Damping Engineering

Dear customer,

This catalog contains plenty of detailed data about many of our products. Although we have carefully checked all the information we cannot guarantee that this catalog contains no mistakes and take no responsibility for the correctness of the data/details provided.

Certain details of all technical products - even when they are manufactured very accurately – have tolerances.

Please note that all measurements (unless stated otherwise) are in inch, pound, pound force etc. As the measurements have been converted from metric numbers, the numbers are nearly always odd numbers.

Technical changes may happen and are not subject to notice.

We appreciate your interest and promise to furnish you immediately with detailed information to any of our other products by fax, email or letter post.

DICTATOR is well known worldwide for its close personal contact to his customers.

We want to become your partner, too.

Management
DICTATOR U.S., Inc.

Conversion formulae:
mm : 25.4 => inch
N x 0.225 => lbf

State 02/2018

DICTATOR Damping Solutions

Types of Dampers and Functioning

DICTATOR damping solutions offer four different lines of dampers:

1) EDH and ZDH final dampers

Final dampers are used to slow down a movement before reaching the final position, e.g. with sliding doors in the positions OPEN and CLOSED. The relatively long stroke dimensions assure a sufficient safety zone. Final dampers are adjustable, to fit exactly the requirements of each door.

2) Oil dampers with fixings on both ends

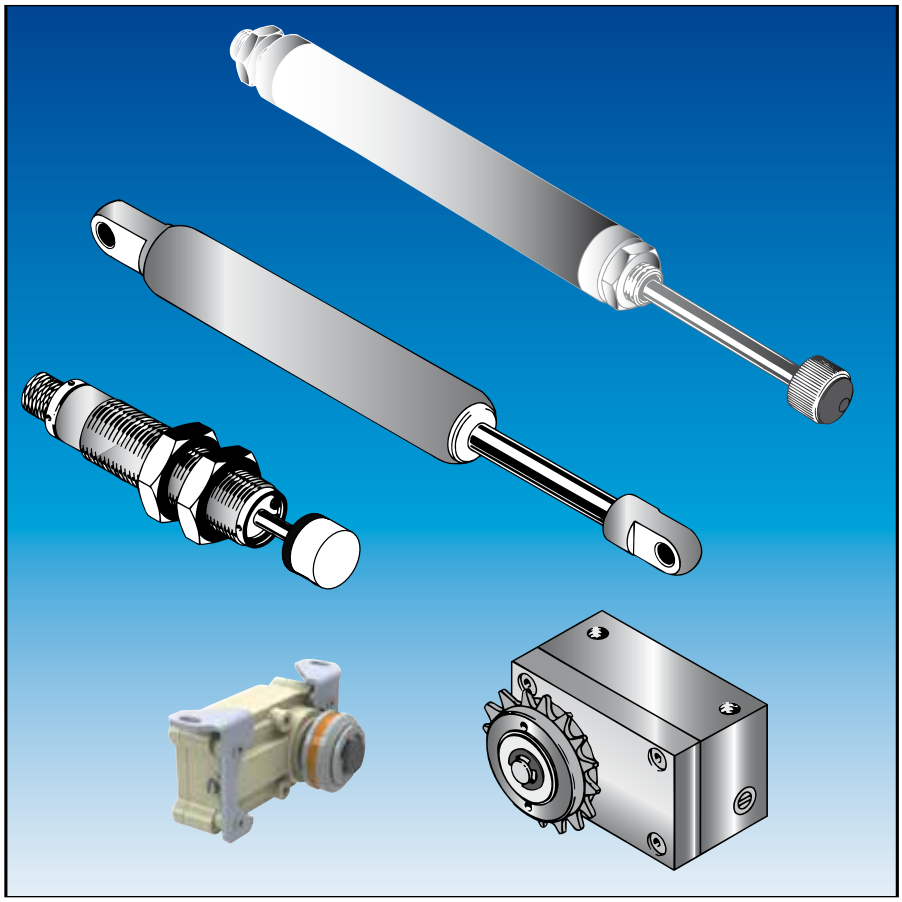
Oil dampers with fixings on both ends are connected firmly to the object that has to be damped (e.g. a flap). This way they control the movement from the very first moment. They are fabricated in two different lines: adjustable and preset.

3) High-performance final dampers

These dampers slow down high loads on a very short distance. They are mainly used in machine construction.

4) Radial dampers

Radial dampers use the rotation principle for damping. This way they provide constant damping even for high loads over large travel distances (e.g. sliding doors).



Summary

Types of dampers	linear and radial
Damping	hydraulic
Damping fluid	hydraulic, biological, silicone oil
Product range	standard product line and
	customized production
	(also single units)

Functional Principle

Basic Information

Masses are moved almost everywhere in daily life and working units: doors and gates, flaps, transported goods or machinery parts. These involve high kinetic energy and high impact speed. If these forces are not controlled and slowed down, products and machinery can be damaged and people can get injured.

DICTATOR dampers are based on the principle of transforming kinetic energy into thermal energy. The movement is transmitted to the damping cylinder - depending on the type of damper either via the piston rod or the wheel of the radial damper. Inside the cylinder the piston or the gear pump displaces the hydraulic fluid and pushes it through one or several of the throttling ports. With most DICTATOR dampers the diameter of the throttling port can be adjusted individually to achieve an optimum damping result for different requirements.

In the following the functioning principles of the different types of dampers are shown, along with information for which application area each type is designed.

Fields of Application

Final dampers are needed to slow down the rotative or linear movement of all kinds of objects. DICTATOR final dampers are used

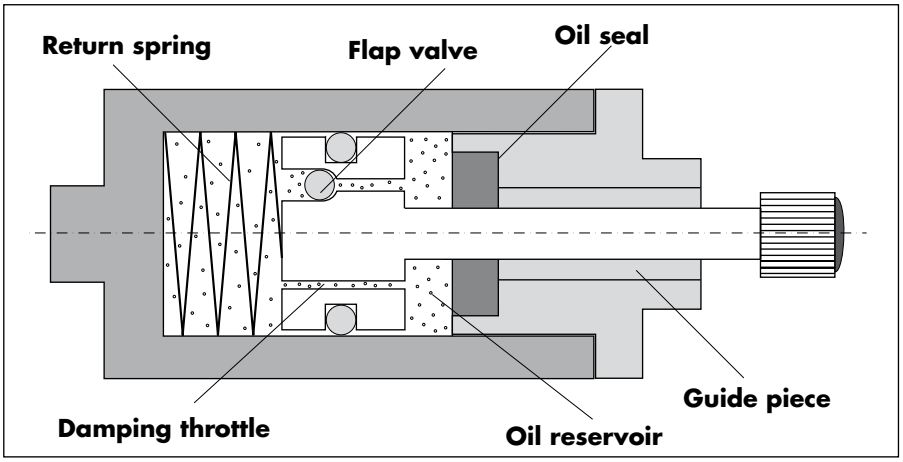
- if the distance is too large to control the movement during the whole travel.
- if the object should move unrestrictedly during most of the distance (e.g. as fast as possible).
- due to space restrictions.

The relatively long strokes offer saftey distances allowing for protection against pinching and squeezing.

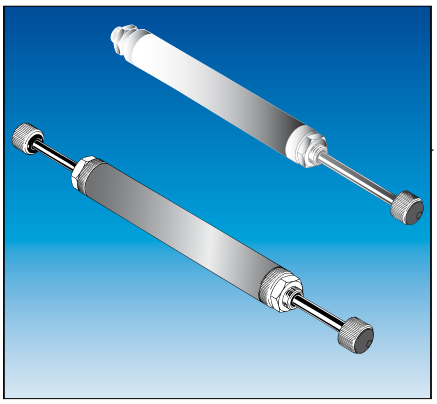
Detailed examples you will find in our overview folder.

Functional Principle of Final Dampers

Basic functional principle



Hydraulic dampers are an indispensable alternative to springs (spiral springs, rubber buffers) as these return the taken energy at once by springing back. They lessen the impact but neither can regulate nor slow down the kinetic energy. Hydraulic dampers in contrast bring moving objects in a controlled way to a standstill. The movement of the impacting mass is transferred by the piston rod to the damper. The entering piston is damped continually by pushing the oil in the cylinder through one or several throttling ports. The displaced oil is collected in a reservoir. From there it flows back by the flap valve as soon as the piston rod returns to its starting position.



Functional Principle - cont.

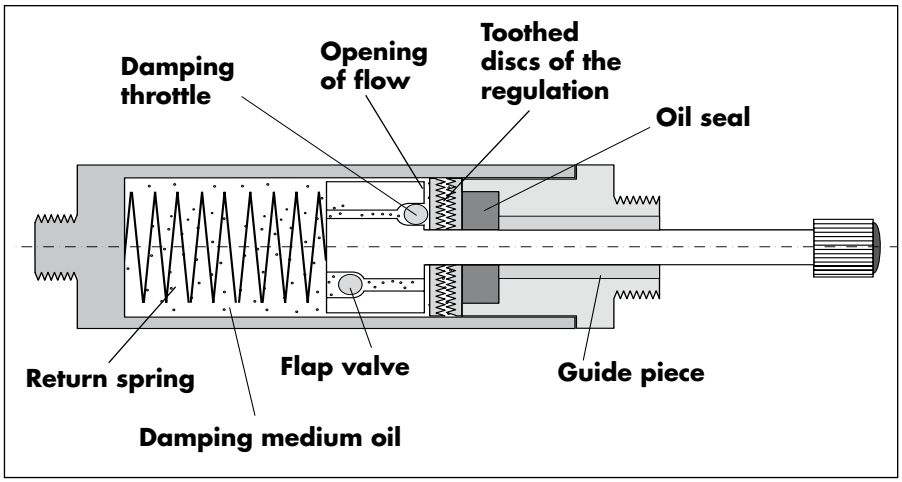
The diameter of the throttling port in the piston is adjustable with the final dampers.

There exist **two different kinds of adjusting**:

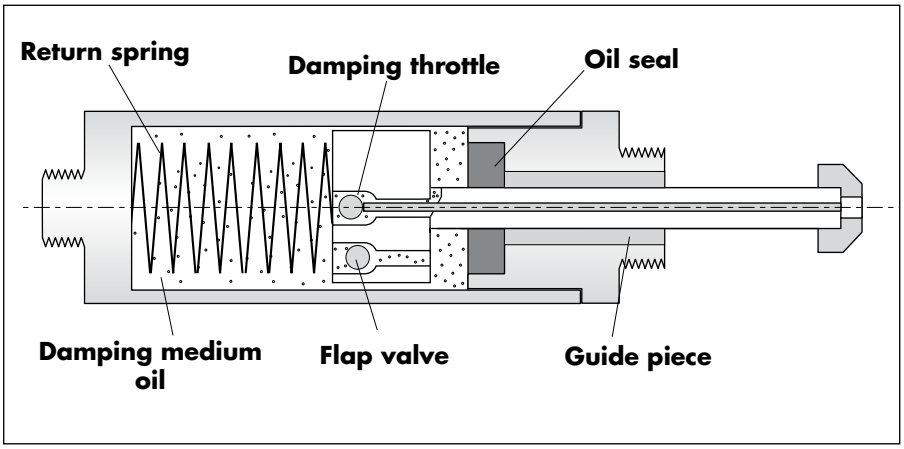
- stepped adjustment
- screw adjustment

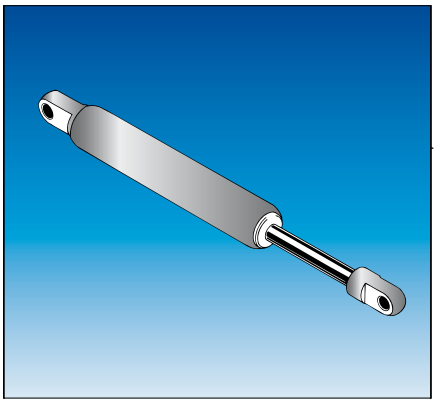
The stepped adjustment is more common. It has got its name by two toothed discs, which allow to adjust the opening of the throttling port only when being intertwined. The farther to the front the two discs are positioned the bigger is the flow opening for the oil, i.e. the less the damping.

To adjust the opening of the throttling port the piston rod has to be pulled out completely.



The screw adjustment allows a very precise adjustment and works as follows: The throttling port in the piston is adjusted by a setting screw in the front of the piston rod. The adjusting bar changes the position of the ball in the throttling port: the farther it is pushed to the back the more oil can flow through, i.e. the less is the damping. However this type of regulation is only possible with the damper types EDH 28 and ZDH 28, because the buckling resistance of the piston rod with the internal bore is diminished in comparison to one of solid material.





Functional Principle of Oil Dampers with Fixings on Both Ends

DICTATOR oil dampers with fixings on both ends are choosen,
- when you need a damping as constant as possible during the whole travel.
- if otherwise the risk of accident would be too high (e.g. with roof hatches).

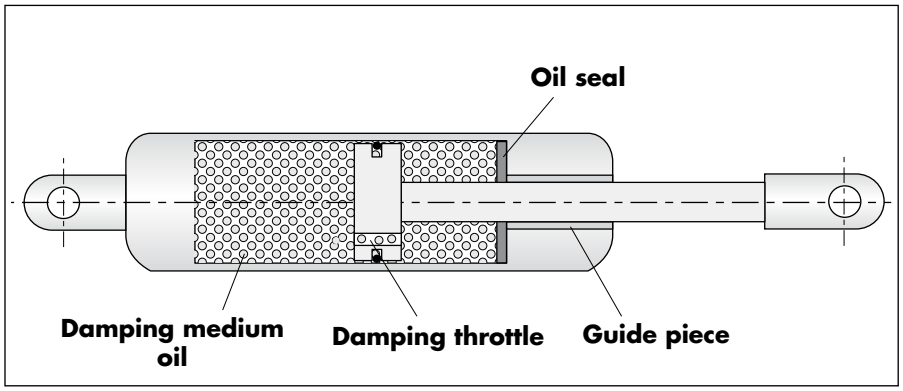
Oil dampers are installed in the same way as gas springs. But contrary to gas springs, which for example should assist in opening, they are intended to damp a movement (e.g. to prevent a hatch opening too fast downward).

Detailed examples you will find in our overview folder.

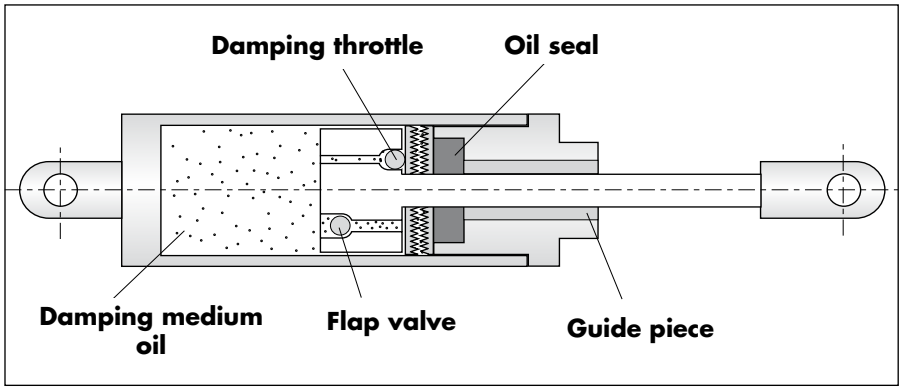
Functional Principle of Oil Dampers with Fixings on Both Ends

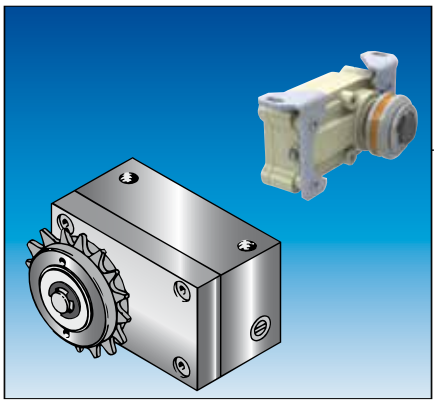
Apart for some exceptions oil dampers with fixings on both ends are always **custom made** as they are connected firmly with the object to be dampened. They are availabe with and without adjustment of the damping. The factory preadjusted oil dampers (ÖD) are mainly used in unchanging applications (e.g. damping of a flap in a serial-production machine) or when all data to calculate the necessary damping force are known. The non-adjustable oil dampers are more economic than the ones with regulation (ÖDR).

To determine the required damping with the preadjusted oil dampers with fixings on both ends we need among other data the mass to slow down and its speed, as they determine the diameter of the throttling port in the piston. Our technical service will gladly assist you in calculating and choosing the appropriate oil damper. We just need the information asked for in the questionnaire on pages 03.068.00 et sqq.at the end of this chapter.



The **adjustable oil dampers with fixings on both ends (ÖDR)** use the stepped adjustment of the final dampers. The damping is adjusted by pulling and turning the piston rod.





Functional Principle Radial Dampers

DICTATOR radial dampers are designed to continuously control the speed of high masses on long distances. The movement is controled during the whole travel. Often they are used on sliding doors.

To transfer the force to be controlled to the radial damper there exist different possibilities: by tensioned chain or rope, by revolving chain, rope or toothed belt, by rack or directly by a friction wheel on the radial damper.

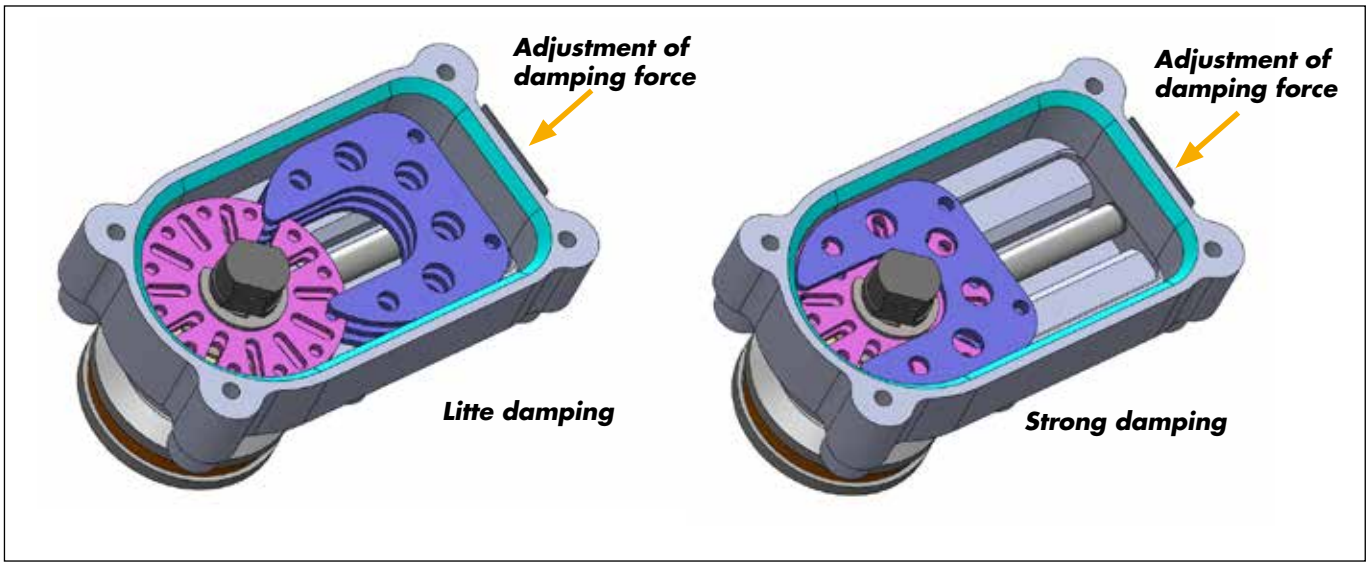
The radial dampers are furnished in two different base types: in a plastic casing or in an aluminium casing (for very heavy loads and for use on fire protection doors).

Detailed examples you will find in our overview folder.

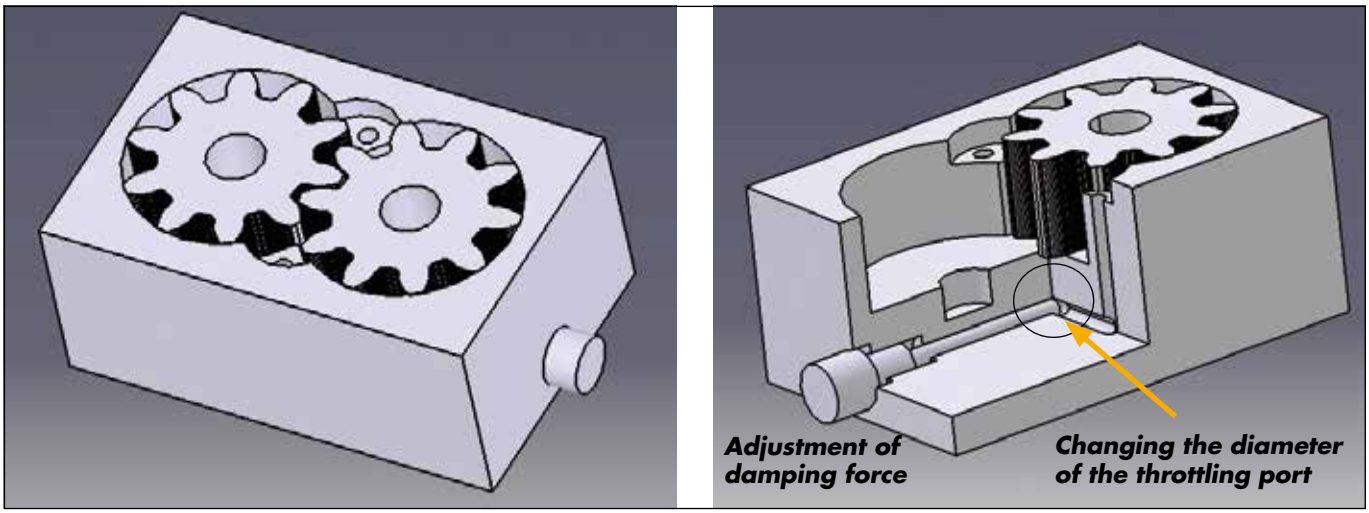
Functional Principle Radial Dampers

The damping force of the radial dampers can be adjusted continuously.

The damping force of the **lamellar radial dampers LD** is determined by how far the movable lamellae gear into the lamellae fixed on the axle of the damper. The farther they gear into, the stronger the damping.



In case of the radial dampers **type RD 240/241** the damping is adjusted by an adjusting screw on the side of the aluminium casing.



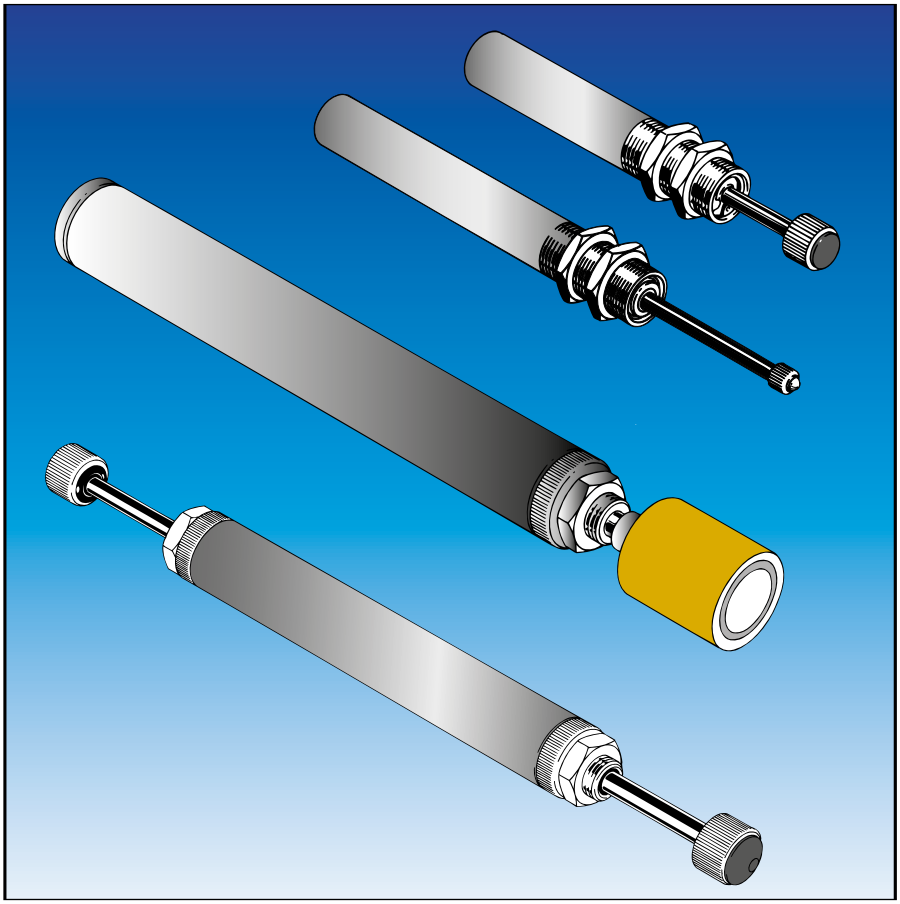
DICTATOR Final Dampers

DICTATOR final dampers are needed to slow down all kinds of rotative or linear movement. Their relatively long strokes offer sufficient saftey distances. The final dampers are available in both single (EDH) and bi-directional (ZDH) configurations.

A large variety of dimensions is on stock. In addition we furnish customized dampers, same as with the oil dampers with fixings on both ends and the gas springs (see extra chapter) - even single pieces.

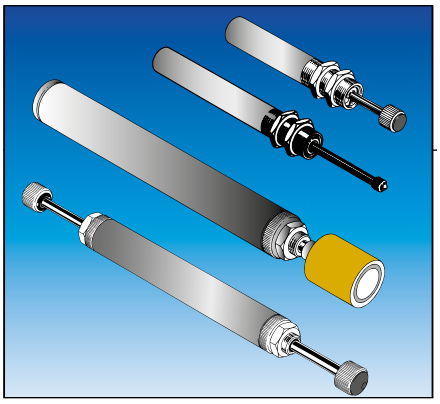
The DICTATOR production program is very comprehensive and thus offers solutions for a broad spectrum of applications. The most important characteristics of the DICTATOR final dampers are:

- many different diameters
- stroke depends on application
- different buffers or piston rod end fittings
- different possibilities of resetting
- fixing possibilities
- all final dampers are adjustable
- with and without overload safety valve
- partly with authorization for fire protection applications



Technical Data

Diameter piston rod	0.16, 0.24, 0.33, 0.39, 0.47, 0.98 inch (as standard)
Diameter cylinder	0.55, 0.79, 1.1, 1.38, 2.72 inch (as standard)
Material piston rod	hard chromed, AISI 304, AISI 316
Material cylinder	steel tube zinc or nickel plated, painted, AISI 304, -316, aluminium
Stroke lengths	0.79 to 39.37 inch
Damping fluids	hydraulic oil, biological oil (on demand also with FDA authorisation)
Damping forces	up to 2700 lbf

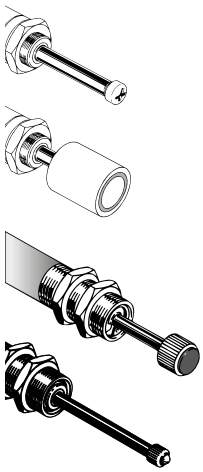


Final Damper Variations

Almost all dampers of the DICTATOR standard program can be produced as modified types. Generally just the relation between the diameter of piston rod and cylinder has to be observed.

Apart from other dimensions a large range of other features is variable:
material, finish, damping characteristics, end fittings, type of fixing, special damping fluids etc.
On the following pages you will find the standard dampers of the different diameter series. Here all the above mentioned variables may be adapted to your requirements. Just ask our technical department.

End Fittings



Most final dampers are equipped with a **rubber buffer (PF)** on the piston rod.

Wherever there is any danger that the integrated return spring of the damper might push back e.g. the door (as it is moving very smoothly), the damper is delivered with a **magnet (M)** on the piston rod. When the damped object is removed from the damper, the magnet adheres to it until the piston rod is completely extended. Besides the standard magnet there are other dimensions/forces available as well as the **neodym magnet**. This special magnet represents a very economic alternative. However it can not be used when there are high surrounding temperatures (max. temperature 176 °F compared to 248 °F of the standard magnets). Furthermore the neodyn magnet has a higher back reflection and therefore should not be used anywhere where this might cause problems.

A further possibility is the **ball head (K)**. It is mainly used when the impact of the mass is not exactly in-line.

The dampers can also be produced with **customized threads on cylinder and piston rod** (there an inside thread is also possible). This allows for the use of other buffers or fixing parts.

Fixing

The cylinders of the **final dampers** are normally provided with a thread at the front and partly also at the rear of the cylinder. Furthermore they can be furnished with a thread on the cylinder itself, either end-to-end or just part of it.

For the dampers of the series EDH 28 and ZDH 28 we provide standard fixing accessories (see page 03.026.00).

Resetting of the Piston Rod

With final dampers it must be assured that the piston rod always returns to its extended position in order to be ready to work again on the next impact of the load. This normally is achieved with a **built-in return spring (RF)**. During the entering of the piston rod into the cylinder this spring is compressed and automatically pushes out the piston rod as soon as the dampened object is withdrawn.

The second standard option with single final dampers (EDH) is a **permanent magnet** on the piston rod (see above). As counterpart to the permanent magnet there is needed on the door either an even iron area or an extra counter plate (part no. 040025) has to be installed.

Further possibilities are (on request):
- an outside return spring (reduces the total length of the damper)
- nitrogen (when the damping has to be as linear as possible)

For the bi-directional dampers **ZDH** we offer the following resetting alternatives:
- built-in return springs for both piston rods (**ZDH a**)
- return spring for one piston rod (side A), the other piston rod (side B) is pushed out by the entering piston rod of side A (**ZDH aeg**)
- without return spring: the piston rods are pushed outside by one another (**ZDH bg**)

Final Damper Variations, continuation

Adjustment of the Damping Force

The damping force of final dampers can be **adjusted** continuously. Depending on the application or the requirements this is either done with a screw in the front of the piston rod (**screw adjustment = NR**) or by pulling and turning the piston rod (**stepped adjustment = ZR**).

A self-acting adjustment of the stepped adjustment is not possible, as this adjustment only works when you pull the piston rod sufficiently to engage two toothed discs on the piston. Only then you can adjust the damping force by turning the piston rod.

The screw adjustment allows an absolutely precise adjustment. A misadjustement by mistake is almost impossible. It is however only available for dampers of the ø 1.1" series. Dampers for high loads (for reasons of stability) can only be produced with the stepped adjustment.

Types of Damping

Depending on the requirements of the application hydraulic dampers offer different damping characteristics. The three types are:

- Constant (**k**): uniform damping during the whole travel
- Progressive (**p**): gentle start and then progressive damping
- **ABS**: In case of a too high impact the overload safety valve in the piston opens and thus prevents blocking. Otherwise this impact could cause the piston rod to bend.

Safety Instructions

The damper has to be installed in a way that the impact hits the piston rod exactly in-line. This prevents lateral forces which could damage/destroy the damper.

To avoid loss of oil or complete failure, the surface of the piston rod should be protected against damages and heavy soiling (e.g. colour).

As a failure could provoke dangerous situations, you should fix the damper securely and look for oil leakage. Due to the oil and/or gas pressure, dampers are not to be opened or damaged (risk of injuries).

Calculation Instructions

Starting on page 03.071.00 you will find instructions how to choose the appropriate damper and formula to calculate the needed damping force. The correction factor needed for this purpose you will find on the following pages.

But DICTATOR would be glad to do this work for you. Just fill in the questionnaires on pages 03.066.00 and 03.067.00 and send it to us.

Overview Production Range of Final Dampers

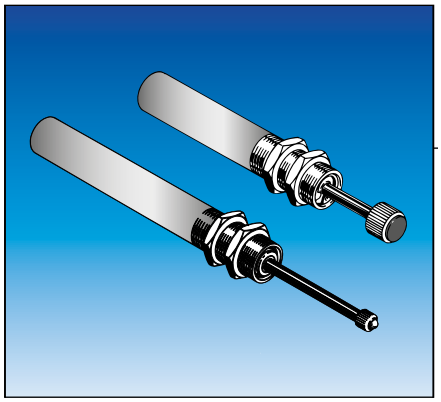
Final Dampers

	Series					
ø piston rod [mm/inch]	4/0.16	6/0.24	8.5/0.33	10/0.39	12/0.47	25/0.98
ø cylinder [mm/inch]	14/0.55	20/0.79	28/1.1	28/1.1	35/1.38	69/2.72
Stroke max. [inch]	1.97	2.95	4.72	7.87	19.69	39.37
Damping force max. [lbf] (depending on the stroke: the shorter the stroke, the stronger the damping force))	393.75	697.5	1170	1170	3937.5	4950
Type of adjustment	ZR	ZR	NR, ZR	ZR	ZR	ZR
Type of damper						
- single (EDH)	x	x	x	x	x	x
- bi-directional (ZDH)			x	x	o	
End fitting piston rod						
- damper EDH	PF, K, M	PF, K, M	PF, M	PF, M	PF, M	point
- damper ZDH			PF	PF		
Resetting of the piston rod						
- damper EDH	RF, M	RF, M	RF, M	RF, M	RF, M	RF
- damper ZDH (customized dampers on request)			a, aeg	a, aeg bg	a, aeg bg	bg
Damping	k, ABS	k, ABS ABS	k, p ABS	k, p ABS	k, p ABS	k, p
Material piston rod						
- hard chromed	x	x	x	x	x	x
- AISI 304	o	o	x	x	o	o
- AISI 316	o	o	o	o	o	o
Material cylinder						
- steel nickel-plated	x	x	o	o	o	x
- steel zinc-plated	o	o	x	x	x	o
- steel powder-coated	o	o	o	o	o	o
- AISI 304	o	o	x	x	o	o
- AISI 316	o	o	o	o	o	o
Temperature range						
32° to 140 °F	x	x	x	x	x	x
to 176 °F	o	o	o	o	o	o
to -22 °F	o	o	o	o	o	o
Damping medium						
- hydraulic oil	x	x	x	x	x	x
- biological oil	o	o	o	o	o	o
- silicone oil	o	o	o	o	o	o

Key:

ZR	stepped adjustment
NR	needle adjustmen
PF	rubber buffer
K	ball head
M	permanent magnet
RF	return spring
a	extending automatically
aeg	side A extending automatically side B pushed out by side A
bg	sides A and B push out one another
k	constant/uniform damping
p	progressive damping
ABS	overload saftey valve
x	standard
o	on request

For explications please see the previous pages.



Final Dampers Series EDH 14

For impact loads up to 220 lbs

The series EDH 14 comprises the smallest standard final dampers. The diameter of the piston rod of 4 mm/0.16" allows them to be used with accordingly short strokes for loads up to 220 lbs.

The damping force can continuously be adjusted by turning the piston rod.

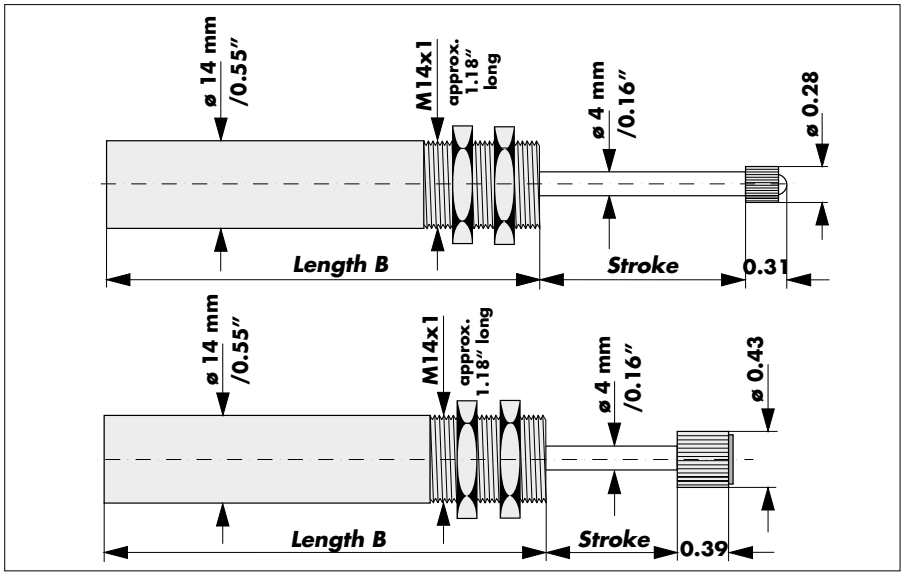
The dampers EDH 14 are available with and without overload safety valve (ABS).

Dampers of the series EDH 14 and EDH 20 are for example used in handling systems, small robots, turnstiles and for slowing down rotative movements.

Technical Data

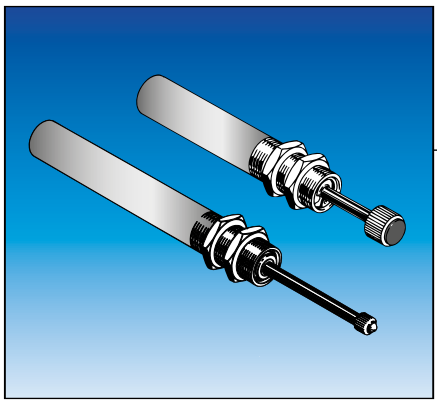
Finish	nickel-plated, piston rod hard chromed
Adjustment	pulling and turning of the piston rod
Types of damping	constant, ABS
End fittings for the piston rod	buffer, ball head (for rotary motion)
Fixing	thread on cylinder with two nuts
Impact speed	3.94 to 35.43 inch/s
Correction factor (see p. 03.072.00)	f_K = 2.0
Returning force (internal spring)	6.75 lbf
Energy per stroke	max. 11.8 lbf ft
Ø piston rod / Ø cylinder	4 mm/0.16" / 14 mm/0.55"
Length of stroke	max. 1.97 inch
Strokes per minute	maximum 10
Operating temperature	32° to 140 °F (on request: -22 °F, 176 °F)

Dimensions



Order Information
Standard Types

Part no. with ABS ball head	Part no. without ABS ball head	Part no. with ABS buffer	Part no. without ABS buffer	Stroke [inch]	Impact load max. [lbs]	Damping force max. [lbf]	LengthB [inch]
201923	201823	201920	201820	0.79	220	393.75	3.43
201924	201824	201921	201821	1.38	165	202.5	4.02
201925	201825	201922	201822	1.97	110	157.5	4.61



Final Dampers Series EDH 20

For impact loads up to 550 lbs

The construction of the series EDH 20 mostly corresponds to the series EDH 14. Due to the larger diameter of 0.24" of the piston rod it can slow down impact loads up to 550 lbs. Please keep in mind that the longer the stroke the less is the maximum admissible impact load (see table below).

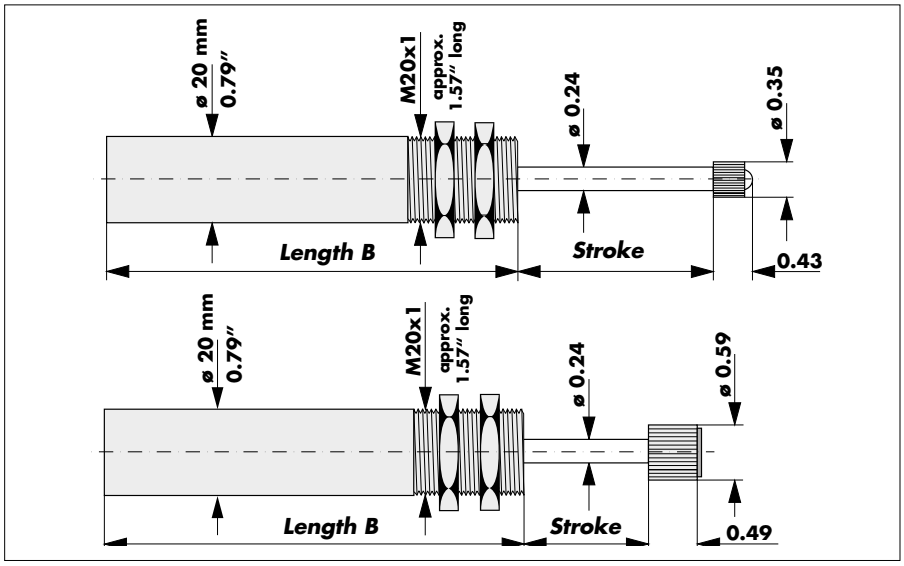
The damping force can continuously be adjusted by turning the piston rod.

The final dampers EDH 20 are availabe with and without overload safety valve (ABS). If the impact is too heavy, this valve in the piston opens and prevents blocking. Otherwise the piston rod might bend.

Technical Data

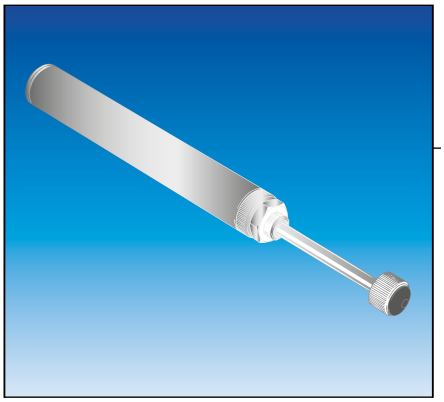
Finish	nickel-plated, piston rod hard chromed
Adjustment	Pulling and turning of the piston rod
Types of damping	constant, ABS
End fittings for the piston rod	buffer, ball head (for rotary motion)
Fixing	thread on cylinder with two nuts
Impact speed	3.94 to 35.43 inch/s
Correction factor (see p. 03.072.00)	f_K = 2.0
Returning force (internal spring)	6.75 lbf
Energy per stroke	max. 39.83 lbf ft
Ø piston rod / Ø cylinder	6 mm/0.24" / 20 mm/0.79"
Length of stroke	max. 2.95 inch
Strokes per minute	maximum 10
Operating temperature	32° to 140 °F (on request: -22 °F, 176 °F)

Dimensions



Order Information
Standard Types

Part no. with ABS ball head	Part no. without ABS ball head	Part no. with ABS buffer	Part no. without ABS buffer	Stroke [inch]	Impact load max. [lbs]	Damping force max. [lbf]	LengthB [inch]
201915	201815	201911	201811	0.98	550	697.5	4.21
201916	201816	201912	201812	1.97	275	483.75	5.2
201917	201817	201913	201813	2.95	165	324	6.18



Final Dampers Series EDH 28

For impact loads up to 6600 lbs - Return spring, one fixing thread

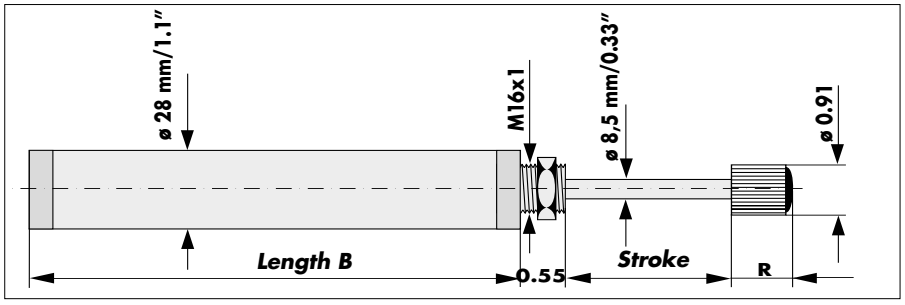
The series EDH 28 is the one of the final dampers offering the greatest variety: many different stroke lengths, with and without return spring, also in AISI 304 and AISI 316, different possibilities of adjusting. For this series we also offer standard fixing accessories.

The adjusting is done either by stepped adjustment ZR (pulling and turning of the piston rod) or by screw adjustment NR (adjustment screw in the front of the piston rod). This series with one fixing thread is intended for stroke lengths up to 4.72 inch.

Technical Data

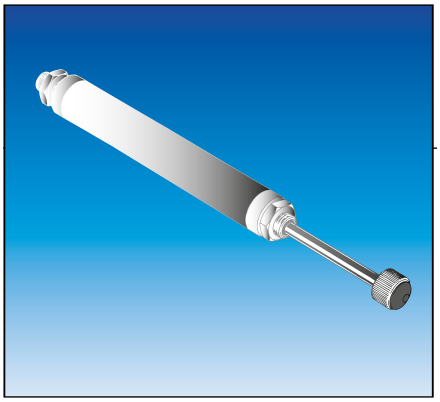
Finish	zinc-plated, piston rod hard chromed
Adjustment	screw or stepped adjustment
Types of damping	constant, ABS, progressive
End fitting for the piston rod	buffer
Fixing	one thread at the front of the cylinder
Impact speed	3.15 to 78.74 inch/s
Correction factor (see p. 03.072.00)	f_K = 2.5
Returning force (internal spring)	6.75 lbf (from 4.72" stroke: 9 lbf)
Energy per stroke	max. 113.58 lbf ft
Ø piston rod / Ø cylinder	8.5 mm/0.33" / 28 mm/1.1"
Length of stroke	max. 4.72 inch
Strokes per minute	maximum 10
Operating temperature	32° to 140 °F (on request: -22 °F, 176 °F)

Dimensions



Order Information
Standard Types

Part no.	Stroke [inch]	Impact load max. [lbs]	Damping force max. [lbf]	Energy/stroke max. [lbf ft]	Length B [inch]	Buffer size R [inch]	Damping type	Adjustment
200000	1.97	6600	1170	113.58	5.12	0.55	k	NR
200400	1.97	6600	1170	109.9	6.18	0.98	ABS	ZR
200002	1.97	6600	1170	113.58	5.12	0.98	k	ZR
200100	2.76	6600	990	113.58	6.26	0.55	k	NR
200410	2.76	6600	990	109.9	7.56	0.98	ABS	ZR
200102	2.76	6600	990	113.58	6.26	0.98	k	ZR
200209	2.95	6600	697.5	113.58	7.28	0.98	k	ZR
200200	3.94	6600	697.5	113.58	7.6	0.55	k	NR
200420	3.94	6600	697.5	109.9	8.86	0.98	ABS	ZR
200202	3.94	6600	697.5	113.58	7.6	0.98	k	ZR
200206	3.94	6600	697.5	113.58	10.12	0.98	k	ZR
200300	4.72	6600	585	113.58	8.35	0.55	k	NR
200302	4.72	6600	585	113.58	8.35	0.98	k	ZR



Final Dampers Series EDH 28

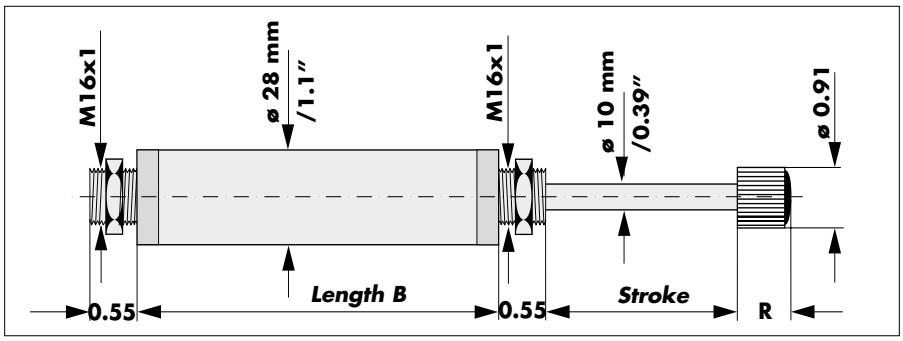
For impact loads up to 6600 lbs - Return spring, two fixing threads

For applications where you need a damper EDH 28 with a longer stroke (4.72 to 7.87 inch) we furnish the version with two fixing threads and a Ø 0.39 inch piston rod.

Technical Data

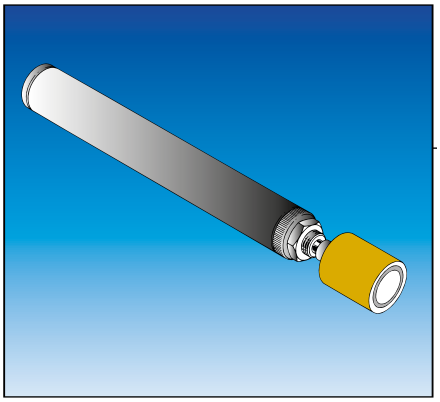
Finish	zinc-plated, piston rod hard chromed
Adjustment	screw or stepped adjustment
Types of damping	constant, ABS, progressive
End fittings for the piston rod	buffer P28-ZR, P28-NR, P28-BS
Fixing	thread at both ends of the cylinder
Impact speed	3.15 to 78.74 inch/s
Correction factor (see p. 03.072.00)	f_K = 2.5
Returning force (internal spring)	6.75 lbf (from 4.72" stroke: 9 lbf)
Energy per stroke	max. 113.58 lbf ft
Ø piston rod / Ø cylinder	10 mm/0.39" / 28 mm/1.1"
Length of stroke	max. 7.87 inch
Strokes per minute	maximum 10
Operating temperature	32° to 140 °F (on request: -22 °F, 176 °F)

Dimensions



Order Information
Standard Types

Part no.	Stroke [inch]	Impact load max. [lbs]	Damping force max. [lbf]	Energy/stroke max. [lbf ft]	Length B [inch]	Buffer size R [inch]	Damping type	Adjustment
200207	3.54	6600	697.5	113.58	8.66	0.98	k	ZR
200203	3.94	6600	697.5	113.58	7.87	0.98	k	ZR
200303	4.72	6600	697.5	113.58	8.66	0.98	k	ZR
203115-28	7.87	6600	540	109.9	12.36	0.98	ABS	ZR



Final Dampers Series EDH M 28

For impact loads up to 6600 lbs - Resetting by magnet

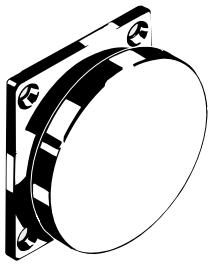
The dampers of the series EDH M 28 are especially used with sliding doors moving very smoothly. When opening the door the magnet adheres as long to the counter plate until the piston rod has been extracted completely. These dampers don't have an internal return spring.

As counterpiece for the permanent magnet on the piston rod you either need an even iron area or a separate counter plate (part no. 040025).

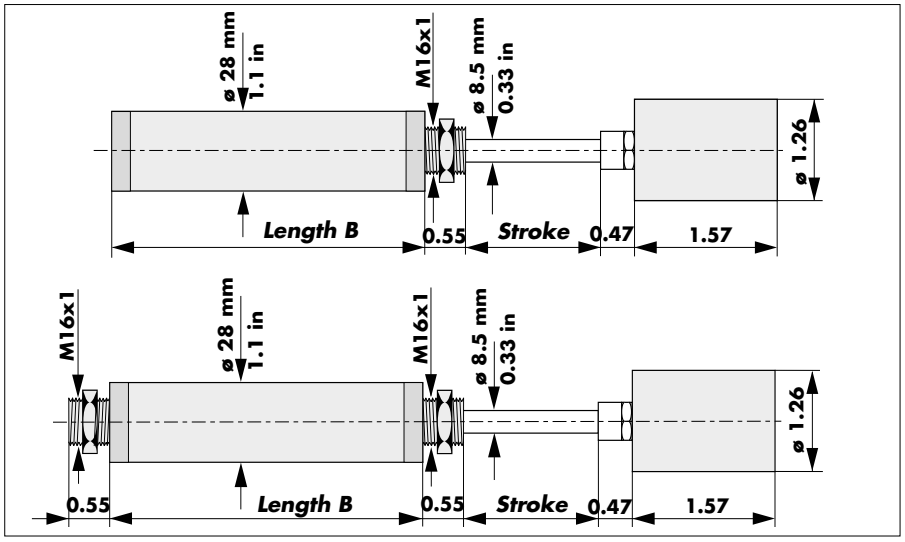
Technical Data

Finish	zinc-plated, piston rod hard chromed
Adjustment	stepped adjustment
Types of damping	constant, ABS, progressive
End fittings for the piston rod	permanent magnet (standard or Neodyn)
Fixing	thread at one or two ends of the cylinder
Impact speed	3.15 to 78.74 inch/s
Correction factor (see p. 03.072.00)	f_K = 2.5
Returning force	0 lbf
Energy per stroke	max. 113.58 lbf ft
Ø piston rod / Ø cylinder	8.5 or 10 mm/0.33 or 0.39" / 28 mm/1.1"
Length of stroke	max. 7.87 inch
Strokes per minute	maximum 10
Operating temperature	32° to 140 °F (on request: -22 °F, 176 °F)

Counter plate
part no. 040025

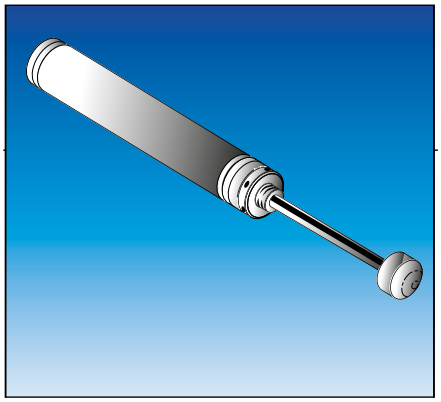


Dimensions



Order Information
Standard Types

Part no.	Stroke [inch]	Impact load max. [lbs]	Damping force max. [lbf]	Energy per stroke max. [lbf ft]	Length B [inch]	Damping type	Fixing thread
203150	1.97	6600	1170	113.59	5.12	k	1
200101	2.76	6600	990	113.59	6.42	k	1
203015	4.72	6600	585	109.9	8.66	k	2
200600-28	7.87	6600	540	109.9	12.95	k	2



Final Dampers Series EDH 28 in Stainless Steel

For impact loads up to 2200 lbs - Return spring, one fixing thread

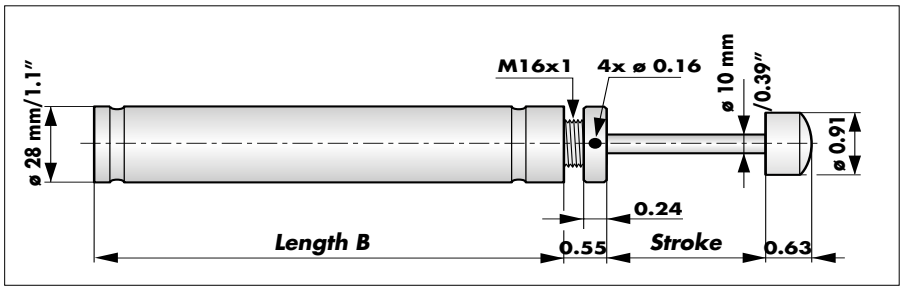
Final dampers of the series EDH 28 also can be produced in stainless steel. They are designed e.g. for applications in the food processing industry (AISI 304) or in tunnels (AISI 316).

A special application area for stainless steel dampers (AISI 304) is the medical sector. If necessary, all parts including the inner components can be produced out of unmagnetic material.

Technical Data

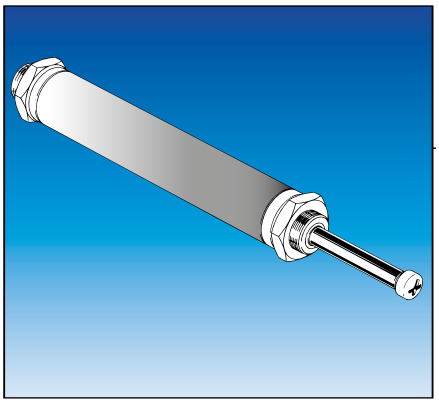
Finish	AISI 304 (standard) or AISI 316
Adjustment	stepped adjustment
Types of damping	constant, ABS, progressive
End fitting for the piston rod	buffer from Delrin
Fixing	one thread at the front of the cylinder
Impact speed	3.94 to 78.74 inch/s
Correction factor (see p. 03.072.00)	f_K = 2.5
Returning force (internal spring)	6.75 lbf (from 4.72" stroke: 9 lbf)
Energy per stroke	max. 109.9
Ø piston rod / Ø cylinder	10 mm/0.39" / 28 mm/1.1"
Length of stroke	max. 7.87 inch
Strokes per minute	maximum 10
Operating temperature	32° to 140 °F (on request: -22 °F, 176 °F)

Dimensions



Order Information
Standard Types

Part no.	Stroke [inch] max. [lbs]	Impact load max. [lbf]	Damping force max. [lbf ft]	Energy per stroke	Length B [inch]	Damping type	Material
200520	1.97	2200	1170	109.9	5.12	k	AISI304
200525	3.94	2200	697.5	109.9	7.6	k	AISI304
200530	7.87	2200	540	109.9	12.36	k	AISI304



Final Dampers Series EDH 35

For impact loads up to 13200 lbs - Return spring, two fixing threads

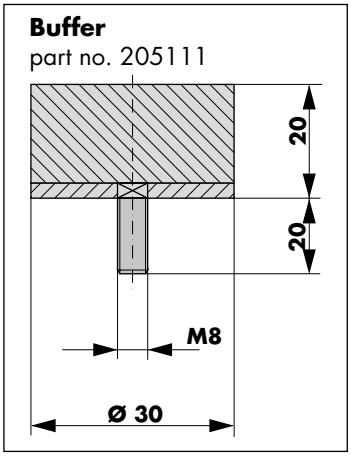
The DICTATOR final dampers of the series EDH 35 are intended for heavy impact loads. The maximum damping force depends on the stroke length: the shorter the stroke the higher the damping force.

The standard version is supplied with inside thread in the piston rod. As accessories a buffer, part no. 205111, is available.

The field of application comprises heavy sliding gates, shifting racks in storage rooms, machine slides.

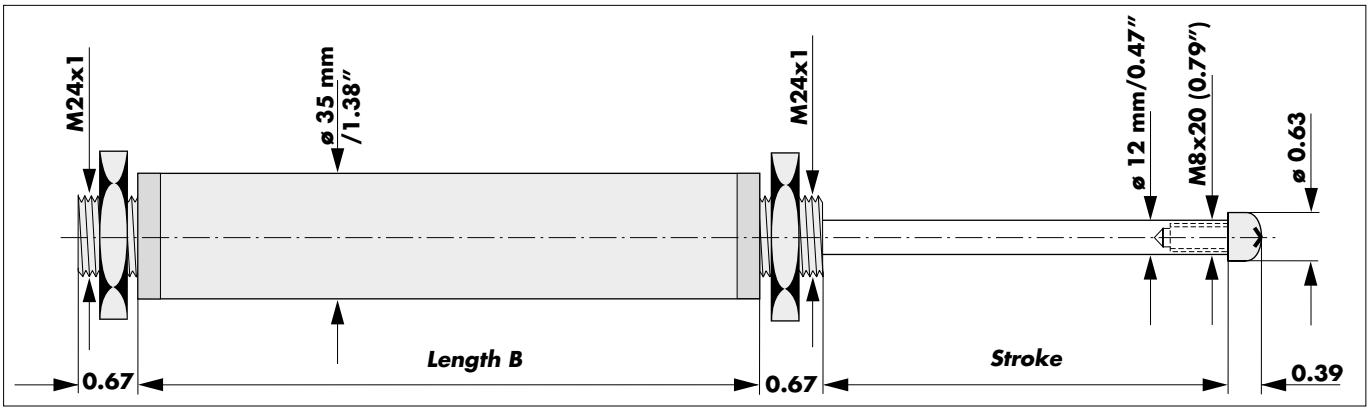
Technical Data

Buffer
part no. 205111



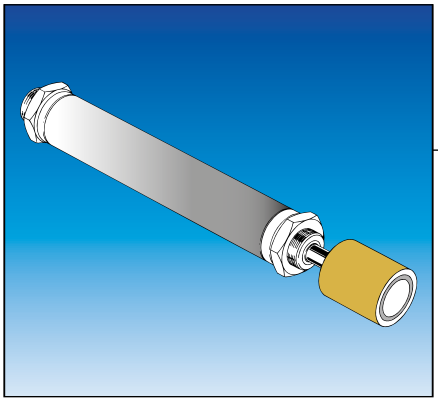
Finish	zinc-plated, piston rod hard chromed
Adjustment	stepped adjustment
Types of damping	constant, progressive
End fitting for the piston rod	inside thread M8x20 (x0.79") with screw
Fixing	threads at both ends of the cylinder
Impact speed	3.15 to 78.74 inch/s
Correction factor (see p. 03.072.00)	f_K = 2.5
Returning force (internal spring)	10.13 - 13.5 lbf
Energy per stroke	max. 323.05 lbf ft
Ø piston rod / Ø cylinder	12 mm/0.47" / 35 mm/1.38"
Length of stroke	max. 19.69 inch
Strokes per minute	maximum 10
Operating temperature	32° to 140 °F (on request: -22 °F, 176 °F)

Dimensions



Order Information
Standard Types

Part no.	Stroke [inch]	Impact load max. [lbs]	Damping force max. [lbf]	Energy per stroke max. [lbf ft]	Length B [inch]	Damping type	Returning force max. [lbf]
200309	1.97	13200	3937.5	323.05	7.24	k	10.13
200310	2.76	13200	2812.5	323.05	8.03	k	10.13
200311	3.94	13200	1980	323.05	9.06	k	10.8
200312	5.91	13200	1305	323.05	11.34	k	11.25
200500	7.87	13200	990	323.05	12.99	k	11.25
200320	19.69	13200	405	323.05	29.09	k	13.5



Final Dampers Series EDH M 35

For impact loads up to 13200 lbs - Resetting by magnet

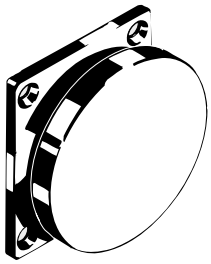
The technical data of the DICTATOR final dampers series EDH M 35 correspond to those of the series EDH 35. The only difference is the missing internal return spring. When the door is opened the magnet pulls the piston rod back to its extended position.

As counterpiece for the permanent magnet on the piston rod you either need an even iron area or a separate counter plate (part no. 040025).

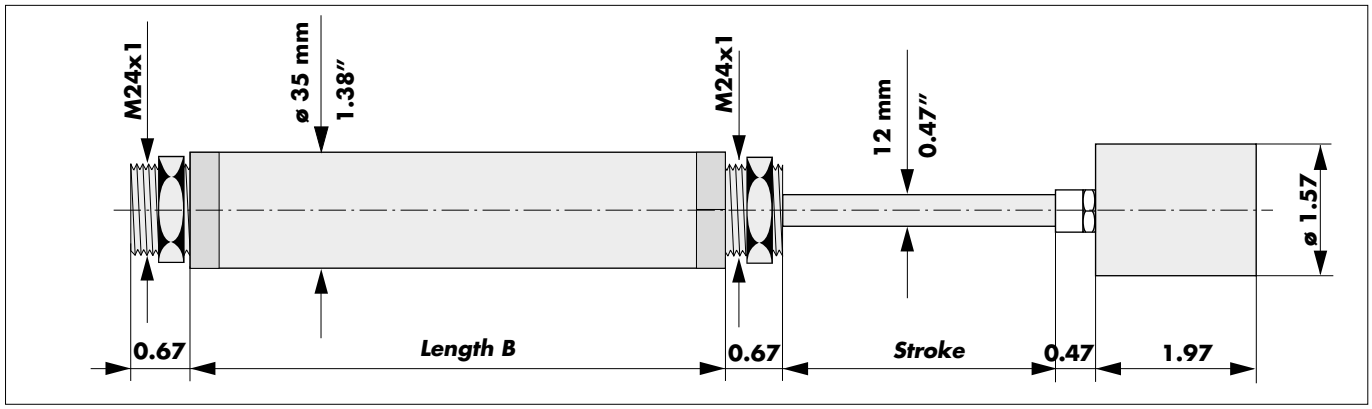
Technical Data

Finish	zinc-plated, piston rod hard chromed
Adjustment	stepped adjustment
Types of damping	constant, progressive
End fitting for the piston rod	permanent magnet
Fixing	threads at both ends of the cylinder
Impact speed	3.15 to 78.74 inch/s
Correction factor (see p. 03.072.00)	f_K = 2.5
Returning force	0 lbf
Energy per stroke	max. 323.05 lbf ft
Ø piston rod / Ø cylinder	12 mm/0.47" / 35 mm/1.38"
Length of stroke	max. 19.69 inch
Strokes per minute	maximum 10
Operating temperature	32° to 140 °F (on request: -22 °F, 176 °F)

Counter plate
part no. 040025

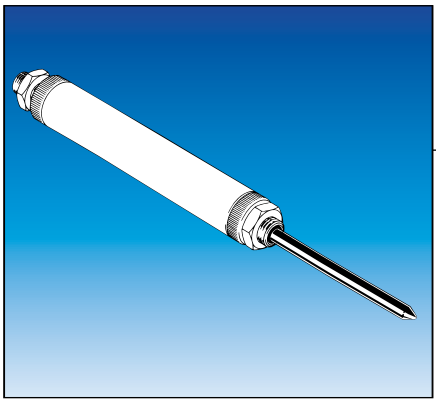


Dimensions



Order Information
Standard Types

Part no.	Stroke [inch]	Impact load max. [lbs]	Damping force max. [lbf]	Energy per stroke max. [lbf ft]	Length B [inch]	Damping type	Returning force max. [lbf]
200313	3.94	13200	1980	323.05	8.82	k	0
200600	7.87	13200	990	323.05	12.99	k	0



Final Dampers Series EDH 69

For impact loads up to 33000 lbs - Return spring, two fixing threads

The series EDH 69 represents the largest and strongest DICTATOR final dampers. The maximum damping force depends on the stroke length: the shorter the stroke the higher the damping force.

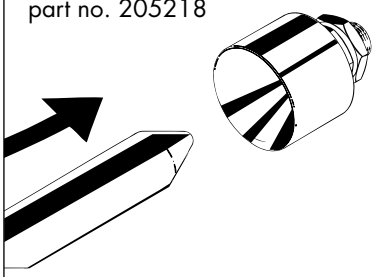
The field of application comprises e.g. heavy sliding gates, shifting racks in storage rooms, machine slides.

As counter piece for the piston rod we furnish an intake guide.

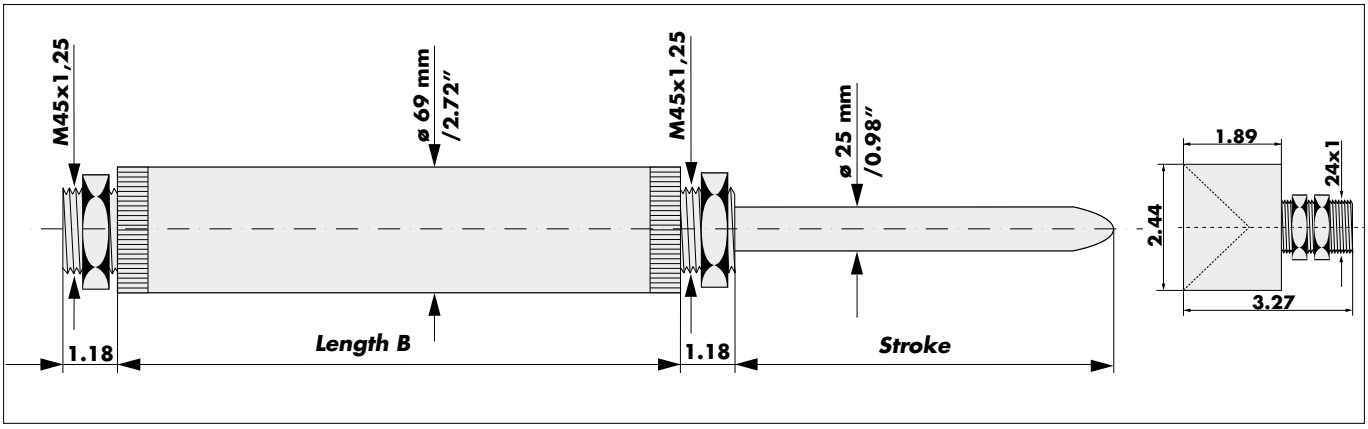
Technical Data

Finish	zinc-plated, piston rod hard chromed
Adjustment	stepped adjustment
Types of damping	constant, progressive
End of piston rod	tip (standard) or thread
Fixing	threads at both ends of the cylinder
Impact speed	3.94 to 78.74 inch/s
Correction factor (see p. 03.072.00)	f_K = 2.5
Returning force (internal spring)	18 lbf
Energy per stroke	max. 2950.25 lbf ft
Ø piston rod / Ø cylinder	25 mm/0.98" / 69 mm/2.72"
Length of stroke	max. 39.37 inch
Strokes per minute	maximum 10
Operating temperature	32° to 140 °F (on request: -22 °F, 176 °F)

Intake guide
part no. 205218

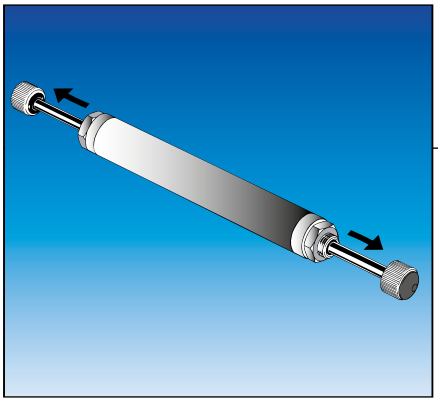


Dimensions



Order Information
Standard Types

Part no.	Stroke [inch]	Impact load max. [lbs]	Damping force max. [lbf]	Energy per stroke max. [lbf ft]	Length B [inch]	Damping type	Returning force max. [lbf]
200780	3.94	33000	2700	2950.25	11.69	k	18
200800	7.87	33000	2700	2950.25	15.63	k	18
200820	11.81	33000	2250	2950.25	20.47	k	18
200840	15.75	33000	1800	2950.25	24.41	k	18
200940	39.37	33000	1350	2950.25	55.91	k	18



Bi-Directional Final Dampers Series ZDH a 28

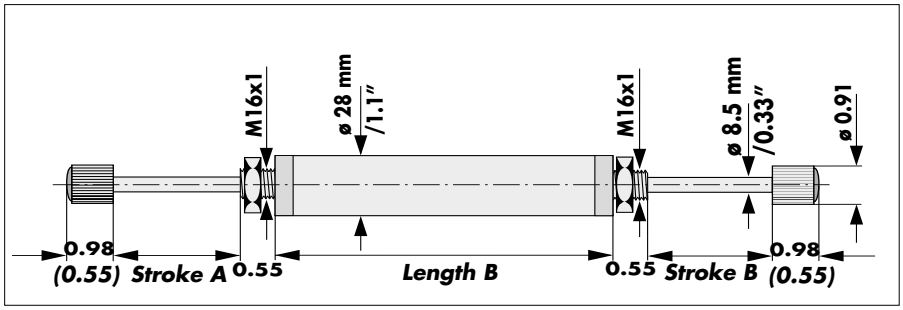
For impact loads up to 2200 lbs - Both sides with return spring

The final dampers of the series ZDH a 28 are characterized by their two piston rods extending independently from one another by an internal return spring. The damper ZDH a 28 is directly fixed to the moving object, thus damping with only one damper both final positions.

Technical Data

Finish	zinc-plated, piston rod hard chromed
Adjustment	screw or stepped adjustment
Types of damping	constant, ABS, progressive
End fittings for the piston rod	buffer (dimensions buffer NR in parentheses)
Fixing	threads at both ends of the cylinder
Impact speed	3.94 to 78.74 inch/s
Correction factor (see p. 03.072.00)	f_K = 2.5
Returning force (internal spring)	min. 6.75 lbf, max. 13.5 lbf
Energy per stroke	max. 121.7 lbf ft
Ø piston rod / Ø cylinder	8.5 mm/0.33" / 28 mm/1.1"
Length of stroke	max. 7.87 inch
Strokes per minute	maximum 10
Operating temperature	32° to 140 °F (on request: -22 °F, 176 °F)

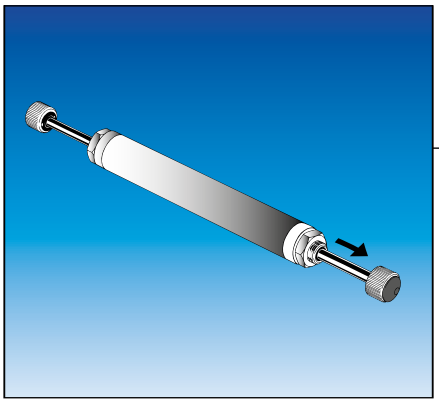
Dimensions



Order Information
Standard Types

Part no.	Stroke A [inch]	Stroke B [inch]	Impact load max. [lbs]	Damping force max. [lbf]	Energy per stroke max. [lbf ft]	Returning force max. [lbf]	Length B [inch]	Damping type	Adjustment
210000	1.97	1.97	1232	967.5	88.51	10.13	5.39	k	NR
210001	1.97	1.97	2200	1125	99.57	10.13	6.5	p	NR
212000	2.76	2.76	1100	787.5	95.88	11.25	6.46	k	NR
210410	2.76	2.76	1540	720	110.63	7.88	9.13	ABS	ZR
210400	2.56	2.56	1540	720	92.2	6.75	10.24	ABS	ZR
210420*	2.36	3.15	1540	945	92.2	6.75	10.24	ABS	ZR
216000	3.94	3.94	1100	540	95.88	11.25	8.7	k	NR
214000	4.72	4.72	1100	382.5	95.88	13.5	9.25	k	NR
218000	3.94	3.94	2200	630	121.7	11.25	10.24	p	NR
213000	4.72	4.72	2200	427.5	121.7	13.5	9.13	p	NR

* Length of thread at stroke A: 1.73"



Bi-Directional Final Dampers Series ZDH aeg 28

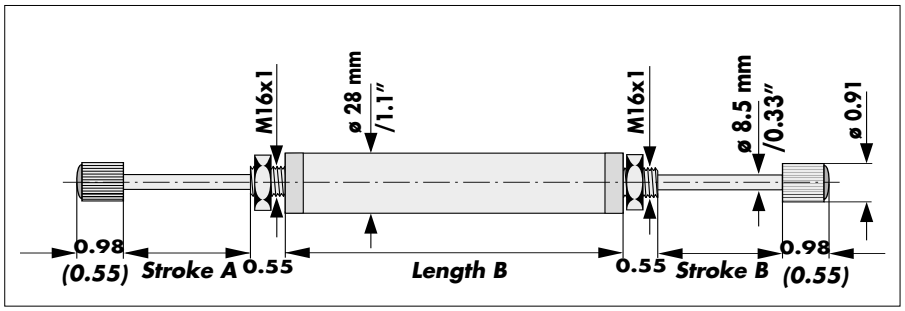
For impact loads up to 2200 lbs - Return spring for one side only

The final dampers of the series ZDH aeg 28 only have on one side (stroke A) a return spring that automatically returns the piston rod. The piston rod on the other side (stroke B) is pushed out by the entering piston rod A. Dampers of this type are often used on sliding doors.
The automatically returning piston rod (stroke A) should point into the opening direction of the door to damp the opening of the door even then when the door, e.g. because of a new opening command, hadn't completely been closed before. The opposite piston rod damps the closing of the door. As on this side there is no return spring, the door won't be reopened.

Technical Data

Finish	zinc-plated, piston rod hard chromed
Adjustment	screw or stepped adjustment
Types of damping	constant, ABS, progressive
End fittings for the piston rod	buffer (dimensions buffer NR in parentheses)
Fixing	threads at both ends of the cylinder
Impact speed	3.94 to 78.74 inch/s
Correction factor (see p. 03.072.00)	f_K = 2.5
Returning force (stroke A)	min. 6.75 lbf, max. 11.25 lbf
Energy per stroke	max. 118.01 lbf ft
Ø piston rod / Ø cylinder	8.5 mm/0.33" / 28 mm/1.1"
Length of stroke	max. 7.87 inch
Strokes per minute	maximum 10
Operating temperature	32° to 140 °F (on request: -22 °F, 176 °F)

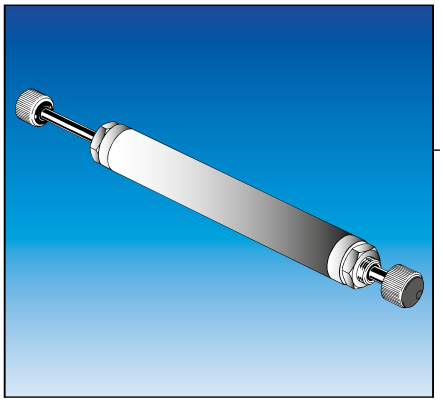
Dimensions



Order Information
Standard Types

Part no.	Stroke A [inch]	Stroke B [inch]	Impact load max. [lbs]	Damping force max. [lbf]	Energy per stroke max. [lbf ft]	Returning force max. [lbf]	Length B [inch]	Damping type	Adjustment
203190	1.97	1.97	2200	1125	99.57	0/10.13	8.66	p	ZR
211000*	2.76	1.97	1232	967.5	88.51	4.5/0	5.39	k	NR
203191	2.76	2.76	2200	900	118.01	0/11.25	10.24	p	ZR
212300	3.15	3.15	1760	945	103.26	0/11.25	11.46	p	NR
217000	3.94	3.94	1100	540	95.88	0/11.25	12.91	k	NR

* **Attention:** The side A piston rod of damper 211000 extends automatically only 0.79". The missing 1.97" will be pushed out only when side B piston rod enters.



Bi-Directional Final Dampers Series ZDH bg 28

For impact loads up to 1232 lbs - No return spring

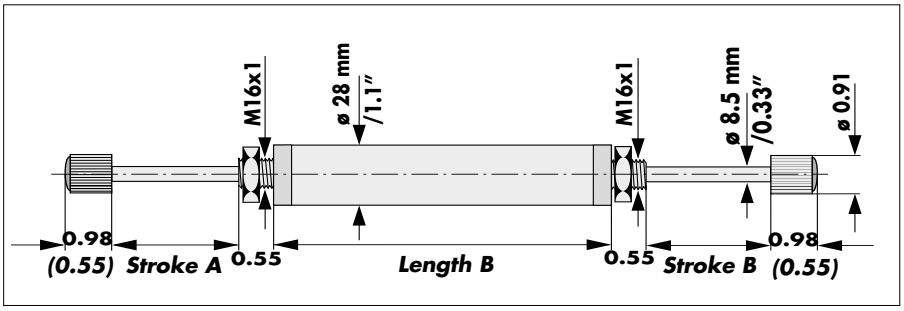
The final dampers ZDH bg 28 have no return spring. Each piston rod is pushed out by the opposite piston rod when it enters. The damper ZDH bg 28 is mounted directly on the moving object, thus damping it in both final positions.

These dampers are mostly used on smoothly moving doors, slides or free pendulums, because there are no return forces to move the object from its final position.

Technical Data

Finish	zinc-plated, piston rod hard chromed
Adjustment	screw or stepped adjustment
Types of damping	constant, ABS, progressive
End fittings for the piston rod	buffer (dimensions buffer for NR in parentheses)
Fixing	threads at both ends of the cylinder
Impact speed	3.94 to 78.74 inch/s
Correction factor (see p. 03.072.00)	f_K = 2.5
Returning force (no spring)	0
Energy per stroke	max. 95.88 lbf ft
Ø piston rod / Ø cylinder	8.5 mm/0.33" / 28 mm/1.1"
Length of stroke	max. 4.72 inch
Strokes per minute	maximum 10
Operating temperature	32° to 140 °F (on request: -22 °F, 176 °F)

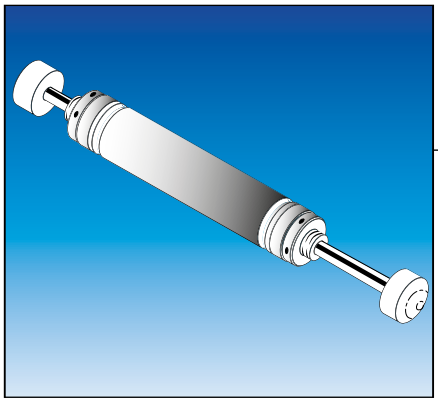
Dimensions



Order Information
Standard Types

Part no.	Stroke A [inch]	Stroke B [inch]	Impact load max. [lbs]	Damping force max. [lbf]	Energy per stroke max. [lbf ft]	Returning force max. [lbf]	Length B [inch]	Damping type	Adjustment
210110	1.97	1.97	1232	967.5	88.51	0	5.39	k	NR
203195*	2.17	2.17	1232	1125	88.51	0	5.2	k	ZR
203162**	4.72	4.72	1100	382.5	95.88	0	8.19	k	ZR

* cylinder ø 1.38", buffer ø 0.91", piston rod ø 0.47", thread on one side M24x1, length 0.67"
** with relief groove



Bi-Directional Final Dampers ZDH a 28 in AISI 304/316

For impact loads up to 1100 lbs - Both sides with return spring

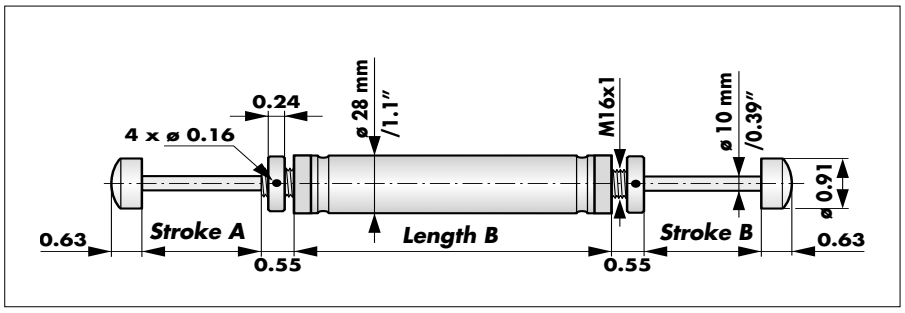
The final dampers of the series ZDH a 28 can also be produced in stainless steel. They are designed for the use in the food processing industry (AISI 304) and in tunnels (AISI 316).

A special application area for stainless steel dampers is the medical sector. If necessary, all parts including the inner components can be produced out of unmagnetic material.

Technical Data

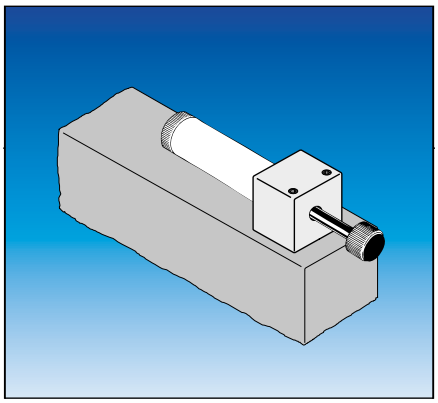
Finish	AISI 304 (standard) or AISI 316
Adjustment	stepped adjustment
Types of damping	constant, ABS, progressive
End fitting for the piston rod	buffer from Delrin
Fixing	threads at both ends of the cylinder
Impact speed	3.94 to 78.74 inch/s
Correction factor (see p. 03.072.00)	f_K = 2.5
Returning force (internal spring)	6.75 lbf (from 4.72" stroke: 9 lbf)
Energy per stroke	max. 118.01 lbf ft
Ø piston rod / Ø cylinder	10 mm/0.39" / 28 mm/1.1"
Length of stroke	max. 7.87 inch
Strokes per minute	maximum 10
Operating temperature	32° to 140 °F (on request: -22 °F, 176 °F)

Dimensions



Order Information
Standard Types

Part no.	Stroke A [inch]	Stroke B [inch]	Impact load max. [lbs]	Damping force max. [lbf]	Energy per stroke max. [lbf ft]	Returning force max. [lbf]	Length B [inch]	Damping type	Adjustment
210525	3.94	3.94	1100	540	95.88	11.25	8.7	k	ZR



Fixing Accessories for Final Dampers

Series EDH 28 and ZDH 28

For the final dampers of the series EDH 28 and ZDH 28 we also supply fixing accessories.

The fixing bracket is especially intended to be used when the dampers are mounted on sliding doors with tubular travelling gear. With the aid of the counter plate it can directly be fixed to the guide rail.

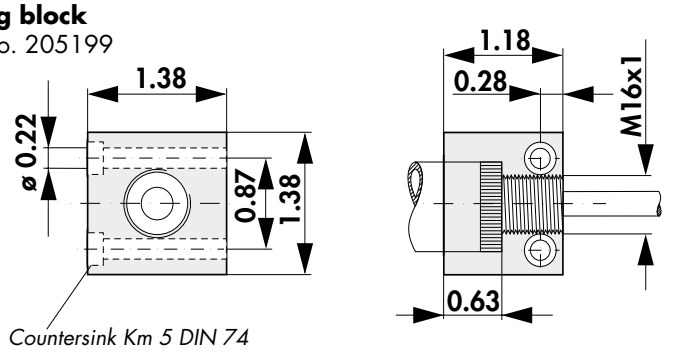
The XL fixing bracket is especially intended for guide rails larger than e.g. Helm 400. With this bracket the threaded holes are in the clamp plate.

Technical Data

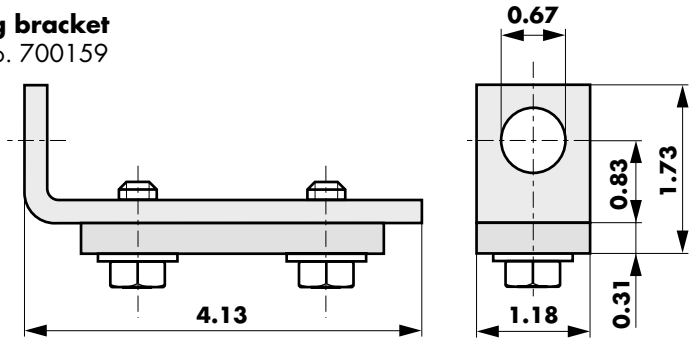
Fixing block	aluminium
Fixing bracket	steel zinc-plated

Dimensions

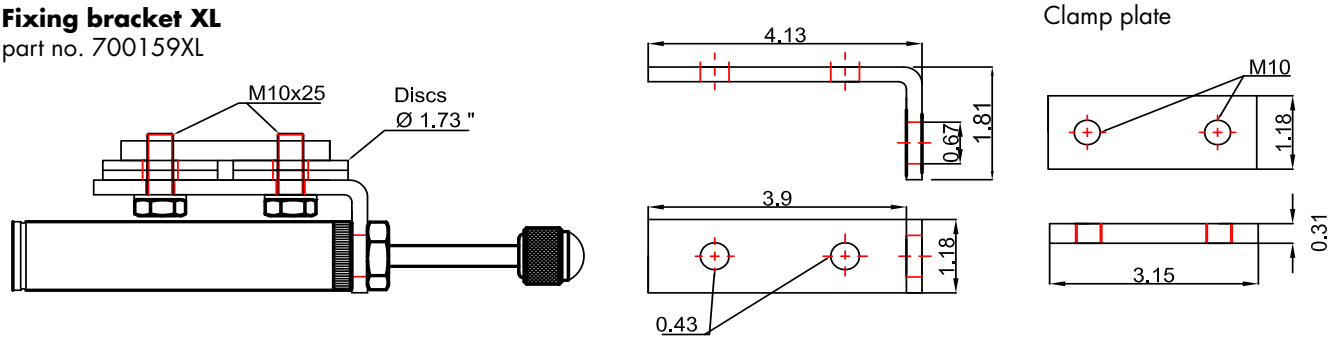
Fixing block
part no. 205199



Fixing bracket
part no. 700159



Fixing bracket XL
part no. 700159XL



Order Information

Fixing block	part no. 205199
Fixing bracket	part no. 700159
Fixing bracket with clamp plate with threaded holes	part no. 700159XL

Oil Dampers with Fixings on Both Ends

Oil dampers with fixings on both ends are used when moving objects may not exceed a certain speed, e.g. flaps, lids, lever arms. They are fixed at both ends and slow down the movement over the whole distance. The oil dampers control **pull** or **push forces** as well as pull **and** push forces.

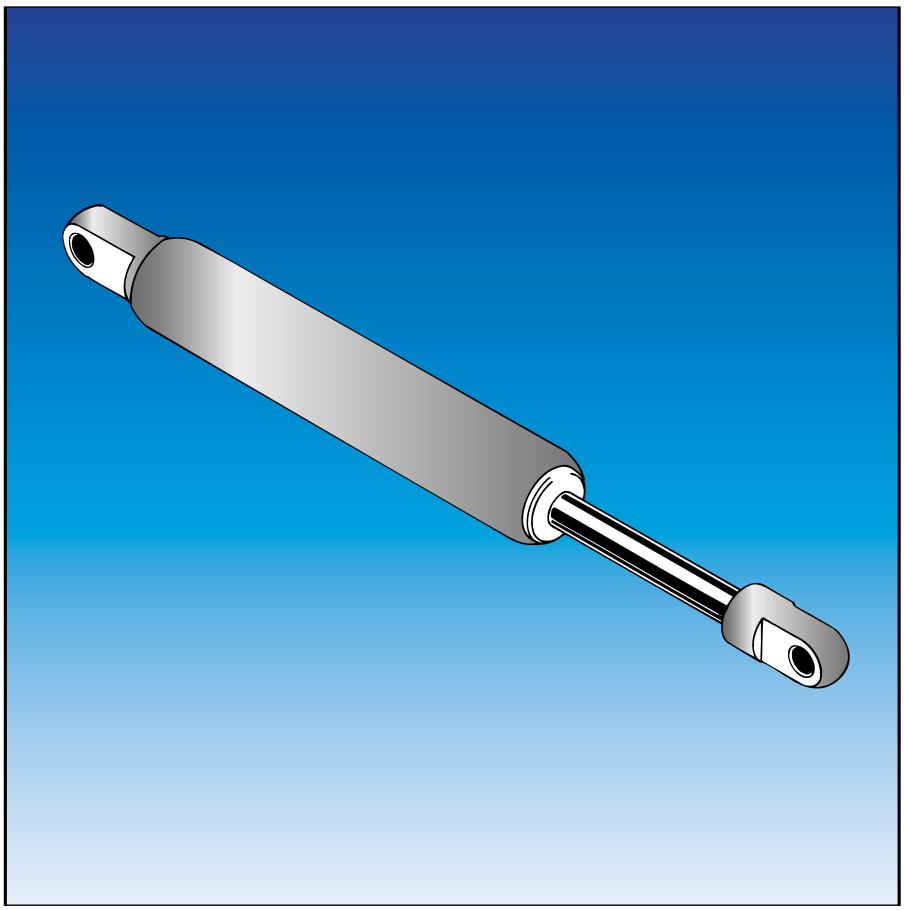
Oil dampers with fixings on both ends are available in **2 designs**:

- as preset oil damper ÖD
- as adjustable oil damper ÖDR

With the preset oil dampers (**ÖD**) as economically priced alternative the required extending and retracting speed of the piston rod is preset during fabrication according to your requirements. The exact speed is subject to certain tolerances. It depends on the type of installation and on the tolerances of the boring in the piston.

The **adjustable** oil dampers (**ÖDR**) are the ideal solution when the forces cannot exactly be determined, as the damping force can be adjusted on site.

The fabrication of the oil dampers is generally to order. Therefore it is no problem to realize special, customized designs.



Technical Data

Diameter piston rod	**ÖD**: 6, 8, 10, 14 mm / **ÖDR**: 6, 10, 14, 25 mm 0.24, 0.31, 0.39, 0.55 in / 0.24, 0.39, 0.55, 0.98 in
Diameter cylinder	**ÖD**: 19, 23, 28, 40 mm / **ÖDR**: 20, 28, 35, 69 mm 0.75, 0.91, 1.1, 1.57 in / 0.79, 1.1, 1.38, 2.72 in
Strokes / Damping forces	20 - 1000 mm = 0.79 - 39.37" / max. 7500 N = 1687 lbf
Operating temperature	32 °F - 140 °F; on demand also other temperatures
Finish piston rod	hard chromed, AISI 304, AISI 316
Finish cylinder	zinc-plated or painted in RAL colours, AISI 304, AISI 316
Damping fluid	hydraulic, biological oil
Maximum stroke frequency	6 strokes per minute

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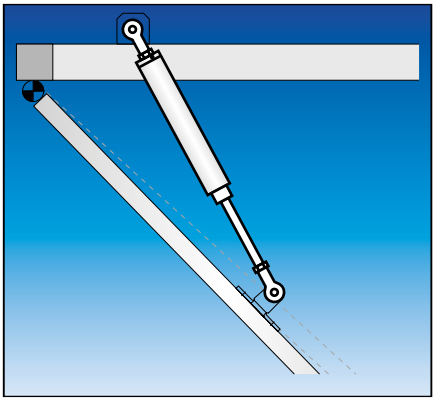
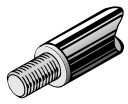
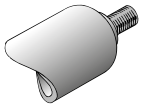
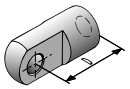
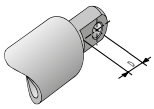
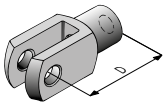
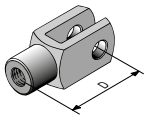
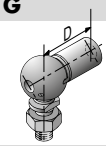
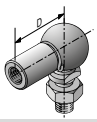
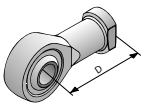
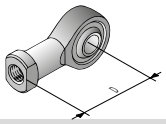


Preset Oil Dampers with Fixings on Both Ends, ÖD

Preset oil dampers are always produced to order. Stroke and therewith the length of the cylinder, end fittings, damping force and speed depend on the application it is designed for.

The speed realized when the oil damper has been fitted may vary from the adjusted speed. It depends on several parameters of the installation, for example the acting forces and the installation situation. The speed furthermore depends on the damping force. Therefore not all combinations of speed and damping force are possible. Please observe the tolerances given below.

End Fittings

On piston rod	**On cylinder**
 Threaded end **GZ**	 Threaded end **GZ**
 Eyelet **A**	 Eyelet **A**
 Fork **G**	 Fork **G**
 Ball and socket joint **WG**	 Ball and socket joint **WG**
 Rose bearing **GK**	 Rose bearing **GK**

Exactly dimensioned drawings of the above end fittings with indication of measure D can be found on page 03.030.00.

Material

Default version: Piston rod hard chromed, cylinder zinc-plated
Special execution: 8-23 and 10-28 completely in AISI 304 and AISI 316

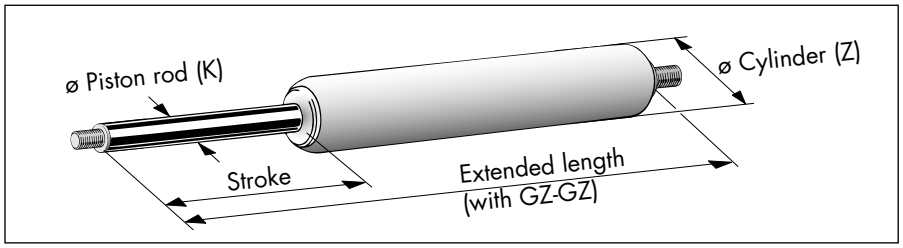
Types of damping

1 = damping on extending stroke (pull forces)
2 = damping on compressing stroke (push forces)
3 = damping on both extending and compressing stroke (push and pull forces)

Determining your preset oil damper

With help of the following table you can easily find the correct oil damper if you already know the necessary stroke, force and end fittings. If you require other end fittings than the threaded end, simply add the measurement D of the chosen end fitting to the total length of the oil-damper.

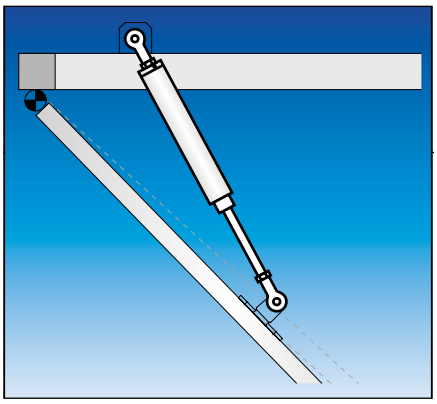
If not all data are available or if you need technical advice, please contact our advisory service.



Required data	**Diameters**				**Your ÖD**
ø K - ø Z [**mm**] [inch]	**6-19** 0.24-0.75	**8-23** 0.31-0.91	**10-28** 0.39-1.1	**14-40** 0.55-1.57	
Max. stroke [**mm**/inch]	**250**/9.84	**400**/15.75	**500**/19.69	**500**/19.69	
Type of damping	You can choose between: type of damping **1, 2, 3**				
Damping fluid	oil	oil	oil	oil	oil
Compressed length (Le)	extended length - stroke				
Extended length (La)	min. 2 x stroke + measure F + measure(s) D of end fittings				
Measure F [**mm**/inch]	**38**/1.5	**45**/1.77	**45**/1.77	**70**/2.76	
Piston rod end fittings	GZ, A*, G, WG, GK (observe measure D!)				
Cylinder end fittings	GZ, A*, G, WG, GK (observe measure D!)				
Options	**6** = protective tube (La + 5 mm/0.2 in), **8** = plant oil				
Required speed	meter/in per second[1] ≥ **0.02 m/s** / 7.87 in/s				
Max. damping force [**N**/lbf]	**400**/90	**700**/157	**1200**/270	**2500**/562	

[1] **Speed tolerances** (due to production):
Oil dampers 6-19 +/- 25 %, Oil dampers 8-23 +/- 20 %
Oil dampers10-28 +/- 15 %, Oil dampers 14-40 +/- 15 %

If you need a more precise or a lower speed, please contact our technical department.

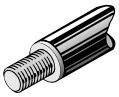
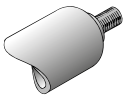
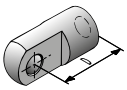
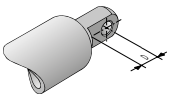
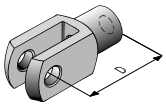
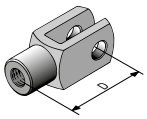
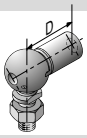
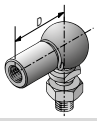
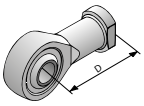
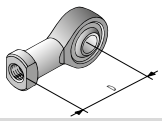


Adjustable Oil Dampers with Fixings on Both Ends, ÖDR

Adjustable oil dampers with fixings on both ends have - compared to the preadjusted oil dampers - a much more complicated design. However they are the ideal solution when the existing forces cannot be determined precisely. Damping force and speed are adjusted on site, once the damper has been installed. .

The standard adjustable oil dampers are produced in 4 different ranges of diameters. Which diameter should be chosen depends amongst others on the required stroke and the damping force.

End Fittings

On piston rod	**On cylinder**
 Threaded end **GZ**	 Threaded end **GZ**
 Eyelet **A**	 Eyelet **A**
 Fork **G**	 Fork **G**
 Ball and socket joint **WG**	 Ball and socket joint **WG**
 Rose bearing **GK**	 Rose bearing **GK**

Exactly dimensioned drawings of the above end fittings with indication of measure D can be found on page 03.030.00.

Material

Standard: piston rod hard chromed
cylinder zinc-plated
Special types: 10-28 + 14-35 completely in AISI 304 and AISI 316

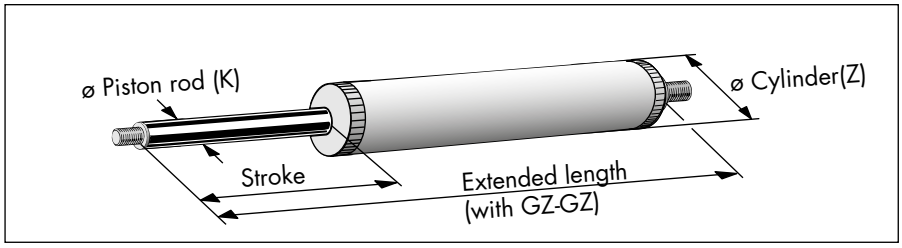
Types of damping

1 = damping on extending stroke (pull forces)
2 = damping on compressing stroke (push forces)
3 = damping on both extending and compressing stroke (push and pull forces)

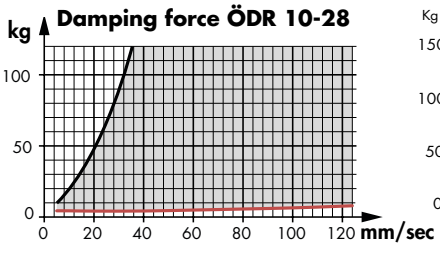
Determining your adjustable oil damper

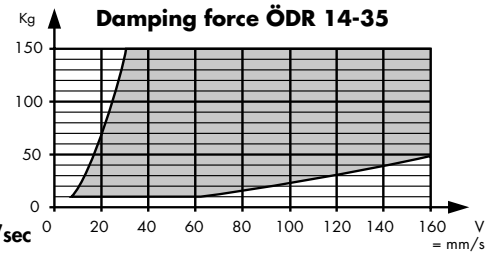
With help of the following table you can easily find the correct oil damper if you already know the necessary stroke, force and end fittings. If you require other end fittings than the threaded end, simply add the measurement D of the chosen end fitting to the total length of the oil damper.

If not all data are available or if you need technical advice, please contact our advisory service.



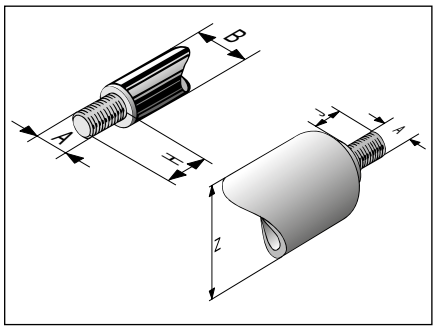
Required data	**Diameters**				**Your ÖDR**
ø K - ø Z [**mm**] [inch]	**6-20** 0.24-0.79	**10-28** 0.39-1.1	**14-35** 0.55-1.38	**25-69** 0.98-2.72	
Max. stroke [**mm**] [inch]	**75** 2.95	**500** 19.69	**1000** 39.37	**1000** 39.37	
Type of damping	You can choose between: type of damping **1, 2, 3**				
Damping fluid	oil	oil	oil	oil	oil
Compressed length (Le)	extended length - stroke				
Extended length (La)	min. 2 x stroke + measure F + measure(s) D of end fittings				
Measure F [**mm**/in]	**82**/3.23	**80**/3.15	**100**/3.94	**220**/8.66	
Piston rod end fittings	GZ, A, G, WG, GK (observe measure D!)				
Cylinder end fittings	GZ, A, G, WG, GK (observe measure D!)				
Options	**6** = protective tube (La + **20 mm**/0.79 in!) , **8** = plant oil				
Max. damping force [**N**/lbf]	**220**/49	**1200**/270	**1200**/270	**7500**/1687	





DICTATOR

End Fittings (in mm!)

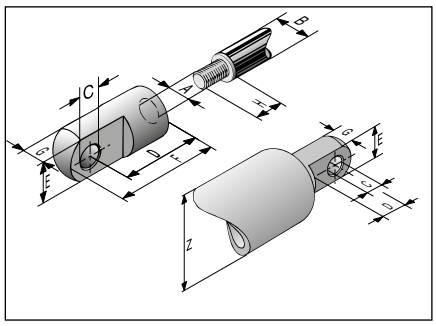


Threaded end on the piston rod (GZ) [mm]

	6-19 6-20	8-23	10-28	14-35	14-40	25-69
A	M5	M8	M8	M10	M10	M20x1,5
H	6,5	10	10	12	12	30
B	Ø6	Ø8	Ø10	Ø14	Ø14	Ø25

Threaded end on the cylinder (GZ) [mm]

	6-19	6-20	8-23	10-28	14-35	14-40	25-69
A	M5	M5	M8	M8	M10	M10	M20x1,5
J	8	8	12	12	12	12	30
Z	Ø19	Ø20	Ø23	Ø28	Ø35	Ø40	Ø69



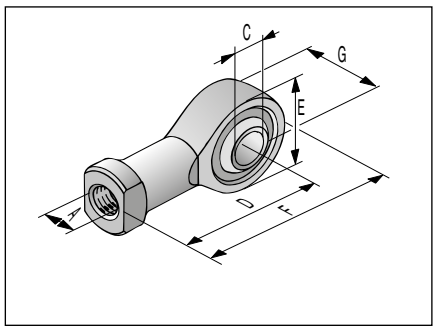
Eyelet with inside thread (a) - to be screwed onto [mm]

	6-19	6-20	8-23	10-28	14-35	14-40	25-69
A	M5	M5	M8	M8	M10	M10	M20x1,5
C	Ø6	Ø6	Ø8	Ø8	Ø8	Ø8	Ø20
D	16	16	22	22	30	30	80
E	10	10	14	14	18	18	40
F	21	21	32	32	40	40	105
G	6,5	6,5	10	10	10	10	20

Eyelet on cylinder end (A) - pressed into cylinder* [mm]

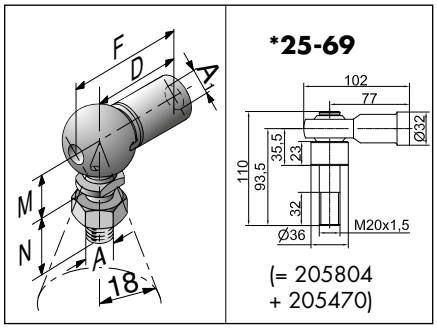
	6-19	8-23	10-28ÖD
C	Ø6	Ø8	Ø8
D	11	13	16
E	10	14	18
G	6	10	10

* This eyelet is only available for the adjacent series. For all other series, please use the eyelet with inside thread both on the piston rod and the cylinder.



Rose bearing (GK) (for piston rod and cylinder) [mm]

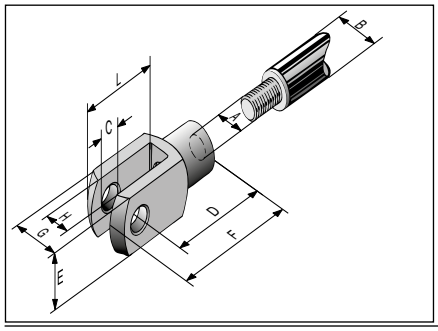
	6-19/6-20	8-23	10-28	14-35/14-40	25-69
Part no.	205800	205801	205801	205802	205804
A	M5	M8	M8	M10	M20x1,5
C	5	8	8	10	20
D	27	36	36	43	77
E	18	24	24	28	50
F	36	48	48	57	102
G	8	8	8	14	25



Ball and socket joint (WG) DIN 71802 (for piston rod and cylinder) [mm]

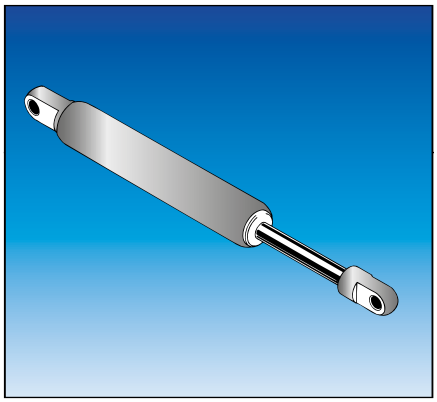
	6-19	6-20	8-23	10-28	14-35	14-40	25-69*
A_1/A	M5	M5	M8	M8	M10	M10	M20x1,5
D	22	22	30	30	35	35	77
F	28	28	39	39	46	46	102
M	9	9	13	13	16	16	see drawing
N	10	10	16	19	19	19	see drawing

ATTENTION: With ball and socket joints from AISI 304 or AISI 316 the maximum admissible damping forces are reduced as follows:
6-19 and 6-20: 300 N / 8-23 and 10-28: 800 N / 14-35 and 14-40: 1200 N



Fork (G) DIN 71752 (for piston rod and cylinder) [mm]

	6-19	6-20	8-23	10-28	14-35	14-40	25-69
A	M5	M5	M8	M8	M10	M10	M20x1,5
B	Ø6	Ø6	Ø8	Ø10	Ø14	Ø14	Ø25
C	Ø5	Ø5	Ø8	Ø8	Ø10	Ø10	Ø20
D	20	20	32	32	40	40	80
E	10	10	16	16	20	20	40
F	26	26	41	41	52	52	105
G	10	10	16	16	20	20	40
H	5	5	8	8	10	10	20
L	16	16	25	25	32	32	65

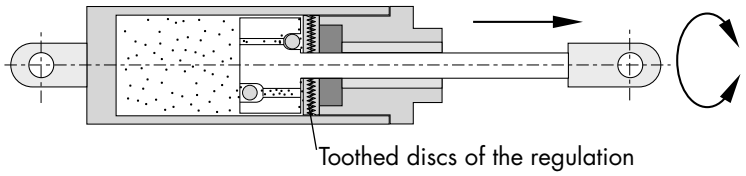


Installation, Fixing Brackets

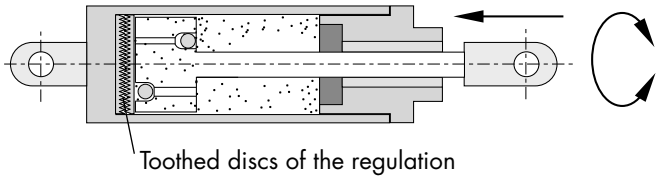
Adjusting the Damping of the ÖDR

The adjusting of the damping force works the same way as with the final dampers with stepped adjustment (see page 03.005.00).
Standard stepped adjustment: The piston rod is pulled out completely (Attention: For this purpose you should never use nippers as this would damage the surface of the piston rod and following the seal). Then you increase or decrease the damping force by turning the piston rod.
Some oil dampers are produced with the adjustment when the piston rod is completely pushed in. Please observe the label on the cylinder!

Adjusting with the completely pulled out piston rod



Adjusting with the completely pushed in piston rod



Installation Instruction

Oil dampers start damping only after a few millimeters of travel.

Oil dampers should not be used as a final stopping device. It is recommended to provide a separate mechanical final stop.

Fixing Accessories

For the mounting of the oil dampers various fixing brackets are available. The type of bracket to be chosen depends on the end fittings of the oil damper and the type of mounting (lateral or frontal). A large variety can be found in the chapter gas springs of this catalogue.

Adjustable Oil Dampers with Fixings, ÖDR 14-35 for Hinged Gates with Ascending Hinges

Hinged doors and gates with ascending hinges which are opened by hand close as soon as they are free. Depending on the size of the door/gate, high loads can build up when the gate is closing. This represents a high injury risk for persons and it might damage the complete door installation.

The increased demands of the EN 13241 regarding safety will be met when an adjustable oil damper with fixings on both ends is mounted on these gates.

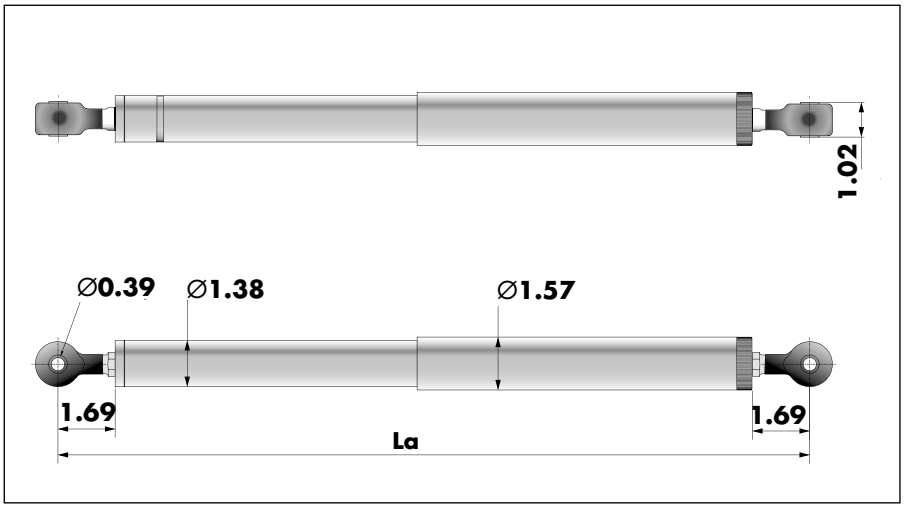
Versions

For the use on hinged gates with ascending hinges DICTATOR supplies adjustable oil dampers with three different stroke lengths. Due to the outside application they always have a protective tube to protect the piston rod against dirt and damage.

As one end of the oil dampers is fixed on the gate and the other one on the wall or the jamb, they provide a cushioned movement during the complete closing.

Information about fixing accessories can be found two pages ahead.

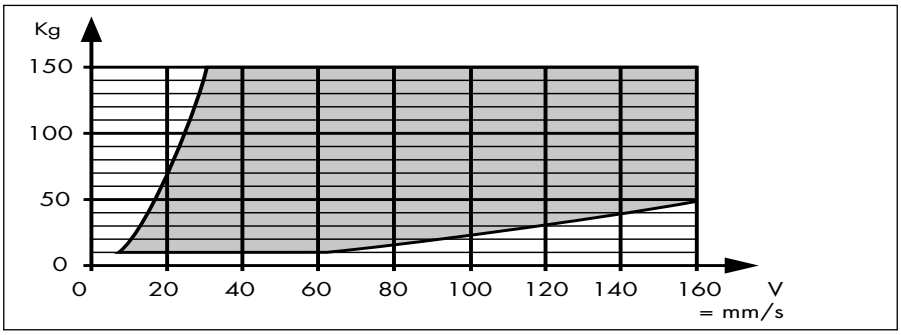
Dimensions



Stroke (mm/inch)	**La* GK-GK (mm**/inch)
200/7.87	**700**/29.53
300/11.81	**900**/35.43
400/15.75	**1100**/43.31

*** La** = extended length (with end fittings)

Diagram Load - Speed



Adjustable Oil Dampers with Fixings, ÖDR 14-35 for Hinged Gates with Ascending Hinges - cont.

Gladly we will help you in choosing the most appropriate oil damper for your application. For this we need the following data:
- dimensions and weight of the gate
- opening angle
- gradient
- fixing possibilities

The rose bearings (GK) are sealed against entering water.

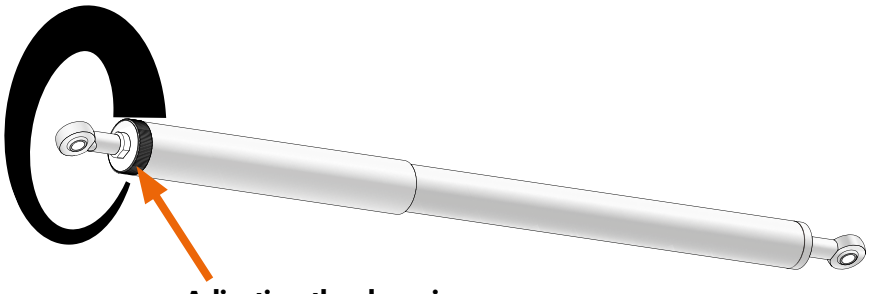
Technical Data

Maximum tensile load	1500 N = approx. 150 kg/337.5 lbf
Minimum speed	35 mm/s / 1.38 inch/s
Material piston rod	hard chromed
Material/finishing cylinder	zinc-plated steel, in addition covered with shrink wrap, colours either black, grey or white
Material/finishing protective tube	aluminium, in addition covered with shrink wrap, colours either black, grey or white

Adjusting the Damping

The damping force of the adjustable oil dampers ÖDR for hinged gates with ascending hinges can be regulated **when they are mounted**. For this purpose the dampers have a knurled shifting ring which allows an exact adaption of the damping to the respective gate.

Due to the outside installation, larger temperature changes influence the damping behaviour. But the damping force can easily be adapted.



Adjusting the damping

Order Information

Model	Part number		
	black	grey	white
ÖDR 14-35-200-1/Öl-500-700-GK-GK-6 with protective tube and external regulation	392530S	392530G	392530W
ÖDR 14-35-300-1/Öl-600-900-GK-GK-6 with protective tube and external regulation	392540S	392540G	392540W
ÖDR 14-35-400-1/Öl-700-1100-GK-GK-6 with protective tube and external regulation	392550S	392550G	392550W

On demand, these dampers are also available completely in AISI 304.

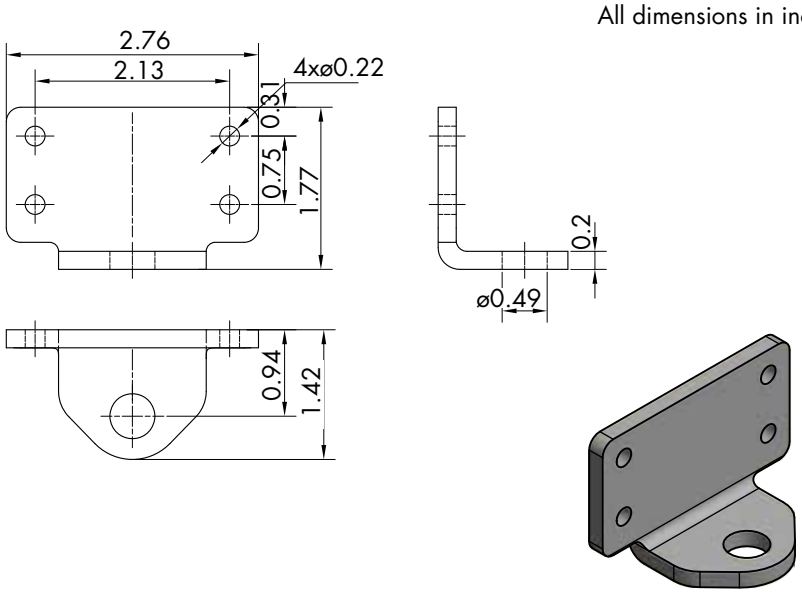
Adjustable Oil Dampers with Fixings, ÖDR 14-35 for Hinged Gates with Ascending Hinges - Fixing

Due to the many different gate and hinge situations, for the ÖDR 14-35 no standard fixing brackets are available. Often, however, the fixing bracket shown below can be used. Our technical staff members will be happy to help you.

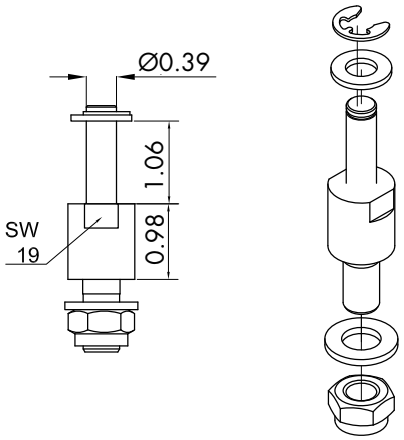
For fixing the oil damper ÖDR in the fixing bracket or in brackets on site, a pin with the corresponding accessories is available.

Dimensions Fixing Bracket

All dimensions in inch



Dimensions Fixing Pin



Order Information Accessories

Fixing pin ÖDR 25 mm/0.98", Ø 10 mm/0.39", zinc-plated, with accessories	part no. 205510
Fixing bracket TB 70x45x36 mm/2.76x1.77x1.42", zinc-plated	part no. 205489

Radial Dampers

Fully Adjustable, for Constant Damping

DICTATOR provides **two** different **types** of radial dampers for the control and the damping of rotating and linear movements over long distances:

- Lamellar radial dampers LD
- Radial dampers RD 240/241

They are ideal for avoiding high mass forces. They control and reduce speed during the whole travel of moving objects, e.g. sliding doors and gates, of sledges or carriages in machine construction. All types can be adjusted continuously. DICTATOR radial dampers damp in both directions, but usually they come with a free wheel in one direction.

The patented lamellar radial dampers LD are characterized by their small basic dimensions combined with high performance and the possibility to individually adapt them to requirements of the customers.

Information about the radial dampers approved for their use on fire protection sliding doors and gates can be found in our Fire Door Operators catalogue.

Overview

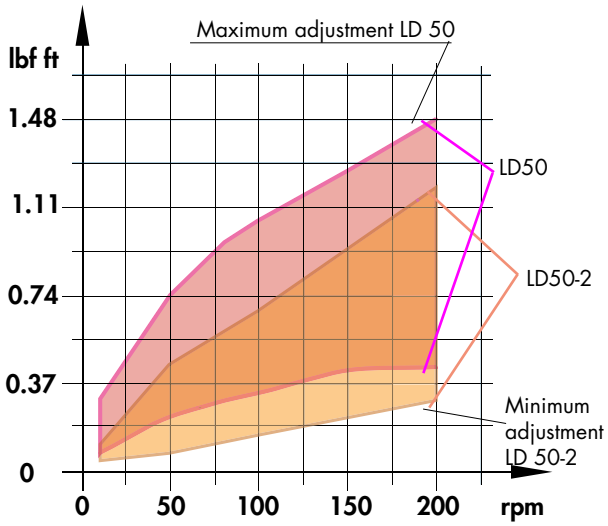
Radial dampers LD 50	max. pivot moment 1.5 lbf ft
Radial dampers LD 100	max. pivot moment 3.7 lbf ft
Radial dampers LD	special models with differing damping according to customer's requirements
Radial dampers RD 240/241	max. pivot moment 5.9 lbf ft double radial damper: max. 8.9 lbf ft
Damping by	rope, chain (tensioned or revolving), toothed belt, rack and friction wheel (only RD 240/241), customized

Technical Data Lamellar Radial Dampers LD

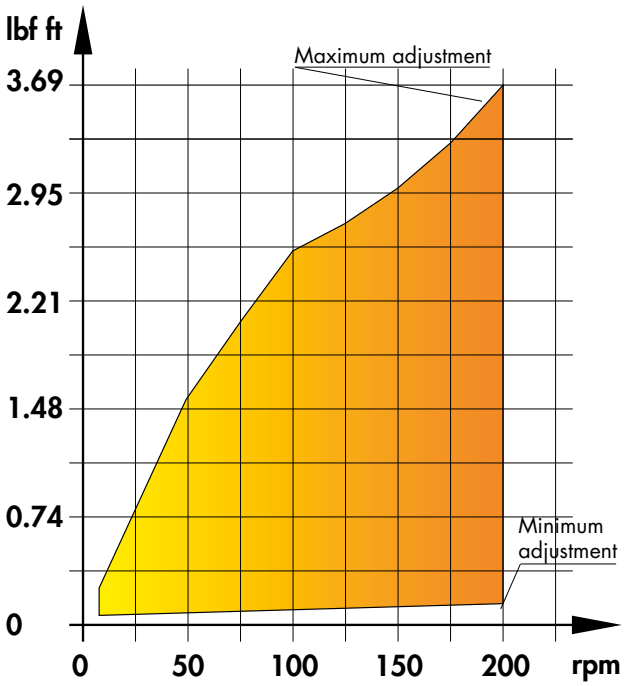
The two following diagrams inform about the damping force of the LD 50 and LD 100 series of the lamellar radial dampers. Both series differ in their height. The base dimensions are identical.
The patented lamellar construction allows by varying the height to realize also customised damping forces. This is also possible with small quantities as the damping characteristics don't depend on the material of the body. When there are special requirements regarding the damping forces or the material, the casing can also be made of aluminium or stainless steel for instance.

Damping Diagrams LD 50 / LD 100

The lamellar radial damper LD offers a very large adjusting range. In the diagram of the radial damper LD 50 are indicated two damping ranges. They are determined by the used oil. Therefore, on demand, also other damping ranges are possible.



Radial dampers LD 50



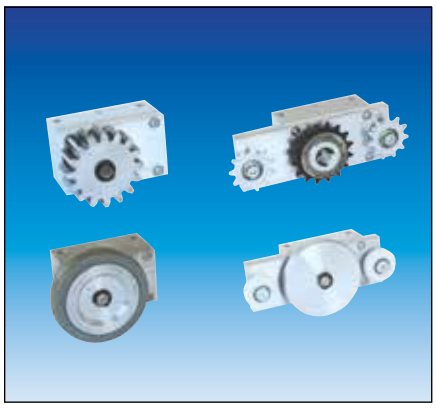
Radial dampers LD 100

Technical Data

Operating temperature	5° up to 104 °F
Duty cycle*	standard plastics: 30 - 40 %, more on demand
Material casing LD	Aquamid (glass fibre reinforced, flame resistant; standard)
	other materials as aluminium or stainless steel on demand
Versions LD	rope pulley, chain wheel, toothed wheel, others on demand

For a longer period the duty cycle of the lamellar radial dampers LD should not exceed 30 - 40 % as otherwise the oil would be heated too much.

*Duty cycle: the duty cycle of a door that is being damped during closing and is always moving, i.e. opening and closing permanently, is 50 %, as the radial damper works only during closing.

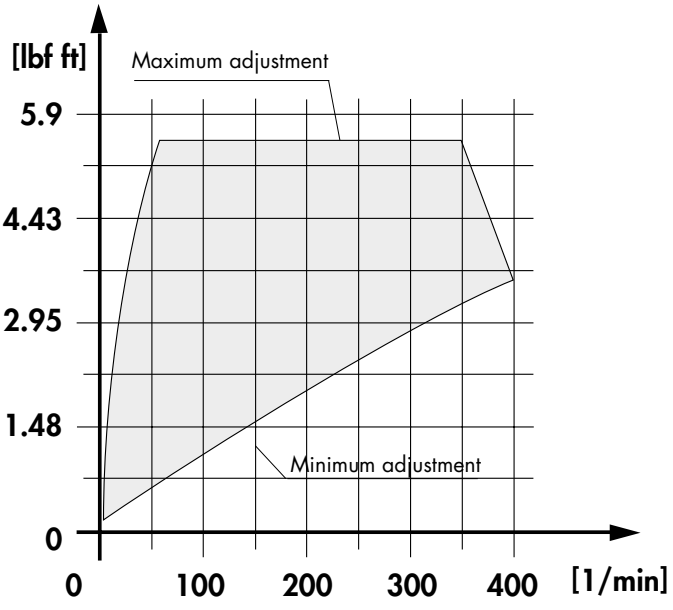


Technical Data Radial Dampers Series RD 240/241

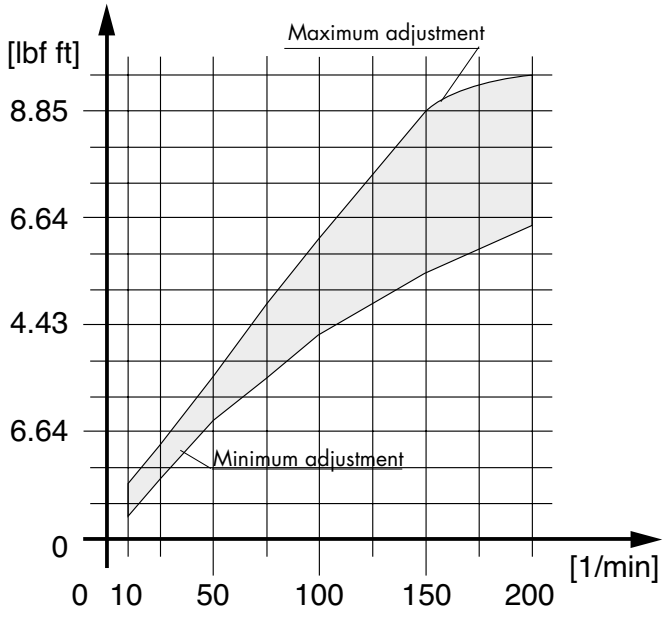
The damping forces of the RD 240/241 series can be seen in the two following diagrams. Most of the RD 240/241 models have been tested for their use on fire sliding doors. The body of this series is made of aluminium. Therefore they allow a slightly higher duty cycle than the lamellar radial dampers LD.
Detailed information about the different standard models can be found beginning on page 03.057.00. On demand, other models are available.

Damping Diagrams RD 240 / 241

The radial dampers of the RD 240/241 series are available in two strengths. The double radial damper is higher, the dimensions of the base, however, correspond to those of the RD 240/241.



Radial dampers 240 / 241



Radial dampers 241024 / 241030 ("double radial dampers")

Technical Data

Operating temperature	5° up to 158 °F
Duty cycle*	standard approx. 50 %
Material casing	aluminium
Versions	chain wheel, rope pulley, friction wheel, toothed wheel

*Duty cycle: the duty cycle of a door that is being damped during closing and is always moving, i.e. opening and closing permanently, is 50 %, as the radial damper works only during closing.

Radial Dampers LD

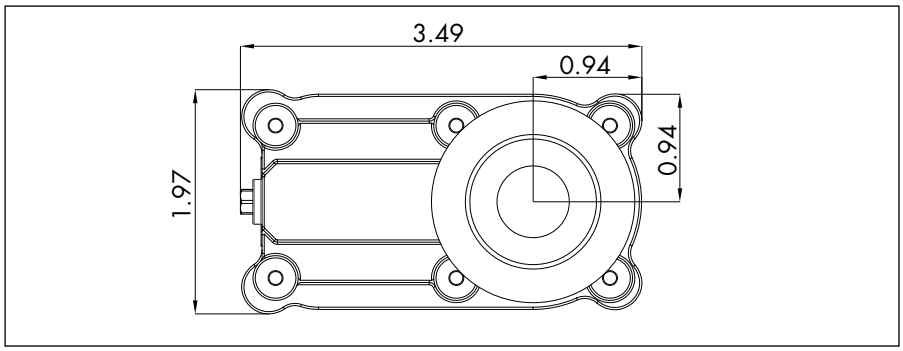
Patented new development with extremely broad damping range

DICTATOR has broken new ground with the LD radial damper. It is an in-house newly developed, patented technology. Its flexible, extremely adaptable construction offers the possibility to easily realize beside the standard models customized solutions - in small quantities and even single units. It is possible to adapt the damping characteristics and also to manufacture bodies of other material, e.g. aluminum or stainless steel.

Damping Characteristics

More crucial advantages of the new series:

- Very large damping range.
- Very precise and sensitive adjusting of the damping.
- Stable damping characteristics, also at very high numbers of revolutions.
- All radial dampers of the new generation have the same dimensions of the body base. They only differ in their height. Due to the small width (1.97 inch) it is easy to mount them, if necessary often even in the rail.



Variation Possibilities

The LD radial dampers can be furnished with the most different driving wheels to ***transmit the damping***: from rope pulleys with different diameters and for different rope diameters to toothed wheels, toothed belt disks, chain wheels, friction wheels etc. It is also possible to supply the radial damper just with the axle for your own driving wheel.

On the following pages only the standard models are described. In case of differing requirements, we gladly will elaborate an individual solution.

Also the ***damping characteristics*** of the radial dampers can be adapted to the customer's requirements:

- ***Increasing the damping*** by a higher body - in a customized casing - on demand.
- ***Modifying the damping force*** by using different damping media with differing viscosity (for an example please see the damping diagram LD 50 on page 03.036.00). In the description of the lamellar radial damper this is indicated by adding a "-2", "-3", "-4" (e.g. LD 50-2 S-45).
- ***Damping in both directions*** (By default the driving wheel features a freewheel and therefore hydraulically damps only in one direction.)

The **standard *casing*** of the LD radial damper is made of **plastics**. This casing has passed a **fire test according to DIN 53438-2** and thus meets the special directives for the **use in rail vehicles**.

It is however possible to make it for **special requirements** also in **other material** as e.g. aluminum or stainless steel (see picture on the left).

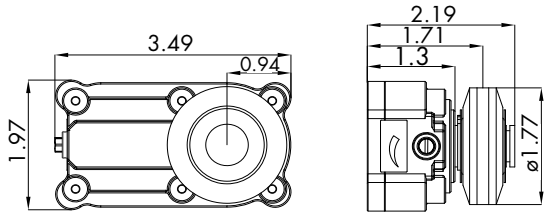
Radial Damper LD 50 S-45 with Rope Pulley Ø 45/1.77

With or without mounting bracket kit

The LD 50 S-45 radial damper has been designed for damping by **revolving rope**. The rope pulley has a diameter of 45 mm/1.77 inch.

In total the LD radial damper has 6 mounting holes with a diameter of 0.11 inch for individual fitting. The mounting bracket kit allows to easily fix the LD 50 radial damper in an either horizontal or vertical position. Other fitting accessories are available on demand.

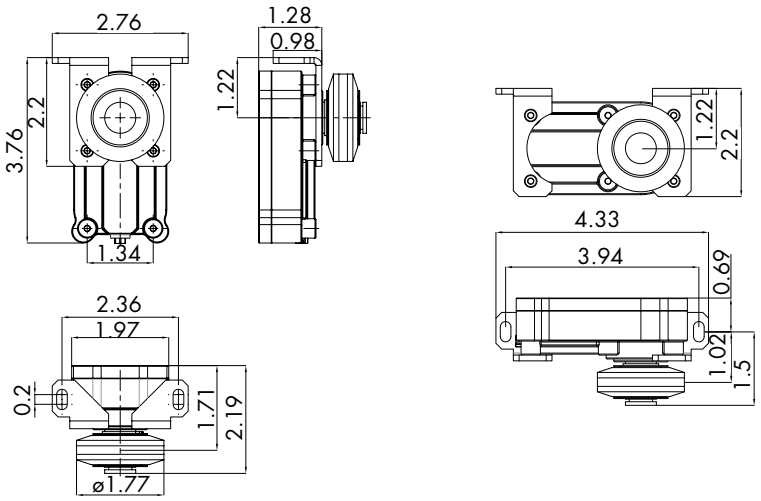
Dimensions
LD 50 S-45 Basic Unit



All dimensions in inch

Radial damper LD 50 S-45, without mounting bracket

Dimensions
LD 50 S-45 with Mounting Bracket Kit



Radial damper LD 50 S-45, with mounting bracket kit, in vertical position

Radial damper LD 50 S-45, with mounting bracket kit, in horizontal position

Components Included

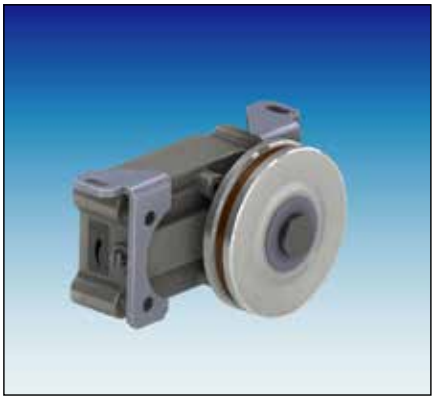
Radial damper LD 50 S-45 with rope pulley Ø 45 mm/1.77" in aluminum with Vulkollan insert, with freewheel, casing in plastics, with or without mounting bracket kit

Optional Accessories

Rope Ø 0.08" in steel or stainless steel, idler pulley Ø 1.77", door actuator (see page 03.052.00)

Order Information

LD 50 S-45, without mounting bracket	part no. 244041
LD 50 S-45, with mounting bracket kit, zinc-plated	part no. 244040
LD 50 S-45, with mounting bracket kit, AISI 304	part no. 244042
LD 50-2 S-45, without mounting bracket	part no. 244049
LD 50-2 S-45, with mounting bracket kit, zinc-plated	part no. 244047
LD 50-2 S-45, with mounting bracket kit, AISI 304	part no. 244048



Radial Damper LD 50 S-65 with Rope Pulley Ø 65/2.56

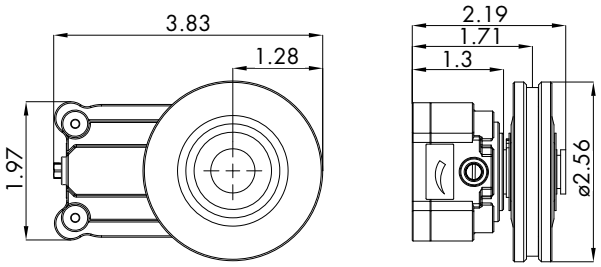
With or without mounting bracket kit

The LD 50 S-65 radial damper has been designed for damping with **revolving rope**. The rope pulley has a diameter of 65 mm/2.56 inch.

The LD 50 S-65 radial damper is intended in particular for lightweight doors (room doors). Due to the larger diameter of the rope pulley, the damping can be adjusted in an optimum way to this application.

To achieve an optimum damping, the rope should enlace the rope pulley for about 150°.

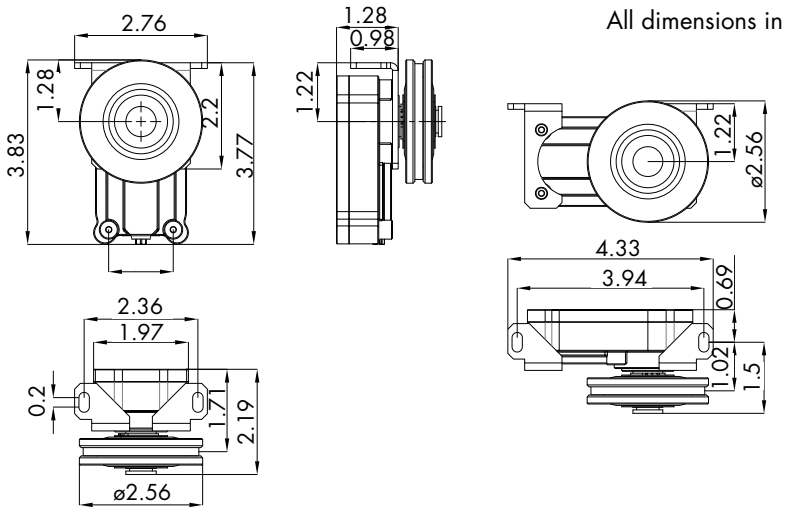
Dimensions LD 50 S-65 Basic Unit



Radial damper LD 50 S-65, without mounting bracket

Dimensions LD 50 S-65 with Mounting Bracket Kit

All dimensions in inch



Radial damper LD 50 S-65, with mounting bracket kit, in vertical position

Radial damper LD 50 S-65, with mounting bracket kit, in horizontal position

Components Included

Radial damper LD 50 S-65 with rope pulley Ø 65 mm/2.56" in aluminum with Vulkollan insert, with freewheel, casing in plastics, with or without mounting bracket kit

Optional Accessories

Rope Ø 0.08" in steel or stainless steel, idler pulley Ø 2.48", door actuator (see page 03.052.00)

Order Information

LD 50-2 S-65, without mounting bracket	part no. 244063
LD 50-2 S-65, with mounting bracket kit, zinc-plated	part no. 244061
LD 50-2 S-65, with mounting bracket kit, AISI 304	part no. 244062

Radial Damper LD 50 Z-Z26 with Toothed Belt Disk

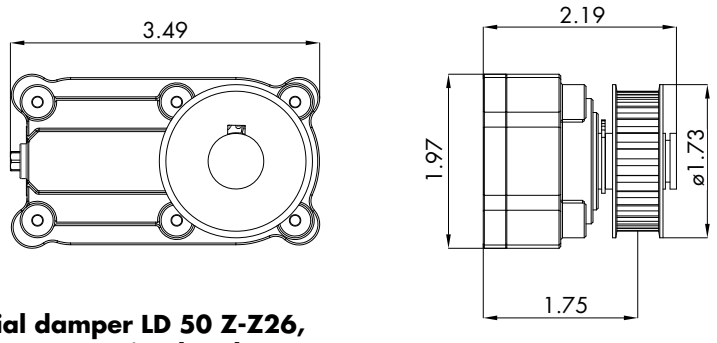
With or without mounting bracket kit

The LD 50 Z-Z26 radial damper uses a **revolving toothed belt**. The driving wheel of the LD 50 Z-Z26 is configured for a toothed belt 5M, 0.39" wide. Driving wheels for other toothed belt types are available on demand.

The toothed belt is the ideal medium for power transmission as it creates an absolutely positive connection between the toothed belt and the driving wheel of the radial damper. Therefore, in comparison with a steel rope, less pretension is required, friction is reduced and it is easier to move the door.

The toothed belt disk is made from steel.

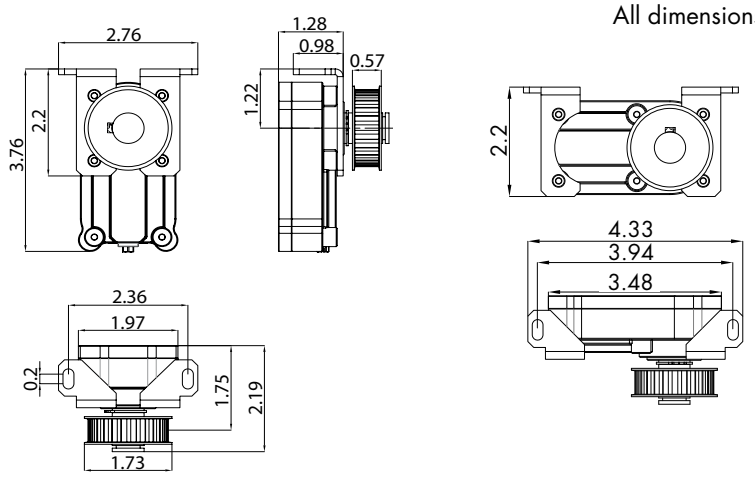
Dimensions LD 50 Z-Z26 Basic Unit



Radial damper LD 50 Z-Z26, without mounting bracket

Dimensions LD 50 Z-Z26 with Mounting Bracket Kit

All dimensions in inch



Radial damper LD 50 Z-Z26, with mounting bracket kit, in vertical position

Radial damper LD 50 Z-Z26, with mounting bracket kit, in horizontal position

Components Included

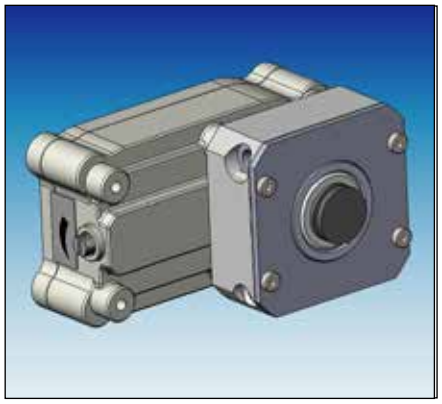
Radial damper LD 50 Z-Z26 with toothed belt disk in steel for toothed belt HDT 5, 0.39" wide, with freewheel, casing in plastics, with or without mounting bracket kit

Optional Accessories

Toothed belt HDT 5, 0.39" wide; idler pulley, door actuator (see page 03.054.00)

Order Information

LD 50 Z-Z26, without mounting bracket	part no. 244071
LD 50 Z-Z26, with mounting bracket kit, zinc-plated	part no. 244070
Toothed belt HDT 5, 0.39" wide, per meter (approx. 3.3 ft)	part no. 710502



Radial Damper LD 50 WS

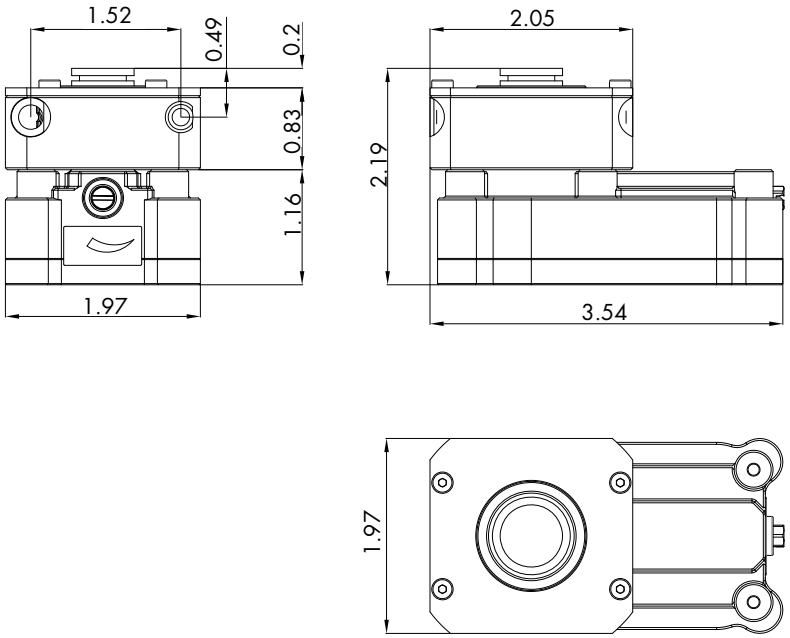
For tensioned wire rope

The LD 50 WS hydraulically damps via a **tensioned wire rope** which runs through the cap on the radial damper. The rope is fixed on both sides of the door (e.g. to the door frame). This type of radial damper is mounted on the door leaf.

To fix and tension the wire rope a tensioner and a clamp piece are available, both either with or without mounting bracket. Drawings and more detailed information can be found on the pages about the sliding door closer DICTAMAT 50 WS in the catalogue Door Closer Solutions.

Dimensions LD 50 WS

All dimensions in inch



Radial damper LD 50 WS, without mounting bracket

Components Included

Radial damper LD 50 WS with cap in steel for tensioned WS6 wire rope, with freewheel, casing in plastics, without mounting bracket

Optional Accessories

Mounting bracket for LD 50 WS, WS6 wire rope, wire rope tensioner and clamp piece for tensioning the wire rope, with or without bracket (see catalogue Door Closer Solutions, DICTAMAT 50 WS)

Order Information

LD 50 WS, without mounting bracket	part no. 244080
Wire rope WS6, per meter (approx. 3.3 ft)	part no. 244147
Wire rope tensioner, without bracket	part no. 701042
Wire rope tensioner, with bracket	part no. 701043
Clamp piece, without bracket	part no. 701047
Clamp piece, with bracket	part no. 701048
Mounting bracket	part no. 701040

Radial Damper LD 100 S-65 with Rope Pulley Ø 65

For horizontal or vertical mounting

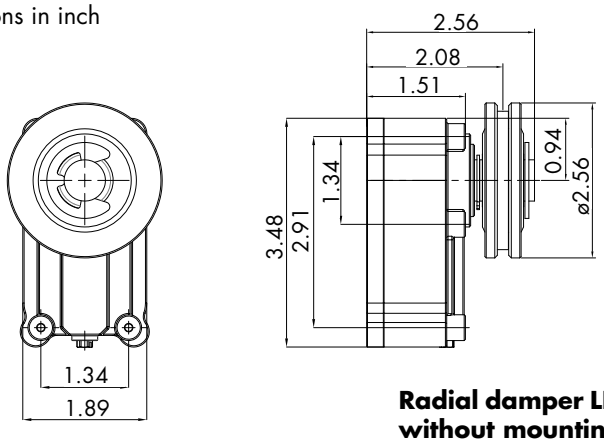
The radial damper LD 100 S-65 with rope pulley Ø 65 mm/2.56" uses a **revolving rope** of Ø 0.12" to transmit the damping. The LD 100 S-65 is available with or without mounting bracket kit.

The standard rope pulley features a freewheel, i.e. it hydraulically damps only in one direction.

To achieve an optimum damping, please make sure when mounting the damper that the rope enlaces the rope pulley for about 150°.

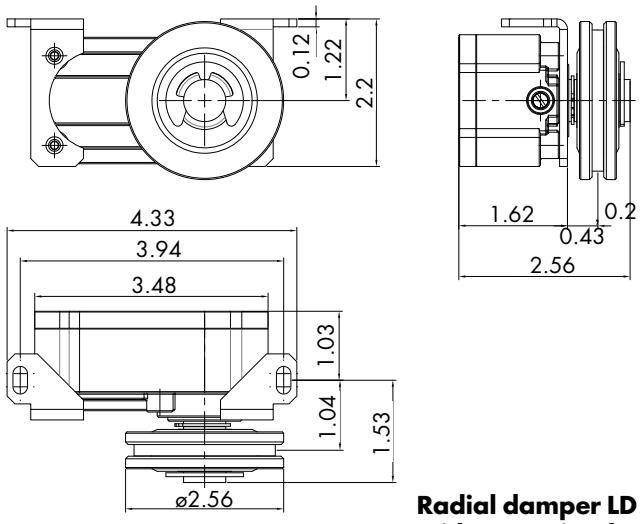
Dimensions LD 100 S-65 Basic Unit

All dimensions in inch



Radial damper LD 100 S-65 without mounting bracket

Dimensions LD 100 S-65 with Mounting Bracket Kit



Radial damper LD 100 S-65 with mounting bracket kit

Components Included

Radial damper LD 100 S-65 with rope pulley Ø 65 mm/2.56" in aluminum with Vulkollan insert, with freewheel, casing in plastics, with or without zinc-plated mounting bracket kit

Optional Accessories

Steel rope Ø 0.12", idler pulley Ø 2.48", rope tensioner with door actuator (see pages 03.052.00 and 03.053.00)

Order Information

LD 100 S-65, without mounting bracket	part no. 244141
LD 100 S-65, with mounting bracket kit, zinc-plated	part no. 244101

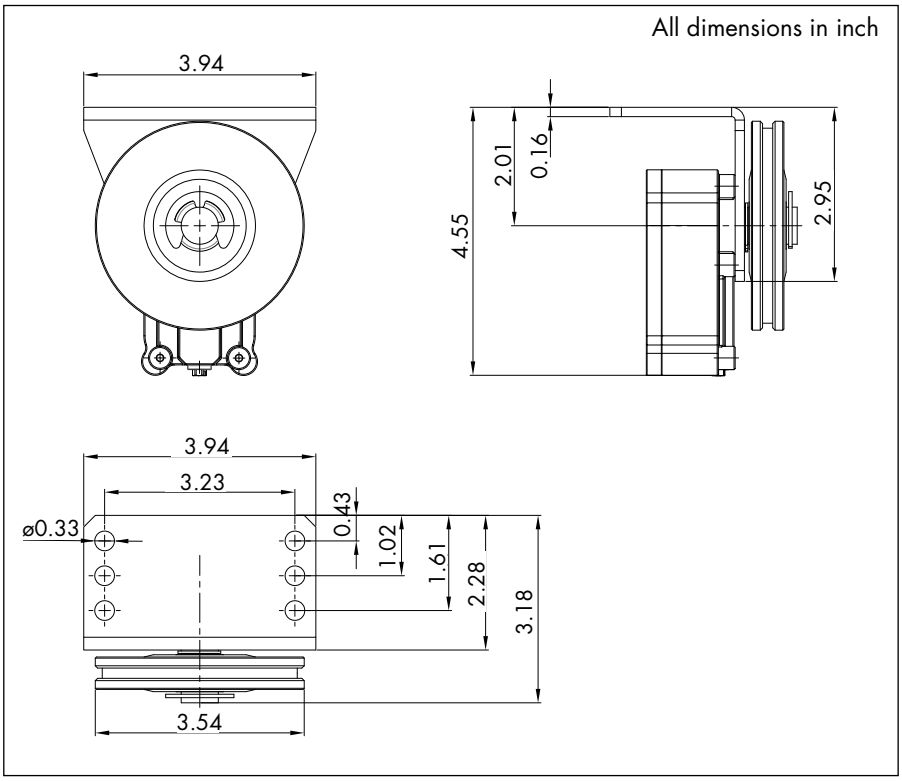
Radial Damper LD 100 S-90 with Rope Pulley Ø 90/3.54

With zinc-plated mounting bracket with 6 holes

The radial damper LD 100 S-90 with rope pulley Ø 90 mm/3.54" uses a **revolving rope** of Ø 0.12" to transmit the damping. When the rope runs over longer distances, it is preferable to use this model as due to the larger diameter of the rope pulley, the rope is longer in contact with the pulley and therefore offers a more secure rope guiding. To achieve an optimum damping, the rope should enlace of the rope pulley for about 150°.

The rope pulley of the standard model features a freewheel, i.e. it hydraulically damps only in one direction.

Dimensions



Normally the LD 100 S-90 is supplied with a zinc-plated mounting bracket. It has 6 holes to allow adapting the mounting position to the local situation. If you need another fitting type, please contact us.

Components

Radial damper LD 100 S-90 with rope pulley Ø 90 mm/3.54" in aluminum with Vulkollan insert, with freewheel, casing in plastics, zinc-plated mounting bracket with 6 fixing holes

Optional Accessories

Steel rope Ø 0.12", idler pulley Ø 3.54", rope tensioner with door actuator (for order information see below, for drawings see page 03.053.00)

Order Information

LD 100 S-90, without mounting bracket	part no. 244142
LD 100 S-90, with mounting bracket kit, zinc-plated	part no. 244102
Idler pulley Ø 90 mm/3.54" for rope	part no. 700530
82.02 ft of steel rope Ø 0.12"	part no. 700155
Rope tensioner with door actuator	part no. 700478

Radial Damper LD 100 Z-Z26 with Toothed Belt Disk

With or without fixing accessories

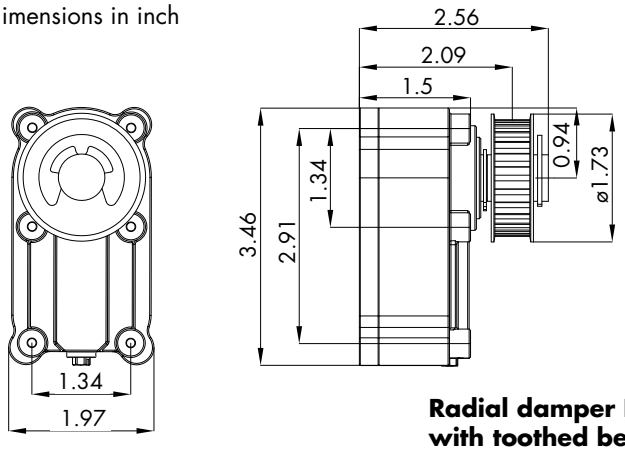
The LD 100 Z-Z26 radial damper using a **revolving toothed belt** ensures an absolutely reliable speed control also for larger masses, due to the positive connection between toothed belt and the driving wheel of the radial damper. Therefore, in comparison with a steel rope, less pretension is required, friction is reduced and it is easier to move the door.

The damping wheel is intended for a toothed belt 5M, 0.39" wide. Driving wheels for other toothed belt types are available on demand.

The toothed belt disk is made from steel.

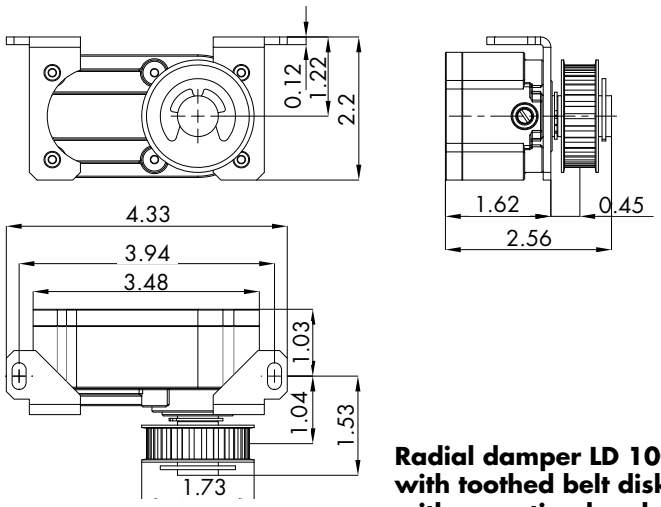
Dimensions
LD 100 Z-Z26 Basic Unit

All dimensions in inch



Radial damper LD 100 Z-Z26 with toothed belt disk Z26, without mounting bracket kit

Dimensions LD 100 Z-Z26 with Mounting Bracket Kit



Radial damper LD 100 Z-Z26 with toothed belt disk Z26, with mounting bracket kit

Components

Radial damper LD 100 Z-Z26 with toothed belt disk Z26 in steel for toothed belt HDT 5, 0.39" wide, with freewheel, casing in plastics, with or without zinc-plated mounting bracket kit

Optional Accessories

Toothed belt HDT 5, 0.39" wide; idler pulley, door actuator (see page 03.054.00)

Order Information

LD 100 Z-Z26, without mounting bracket	part no. 244104
LD 100 Z-Z26, with mounting bracket kit, zinc-plated	part no. 244105
Toothed belt HDT 5, 0.39" wide, per meter (approx. 3.3 ft)	part no. 710502

Radial Damper LD 100 Z-Z26 with Toothed Belt Disk

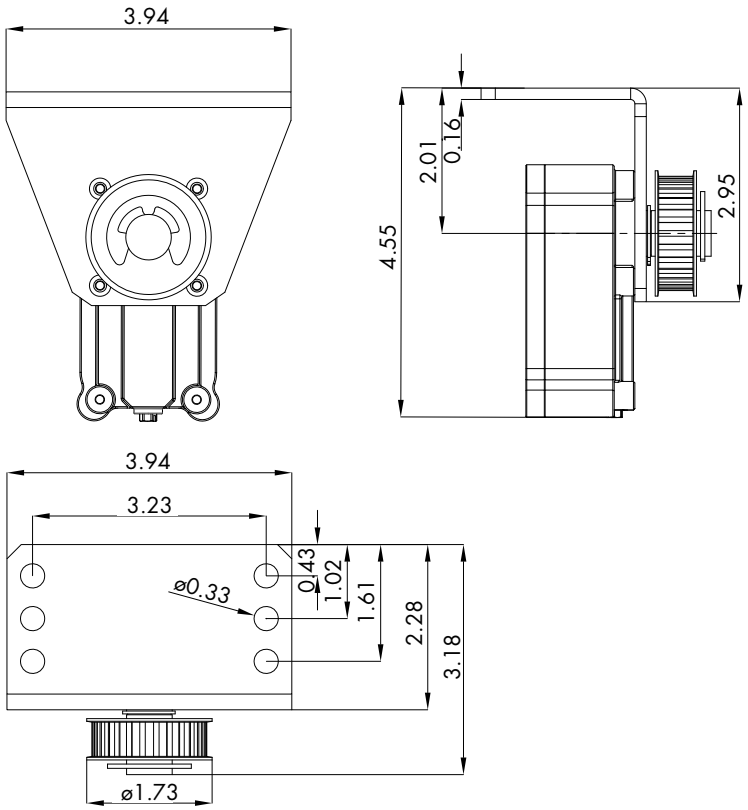
With zinc-plated mounting bracket with 6 holes

The LD 100 Z-Z26 radial damper with mounting bracket uses a **revolving toothed belt** to control the speed. Due to the very **stable mounting bracket** it is ideal for applications where higher forces occur. The 6 holes of the bracket allow to optimally adapt the mounting position.

The driving wheel is intended for a toothed belt 5M, 0.39" wide. Driving wheels for other toothed belts are available on demand.

Dimensions

All dimensions in inch



Components Included

Radial damper LD 100 Z-Z26 with toothed belt disk Z26 in steel for toothed belt HDT 5, 0.39" wide, with freewheel, casing in plastics, zinc-plated mounting bracket with 6 fixing holes

Optional Accessories

Toothed belt HDT 5, 0.39" wide; idler pulley, door actuator with belt tensioner (for order information and drawings see page 03.054.00)

Order Information

LD 100 Z-Z26, with mounting bracket, zinc-plated	part no. 244106
Toothed belt HDT 5, 0.39" wide, per meter (approx. 3.3 ft)	part no. 710502

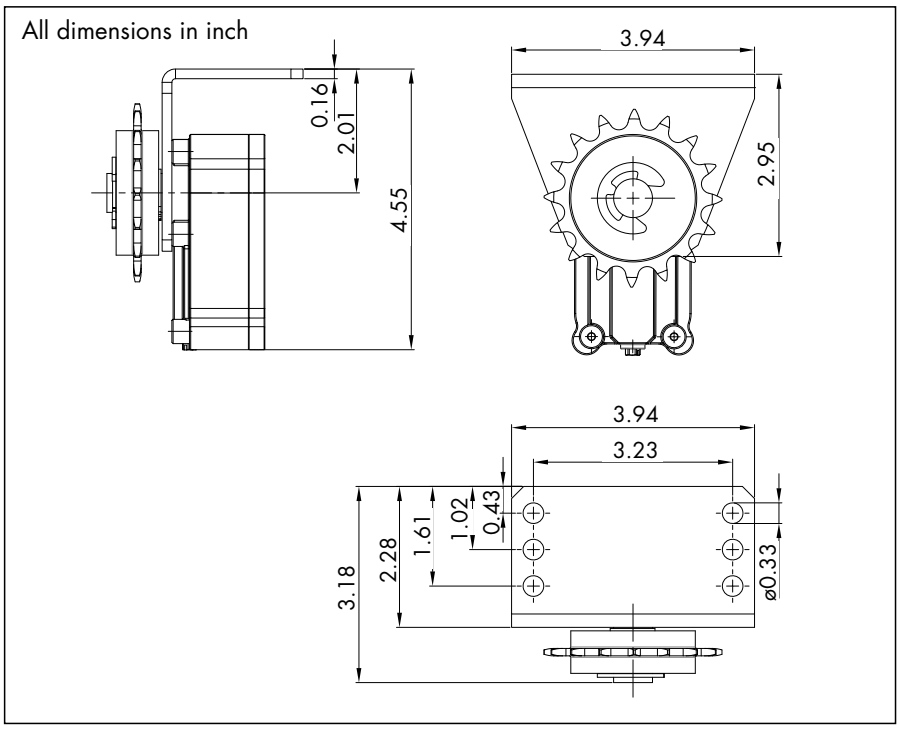
Radial Damper LD 100 K-Z16, Chain Wheel Z16 1/2x1/8"

With zinc-plated mounting bracket with 6 holes

The radial damper LD 100 K-Z16 with chain wheel uses a **revolving chain** 1/2x1/8" to transmit the damping. This provides an absolutely positive connection to the device to be dampened (door). To achieve an optimum damping, it is important that as many chain links as possible engage with the chain wheel.

On demand the LD 100 K radial damper is also available with other chain wheels. The standard chain wheel features a freewheel, i.e. it hydraulically damps only in one direction.

Dimensions



Normally the LD 100 K-Z16 with chain wheel is supplied with a zinc-plated mounting bracket. It has 6 holes to allow adapting the mounting position to the local situation.

Components Included

Radial damper LD 100 K-Z16 with chain wheel Z16, 1/2 x 1/8", with freewheel, casing in plastics, zinc-plated mounting bracket with 6 fixing holes

Optional Accessories

Chain 1/2 x 1/8", idler pulley, door actuator with chain tensioner (for order information and drawings see page 03.054.00)

Order Information

LD 100 K-Z16, with mounting bracket, zinc-plated	part no. 244103
Chain 1/2 x 1/8", piece of 16.4 ft length	part no. 220006
Chain lock	part no. 220007

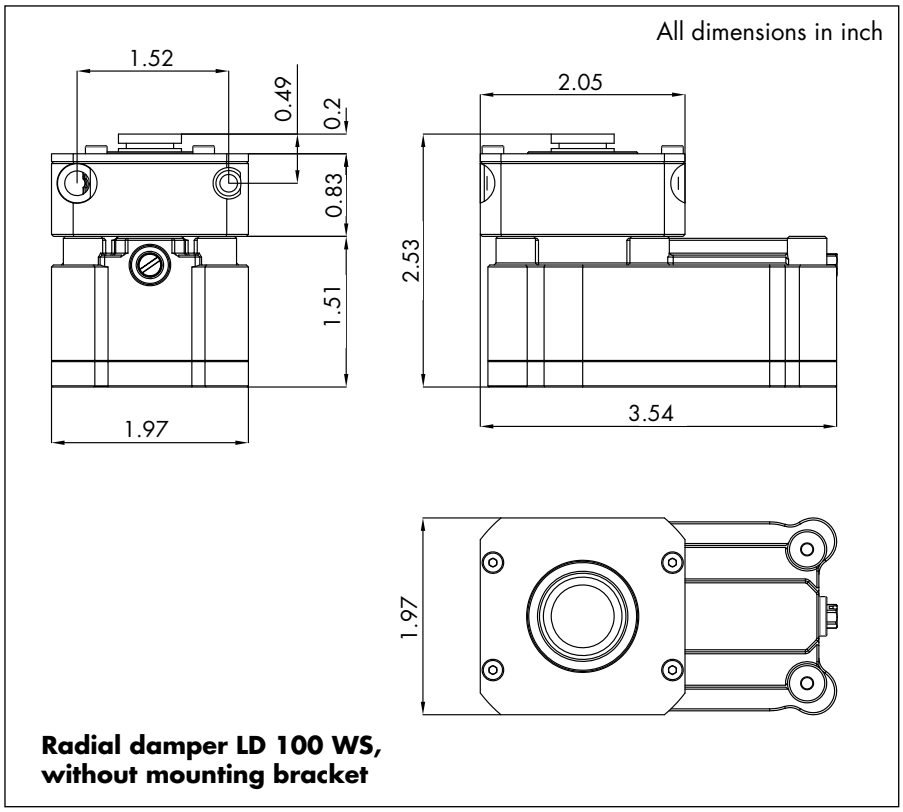
Radial Damper LD 100 WS

For tensioned wire rope

The LD 100 WS hydraulically damps via a **tensioned wire rope** which runs through the cap on the radial damper. The rope is fixed on both sides of the door (e.g. to the door frame). This type of radial damper is mounted on the door leaf.

For fixing and tensioning the wire rope are available a tensioner and a clamp piece, both either with or without mounting bracket. Drawings and more detailed information can be found on the pages about the sliding door closer DICTAMAT 50 WS in the Door Closer Solutions catalogue.

Dimensions LD 100 WS



Radial damper LD 100 WS, without mounting bracket

Components Included

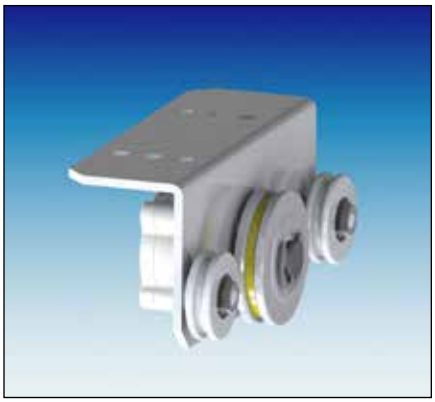
Radial damper LD 100 WS with cap in steel for tensioned WS6 wire rope, with free-wheel, casing in plastics, without mounting bracket

Optional Accessories

Mounting bracket for LD 100 WS, WS6 wire rope, wire rope tensioner and clamp piece for tensioning the wire rope, with or without bracket (see catalogue Door Closer Solutions, DICTAMAT 50 WS)

Order Information

LD 100 WS, without mounting bracket	part no. 244150
Wire rope WS6, per meter (approx. 3.3 ft)	part no. 244147
Wire rope tensioner without bracket	part no. 701042
Wire rope tensioner with bracket	part no. 701043
Clamp piece without bracket	part no. 701047
Clamp piece with bracket	part no. 701048
Mounting bracket	part no. 701040

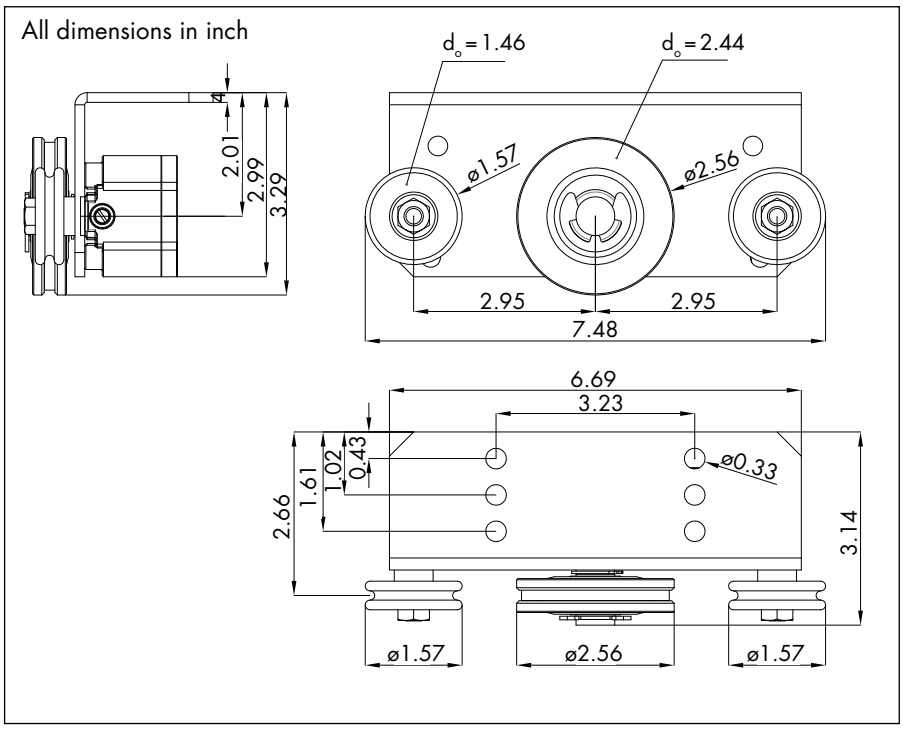


Radial Damper LD 100L S-65 with Rope Pulley Ø 65 mm/ 2.56", two small guiding pulleys Ø 1.57" and wide mounting bracket

The radial damper LD 100L S-65 with rope pulley Ø 65 mm/2.56" and two additional guiding pulleys Ø 40 mm/1.57" hydraulically damps by means of a **tensioned rope** Ø 0.12". The rope is guided via the two guiding pulleys around the central rope pulley of the lamellar radial damper. This ensures an optimum damping.

The standard rope pulley features a freewheel. The way of guiding the rope around the pulleys determines the direction of damping. It is of course possible to take off the driving rope pulley, turn it around and fix it again on the axle (see page 03.056.00).

Dimensions



The lamellar radial damper LD 100L S-65 with rope pulley Ø 65 mm/2.56" and two guiding pulleys is always supplied with mounting bracket. The bracket has 6 holes to allow adapting the mounting position to the local situation.

Components Included

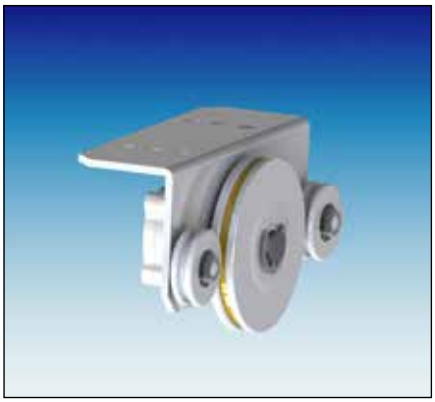
Radial damper LD 100L S-65 with rope pulley Ø 65 mm/2.56" in aluminum with Vulkollan insert, with freewheel, 2 small guiding pulleys Ø 40 mm/1.57" in plastics, casing in plastics, zinc-plated mounting bracket with 6 fixing holes

Optional Accessories

Steel rope Ø 0.12", rope tensioner (for order information see below)

Order Information

Radial damper LD 100L S-65, 2 guiding pulleys Ø 40 mm/ 1.57", mounting bracket, zinc-plated	part no. 244121
82.02 ft of steel rope Ø 0.12"	part no. 700155
Rope tensioner (complete kit)	part no. 220005S

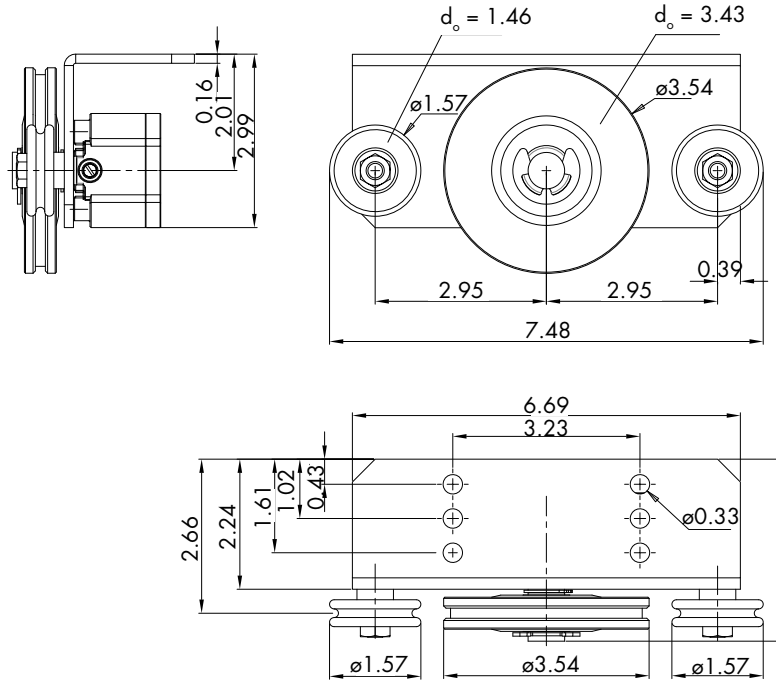


Radial Damper LD 100L S-90 with Rope Pulley Ø 90 mm/ 3.54", two small guiding pulleys Ø 1.57" and wide mounting bracket

The radial damper LD 100L S-90 with rope pulley Ø 90 mm/3.54" and two additional guiding pulleys Ø 40 mm/1.57" hydraulically damps by means of a **tensioned rope** Ø 0.12". When there are higher loads, you should use this model as the rope is longer in contact with the rope pulley due to its larger diameter.

The standard center rope pulley of the model features a freewheel. The way of guiding the rope around the pulleys determines the direction of damping. It is of course possible to take off the rope pulley, turn it around and fix it again on the axle (see page 03.056.00).

Dimensions



All dimensions in inch

The lamellar radial damper LD 100L S-90 with rope pulley Ø 90 mm/3.54" and two guiding pulleys is always supplied with mounting bracket. The bracket has 6 holes to allow adapting the mounting position to the local situation.

Components Included

Radial damper LD 100L S-90 with rope pulley Ø 90 mm/3.54" in aluminum with Vulkollan insert, with freewheel, 2 small guiding pulleys Ø 40 mm/1.57" in plastics, casing in plastics, zinc-plated mounting bracket with 6 fixing holes

Optional Accessories

Steel rope Ø 0.12", rope tensioner (for order information see below)

Order Information

LD 100L S-90, 2 guiding pulleys Ø 40 mm/1.57", mounting bracket, zinc-plated	part no. 244144
82.02 ft of steel rope Ø 0.12"	part no. 700155
Rope tensioner (complete kit)	part no. 220005S

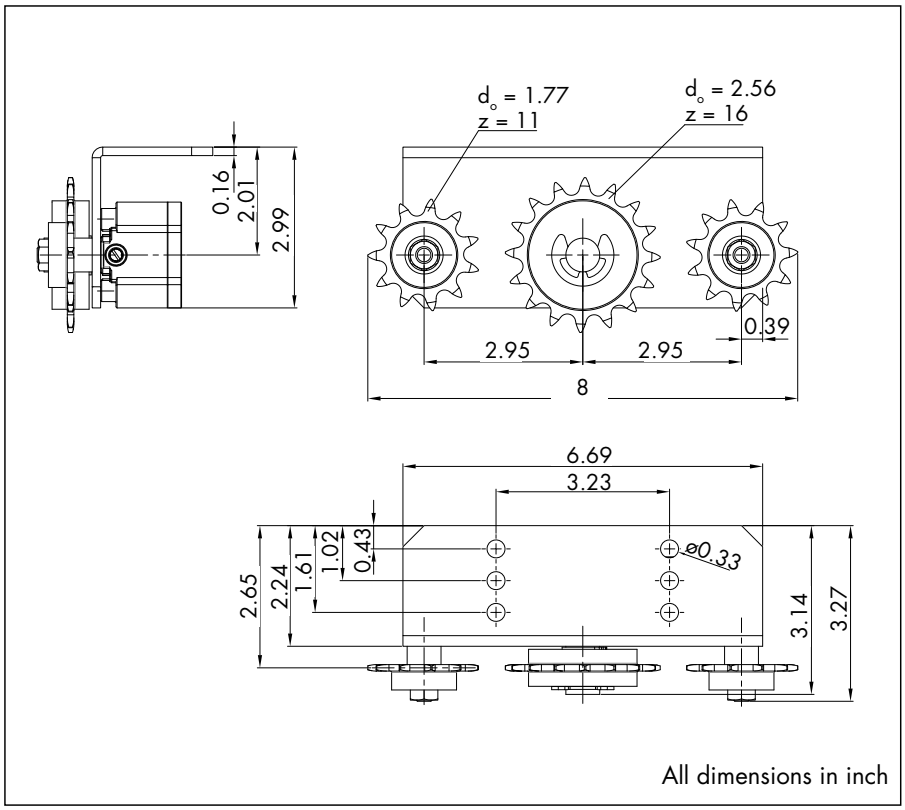
Radial Damper LD 100L K-Z16 with Chain Wheel Z16,

two small chain wheels and wide mounting bracket

The radial damper LD 100L K-Z16 with chain wheel Z16 and two additional guiding wheels Z11 damps by means of a **tensioned chain**. This model should always be used in case of high loads as it assures an absolutely positive connection between radial damper and the device (e.g. door) to be controlled.

By default the chain wheel Z16 features a freewheel and therefore hydraulically damps only in one direction.The way of guiding the chain around the wheels determines the direction of damping. It is of course possible to take off the chain wheel, turn it around and fix it again on the axle (see page 03.056.00).

Dimensions



All dimensions in inch

The lamellar radial damper LD 100L K-Z16 with chain wheel Z16 and two guiding chain wheels is always supplied with mounting bracket. The bracket has 6 holes to allow adapting the mounting position to the local situation.

Components Included

Radial damper LD 100L K-Z16 with chain wheel Z16, with freewheel, 2 small chain wheels Z11, casing in plastics, zinc-plated mounting bracket

Optional Accessories

Chain 1/2 x 1/8", chain tensioner (for order information see below))

Order Information

LD 100L K-Z16, 2 chain wheels Z11, mounting bracket, zinc-plated	part no. 244145
Chain 1/2 x 1/8", piece of 16.4 ft length	part no. 220006
Chain lock	part no. 220007
Chain tensioner (complete kit)	part no. 220005

Accessories for Radial Dampers LD 50 S

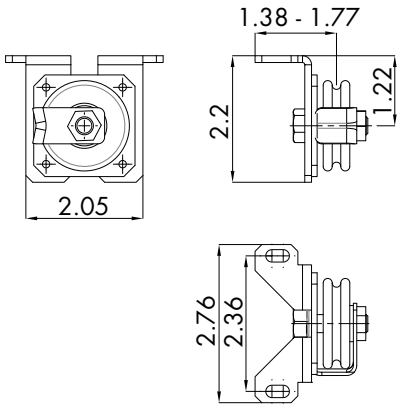
Mounting accessories for revolving rope (up to rope pulley Ø 65 mm/2.56")

For the radial damper LD S with revolving rope the appropriate accesories for transmitting the damping force are available.

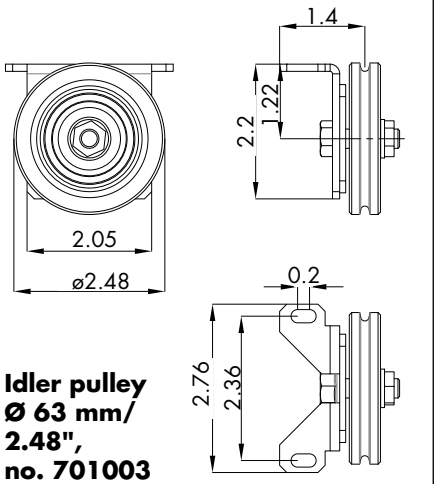
Due to the different forces effective in the applications they are used for, the radial dampers LD 50 and LD 100 require different accessories. For the LD 50 radial dampers is used a steel rope of Ø 0.08", for the LD 100 ones one of Ø 0.12".

More accessories can be found on the pages about the respective models and in the Door Closer Solutions catalogue, the sliding door closer DICTAMAT 50.

Dimensions Idler Pulleys Ø 45/63 mm/ 1.77/2.48"



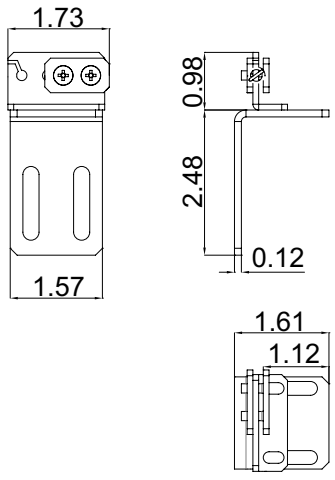
Idler pulley Ø 45 mm/1.77", part no. 700070



Idler pulley Ø 63 mm/ 2.48", no. 701003

Dimensions Door Actuator with Rope Tensioner for Rope Ø 0.08"

All dimensions in inch



Door actuator with rope tensioner, part no. 700071

Order Information

Door actuator for revolving rope Ø 0.08", zinc-plated	part no. 700071
Door actuator for revolving rope Ø 0.08", AISI 304	part no. 700073
Idler pulley Ø 1.77", mounting bracket kit for LD 50 S-45, zinc-plated	700070
Idler pulley Ø 1.77", mounting bracket kit for LD 50 S-45, AISI 304	700077
Idler pulley Ø 2.48" mount. bracket kit for LD 50/100 S-65, zinc-plated	701003
Idler pulley Ø 2.48", mount. bracket kit for LD 50/100 S-65, AISI 304	701004
26.25 ft of steel rope Ø 0.08" with compensation spring for LD 50 S	700075
26.25 ft of stainless steel rope Ø 0.08" with compensation spring for LD 50 S	700076

Accessories for Radial Dampers LD 100 S

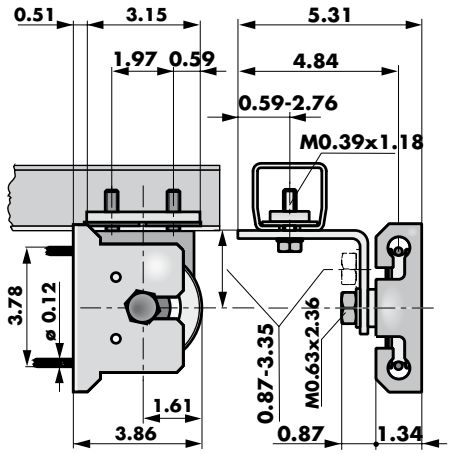
Mounting accessories for revolving rope (rope pulley Ø 90 mm/3.54")

For the LD 100 S radial dampers, models LD 100 S-65 and LD 100 S-90, you always should use the Ø 0.12" steel rope. The rope is tensioned by means of the rope tensioner, part no. 700478.

The dimensions of the idler pulley for the model LD 100 S-65 can be found on the preceding page.

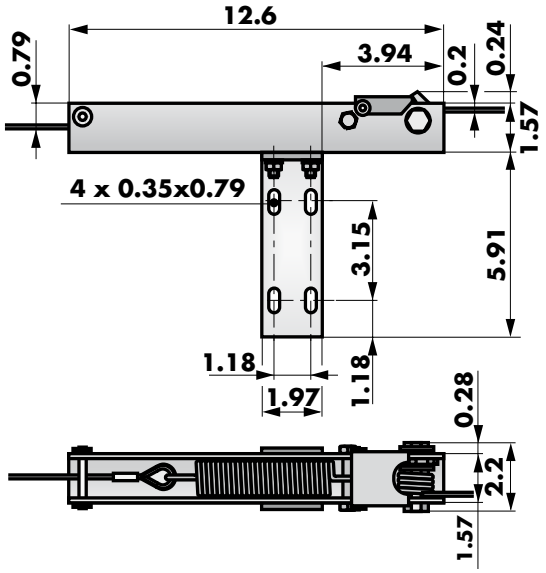
Dimensions Idler Pulley Ø 90 mm/ 3.54"

All dimensions in inch



Idler pulley Ø 90 mm/3.54", part no. 700530

Dimensions Door Actuator with Rope Tensioner for Rope Ø 0.12"



Door actuator with rope tensioner, part no. 700478

Order Information

Door actuator for revolving rope for LD 100 S-65 and S-90	part no. 700478
Idler pulley Ø 90 mm/3.54" for revolving rope for LD 100 S-90	part no. 700530
82.02 ft of steel rope Ø 0.12" for LD 100 S	part no. 700155

Accessories for LD 50 Z/K and LD 100 Z/K

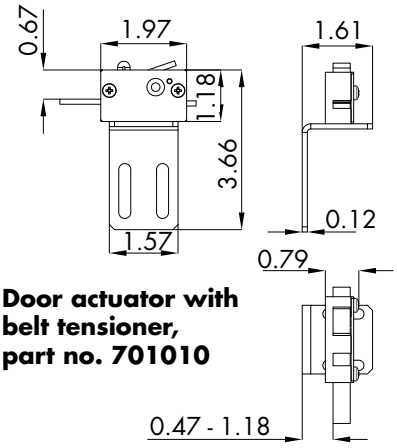
Mounting accessories for revolving toothed belt, chain

For the radial dampers LD transmitting the damping force by toothed belt or chain, the appropriate accessories are available.

The idler pulley is intended for the radial damper LD with toothed belt disk Z26.

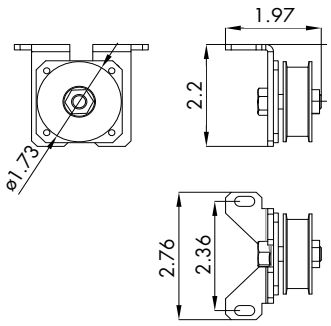
The chain 1/2 x 1/8" is packaged in pieces of 16.4 ft. To connect the chain pieces, chain locks can be ordered.

Dimensions Accessories for Revolving Toothed Belt



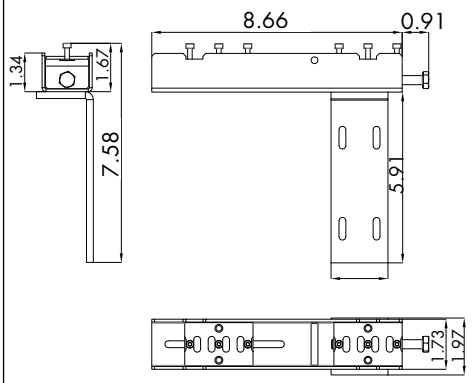
Door actuator with belt tensioner, part no. 701010

All dimensions in inch

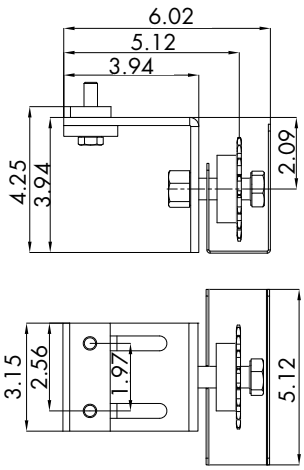


Idler pulley with mounting brackets, part no. 701011

Dimensions Accessories for Revolving Chain



Door actuator with chain tensioner, part no. 710497K



Idler pulley for chain, part no. 785972

Order Information

Door actuator for revolving toothed belt	part no. 701010
Idler pulley with mounting brackets for toothed belt	part no. 701011
Toothed belt HDT 5, 0.39" wide, per meter (approx. 3.3 ft)	part no. 710502
Idler pulley for chain	part no. 785972
Door actuator for revolving chain	part no. 710497K
Chain 1/2 x 1/8", piece of 16.4 ft length	part no. 220006
Chain lock	part no. 220007

Mounting Brackets

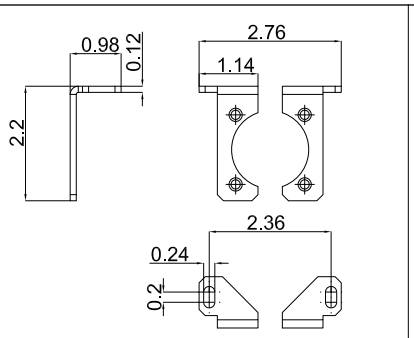
for radial dampers LD 50 and LD 100

The mounting bracket kit for fitting the LD radial dampers can be complemented with an additionally available adapter bracket and an adapter plate.

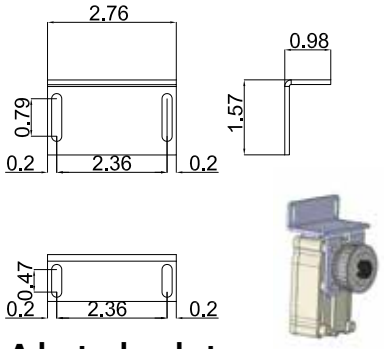
Also the mounting bracket with 6 fixing holes can be ordered separately.

Other accessories can be found on the pages about the respective models and in the catalogue Door Closer Solutions, sliding door closer DICTAMAT 50.

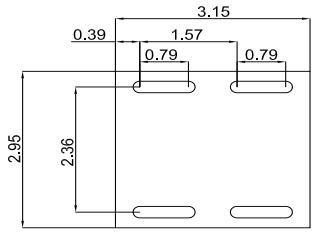
Dimensions Mounting Bracket Kit for LD 50 and LD 100 and Adapter Bracket and Adapter Plate



Mounting bracket kit, part no. 244054

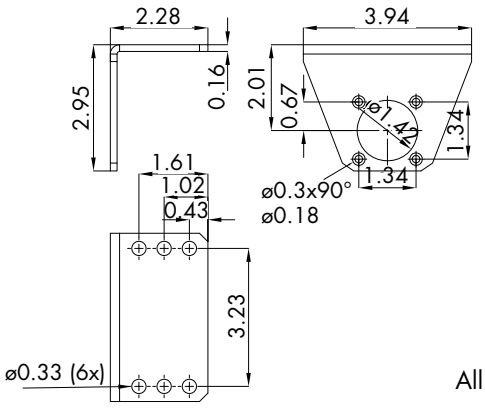


Adapter bracket, part no. 244051



Adapter plate, part no. 244050

Dimensions Mounting Bracket with 6 Fixing Holes



All dimensions in inch

Order Information

Mounting bracket kit for LD 50/LD 100, zinc-plated	part no. 244054
Mounting bracket kit for LD 50/LD 100, AISI 304	part no. 244055
Adapter bracket 2.76x0.98x1.57" (70 x 25 x 40 mm), zinc-plated	part no. 244051
Adapter bracket 2.76x0.98x1.57" (70 x 25 x 40 mm), AISI 304	part no. 244053
Adapter plate 2.95x3.15" (75 x 80 mm), zinc-plated	part no. 244050
Adapter plate 2.95x3.15" (75 x 80 mm), AISI 304	part no. 244052
Mounting bracket with 6 fixing holes	part no. 244057

Mounting and Operating Instructions

For radial dampers LD 50 and LD 100

The DICTATOR LD radial dampers control the speed of movements over unlimited distances.

The damping force and therewith the speed can continuously be adjusted and exactly adapted to the requirements.

The mounting depends on the model. Below you will find the most important instructions for the different types.

Damping Adjustment

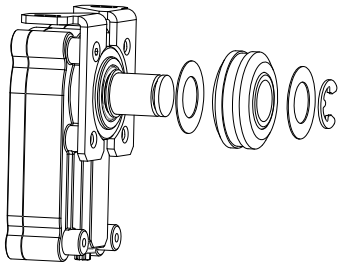
The lateral adjusting screw allows to continuously adjust the damping force to the requirements.

The more you tighten the adjusting screw (turn it clockwise) the higher becomes the damping force. Turning it anticlockwise will reduce the damping force.

When mounting the radial damper, make sure the adjusting screw is always easy to reach.

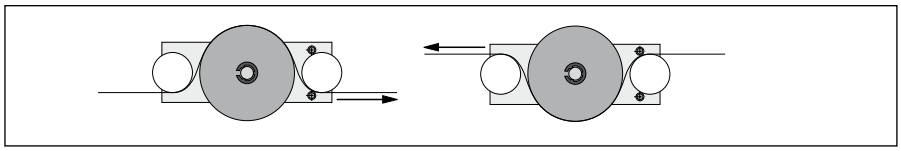
Mounting of the Driving Wheel

All models with only one damping wheel (rope pulley, chain wheel, toothed belt disk) are delivered with the wheel not being mounted. By default the rope pulley, the chain wheel as well as the toothed belt disk have a freewheel, i.e. they damp only in one direction. (On demand the driving wheel can also be furnished without freewheel for damping in both directions.) Depending on the mounting, the desired damping direction and the guiding of the rope/chain/toothed belt you put the driving wheel on the axle and secure it.



Determining the Damping Direction of the Models with 2 Guiding Pulleys

The damping direction of the models with two guiding pulleys is determined by the way the rope or chain is guided around the pulleys/wheels, see the following illustration.



But you also can change the damping direction by taking off the driving pulley, turning it around and fixing it again on the axle.

Type of Driving Wheel

Beside the standard models shown on the previous pages, on demand also other driving wheels are possible, e.g. friction wheels, toothed wheels Z16 module 4 or Z30 module 1.5. Just ask us.

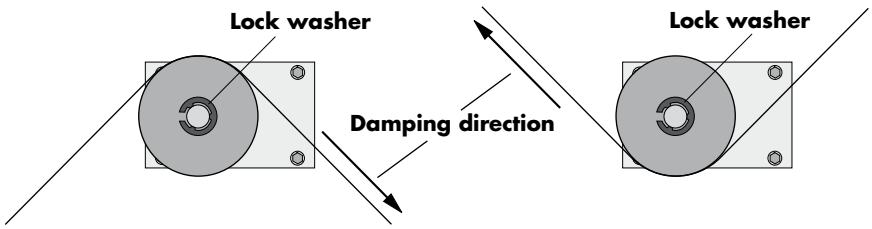
RD 240/241 Radial Damper with Gear Wheel

For continuous damping with a revolving chain

DICTATOR radial dampers provide continuous damping over unlimited distances. Although designed for sliding doors, they are also used on a variety of other applications e.g. roller conveyors, chain hoists etc.

RD 240000 and RD 240017 radial dampers damp by means of a revolving chain which runs around the chain wheel (at least one quarter of the wheel should be in constant contact with the chain).

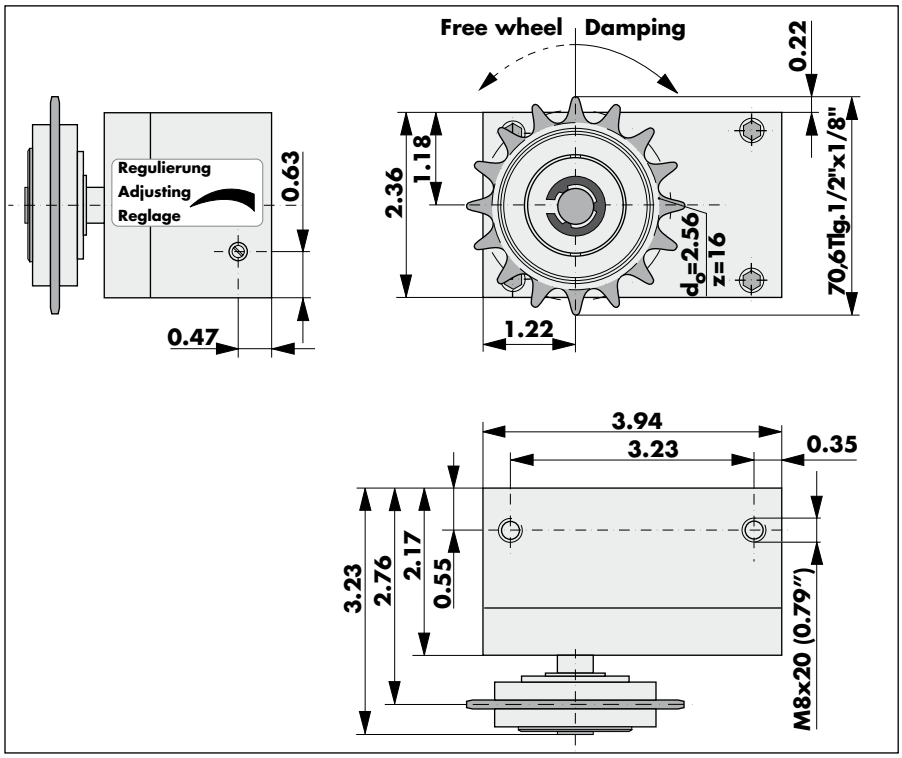
Installation and Operating Instructions



The diagram below shows the direction in which the chain wheel usually rotates. The direction of damping depends on the direction the chain is run around the wheel (see diagram above). If necessary, you can change the damping direction by removing the lock washer, taking off the wheel and replacing it on the axle the other way round. Make sure you replace the lock washer again.

The closing speed can continuously be varied by the adjustment screw.

Dimensions



Order Information

RD 240000 radial damper, normal damping	part no. 240000
RD 240017 radial damper, slight damping	part no. 240017
Idler pulley for chain	part no. 785972
Chain tensioner	part no. 710497
Chain per running meter/3.28 ft	part no. 220006
Chain joint	part no. 220007

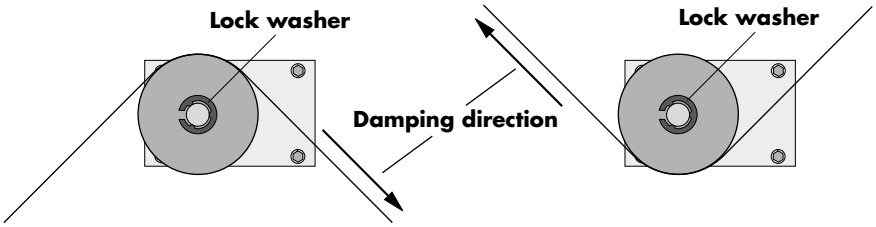
RD 240/241 Radial Damper with Rope Pulley

For continuous damping with rope

DICTATOR radial dampers provide continuous damping over unlimited distances. They are used on sliding doors, fire protection doors, roller conveyors, rope or chain hoists etc.

RD 240011 and RD 240013 radial dampers damp by means of a revolving steel rope (ø 0.12 inch) which runs around the pulley. Make sure that the rope runs in true alignment on the wheel and that it is properly tensioned (e.g. with a DICTATOR rope tensioner, fixing bracket included).

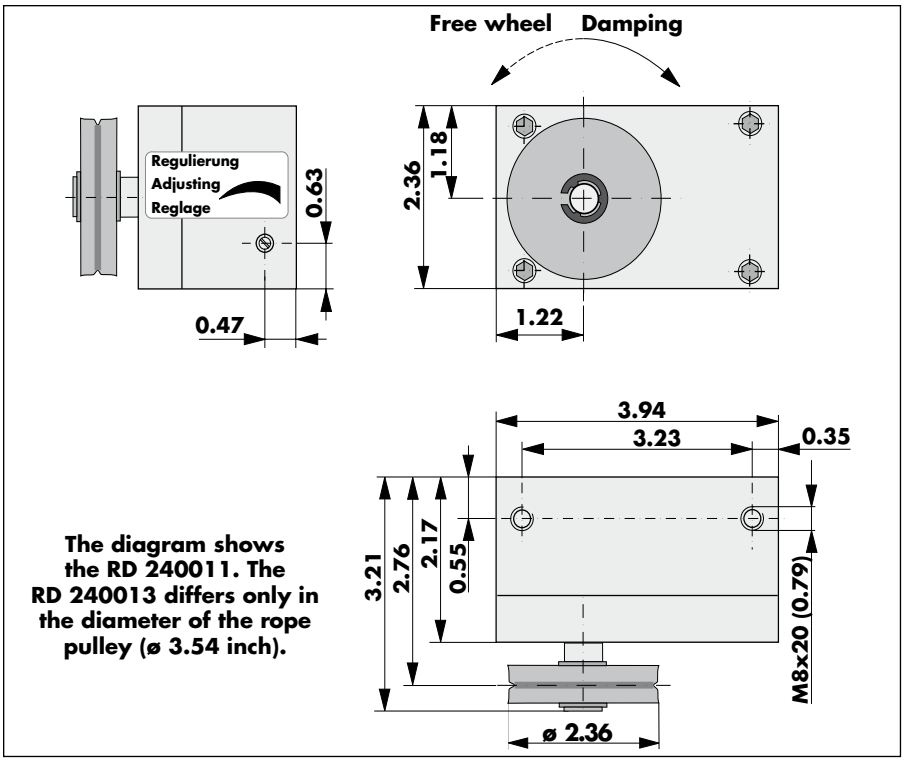
Installation and Operating Instructions



The diagram below shows the direction in which the pulley usually rotates. The direction of damping depends on the direction the rope is run around the pulley. If necessary, you can change the damping direction by removing the lock washer, taking off the pulley and replacing it on the axle the other way round. Make sure you put the lock washer on again.

The closing speed can continuously be varied by the adjustment screw.

Dimensions



The diagram shows the RD 240011. The RD 240013 differs only in the diameter of the rope pulley (ø 3.54 inch).

Order Information

Radial damper with rope pulley Ø 2.36"	part no. 240011
Radial damper with rope pulley Ø 3.54"	part no. 240013
Idler pulley for rope	part no. 700530
82.02 ft steel rope (Ø 0.12")	part no. 700155
Rope tensioner with fixing bracket	part no. 700478

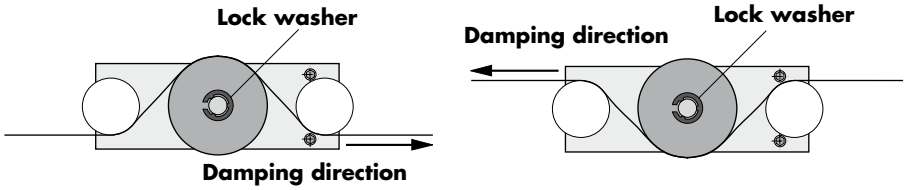
RD 240001 Radial Damper

For continuous damping with tensioned chain

DICTATOR radial dampers provide continuous damping over unlimited distances. They are used on sliding doors, fire protection doors, roller conveyors, rope or chain hoists etc.

The RD 240001 damps by means of a tensioned chain which runs around three toothed wheels.

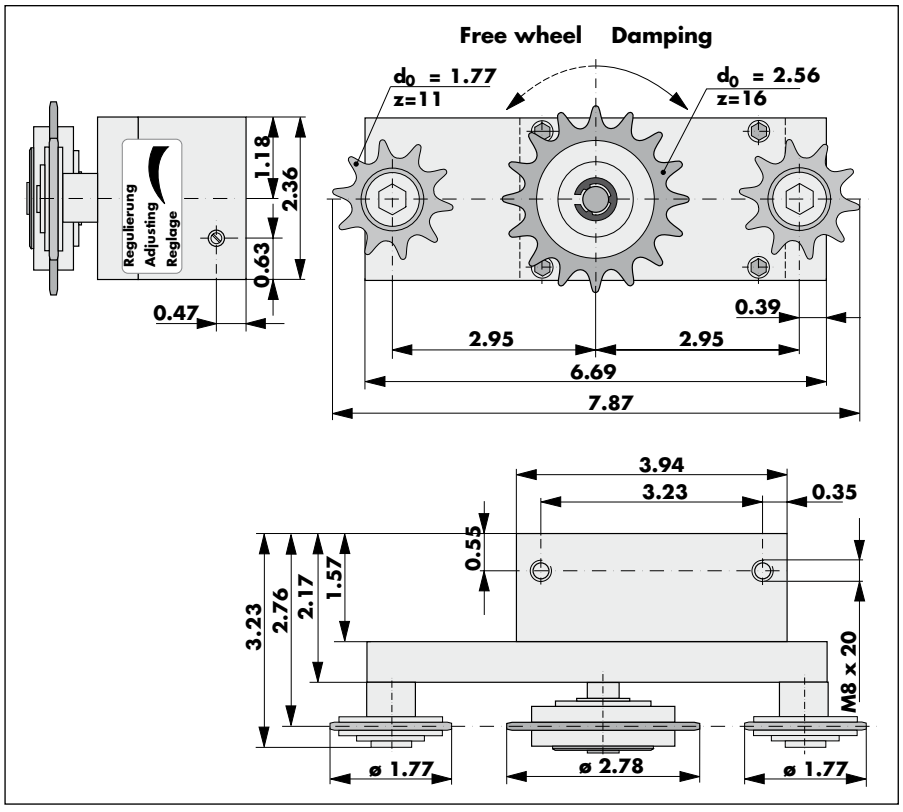
Installation and Operating Instructions



The diagram below shows the direction in which the toothed wheel usually rotates. The direction of damping depends on the direction the chain is run around the wheel (see diagram above). If necessary, you can change the damping direction by removing the lock washer, taking off the centre wheel and then placing it back on the axle the other way round. Make sure you put the lock washer back on again.

The closing speed can continuously be varied by the adjustment screw.

Dimensions



Order Information

Radial damper for tensioned chain	part no. 240001
Chain (per running meter/3.28 ft	part no. 220006
Chain tensioner (complete set)	part no. 220005
Chain lock	part no. 220007

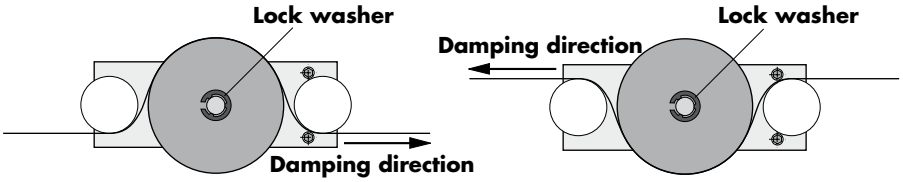
RD 240003 and RD 240012 Radial Dampers

For continuous damping with tensioned rope

DICTATOR radial dampers provide continuous damping over unlimited distances. They are used on sliding doors, fire protection doors, roller conveyors, rope or chain hoists etc.

RD 240003 and RD 240012 radial dampers damp by means of a tensioned rope running around three pulleys.

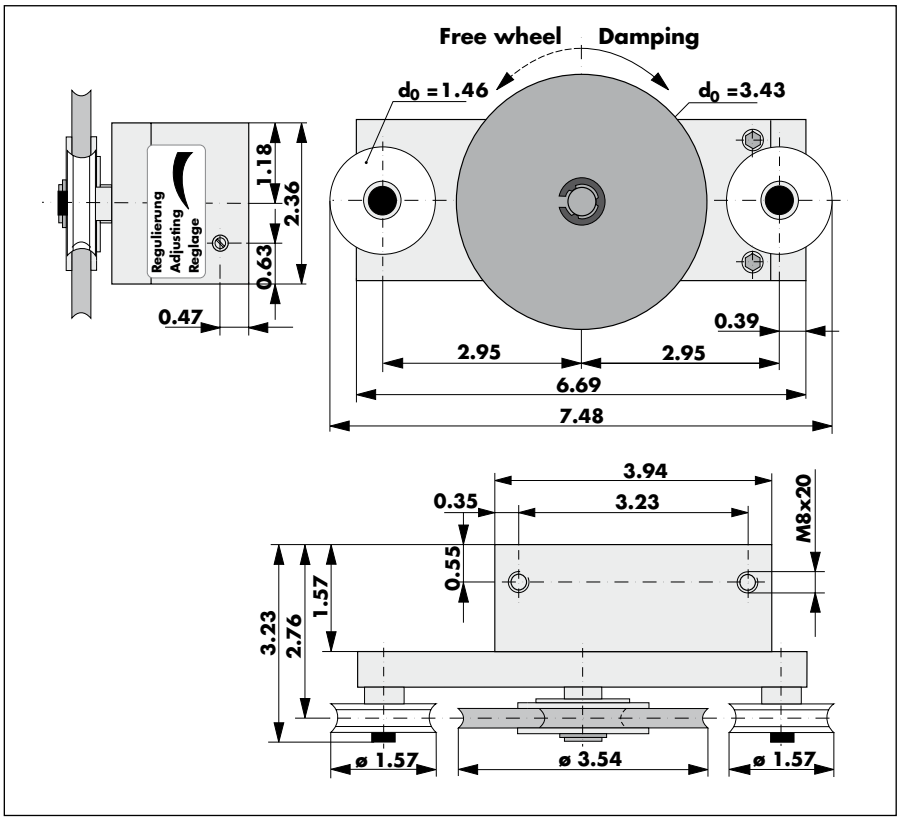
Installation and Operating Instructions



The diagram below shows the direction in which the damping pulley usually rotates. The direction of damping depends on the direction the rope is run around the wheel (see diagram above). If necessary, you can change the damping direction by removing the lock washer, taking off the centre pulley and then placing it back on the axle the other way round. Make sure you put the lock washer on again.

The closing speed can continuously be varied by the adjustment screw.

Dimensions



Order Information

Radial damper for tensioned rope, normal damping	part no. 240003
Radial damper for tensioned rope, slight damping	part no. 240012
Steel rope (length 82.02 ft)	part no. 700155
Rope tensioner (complete set)	part no. 220005

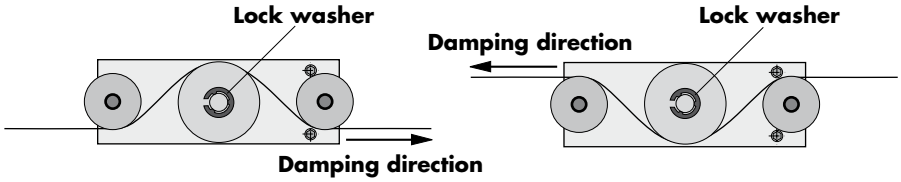
RD 240004 Radial Damper

For continuous damping with tensioned rope

DICTATOR radial dampers provide continuous damping over unlimited distances. They are used on sliding doors, fire protection doors, roller conveyors, rope or chain hoists etc.

The radial damper RD 240004 damps by means of a tensioned rope running around three pulleys.

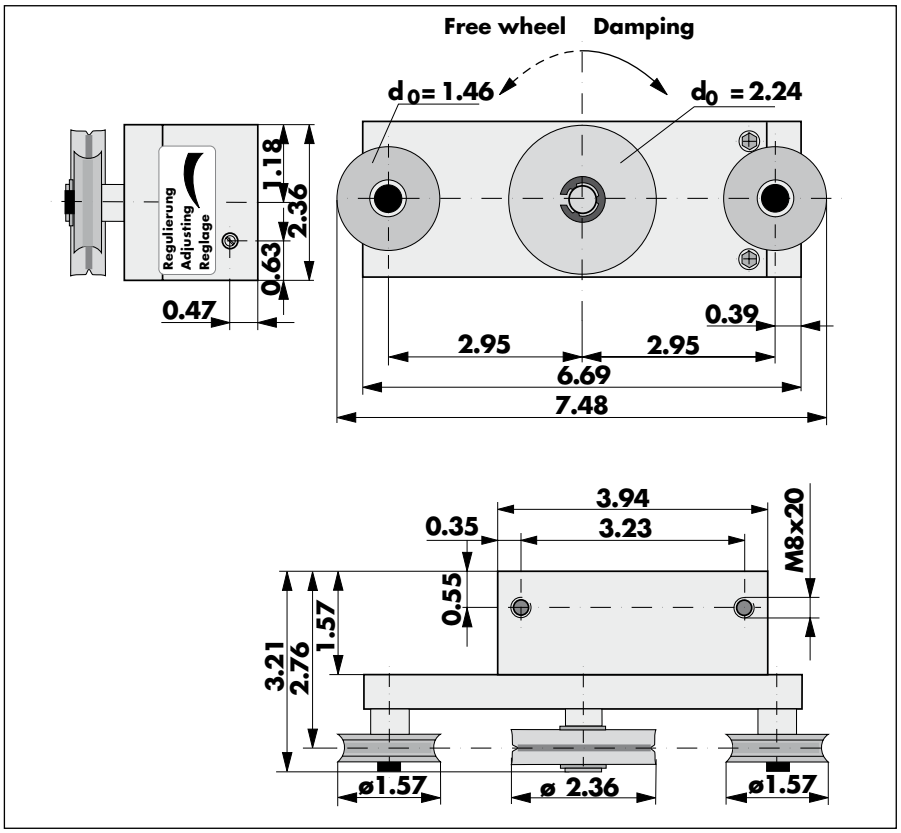
Installation and Operating Instructions



The diagram below shows the direction in which the pulley usually rotates. The direction of damping depends on the direction the rope is run around the wheel (see diagram above). If necessary, you can change the damping direction by removing the lock washer, taking off the centre pulley and then placing it back on the axle the other way round. Make sure you put the lock washer on again.

The closing speed can continuously be varied by the adjustment screw.

Dimensions



Order Information

Radial damper for tensioned rope (pulley ø 2.36")	part no. 240004
Steel rope (length 82.02 ft)	part no. 700155
Rope tensioner (complete set)	part no. 220005

RD 240022 Radial Damper

For continuous damping with a rubber wheel

DICTATOR radial dampers provide continuous damping over unlimited distances. They are used on sliding doors, fire protection doors, roller conveyors, rope or chain hoists etc.

The RD 240022 radial damper stays in damping contact with the moving object by a rubber wheel.

Installation and Operating Instructions

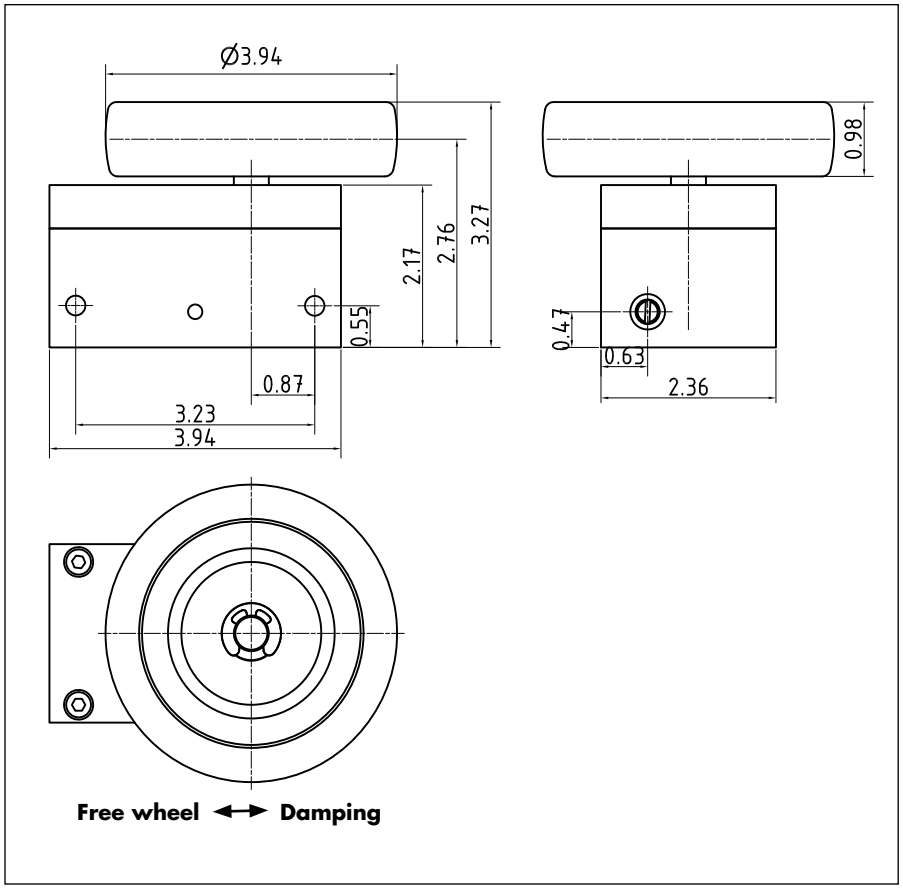
Fix the RD 240022 radial damper in a position where the rubber wheel presses against a straight and even area of the object it has to slow down.

The diagram below shows the radial damper damping to the right as delivered.

You can change the damping direction by removing the lock washer from the axle and taking off the rubber wheel. Now it is put back on the axle the other way round and secured again. Take care not to damage the inner shaft seals which protect the free wheel.

The closing speed can continuously be varied by the adjustment screw.

Dimensions



Order Information

Radial damper with rubber wheel	part no. 240022

RD 241013 and RD 241029 Radial Dampers

For continuous damping of inclined gates with running rack

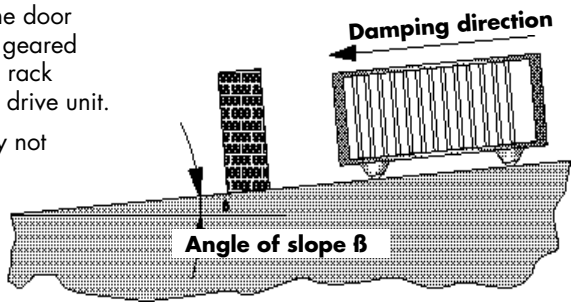
The DICTATOR radial dampers with gearwheel, model 4 (16 teeth) and model 6 (12 teeth) have especially been designed for sliding gates being usually opened and closed by a door drive unit with the help of a rack. For safety reasons a RD 241013 or 241029 radial damper should be fitted on all ascending gates to control the closing speed over the complete distance in the event of power failure.

As these radial dampers are mainly used at the outside they are rust resistant.

Installation and Operating Instructions

The radial damper is fixed to the door post or near the drive unit. The geared wheel must be in mesh with the rack transmitting the power from the drive unit.

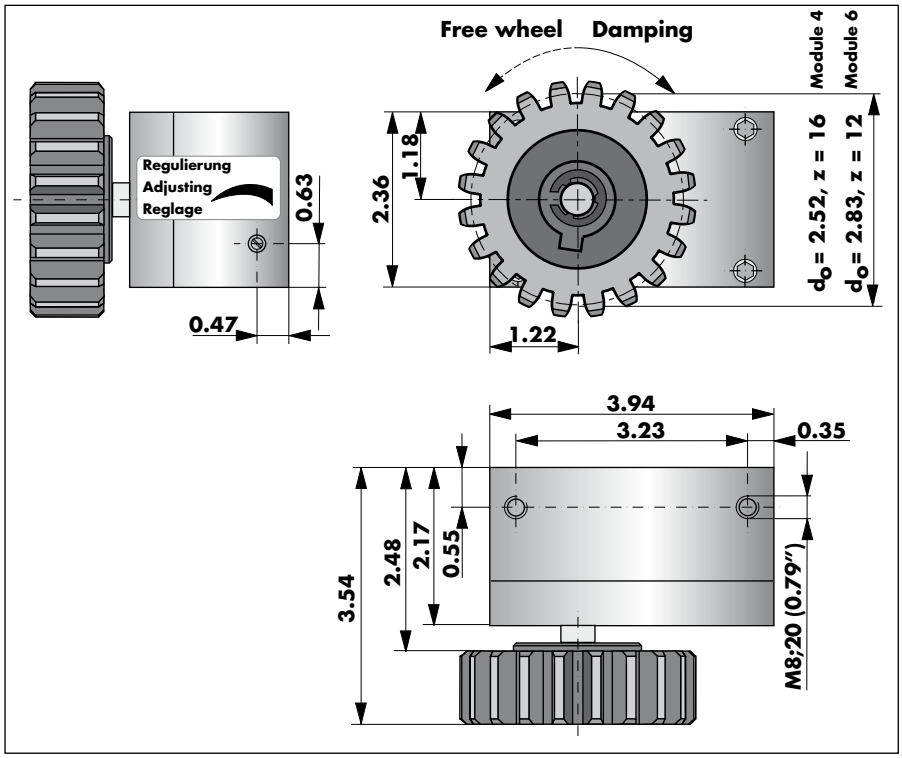
The load on the damper M may not exceed 7 Nm = 5.16 lbf ft:
M [Nm] = **G** x sin**ß** x **0.032**
{G = weight of the gate in N
(1 N = 0.225 lbf)
ß = ascent in degrees}



The diagram below shows the direction in which the toothed wheel usually rotates. You can change the damping direction by removing the lock washer from the axle, taking off the toothed wheel, putting it back the other way round and securing it again. Take care not to damage the inner shaft seals which protect the free wheel.

The closing speed can continuously be varied by the adjustment screw.

Dimensions



Order Information

Radial damper with toothed wheel module 4 (Ø 2.52", 16 teeth)	part no. 241013
Radial damper with toothed wheel module 6 (Ø 2.83", 12 teeth)	part no. 241029

Double Radial Dampers RD 241024 and RD 241030

To slow down high forces

The DICTATOR double radial dampers offer almost twice as high damping forces as the normal radial dampers (the damping moment is 10 lbf ft). The total dimensions change but slightly: only the height increases by 0.75 inch.

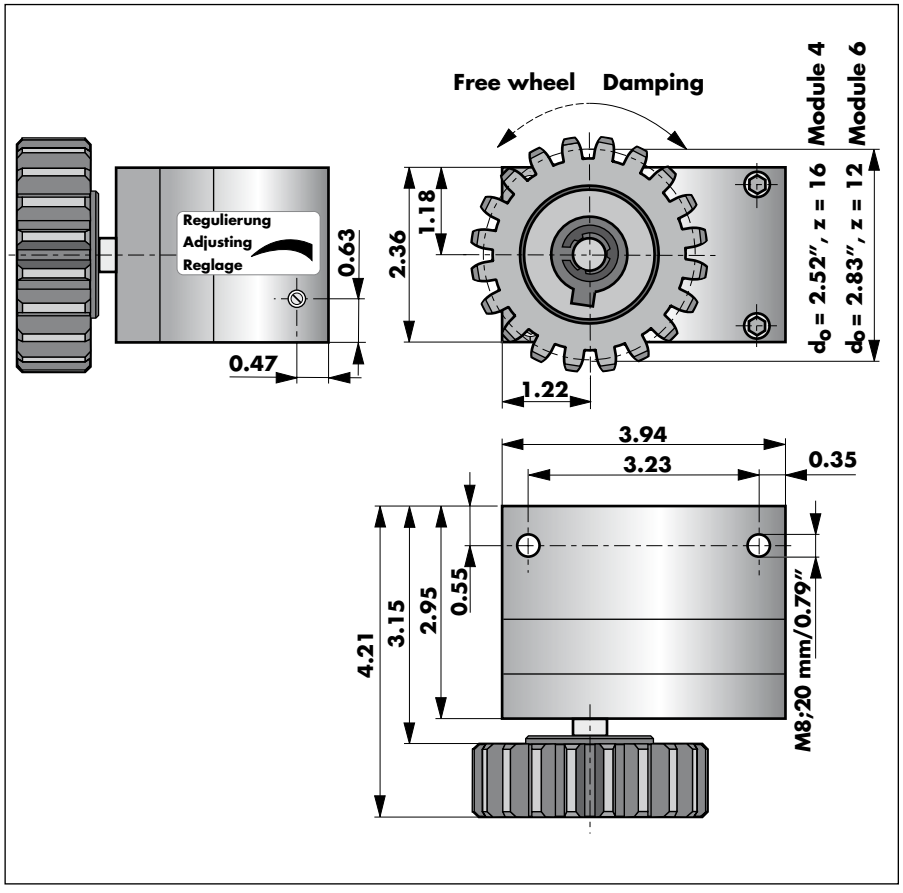
On demand the double radial damper is also available with a pulley for steel rope or with a normal toothed wheel.

Installation and Operating Instructions

The diagram below shows the direction in which the gearwheel usually rotates. You can change the damping direction by removing the lock washer, taking off the wheel and then placing it back on the axle the other way round. Make sure you put the lock washer back on again.

The closing speed can continuously be varied by the adjustment screw.

Dimensions



Order Information

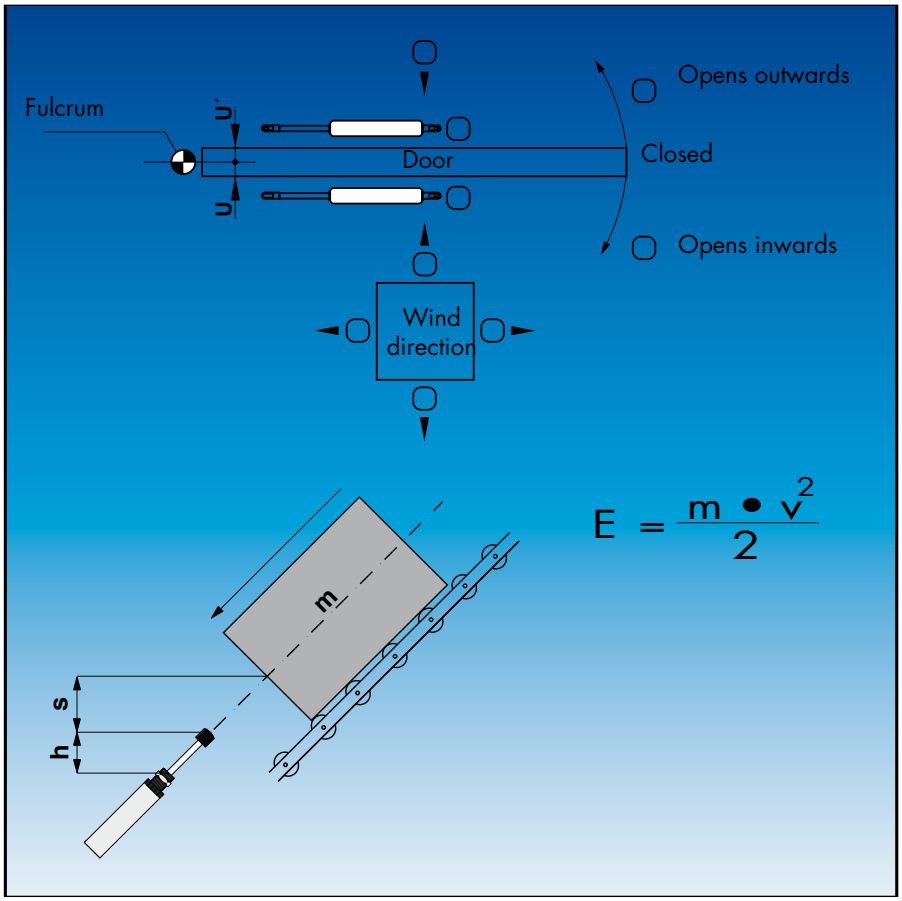
Double radial damper with gearwheel module 4 (Ø 2.52", 16 teeth)	part no. 241024
Double radial damper with gearwheel module 6 (Ø 2.83", 12 teeth)	part no. 241030

Advice for Calculation and Selection of the Appropriate Damper

DICTATOR assists you in selecting the appropriate damper for your application. You merely have to complete one of the following questionnaires. DICTATOR then will calculate and offer you the damper from our large range going best with your requirements.

On the next two pages you will find questionnaires for final dampers. They are followed by those for oil dampers with fixings on both ends. To facilitate your work there are several ones for different fields of application. You only have to fill in the one representing your use.

In case of questions or problems do not hesitate to contact our Technical Service.



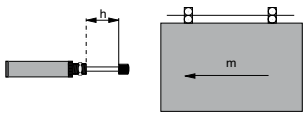
Outline of Questionnaires

Questionnaire for Final Dampers

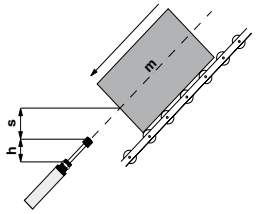
The questionnaire for final dampers consists of two pages. On the first page please mark which kind of impact you need to cushion. On the second page please fill in - as complete as possible - all information regarding mass and speed. Please send us these two pages. We gladly calculate the necessary damper.

In case you want to calculate the damper yourself, you will find the corresponding formula beginning with page 03.071.00.

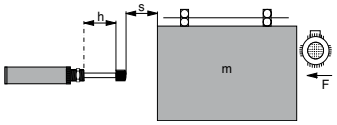
❑ **Horizontal impact**



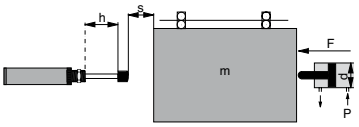
❑ **Inclined impact**



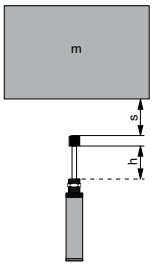
❑ **Electric operator**



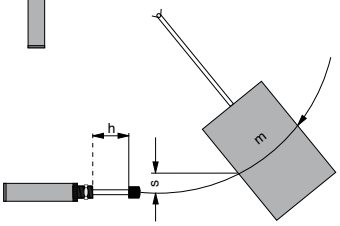
❑ **Pneumatic operator**



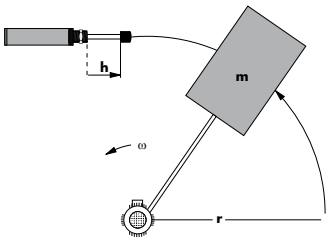
❑ **Vertical impact**



❑ **Falling pendulum**



❑ **Rotary operator**



Questionnaire for Final Dampers - cont.

Impact mass ..... **lb**

Impact speed

Direction of movement

❑ linear: → ..... **ft/s**

❑ rotating: ↻ ..... **degree/s**

Angular velocity: ..... **rad /s**

Driving power

❑ linear: → ..... **lbf**

❑ rotating: ↻ ..... **lbf ft**

Driving power unknown

Kind of operator

❑ Pneumatic: Diameter of piston: ..... **inch**

Pressure: ..... **psi**

❑ Hydraulic system: Diameter of piston: ..... **inch**

Pressure: ..... **psi**

❑ Electric motor: Capacity: ..... **KW**

Gearing: .....

Movement direction of the mass

❑ **horizontally:**

❑ **vertically:** up: ❑ down: ❑

Drop height: ..... **ft**

❑ **incline:** Angle: .....

Distance of acceleration: ..... **ft**

❑ **rotating:** Distance between fulcrum and barycentre: .....**ft**

Distance between fulcrum and damper:... **ft**

Number of operations

❑ **continuously:** per minute: ..... per hour: .....

You don't have to fill in all questions, just what you know. Of course it would be most helpful to know the kind, mass and speed of the impact.
The developing of a damper includes a test under realistic conditions. Our experienced technicians will gladly advise you. Please contact us.

Questionnaire for Oil Dampers with Fixings on Both Ends - Vertical

Address

Name :

Street :

Town, postcode :

Tel. :

Fax :

Person in charge :

Date :

Data of the flap

Weight [Kg] :

Barycentre [mm] T :

Barycentre [mm] B :

Hand lever [mm] A :

Opening angle [degree] q :

Distance lower edge U :

Number of dampers :

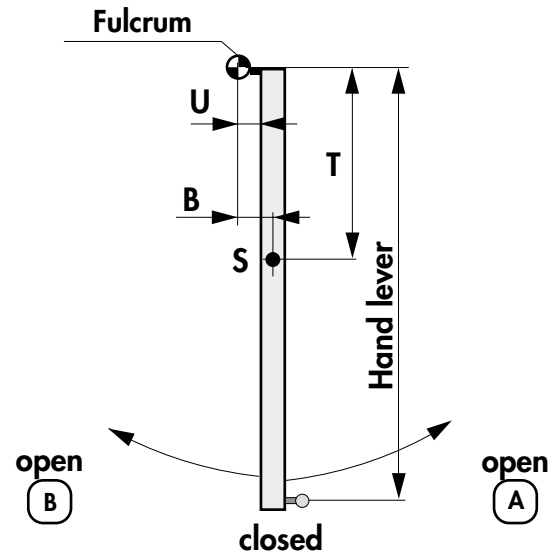
On which side shall the damper be positioned? Please draw in.

Please tick your application and indicate your dimensions.
The flap is shown in the closed position.

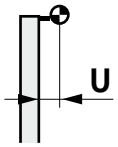
Fulcrum at the top

(A) Flap is vertical, opening to the exterior

(B) Flap is vertical, opening to the interior



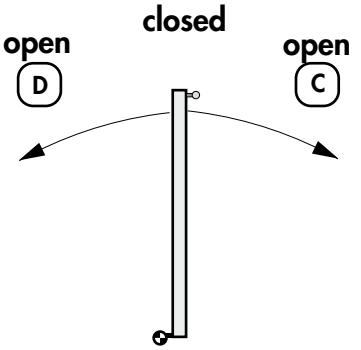
( ) Flap is left of fulcrum.



Fulcrum below

(C) Flap is vertical, opening to the exterior

(D) Flap is vertical, opening to the interior



Questionnaire for Oil Dampers with Fixings on Both Ends - Horizontal

Address

Name :

Street :

Town, postcode :

Tel :

Fax :

Person in charge:

Date :

Data of the flap

Weight [Kg] :

Barycentre [mm] T :

Barycentre [mm] B :

Hand lever [mm] A :

Roof slope [degree] :

Opening angle [degree] q :

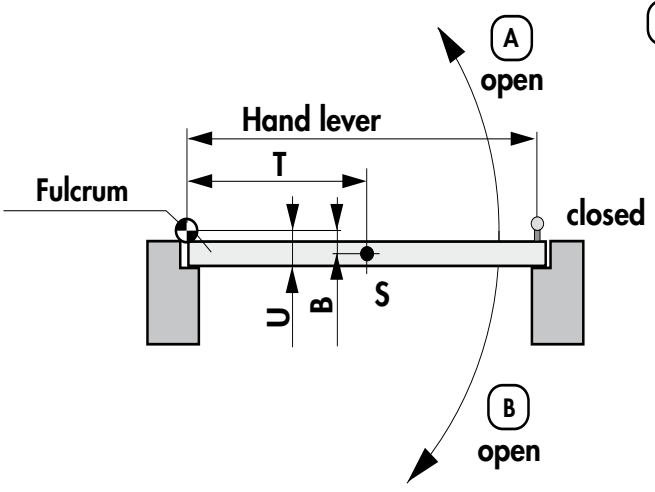
Distance lower edge U :

Number of dampers :

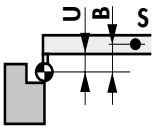
On which side shall the damper be positioned? Please draw in.

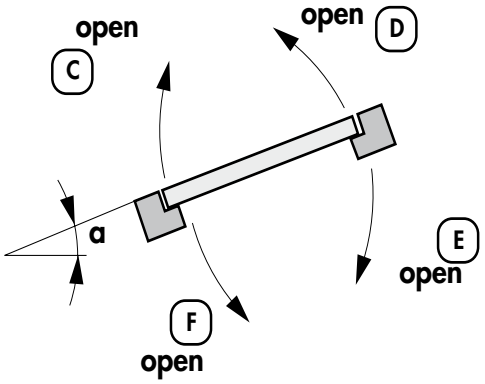
Please tick your application and indicate your dimensions.
The flap is shown in the closed position.

- A Flap is horizontal, opening angle to the top.
- B Flap is horizontal, opening angle to the bottom.
- C Flap is inclined, hinges are on top.
- D Flap is inclined, hinges are below.
- E Flap is inclined, hinges are below.
- F Flap is inclined, hinges are on top.

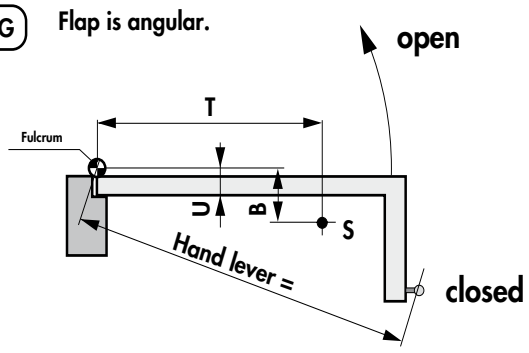


Flap is above the fulcrum.





G Flap is angular.



Questionnaire for Oil Dampers with Fixings on Both Ends - Hinged Doors

Address

Name :

Street :

Town, postal code :

Tel. :

Fax :

Person in charge :

Date :

Data of the door

Weight [kg] :

Width [mm] :

Height [mm] :

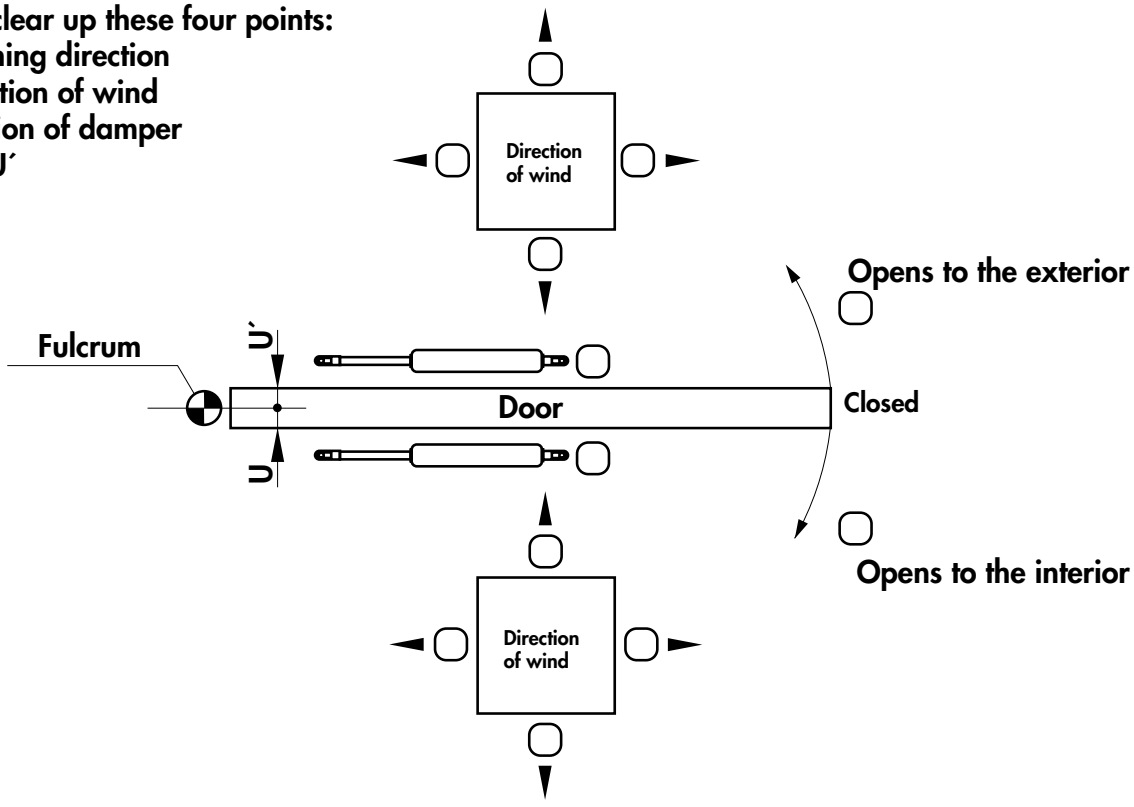
Opening angle [degree] :

Distance lower edge U / U´ :

Wind load [N/qm] :

Please tick your application.
Door shown in closed position.

Please clear up these four points:
1. Opening direction
2. Direction of wind
3. Position of damper
4. U / U´



Door is
- ☐ vertical
- ☐ inclined to the interior — angle of inclination :
- ☐ inclined to the exterior — angle of inclination :

Calculation and Determining of a Final Damper

Calculation Examples / Formula

Please follow the instructions given below to calculate yourself the required final damper.

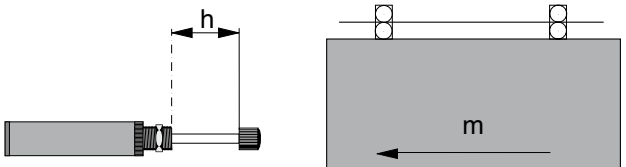
If the situation allows it, you should choose a stroke as long as possible, as this keeps the actual impact (damping force) lower.

To obtain the necessary damping force you first have to calculate the energy the damper has to absorb with every stroke. Therefore you need - depending on the application - the following data:

- impact mass **m** (e.g. weight of door) in lb — or
- mass moment of inertia **J** [lb · ft²] = m · r² — and
- impact speed **v** in feet per second — or
- angular velocity ω [r/s] = rpm · 0.1047 — and
- damping distance (stroke) **h** [ft] — and
- correction factor $\mathbf{f_K}$ (see Technical Data of the damper) — and partly
- distance of acceleration **s** (e.g. height of fall) [ft] — and
- driving force **F** [lbf] — or
- turning moment **M** [lbf ft]

Which of these data you need depends on the purpose the damper is intended for.

Load moved horizontally without operator



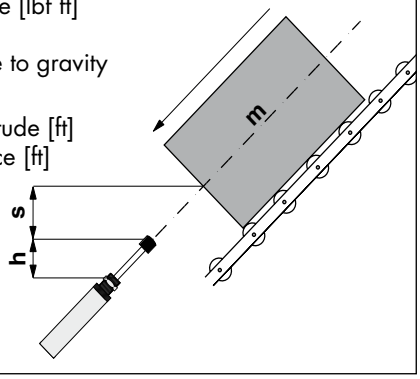
$$E = \frac{m \cdot v^2}{2} \cdot 0.031$$

E = energy per stroke [lbf ft]
m = impact mass [lb]
v = impact speed [ft/s]
h = damping distance [ft]

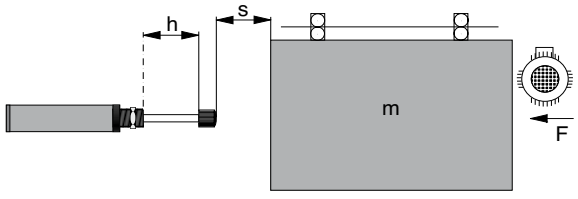
Load on an incline

$$E = [(m \cdot g \cdot h) + (m \cdot g \cdot s)] \cdot 0.031$$

E = energy per stroke [lbf ft]
m = impact mass [lb]
g = acceleration due to gravity = 32.184 [ft/s²]
s = acceleration altitude [ft]
h = damping distance [ft]



Load moved horizontally (electric operator)

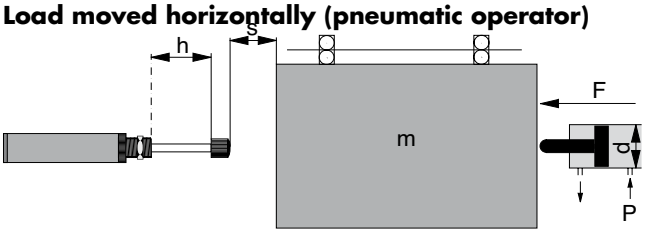


$$E = \frac{m \cdot v^2}{2} \cdot 0.031 + F \cdot h$$

$$v = \sqrt{2 \frac{F \cdot s}{m}} \cdot 5.672$$

E = energy per stroke [lbf ft]
m = impact mass [lb]
v = impact speed [ft/s]
s = acceleration distance [ft]
F = driving force [lbf]
h = damping distance [ft]

Load moved horizontally (pneumatic operator)



$$E = \frac{m \cdot v^2}{2} \cdot 0.031 + F \cdot h$$

$$v = \sqrt{2 \frac{F \cdot s}{m}} \cdot 5.672$$

$$F = 0.7854 \cdot d^2 \cdot P$$

E = energy per stroke [lbf ft]
m = impact mass [lb]
v = impact speed [ft/s]
F = driving force [lbf]
h = damping distance [ft]
d = piston diameter of the pneumatic cylinder [in]
P = pressure [psi]
s = acceleration distance [ft]

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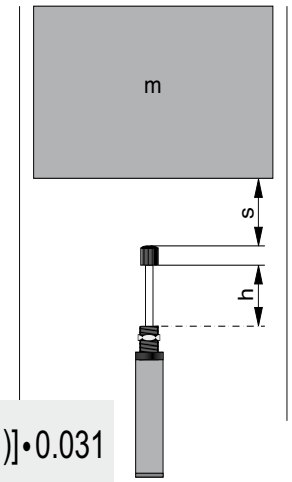
Free fall

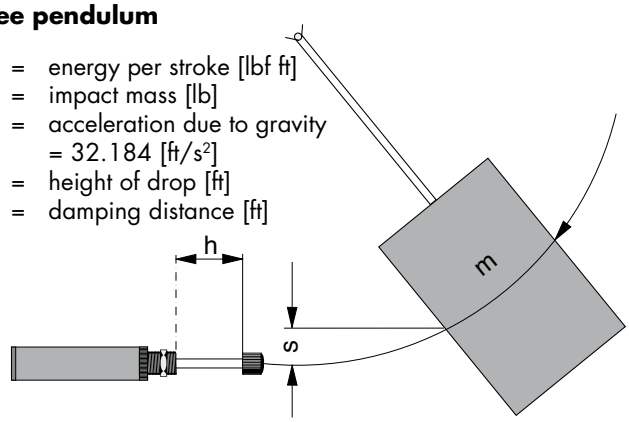
E = energy per stroke [lbf ft]
m = impact mass [lb]
g = acceleration due to gravity = 32.184 [ft/s²]
s = height of drop [ft]
h = damping distance [ft]



$$E = [(m \cdot g \cdot s) + (m \cdot g \cdot h)] \cdot 0.031$$

Free pendulum

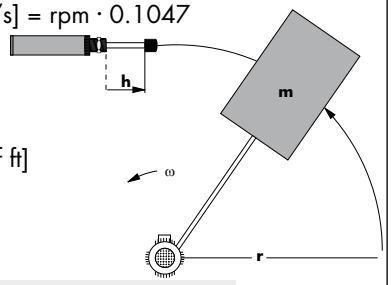
E = energy per stroke [lbf ft]
m = impact mass [lb]
g = acceleration due to gravity = 32.184 [ft/s²]
s = height of drop [ft]
h = damping distance [ft]



$$E = m \cdot g \cdot s \cdot 0.031$$

Turning load (electric operator)

E = energy per stroke [lbf ft]
J = mass moment of inertia [lb · ft²] = m · r²
ω = angular velocity [r/s] = rpm · 0.1047
F = driving force [lbf]
h = damping stroke [ft]
m = impact mass [lb]
r = radius [inch]
M = turning moment [lbf ft]



$$E = \frac{J \cdot \omega^2}{2} \cdot 0.031 + F \cdot h$$

$$= \frac{m \cdot r^2 \cdot (rpm \cdot 0.1047)^2}{2} \cdot 0.031 + \frac{M \cdot h}{r}$$

Calculation of the damping force

Damping force [lbf] =

$$\frac{\textbf{energy per stroke [lbf ft] x correction factor}}{\textbf{stroke [ft]}}$$

Correction factor: it is indicated in the technical data of the respective damper type.
Now look in the table of the choosen damper type for the damper corresponding to the calculated damping force. The calculated damping force is valid only for the stroke used in the calculation.

In case you don't find in the choosen table a damper on which you could put the weight (damping force) calculated, there are three possibilities:

1. The choosen type of damper does not suit your application. Choose another type of damper and recalculate the damping force.
2. Your application is a special one needing a special damper. Please fill in the questionnaire on pages 03.066.00 and 03.067.00. We will calculate an appropriate damper.
3. There are no exact data at hand and you have to estimate the energy per stroke. In this case please also contact the DICTATOR Technical Service.

Calculation Example

"You are looking for a damper to cushion a pneumatically moved slider, e.g. with an EDH 20."

Impact mass (weight of slider and drive piston) m = 660 [lb]
Acceleration distance (not dampened) s = 0.5 [ft]
Ø of piston of pneumatic cylinder d = 1.18 [in]
Pressure P = 50 [psi]

Thus calculating:

Driving power F [lbf] = 0.7854 x 1.18² x 50 = 54.7 lbf

Impact speed v [ft/s] = $\sqrt{2 \times \frac{54.7 \times 0.5}{660}} \times 5.672 = 1.63$ ft/s

First calculation with a stroke of 0.083 ft, damper type EDH 20.

Resulting in:

Energy per stroke [lbf ft] = $\frac{660 \times 1.63^2}{2} \times 0.031 + 54.7 \times 0.083 = 31.72$ lbf ft

As the correction factor for the type EDH 20 is 2.0:

Damping force [lbf] = $\frac{31.72 \times 2.0}{0.083} = 764$ lbf

This result exceeds the maximum value in the table. But if you chose a longer stroke of e.g. 0.166 ft, the new calculation results in 437 lbf. This value would be okay.