

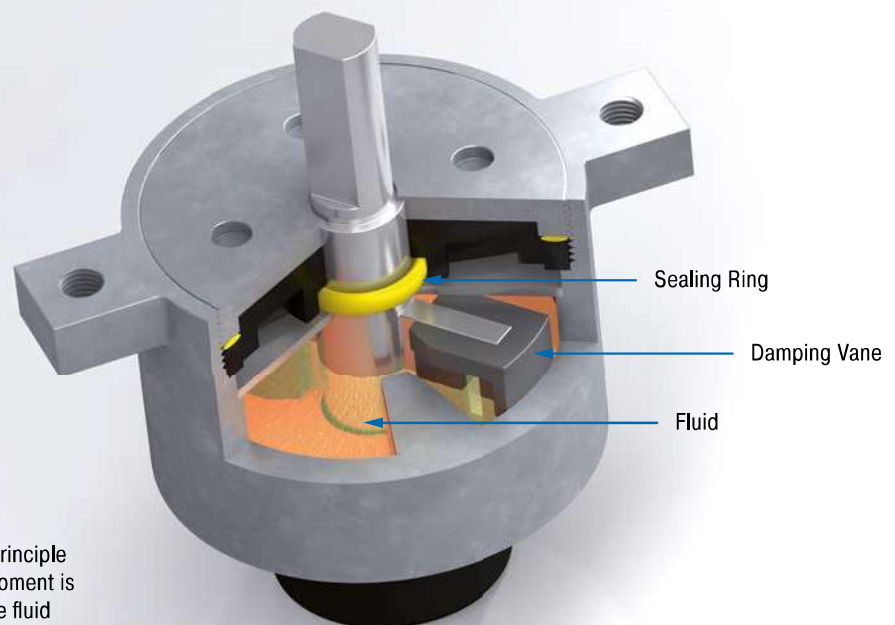
# Rotary Dampers

## Small dampers refine end product

**ACE rotary dampers mainly provide an invisible yet valuable service as a maintenance-free machine element to allow controlled deceleration of rotary or linear movements.**

They are often necessary to make careful opening and closing of small lids, compartments and drawers possible and they protect sensitive components while increasing the quality and value of products. They are easy to integrate. The harmoniously gentle movements of these little decelerators can be achieved with continual rotation or with limited pivoting angles. They slow down left, right or double sided rotation. Suitable for almost any application and currently also available in adjustable variations, they provide braking torques of 0.05 Ncm to 40 Nm.

**Partial Rotation Angle, Adjustable**  
e.g. FYT-H1 and FYN-H1



### General Function

Rotary dampers operate on the principle of fluid damping. The damping moment is determined by the viscosity of the fluid and the dimensioning of the throttle gap or throttle orifices.



### Rotary Dampers with Continuous Rotation

Rotate for the plus in quality: For smooth, quiet movements of small hoods, flaps and fans these continuously rotating rotary dampers from ACE decelerate either right, left or two-sided rotation right in the pivot point or linear through a gear and gear rack. The harmoniously gentle process protects components and increases the quality and value of products. The maintenance-free, ready-to-install ACE rotary dampers are filled with an inert fluid, usually silicone oil. The viscosity of the fluid and the sizing of the throttling gap determine the damping torque. The FFD series is the only exception: These fluid-free rotary dampers operate according to the principle of friction.

The continuously rotating rotary dampers with the designations FRT, FRN, FFD, FDT and FDN are used in household and medical devices as well as in the automotive, electronics and furniture industries.



### Rotary Dampers with Partial Rotation Angle

For controlled and gentle deceleration: The damping direction of this rotary damper, which is available with adjustable damping torque, can be right, left or two-sided rotation. They can be installed directly in the pivot point of a construction and achieve uniform, quiet movements, which increases quality and value and protects sensitive components. The products are maintenance-free, ready-to-install and filled with an inert fluid, usually silicone oil. A rotor movement presses the fluid from one chamber into the other. The damping torque is determined by the viscosity of the fluid and the sizing of the throttling gap the throttle holes. During each reversal of movement, depending on the frame size a certain return damping torque develops.

These solutions are used in the automotive sector, in many industrial applications, in the electronics and furniture industries as well as in medical devices.

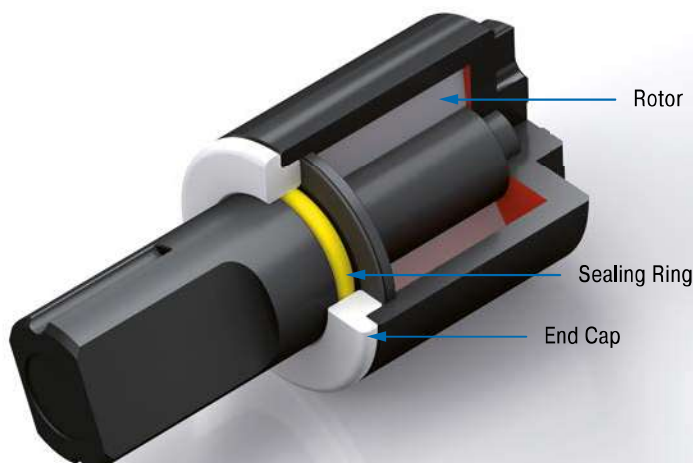
High protection of sensitive components

Various designs for every application

Maintenance-free and ready-to-install

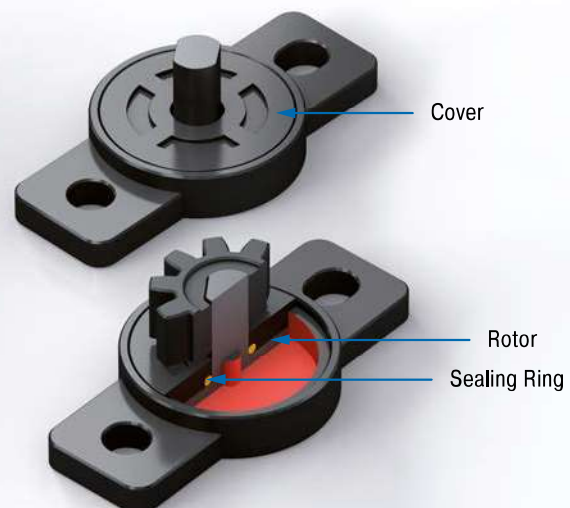
#### Partial Rotation Angle

e.g. FYN-N1



#### Continuous Rotation

e.g. FRT-E2





## Rotary Dampers

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#### FRT-E2

Continuous Rotation

**Small and lightweight for finest braking**

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#### FRT-G2

Continuous Rotation

**Small and lightweight for finest braking**

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#### FRT-C2 and FRN-C2

Continuous Rotation

**Flexible and cost efficient use**

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#### FRT-D2 and FRN-D2

Continuous Rotation

**Flexible and cost efficient use**

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#### FRT-F2/K2 and FRN-F2/K2

Continuous Rotation

**For very long service life extension**

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#### FFD

Continuous Rotation

**Precise braking without oil**

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#### FDT

Continuous Rotation

**The flat disc brake for two-sided damping**

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#### FDN

Continuous Rotation

**The flat disc brake for one direction of rotation**

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## Rotary Dampers



### FYN-P1

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Partial Rotation Angle  
**Small diameter, large damping torques**



### FYN-N1

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Partial Rotation Angle  
**Small diameter, large damping torques**



### FYN-U1

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Partial Rotation Angle  
**Small, strong and very robust**



### FYN-S1

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Partial Rotation Angle  
**The flat damper for constant component protection**



### FYT-H1 and FYN-H1

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Partial Rotation Angle, Adjustable  
**Specifically adjustable, strong braking force**



### FYT-LA3 and FYN-LA3

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Partial Rotation Angle, Adjustable  
**Adjustable high performance**

# FRT-E2

Small and lightweight for finest braking

## Continuous Rotation

Damping torque 0.1 Ncm to 0.4 Ncm

The damping direction of the smallest ACE FRT-E2 rotary dampers with plastic body is rotating on both sides. They can brake directly in the pivot point or linear through a gear and gear rack. ACE rotary dampers are maintenance-free and ready-to-install.



## Technical Data

**Construction size:** Ø 10 mm

**Rotational speed max.:** 50 rpm

**Lifetime:** 50,000 cycles (1 cycle = 360° left-hand, 360° right-hand). Even after this time, the dampers still produce over approx. 80 % of their original damping moment. The service life may be significantly higher or lower, depending on the application.

**Operating temperature range:** 0 °C to +50 °C

**Pressure angle:** 20°

**Material:** Outer body, Shaft, Gear: Plastic

**Mounting:** In any position

**Tooth:** Involute gearing

**P.C.D.:** 6 mm

**No. of teeth:** 10

**Module:** 0.6

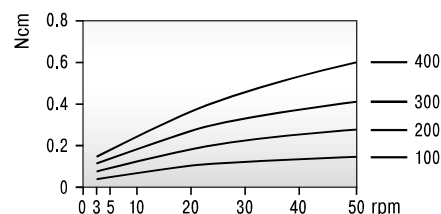
**Mounting information:** No axial or radial forces may be induced via the shaft.

**Safety instructions:** Do not use rotary dampers as supports. Provide an external guide or support.

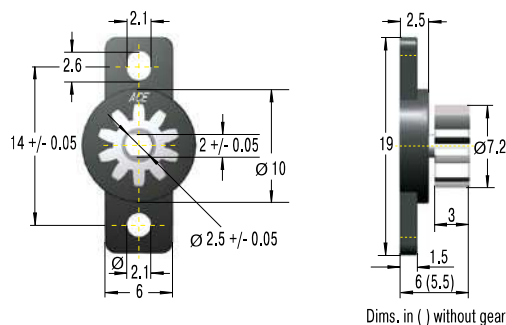
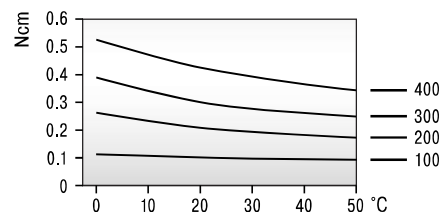
**On request:** Special designs available on request. Toothed plastic racks (modules 0.5 to 1.0) are available for the rotary dampers with pinions.

## Characteristics

At 23 °C ambient temperature



At 20 rpm rotational speed



## Performance

TYPES	<sup>1</sup> Damping torque Ncm	Damping direction	Gear	Weight kg
FRT-E2-100	0.10 +/- 0.05	bidirectional	without	0.00032
FRT-E2-200	0.20 +/- 0.07	bidirectional	without	0.00032
FRT-E2-300	0.30 +/- 0.08	bidirectional	without	0.00032
FRT-E2-400	0.40 +/- 0.10	bidirectional	without	0.00032
FRT-E2-100-G1	0.10 +/- 0.05	bidirectional	with	0.00041
FRT-E2-200-G1	0.20 +/- 0.07	bidirectional	with	0.00041
FRT-E2-300-G1	0.30 +/- 0.08	bidirectional	with	0.00041
FRT-E2-400-G1	0.40 +/- 0.10	bidirectional	with	0.00041

<sup>1</sup> The indicated damping torque refers to a rotational speed of 20 rpm and an ambient temperature of 23 °C.

## FRT-G2

Small and lightweight for finest braking

### Continuous Rotation

Damping torque 0.2 Ncm to 1 Ncm

The damping direction of the ACE FRT-G2 product family with plastic body is rotating on both sides. The small rotary dampers can brake directly in the pivot point or linear through a gear and gear rack. ACE rotary dampers are maintenance-free and ready-to-install.



### Technical Data

**Construction size:** Ø 15 mm

**Rotational speed max.:** 50 rpm

**Lifetime:** 50,000 cycles (1 cycle = 360° left-hand, 360° right-hand). Even after this time, the dampers still produce over approx. 80 % of their original damping moment. The service life may be significantly higher or lower, depending on the application.

**Operating temperature range:** 0 °C to +50 °C

**Pressure angle:** 20°

**Material:** Outer body, Shaft, Gear: Plastic

**Mounting:** In any position

**Tooth:** Involute gearing

**P.C.D.:** 7 mm

**No. of teeth:** 14

**Module:** 0.5

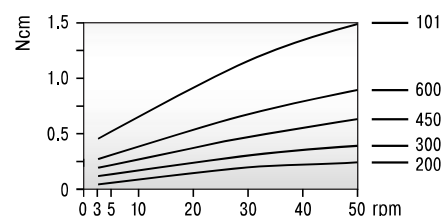
**Mounting information:** No axial or radial forces may be induced via the shaft.

**Safety instructions:** Do not use rotary dampers as supports. Provide an external guide or support.

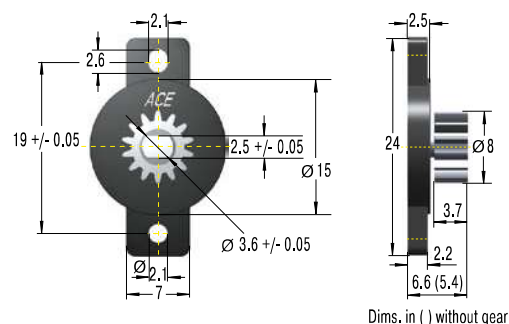
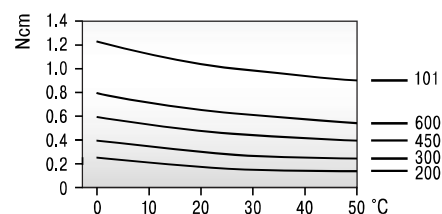
**On request:** Special designs available on request. Toothed plastic racks (modules 0.5 to 1.0) are available for the rotary dampers with pinions.

### Characteristics

At 23 °C ambient temperature



At 20 rpm rotational speed



Dims. in ( ) without gear

### Performance

TYPES	<sup>1</sup> Damping torque Ncm	Damping direction	Gear	Weight kg
FRT-G2-200	0.20 +/- 0.07	bidirectional	without	0.00060
FRT-G2-300	0.30 +/- 0.08	bidirectional	without	0.00060
FRT-G2-450	0.45 +/- 0.10	bidirectional	without	0.00060
FRT-G2-600	0.60 +/- 0.12	bidirectional	without	0.00060
FRT-G2-101	1.00 +/- 0.20	bidirectional	without	0.00060
FRT-G2-200-G1	0.20 +/- 0.07	bidirectional	with	0.00080
FRT-G2-300-G1	0.30 +/- 0.08	bidirectional	with	0.00080
FRT-G2-450-G1	0.45 +/- 0.10	bidirectional	with	0.00080
FRT-G2-600-G1	0.60 +/- 0.12	bidirectional	with	0.00080
FRT-G2-101-G1	1.00 +/- 0.20	bidirectional	with	0.00080

<sup>1</sup> The indicated damping torque refers to a rotational speed of 20 rpm and an ambient temperature of 23 °C.

## FRT-C2 and FRN-C2

Flexible and cost efficient use

### Continuous Rotation

### Damping torque 2 Ncm to 3 Ncm

The damping direction of the simple FRT-C2 and FRN-C2 is either right, left or two-sided rotation. These ACE rotary dampers with plastic body can decelerate directly in the pivot point or linear through a gear and gear rack. ACE rotary dampers are maintenance-free and ready-to-install.



### Technical Data

**Construction size:** Ø 15 mm

**Rotational speed max.:** 50 rpm

**Lifetime:** 50,000 cycles (1 cycle = 360° left-hand, 360° right-hand). Even after this time, the dampers still produce over approx. 80 % of their original damping moment. The service life may be significantly higher or lower, depending on the application.

**Operating temperature range:** 0 °C to +50 °C

**Pressure angle:** 20°

**Material:** Outer body, Gear: Plastic; Shaft: Plastic, steel

**Mounting:** In any position

**Tooth:** Involute gearing

**P.C.D.:** 8.8 mm

**No. of teeth:** 11

**Module:** 0.8

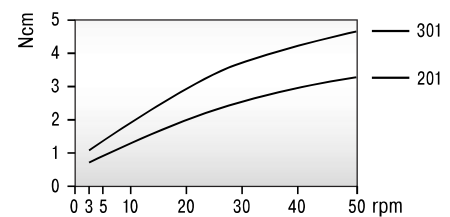
**Mounting information:** No axial or radial forces may be induced via the shaft.

**Safety instructions:** Do not use rotary dampers as supports. Provide an external guide or support.

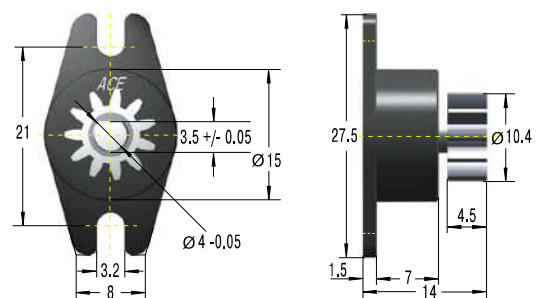
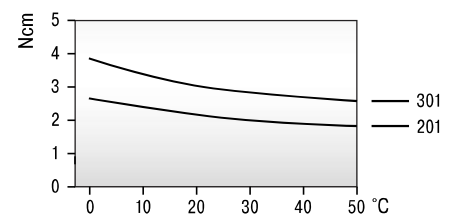
**On request:** Special designs available on request. Toothed plastic racks (modules 0.5 to 1.0) are available for the rotary dampers with pinions.

### Characteristics

#### At 23 °C ambient temperature



#### At 20 rpm rotational speed



### Performance

TYPES	<sup>1</sup> Damping torque Ncm	Damping direction	Gear	Weight kg
FRT-C2-201	2 +/- 0.6	bidirectional	without	0.002
FRT-C2-301	3 +/- 0.8	bidirectional	without	0.002
FRT-C2-201-G1	2 +/- 0.6	bidirectional	with	0.002
FRT-C2-301-G1	3 +/- 0.8	bidirectional	with	0.002
FRN-C2-R201	2 +/- 0.6	right	without	0.002
FRN-C2-R301	3 +/- 0.8	right	without	0.003
FRN-C2-R201-G1	2 +/- 0.6	right	with	0.002
FRN-C2-R301-G1	3 +/- 0.8	right	with	0.004
FRN-C2-L201	2 +/- 0.6	left	without	0.002
FRN-C2-L301	3 +/- 0.8	left	without	0.003
FRN-C2-L201-G1	2 +/- 0.6	left	with	0.002
FRN-C2-L301-G1	3 +/- 0.8	left	with	0.003

<sup>1</sup> The indicated damping torque refers to a rotational speed of 20 rpm and an ambient temperature of 23 °C.

### FRT-D2 and FRN-D2

Flexible and cost efficient use

#### Continuous Rotation

#### Damping torque 5 Ncm to 15 Ncm

The damping direction of the ACE FRT-D2 and FRN-D2 rotary dampers with plastic body is either the right, left or two-sided rotation. They can decelerate directly in the pivot point or linear through a gear and gear rack. ACE rotary dampers are maintenance-free and ready-to-install.



#### Technical Data

**Construction size:** Ø 25 mm

**Rotational speed max.:** 50 rpm

**Lifetime:** 50,000 cycles (1 cycle = 360° left-hand, 360° right-hand). Even after this time, the dampers still produce over approx. 80 % of their original damping moment. The service life may be significantly higher or lower, depending on the application.

**Operating temperature range:** 0 °C to +50 °C

**Pressure angle:** 20°

**Material:** Outer body, Gear: Plastic; Shaft: Plastic, steel

**Mounting:** In any position

**Tooth:** Involute gearing (addendum modification coefficient: +0.375)

**P.C.D.:** 12 mm

**No. of teeth:** 12

**Module:** 1

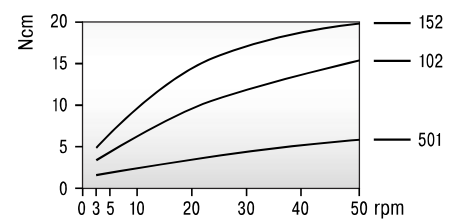
**Mounting information:** No axial or radial forces may be induced via the shaft.

**Safety instructions:** Do not use rotary dampers as supports. Provide an external guide or support.

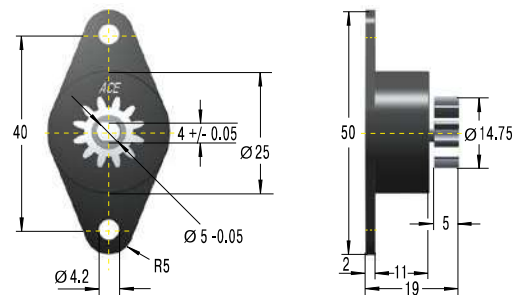
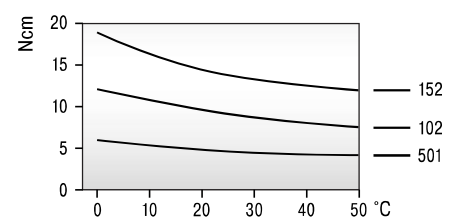
**On request:** Special designs available on request. Toothed plastic racks (modules 0.5 to 1.0) are available for the rotary dampers with pinions.

#### Characteristics

At 23 °C ambient temperature



At 20 rpm rotational speed



#### Performance

TYPES	Damping torque Ncm	Damping direction	Gear	Weight kg
FRT-D2-102	10 +/- 2	bidirectional	without	0.008
FRT-D2-152	15 +/- 3	bidirectional	without	0.008
FRT-D2-501	5 +/- 1	bidirectional	without	0.008
FRT-D2-102-G1	10 +/- 2	bidirectional	with	0.009
FRT-D2-152-G1	15 +/- 3	bidirectional	with	0.009
FRT-D2-501-G1	5 +/- 1	bidirectional	with	0.009
FRN-D2-R102	10 +/- 2	right	without	0.012
FRN-D2-R152	15 +/- 3	right	without	0.012
FRN-D2-R501	5 +/- 1	right	without	0.012
FRN-D2-R102-G1	10 +/- 2	right	with	0.012
FRN-D2-R152-G1	15 +/- 3	right	with	0.012
FRN-D2-R501-G1	5 +/- 1	right	with	0.012
FRN-D2-L102	10 +/- 2	left	without	0.012
FRN-D2-L152	15 +/- 3	left	without	0.012
FRN-D2-L501	5 +/- 1	left	without	0.012
FRN-D2-L102-G1	10 +/- 2	left	with	0.012
FRN-D2-L152-G1	15 +/- 3	left	with	0.012
FRN-D2-L501-G1	5 +/- 1	left	with	0.012

<sup>1</sup> The indicated damping torque refers to a rotational speed of 20 rpm and an ambient temperature of 23 °C.



# FRT-F2/K2 and FRN-F2/K2

For very long service life extension

## Continuous Rotation

Damping torque 200 Ncm to 400 Ncm

The damping direction of FRT F2/K2 and FRN-F2/K2 is either the right, left or two-sided rotation. With a damping torque of up to 400 Ncm, this product family can even handle heavy components. These ACE rotary dampers can decelerate directly in the pivot point or linear through a gear and gear rack. They are maintenance-free and ready-to-install.



### Technical Data

**Construction size:** Ø 40 mm

**Rotational speed max.:** 50 rpm

**Lifetime:** 50,000 cycles (1 cycle = 360° left-hand, 360° right-hand). Even after this time, the dampers still produce over approx. 80 % of their original damping moment. The service life may be significantly higher or lower, depending on the application.

**Operating temperature range:** 0 °C to +50 °C

**Material:** Outer body: Plastic; Shaft: Steel

**Mounting:** In any position

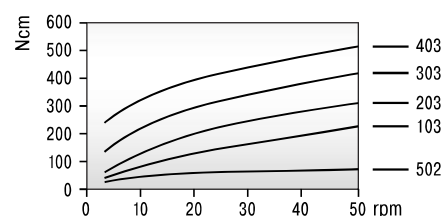
**Mounting information:** No axial or radial forces may be induced via the shaft.

**Safety instructions:** Do not use rotary dampers as supports. Provide an external guide or support.

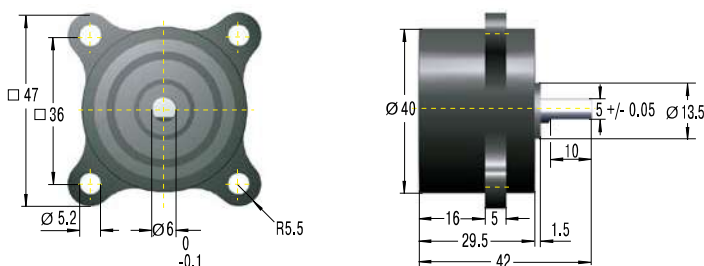
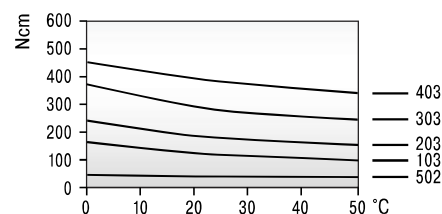
**On request:** Special designs available on request.

### Characteristics

At 23 °C ambient temperature



At 20 rpm rotational speed



### Performance

TYPES	<sup>1</sup> Damping torque Ncm	Damping direction	Weight kg
FRT-K2-502	50 +/- 10	bidirectional	0.080
FRT-K2-103	100 +/- 20	bidirectional	0.080
FRT-F2-203	200 +/- 40	bidirectional	0.115
FRT-F2-303	300 +/- 80	bidirectional	0.115
FRT-F2-403	400 +/- 100	bidirectional	0.115
FRN-K2-R502	50 +/- 10	right	0.057
FRN-K2-R103	100 +/- 20	right	0.057
FRN-F2-R203	200 +/- 40	right	0.090
FRN-K2-L502	50 +/- 10	left	0.057
FRN-K2-L103	100 +/- 20	left	0.057
FRN-F2-L203	200 +/- 40	left	0.090

<sup>1</sup> The indicated damping torque refers to a rotational speed of 20 rpm and an ambient temperature of 23 °C.

### FFD

Precise braking without oil

#### Continuous Rotation

Damping torque 0.1 Nm to 3 Nm

In comparison to other rotary dampers, the ACE FFD product family does not need any fluid to generate the damping torque, but rather works on the principle of friction. That means temperature or speed changes have virtually no influence on the damping torque. The FFD is available in two different body variants and two types of bearings. ACE rotary dampers are maintenance-free and ready-to-install.



#### Technical Data

**Construction size:** Ø 25 mm to 30 mm

**Rotational speed max.:** 30 rpm

**Lifetime:** 30,000 cycles (1 cycle = 360° left-hand, 360° right-hand). Even after this time, the dampers still produce over approx. 80 % of their original damping moment. The service life may be significantly higher or lower, depending on the application.

**Operating temperature range:** -10 °C to +60 °C

**Material:** Outer body: Plastic

**Mounting:** In any position

**Information to the shaft:** Ø +0 / -0.03

Hardness > HRC55, surface smoothness RZ<1µm

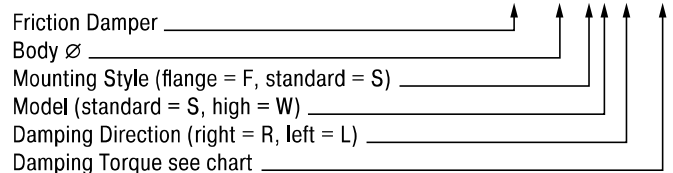
**Mounting information:** Turn the shaft in the opposite direction to the brake direction to avoid damaging the freewheel mount. No axial or radial forces may be induced via the shaft.

**Safety instructions:** Do not use rotary dampers as supports. Provide an external guide or support.

**On request:** Special designs available on request.

#### Ordering Example

FFD-25-FS-L-102



#### Complete details required when ordering

- Damping torque 102 = 0.1 Nm
- Damping torque 502 = 0.5 Nm
- Damping torque 103 = 1.0 Nm
- Damping torque 153 = 1.5 Nm
- Damping torque 203 = 2.0 Nm
- Damping torque 253 = 2.5 Nm
- Damping torque 303 = 3.0 Nm
- Note dimension C.

#### Model Type Prefix

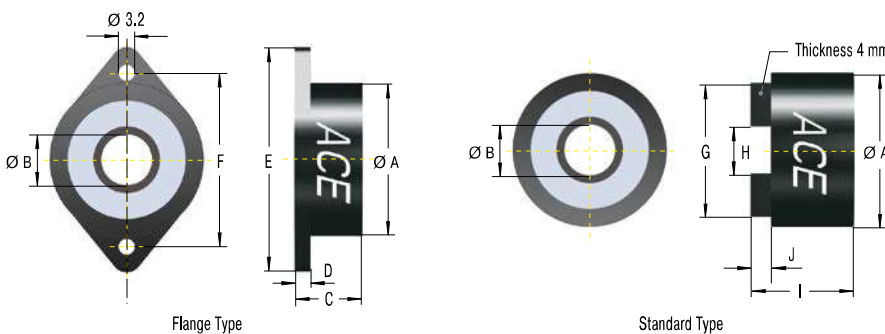
FS = Mounting Style with Flange, Model standard

FW = Mounting Style with Flange, Model high

SS = Mounting Style Standard, Model standard

SW = Mounting Style Standard, Model high

Combinations with W for higher damping torque.



#### Performance and Dimensions

TYPES	<sup>1</sup> Damping torque Nm	Damping direction	Model	A mm	B mm	C mm	D mm	E mm	F mm	G mm	H mm	I mm	J mm	Weight kg
FFD-25SS	0.1/0.5/1.0	right or left	SS	25	6	13	3	42	34	21	6.2	16	4	0.012
FFD-28SS	0.1/0.5/1.0	right or left	SS	28	8	13	3	44	36	24	8.2	16	4	0.014
FFD-30SS	0.1/0.5/1.0/1.5	right or left	SS	30	10	13	3	46	38	26	10.2	16	4	0.016
FFD-25FS	0.1/0.5/1.0	right or left	FS	25	6	13	3	42	34	21	6.2	16	4	0.013
FFD-28FS	0.1/0.5/1.0	right or left	FS	28	8	13	3	44	36	24	8.2	16	4	0.014
FFD-30FS	0.1/0.5/1.0/1.5	right or left	FS	30	10	13	3	46	38	26	10.2	16	4	0.017
FFD-25SW	1.0/1.5/2.0	right or left	SW	25	6	19	3	42	34	21	6.2	22	4	0.023
FFD-28SW	1.0/1.5/2.0	right or left	SW	28	8	19	3	44	36	24	8.2	22	4	0.025
FFD-30SW	1.5/2.0/2.5/3.0	right or left	SW	30	10	19	3	46	38	26	10.2	22	4	0.030
FFD-25FW	1.0/1.5/2.0	right or left	FW	25	6	19	3	42	34	21	6.2	22	4	0.024
FFD-28FW	1.0/1.5/2.0	right or left	FW	28	8	19	3	44	36	24	8.2	22	4	0.027
FFD-30FW	1.5/2.0/2.5/3.0	right or left	FW	30	10	19	3	46	38	26	10.2	22	4	0.031

<sup>1</sup> The indicated damping torque refers to a rotational speed of 20 rpm and an ambient temperature of 23 °C.

# FDT

The flat disc brake for two-sided damping

## Continuous Rotation

Damping torque 2 Nm to 8.7 Nm

The damping direction of the flat constructive ACE rotary damper FDT with robust steel body is two-sided rotation. It can brake directly in the pivot point of the square receptacle. ACE rotary dampers are maintenance-free and ready-to-install.



### Technical Data

**Construction size:** Ø 47 mm to 70 mm

**Rotational speed max.:** 50 rpm

**Lifetime:** 50,000 cycles (1 cycle = 360° left-hand, 360° right-hand). Even after this time, the dampers still produce over approx. 80 % of their original damping moment. The service life may be significantly higher or lower, depending on the application.

**Operating temperature range:** -10 °C to +50 °C

**Material:** Outer body: Steel; Output shaft sleeve: Nylon

**Mounting:** In any position

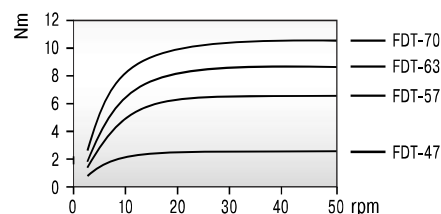
**Mounting information:** No axial or radial forces may be induced via the shaft.

**Safety instructions:** Do not use rotary dampers as supports. Provide an external guide or support.

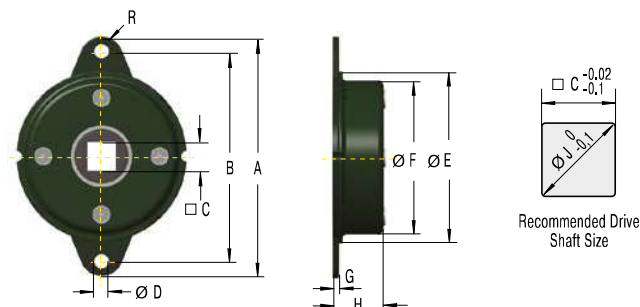
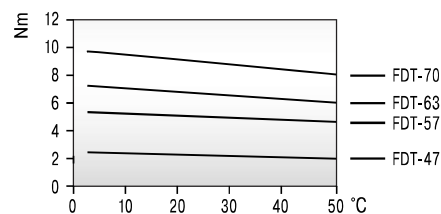
**On request:** Special designs available on request.

### Characteristics

At 23 °C ambient temperature



At 20 rpm rotational speed



### Performance and Dimensions

TYPES	<sup>1</sup> Damping torque Nm	Damping direction	A mm	B mm	C mm	D mm	E mm	F mm	G mm	H mm	R mm	J mm	Weight kg
FDT-47	2.0 +/- 0.3	bidirectional	65	56	8	4.5	47	42.8	1.6	10.3	4.5	10	0.050
FDT-57	4.7 +/- 0.5	bidirectional	79	68	10	5.5	57	52.4	1.6	11.2	5.5	13	0.075
FDT-63	6.7 +/- 0.7	bidirectional	89	76	12.5	6.5	63	58.6	1.6	11.3	6.5	17	0.095
FDT-70	8.7 +/- 0.8	bidirectional	95	82	12.5	6.5	70	65.4	1.6	11.3	6.5	17	0.110

<sup>1</sup> The indicated damping torque refers to a rotational speed of 20 rpm and an ambient temperature of 23 °C.

### FDN

The flat disc brake for one direction of rotation

#### Continuous Rotation

Damping torque 2 Nm to 11 Nm

The damping direction of the flat, strong FDN rotary dampers with steel body can be either right or left rotation. They can brake directly in the pivot point. ACE rotary dampers are maintenance-free and ready-to-install.



#### Technical Data

**Construction size:** Ø 47 mm to 70 mm

**Rotational speed max.:** 50 rpm

**Lifetime:** 50,000 cycles (1 cycle = 360° left-hand, 360° right-hand). Even after this time, the dampers still produce over approx. 80 % of their original damping moment. The service life may be significantly higher or lower, depending on the application.

**Operating temperature range:** -10 °C to +50 °C

**Material:** Outer body: Steel

**Mounting:** In any position

**Information to the shaft:**

FDN-47: Ø 6 +0 / -0.03

FDN-57 to FDN-70: Ø 10 +0 / -0.03

Hardness > HRC55, surface smoothness  $R_z < 1 \mu\text{m}$

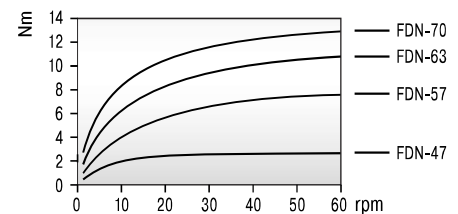
**Mounting information:** Turn the shaft in the opposite direction to the brake direction to avoid damaging the freewheel mount. No axial or radial forces may be induced via the shaft.

**Safety instructions:** Do not use rotary dampers as supports. Provide an external guide or support.

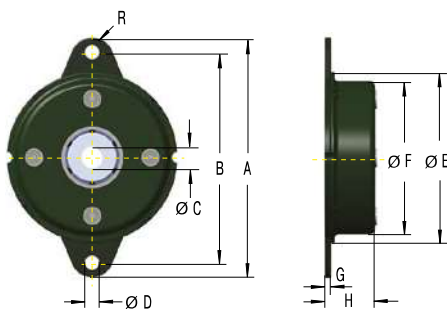
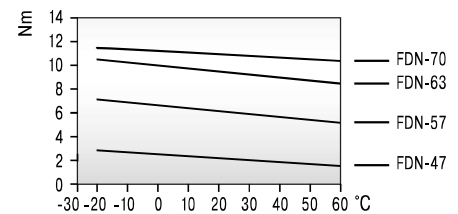
**On request:** Special designs available on request.

#### Characteristics

At 23 °C ambient temperature



At 20 rpm rotational speed



#### Performance and Dimensions

TYPES	Damping torque Nm	Damping direction	A	B	C	D	E	F	G	H	R	Weight kg
			mm	mm	mm	mm	mm	mm	mm	mm	mm	
FDN-47-R	2.0 +/- 0.3	right	65	56	6	4.5	47	42.8	1.6	10.3	4.5	0.055
FDN-57-R	5.5 +/- 0.3	right	79	68	10	5.5	57	52.4	1.6	14	5.5	0.095
FDN-63-R	8.5 +/- 0.8	right	89	76	10	6.5	63	58.6	1.6	13.9	6.5	0.115
FDN-70-R	11.0 +/- 1.0	right	95	82	10	6.5	70	65.4	1.6	13	6.5	0.135
FDN-47-L	2.0 +/- 0.3	left	65	56	6	4.5	47	42.8	1.6	10.3	4.5	0.055
FDN-57-L	5.5 +/- 0.3	left	79	68	10	5.5	57	52.4	1.6	14	5.5	0.095
FDN-63-L	8.5 +/- 0.8	left	89	76	10	6.5	63	58.6	1.6	13.9	6.5	0.115
FDN-70-L	11.0 +/- 1.0	left	95	82	10	6.5	70	65.4	1.6	13	6.5	0.135

<sup>1</sup> The indicated damping torque refers to a rotational speed of 20 rpm and an ambient temperature of 23 °C.

## FYN-P1

Small diameter, large damping torques

### Partial Rotation Angle

**Damping torque 100 Ncm to 180 Ncm**

The damping direction of the rotary damper FYN-P1 can be either right or left rotation. The dampers can be directly mounted in the pivot point. During each reverse movement of the unilateral decelerating versions there is a certain return damping torque that depends on the size. Differentiation of the damping direction through the coloured shaft. ACE rotary dampers are maintenance-free and ready-to-install.



### Technical Data

**Construction size:** Ø 18.5 mm

**Lifetime:** 50,000 cycles, even after this time, the dampers still produce over approx. 80 % of their original damping moment. The service life may be significantly higher or lower, depending on the application.

**Operating temperature range:** -5 °C to +50 °C

**Material:** Outer body, Shaft: Plastic

**Mounting:** In any position

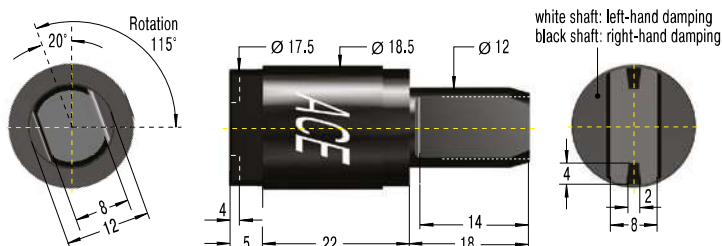
**Rotation angle max.:** 115°

**Note:** Damping direction: Right hand damping = damping action in clockwise direction (when looking onto the output shaft or output shaft sleeve, depending on the damper type). A play of approx. 5° can occur at the beginning of movement.

**Mounting information:** No axial or radial forces may be induced via the shaft.

**Safety instructions:** Do not use rotary dampers as supports. Provide an external guide or support.

**On request:** Special designs available on request.



### Performance

TYPES	Damping torque	Return Damping Torque	Damping direction	Weight kg
	Ncm	Ncm		
FYN-P1-R103	100	30	right	0.011
FYN-P1-R153	150	50	right	0.011
FYN-P1-R183	180	80	right	0.011
FYN-P1-L103	100	30	left	0.011
FYN-P1-L153	150	50	left	0.011
FYN-P1-L183	180	80	left	0.011

### FYN-N1

Small diameter, large damping torques

#### Partial Rotation Angle

Damping torque 100 Ncm to 300 Ncm

The damping direction of the rotary damper FYN-N1 can be either right or left rotation. The dampers can be directly mounted in the pivot point. During each reverse movement of the unilateral decelerating versions there is a certain return damping torque that depends on the size. Differentiation of the damping direction through coloured end cap. ACE rotary dampers are maintenance-free and ready-to-install.



#### Technical Data

**Construction size:** Ø 20 mm

**Lifetime:** 50,000 cycles, even after this time, the dampers still produce over approx. 80 % of their original damping moment. The service life may be significantly higher or lower, depending on the application.

**Operating temperature range:** -5 °C to +50 °C

**Material:** Outer body, Shaft: Plastic

**Mounting:** In any position

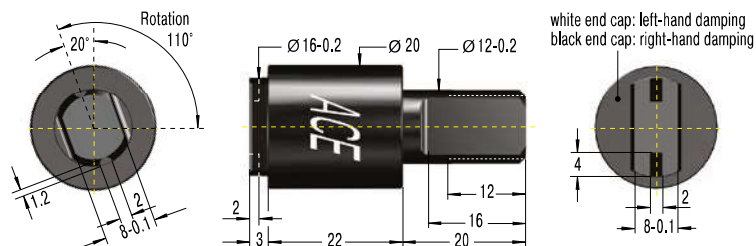
**Rotation angle max.:** 110°

**Note:** Damping direction: Right hand damping = damping action in clockwise direction (when looking onto the output shaft or output shaft sleeve, depending on the damper type). A play of approx. 5° can occur at the beginning of movement.

**Mounting information:** No axial or radial forces may be induced via the shaft.

**Safety instructions:** Do not use rotary dampers as supports. Provide an external guide or support.

**On request:** Special designs available on request.



#### Performance

TYPES	Damping torque Ncm	Return Damping Torque Ncm	Damping direction	Weight kg
FYN-N1-R103	100	20	right	0.012
FYN-N1-R203	200	40	right	0.012
FYN-N1-R253	250	40	right	0.012
FYN-N1-R303	300	80	right	0.012
FYN-N1-L103	100	20	left	0.012
FYN-N1-L203	200	40	left	0.012
FYN-N1-L253	250	40	left	0.012
FYN-N1-L303	300	80	left	0.012

## FYN-U1

Small, strong and very robust

### Partial Rotation Angle

Damping torque 200 Ncm to 300 Ncm

The damping direction of the rotary damper FYN-U1 can be either right or left rotation. The dampers can be directly mounted in the pivot point. The body is made of especially robust die-cast zinc. During each reverse movement of the unilateral decelerating versions there is a certain return damping torque that depends on the size. ACE rotary dampers are maintenance-free and ready-to-install.



### Technical Data

**Construction size:** Ø 16 mm

**Lifetime:** 50,000 cycles, even after this time, the dampers still produce over approx. 80 % of their original damping moment. The service life may be significantly higher or lower, depending on the application.

**Operating temperature range:** -5 °C to +50 °C

**Material:** Outer body, Shaft: Zinc die-cast

**Mounting:** In any position

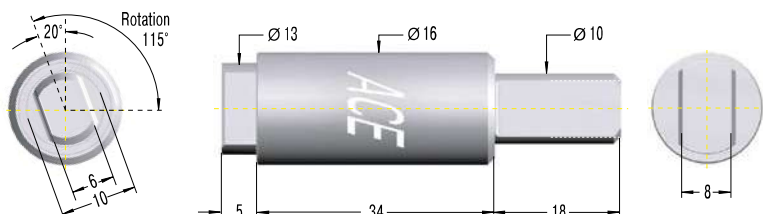
**Rotation angle max.:** 115°

**Note:** Damping direction: Right hand damping = damping action in clockwise direction (when looking onto the output shaft or output shaft sleeve, depending on the damper type). A play of approx. 5° can occur at the beginning of movement.

**Mounting information:** No axial or radial forces may be induced via the shaft.

**Safety instructions:** Do not use rotary dampers as supports. Provide an external guide or support.

**On request:** Special designs available on request.



### Performance

TYPES	Damping torque	Return Damping Torque	Damping direction	Weight kg
	Ncm	Ncm		
FYN-U1-R203	200	40	right	0.040
FYN-U1-R253	250	40	right	0.040
FYN-U1-R303	300	80	right	0.040
FYN-U1-L203	200	40	left	0.040
FYN-U1-L253	250	40	left	0.040
FYN-U1-L303	300	80	left	0.040

### FYN-S1

The flat damper for constant component protection

#### Partial Rotation Angle

Damping torque 5 Nm to 10 Nm

The self-compensating FYN-S1 rotary damper with zinc die-cast body provides a constant sequence of movement for different masses. The damping direction can be either right or left rotation. During each reverse movement of the unilateral decelerating versions there is a certain return damping torque that depends on the size. ACE rotary dampers are maintenance-free and ready-to-install.



#### Technical Data

**Construction size:** Ø 60 mm

**Lifetime:** 50,000 cycles, even after this time, the dampers still produce over approx. 80 % of their original damping moment. The service life may be significantly higher or lower, depending on the application.

**Operating temperature range:** -5 °C to +50 °C

**Material:** Outer body: Zinc die-cast; Output shaft sleeve: Plastic

**Mounting:** In any position

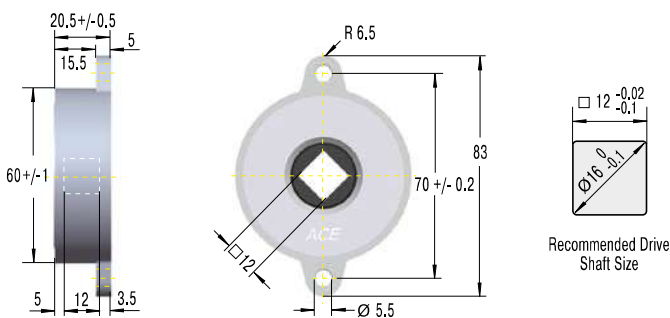
**Rotation angle max.:** 130°

**Note:** Damping direction: Right hand damping = damping action in clockwise direction (when looking onto the output shaft or output shaft sleeve, depending on the damper type). A play of approx. 5° can occur at the beginning of movement.

**Mounting information:** No axial or radial forces may be induced via the shaft.

**Safety instructions:** Do not use rotary dampers as supports. Provide an external guide or support.

**On request:** Special designs available on request.



Recommended Drive Shaft Size

#### Performance

TYPES	Damping torque Nm	Return Damping Torque Nm	Damping direction	Weight kg
FYN-S1-R104	5 - 10	1.5	right	0.220
FYN-S1-L104	5 - 10	1.5	left	0.220

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## FYT-H1 and FYN-H1

Specifically adjustable, strong braking force

**Partial Rotation Angle, Adjustable**  
**Damping torque 2 Nm to 10 Nm**

The damping direction of the adjustable FYT-H1 and FYN-H1 can be right, left or two-sided rotation. During each reverse movement of the unilateral decelerating versions there is a certain return damping torque that depends on the size. The brakes have a particularly robust zinc die-cast body and shafts made of steel. ACE rotary dampers are maintenance-free and ready-to-install.



### Technical Data

**Construction size:** Ø 45 mm

**Lifetime:** 50,000 cycles, even after this time, the dampers still produce over approx. 80 % of their original damping moment. The service life may be significantly higher or lower, depending on the application.

**Operating temperature range:** -5 °C to +50 °C

**Material:** Outer body: Zinc die-cast; Shaft: Steel

**Mounting:** In any position

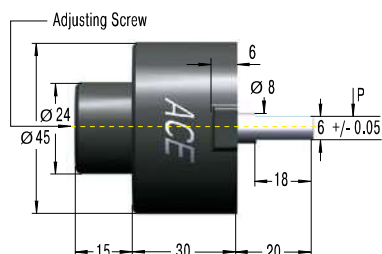
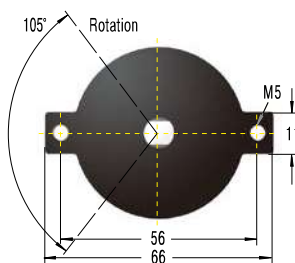
**Rotation angle max.:** 105°

**Maximum side load:** 50 N

**Note:** Damping direction: Right hand damping = damping action in clockwise direction (when looking onto the output shaft or output shaft sleeve, depending on the damper type). A play of approx. 5° can occur at the beginning of movement.

**Safety instructions:** Do not use rotary dampers as supports. Provide an external guide or support.

**On request:** Special designs available on request.



### Performance

TYPES	Damping torque Nm	Return Damping Torque Nm	Damping direction	Weight kg
FYT-H1	2 - 10	0.5	bidirectional	0.235
FYN-H1-R	2 - 10	0.5	right	0.235
FYN-H1-L	2 - 10	0.5	left	0.235

## FYT-LA3 and FYN-LA3

Adjustable high performance

**Partial Rotation Angle, Adjustable  
Damping torque 4 Nm to 40 Nm**

The damping direction of this adjustable high-performance rotary damper can be right, left or two-sided rotation. During each reverse movement of the unilateral decelerating versions there is a certain return damping torque that depends on the size. The brakes have a particularly robust zinc die-cast body and shafts made of steel. ACE rotary dampers are maintenance-free and ready-to-install.



### Technical Data

**Construction size:** Ø 80 mm

**Lifetime:** 50,000 cycles, even after this time, the dampers still produce over approx. 80 % of their original damping moment. The service life may be significantly higher or lower, depending on the application.

**Operating temperature range:** -5 °C to +50 °C

**Material:** Outer body: Zinc die-cast; Shaft: Steel

**Mounting:** In any position

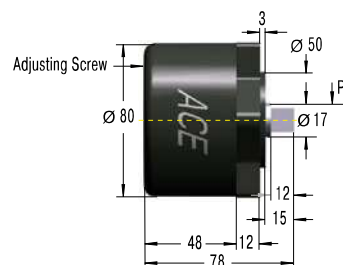
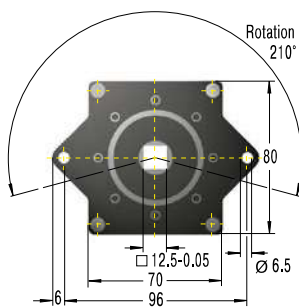
**Rotation angle max.:** 210°

**Maximum side load:** 200 N

**Note:** Damping direction: Right hand damping = damping action in clockwise direction (when looking onto the output shaft or output shaft sleeve, depending on the damper type). A play of approx. 5° can occur at the beginning of movement.

**Safety instructions:** Do not use rotary dampers as supports. Provide an external guide or support.

**On request:** Special designs available on request.



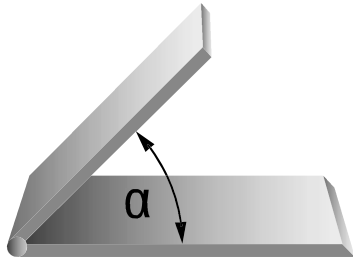
### Performance

TYPES	Damping torque Nm	Return Damping Torque Nm	Damping direction	Weight kg
FYT-LA3	4 - 40	4	bidirectional	1.720
FYN-LA3-R	4 - 40	4	right	1.725
FYN-LA3-L	4 - 40	4	left	1.725

### Calculation Example

#### Damping of a Lid

To select an appropriate rotary damper for the adjacent calculation example, the length and the weight or the centre of gravity of the flap have to be known. After determining the value of the max. torque at an unfavourable angle of the flap, select the appropriate damper.



#### Calculation Steps

1. Calculate max. torque damper will be exposed to (with example shown on the left max. torque is at  $\alpha = 0^\circ$ ).
2. Decide upon rotation speed desired.
3. Choose a rotary damper that can handle the torque calculated above.
4. With the aid of the damper performance curves, check if the r.p.m. given at your torque corresponds to the desired closing speed of the lid.
5. If the r.p.m. is too high – choose a damper with a higher torque rating.  
If the r.p.m. is too low – choose a damper with a lower torque rating.

Closing Torque  
 $M = L / 2 \cdot m \cdot g \cdot \cos \alpha$   
 (L / 2 = centre of gravity)

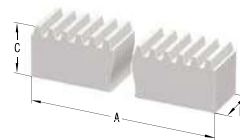
m Mass of a lid [kg] (1 kg = 9.81 N)  
 L Length of lid from pivot [cm]  
 n Rotation speed [r.p.m.]

### Special Accessories

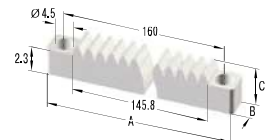
#### Toothed Racks for Rotary Dampers with Gear

Rotary dampers with gears are available in four standard modules which can be optionally supplied with plastic toothed racks as accessories.

**M0.5, M0.6, M0.8, M1.0**  
Toothed Rack



**M0.8P**  
Toothed Rack



#### Delivery Notes

**Delivery form:** Toothed plastic racks with modules 0.5 to 1.0 availables ex stock

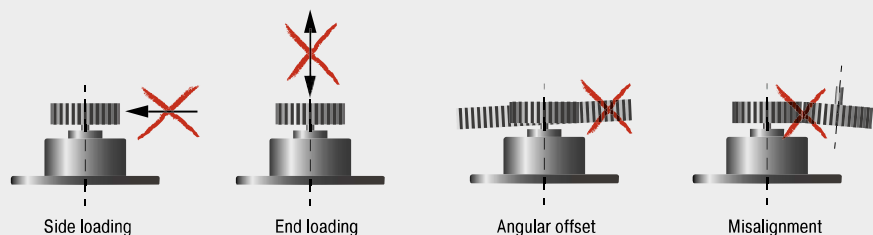
**On request:** Toothed metal racks

#### Dimensions

TYPES	A mm	B mm	C mm	Model
M0.5	250	4	4.5	rigid, milled
M0.6	250	4	6	rigid, milled
M0.8	250	6	8	rigid, milled
M0.8P	170	8	4.1	flexible, milled
M1.0	250	9	9	rigid, milled
M1.0	500	10	10	rigid, milled

### Mounting Information

The rotary axis, square receptacles or free-wheel receptacles are not designed for lateral loads. An external guide or bearing support is fundamentally recommended.



# Application Examples

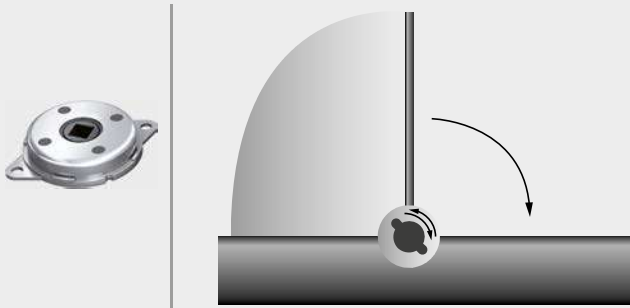
**FDT**

**Finger protection when cutting bread**

To exclude the possibility of injury when using bread slicing machines on self-service counters, the automatic bread slicing process does not start until the flap of the modern machine is closed. To simplify the operation and to thereby increase acceptance of the self-slicing principle among users, two-way rotary dampers of the type FDT-57 ensure smooth opening and closing of the door. Even when rotary dampers must act only in one direction, ACE has appropriate variants readily available.



Protective flaps secured with rotary dampers: the simple operation of bread slicing machines can then be easily managed by hand  
Daub Bakery Machinery BV, 5050 AB Goirle, Netherlands



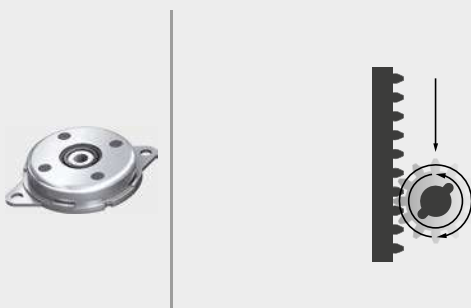
**FDN-R**

**Invisible protection for cooker hoods**

For ergonomic handling, modern cooker hoods can be driven by a motor into an up position and then down again. When driven downwards, an AC load can result in a total loss through current being fed back into the voltage source. One of the tasks of the ACE rotary dampers type FDN-63-R is to prevent this. The modern machine elements are also built to provide protection against motor failure. Sliding the hood down too quickly could lead to further costly damage to the hood and the ceiling console and even cause personal injury.



Rotary dampers in high-end cooker hoods safeguard the protection of drive units and protect chefs, even during power failures  
berbel Ablufttechnik GmbH, 48432 Rheine, Germany



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