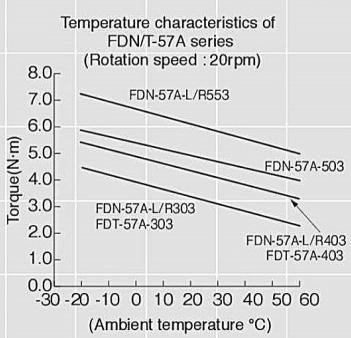
1. Speed characteristics

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.



FDT-63A/FDN-63A Series

RoHS Compliant

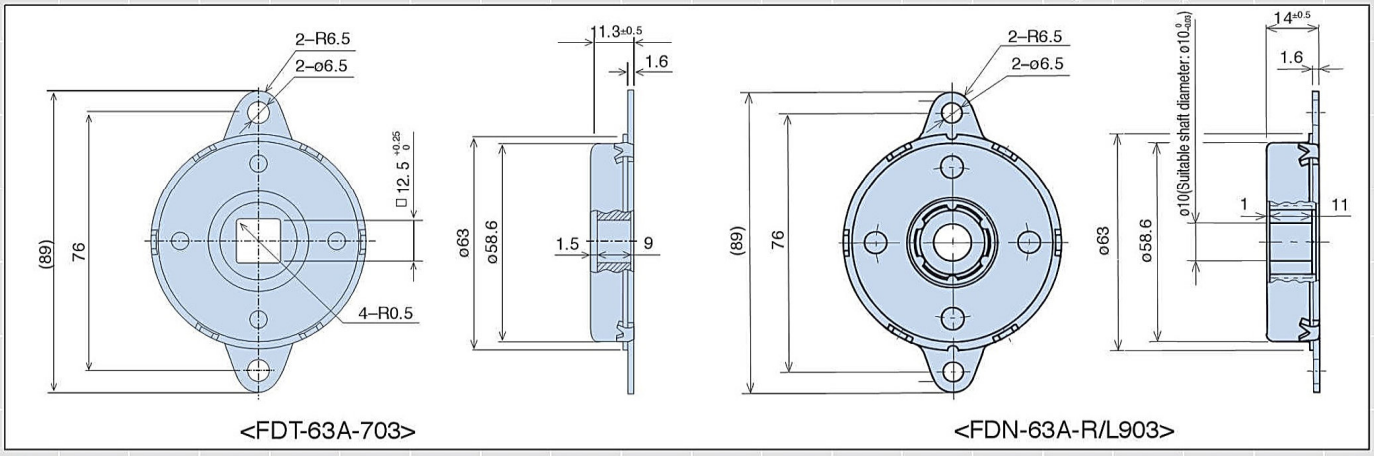
Disk Damper [Bi-Directional] [Uni-Directional] Fixed

∗Max. rotation speed	50rpm
∗Max. cycle rate	12 cycle/min
∗Operating temperature	–10～50˚C
∗Weight	FDT-63A : 92g, FDN-63A : 115g
∗Main body material	Iron (SPFC)
∗Rotor (shaft) material	Nylon (with glass)
∗Oil type	Silicone oil

<Specifications>

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

Note) Rated torque is measured at a rotation speed of 20rpm at 23°C±3°C
63B has a slotted rotating shaft opening



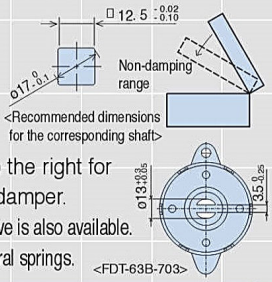
<FDT-63A-703> <FDN-63A-R/L903>

How to Use the Damper

1. Dampers may generate torque in both directions, clockwise, or counter-clockwise.
2. Please make sure that a shaft attached to a damper has a bearing, as the damper itself is not fitted with one.
3. 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.

Shaft's external dimensions	ø10 0 –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 (or R0.2–R0.3)

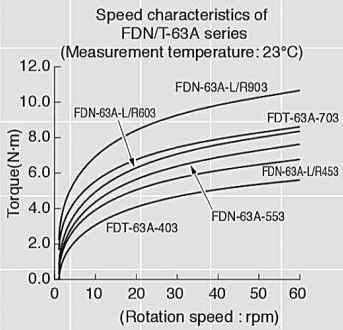
4. To insert a shaft into FDN-63A, insert the shaft while spinning it in the idling direction of the one-way clutch. (Do not force the shaft in from the regular direction. This may damage the one-way clutch.)
5. When using FDT-63A, please ensure that a shaft with specified angular dimensions is inserted 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.
6. A damper shaft connecting to a part with slotted groove is also available. The slotted groove type is excellent for usage with spiral springs.



Damper Characteristics

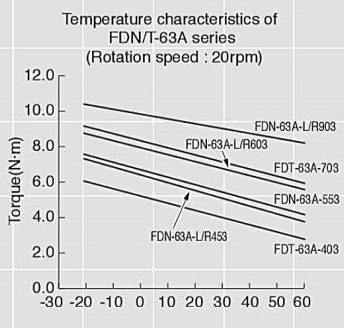
1. Speed characteristics

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.



FYN-N1 Series

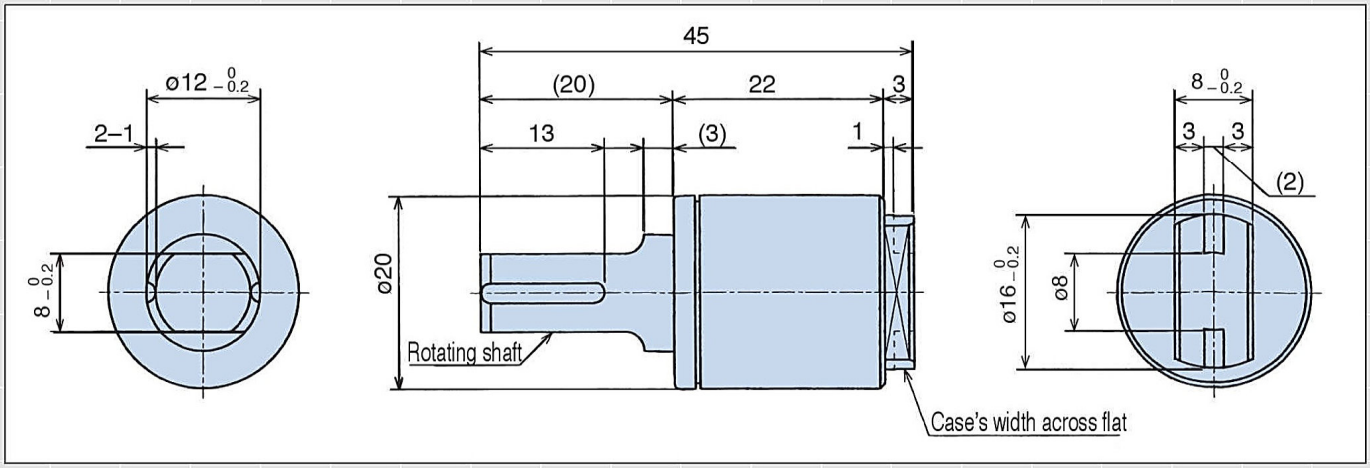
Vane Damper [Uni-Directional] Fixed

<Specifications>

Model	Max. torque	Reverse torque	Damping direction
FYN-N1-R103	1 N·m (10kgf·cm)	0.2 N·m (2kgf·cm)	Clockwise
FYN-N1-L103			Counter-clockwise
FYN-N1-R203	2 N·m (20kgf·cm)	0.4 N·m (4kgf·cm)	Clockwise
FYN-N1-L203			Counter-clockwise
FYN-N1-R303	3 N·m (30kgf·cm)	0.8 N·m (8kgf·cm)	Clockwise
FYN-N1-L303			Counter-clockwise

Note) Measured at 23°C±2°C

*Max. angle	110°
*Operating temperature	–5~50°C
*Weight	12±1g
*Body and cap material	Polybutylene terephthalate (PBT)
*Rotating shaft material	Polyphenylene Sulphide (PPS)
*Oil type	Silicone oil



How to Use the Damper

1. FYN-N1 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.

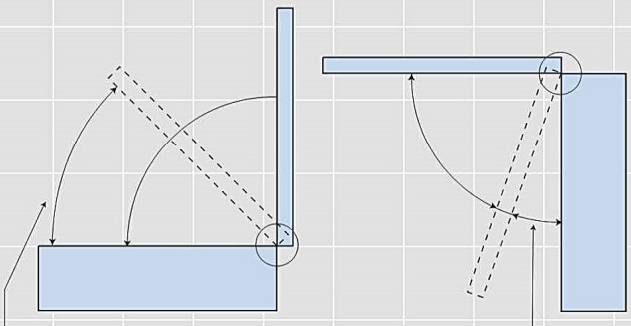


Diagram A

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

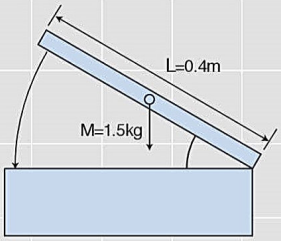
Diagram B

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

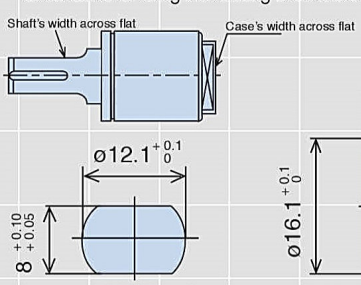
2. When using a damper on a lid, such as the one shown in the diagram, use the following selection calculation to determine the damper torque.

Example) Lid mass M : 1.5 kg
Lid dimensions L : 0.4m
Load torque : T=1.5X0.4X9.8÷2
=2.94N·m

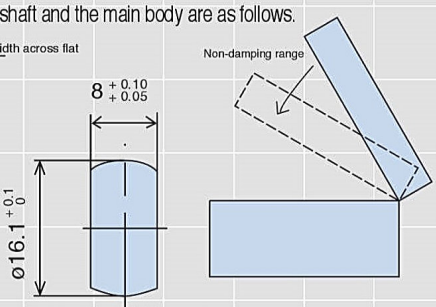
Based on the above calculation, FYN-N1-*303 is selected.



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.



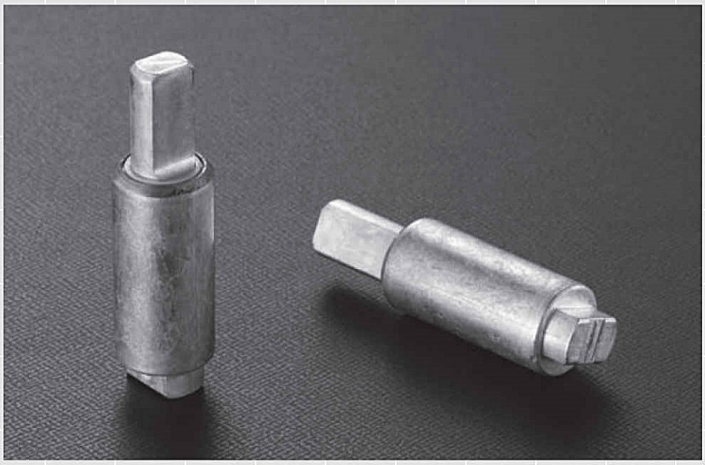
<Recommended dimensions for mounting a rotating shaft>



<Recommended dimensions for mounting the main body>

FYN-U1 Series

Vane Damper [Uni-Directional] Fixed

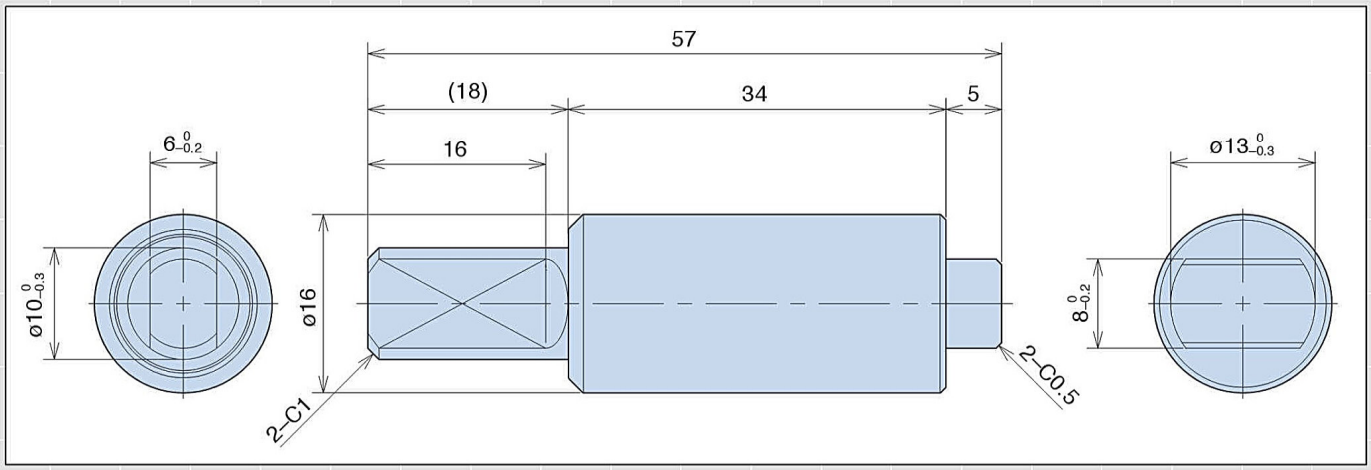


<Specifications>

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

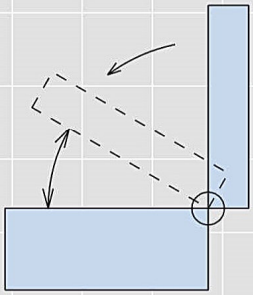


Diagram A

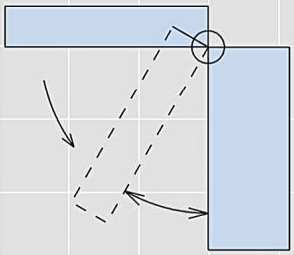


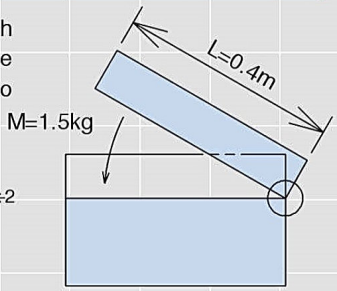
Diagram B

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

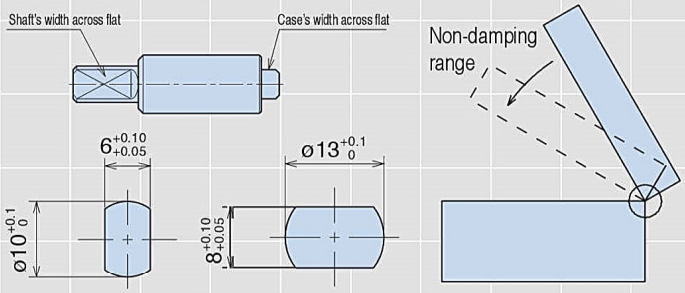
2. When using a damper on a lid, such as the one shown in the diagram, use the following selection calculation to determine the damper torque.

Example) Lid mass M : 1.5 kg
Lid dimensions L : 0.4m
Load torque : T=1.5X0.4X9.8÷2
=2.94N·m

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



3. When connecting the rotating shaft to the 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.



Caution

Read these instructions before use

1. Definition of Warning

"Warning" applies to situations in which death or serious injuries may occur to the user, etc. if the potential dangers of the products are not avoided.

2. Definition of "Caution"

"Caution" applies to situations in which minor injuries or property damage may result if the operation or maintenance procedures are not strictly followed.

⚠ Warning

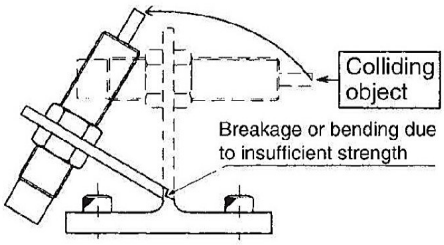
■Do not throw into a fire

- As the products contain oil, throwing them into a fire may cause them to ignite, resulting in injuries.
- Do not throw them into fire.

⚠ Caution

■Do not operate without sufficient mounting strength

- Operating with insufficient mounting strength may damage the main machine and cause injuries.
- Ensure sufficient mounting strength of maximum drag x safety factor (Regarding maximum drag, please refer to the catalogue or contact our sales department.)



■Do not operate without an external stopper

- Without an external stopper, the main machine may become damaged due to bottoming (Note 1).
- Ensure that an external stopper is set in the prescribed location for each type before operating the product. (For the locations of external stoppers, please refer to the catalogue or to the owner's manual.)

■Do not attach using incorrect tightening torque

- Using an incorrect tightening torque when attaching may cause operational failure and damage to the main machine.
- When tightening an attachment screw for a soft absorber, please use the tightening torque as listed below.

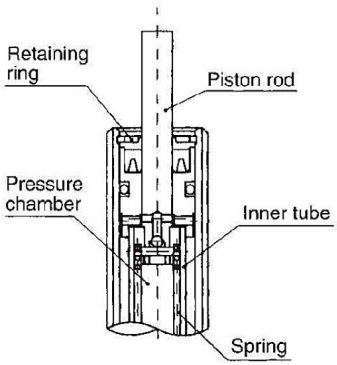
External diameter of the screw (mm)	M4X0.5	M6X0.75	M8X0.75	M10X1	M12X1 M12X1.75	M14X1.5 M14X2.0	M16X1.5 M16X2.0	M20X1.5	M25X1.5 M25X2	M27X1.5 M27X3	M30X1.5	M36X1.5	M42X1.5
Tightening torque for the bolt (N·m)	0.35	0.85	3.9	7.8	7.8	9.8	14.7	29.4	49	58.8	78.4	98	392

* Using an adhesive is an effective way to prevent loosening.
*Tightening torque: 1.5Nm (excluding FA-1212C)

■Dislodged retaining ring

- Failure to adhere to the specifications listed in the catalogue may cause the internal pressure of the inner tube to raise to a dangerous level where the retaining ring may become dislodged and interior parts may shoot out, causing injuries.
- Do not bring your face close to a soft absorber that has a retaining ring while it is operating.

■Do not discard oil more than is necessary

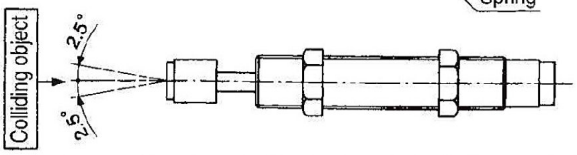


- Discarding the oil contained in soft absorbers more than is necessary will pollute the environment.
- Dispose the oil according to laws concerning waste management and cleaning.

■Scattering pieces due to cap damage

- Failure to adhere to the specifications listed in the catalogue may cause the cap to break, resulting in scattering pieces that may cause injuries.
- Please install an anti-scattering cover.

■Eccentric load and eccentric angle



- When a load collides at an eccentric angle of ±2.5° or larger, recovery failure due to a bent piston rod and performance degradation due to eccentric friction on the sliding part may occur, causing damage to the main machine.
- Please ensure that it collides along the midline of the piston rod. (If the eccentric angle is going to exceed ±2.5° when using this product, please contact our sales department.)

■Operating temperature

- When using a soft absorber, ensure that it is used within the operating temperature.
- Failure to do so will have adverse effects on the packing and accumulator that will reduce the product life, which may damage the main machine. (For the appropriate operating temperature, please refer to the catalogue or to the owner's manual.)

■Usage environment

- This product cannot be used in a vacuum or under high pressure, as this will cause damage to the main machine.
- Do not use in an environment where chips, cutting oil, water, etc. can come in contact with the piston rod. This will damage the packing, resulting in oil leakage, which leads to operational failure and damage to the main machine.

Note1) Effective force occurring in mechanical collisions at stroke end

TK is not responsible for any secondary accidents caused by a soft absorber.
The following are two examples of such secondary accidents caused by a soft absorber:
(Example 1) An overload causes the piston rod to break, resulting in a facial injury. Countermeasure – install a cover.
(Example 2) The drag causes the cap to break. The cap then gets lodged inside the machine, damaging it. Countermeasure – install a tray, etc. under the soft absorber.
The user should implement preventative measures against such secondary accidents.

FPD-1012 Series

U Packing Seal Type, Single Orifice Structure, Fixed

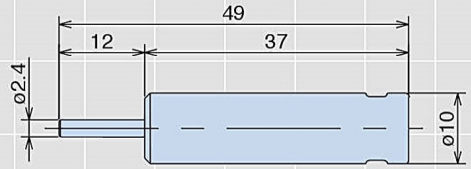
Model Description

F P D – 1 0 1 2 A 1 – S B

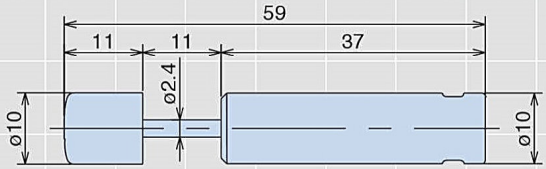
① ② ③ ④ ⑤

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

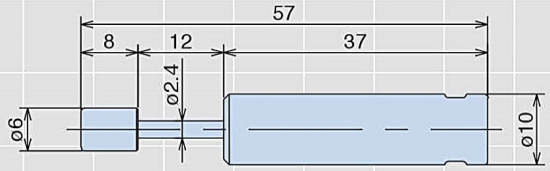
<External Dimensions>



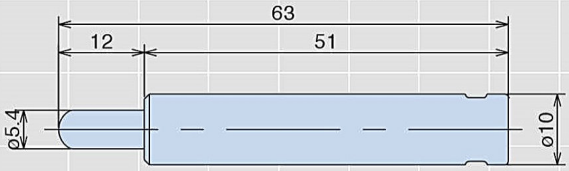
FPD-1012A1-S (S type)



FPD-1012A1-R (R type)



FPD-1012A1-C (C type)



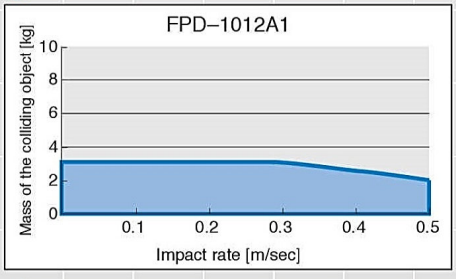
FPD-1012A1-D (D type)

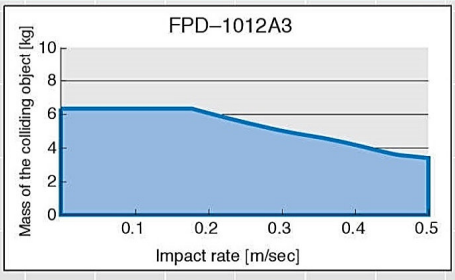
<Specifications>

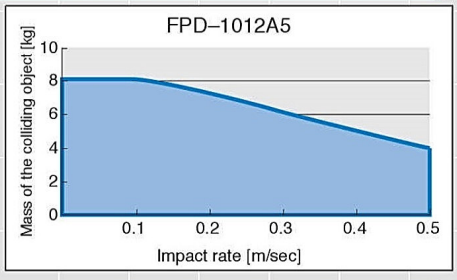
Model	Load [kg]	Max. absorption energy [J (kgf·m)]	Speed range [m/s]	Cylinder cap colour
FPD-1012A1	1	0.5 (0.05)	0.5 or lower	Black
FPD-1012A3	3	0.8 (0.08)	0.5 or lower	White
FPD-1012A5	5	1.0 (0.10)	0.5 or lower	Blue

*Please refer to next page for motion time at each load.

<Impact rate and mass of the colliding object in freefall>





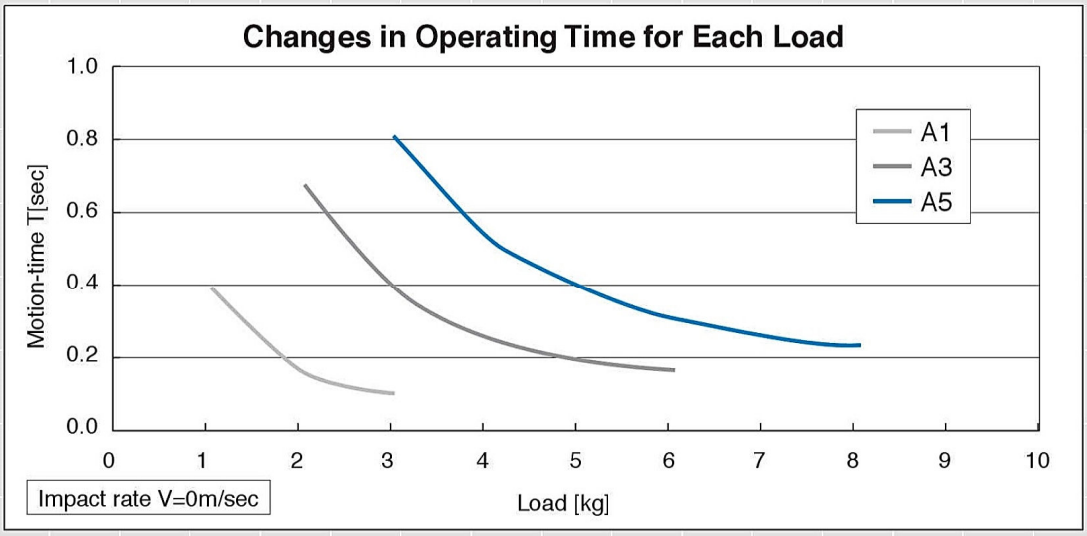


<Common Specifications>

Stroke (S/C/D type)	mm	12	Mass	g	S type=4.5g, C type=5.0g, R type=5.7g, D type=6.0g
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°C

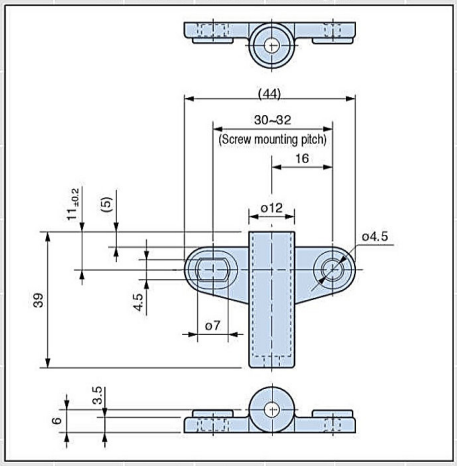
RoHS Compliant

<Characteristics Graph>



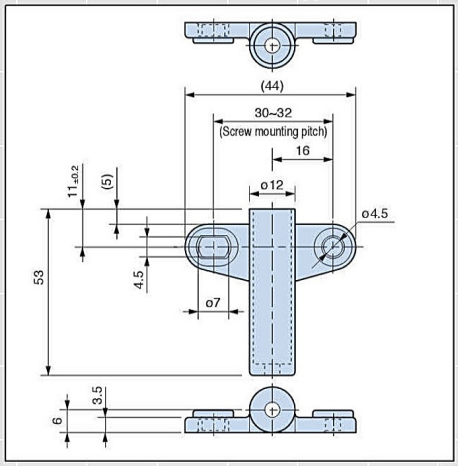
<Optional Parts>

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



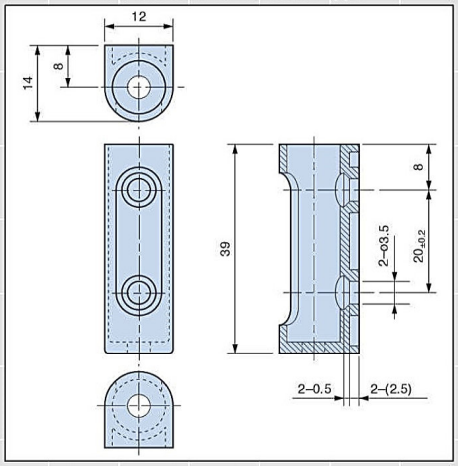
Screw: M4 (Truss screw)
Recommended tightening torque : 0.5N·m

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

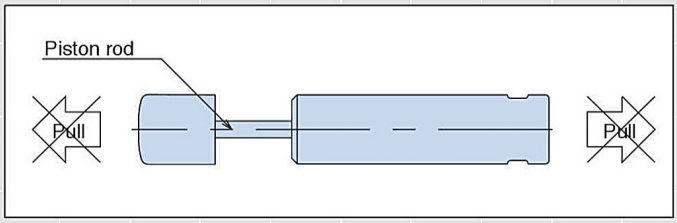


Screw: M3 (Flat head screw)
Recommended tightening torque : 0.3N·m

*These adaptors are dedicated for FPD-1012A series
*They make it easy to install absorbers.
*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 soft absorber.
  - S/C/R type ··· Allowable eccentric angle: ±2.5° or less
  - D type ····· Allowable eccentric angle: ±6° or less



* Do not pull the piston rod of the soft absorber.
  (This will cause air to get inside the soft absorber, causing ineffective stroke, abnormal sounds, and other damage to the soft absorber.)

*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.

FPD-1070/1060/1050/1030 Series

U-Packing Seal Type Fixed

Model Description

F P D – 1 0 7 0 B 1 – S W

① ② ③ ④ ⑤

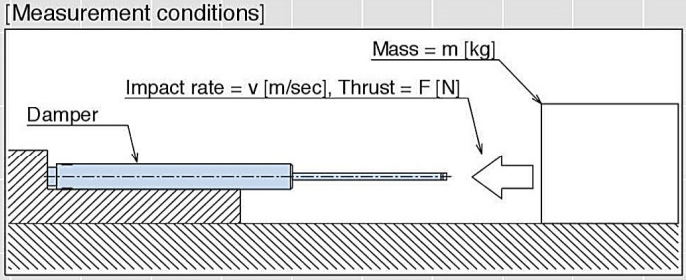
①Base model
②External diameter, stroke
③Self-return presence A:With returning spring
B:Without returning spring
④Symbols indicating characteristics
1: Low load (low thrust) specifications
2: Medium load (medium thrust) specifications
3: High load (high thrust) specifications
⑤Symbols indicating shape SW: Without cap
CW: With cap

<Motion performance>

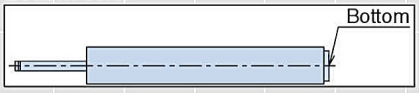
Model	Load [kg]	Thrust [N]	Impact rate [m/sec]	Motion time [sec]	Recovering power of the piston rod [N]	Bottom color *
FPD-1070B1-□W	10	5	0.5	0.3~2.0	1.5 or less	Black
FPD-1070B2-□W	15	8	0.5	0.4~2.2	1.5 or less	White
FPD-1070B3-□W	15	13	0.5	0.5~2.5	1.5 or less	Gray
FPD-1060A1-□W	10	8	0.5	0.3~2.0	6.0 or less	Black
FPD-1060A2-□W	10	10	0.5	0.4~2.2	6.0 or less	White
FPD-1060A3-□W	10	15	0.5	0.5~2.5	6.0 or less	Gray
FPD-1050A1-□W	10	8	0.5	0.3~2.0	6.0 or less	Black
FPD-1050A2-□W	10	10	0.5	0.4~2.2	6.0 or less	White
FPD-1050A3-□W	10	15	0.5	0.5~2.5	6.0 or less	Gray
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	Gray
FPD-1030A1-□W	10	6	0.3	0.2~1.5	5.0 or less	Black
FPD-1030A2-□W	10	8	0.3	0.2~1.5	5.0 or less	White
FPD-1030A3-□W	10	13	0.3	0.3~1.6	5.0 or less	Gray
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	Gray

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 *

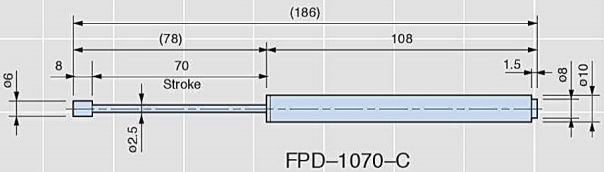


<Specifications>

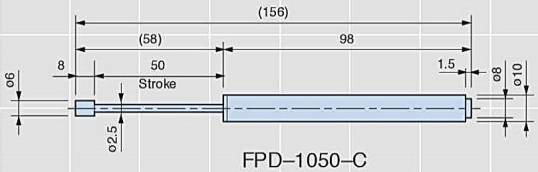
Stroke [mm]	FPD-1070=70mm, FPD-1060=60mm, FPD-1050=50mm, FPD-1030=30mm
External diameter [mm]	ø10
Mass [g]	FPD-1070-SW=13.5g, FPD-1070-CW=14g, FPD-1060-SW=13.5g, FPD-1060-CW=14g FPD-1050-SW=12g, FPD-1050-CW=12.5g, FPD-1030-SW=8g, FPD-1030-CW=8.5g
Main unit material	Resin
Operating temperature [°C]	5~40

RoHS Compliant

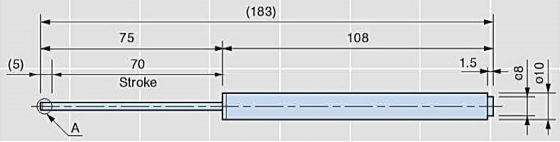
<External dimensions>



FPD–1070–C



FPD–1050–C



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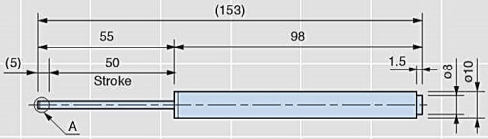

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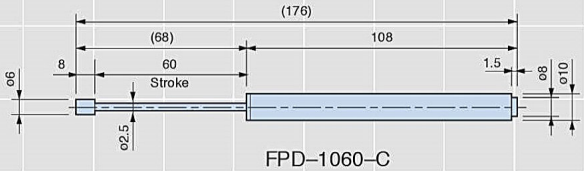

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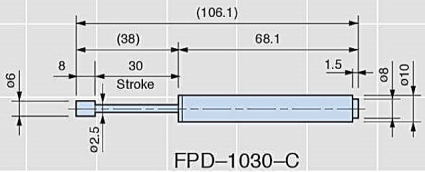
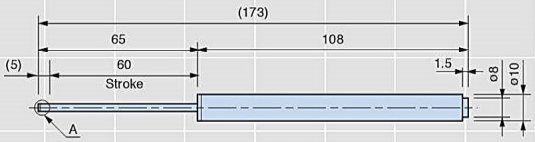


FPD–1030–C



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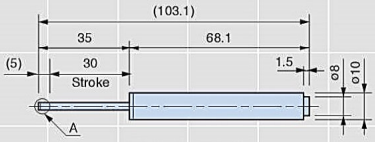
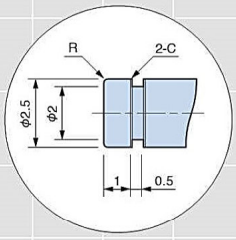


FPD–1030–S

Close up to A



*The FPD-1070B series can be sold only without the spring.
*The FPD-1060A series can be sold only with the spring.
*E-type retaining ring (nominal 2) can be attached to top of S type (A in above drawing).

<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 soft absorber.
*Do not pull the piston rod of the soft absorber more than stroke.
(This will cause air to get inside the soft absorber, causing ineffective stroke, abnormal sounds, and other damage to the soft absorber.)
*Do not push the piston rod of the soft absorber more than stroke.
*(This will cause recovery failure and other damage to the soft absorber.)