

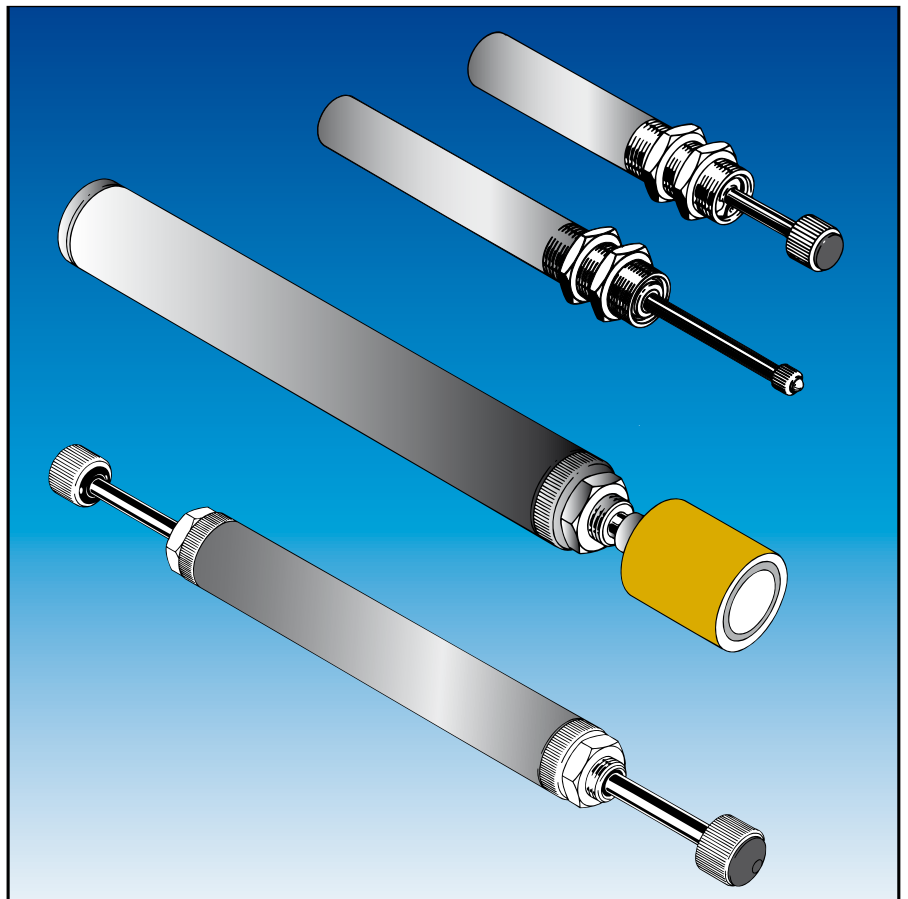
## Dictator Final Dampers

Dictator final dampers are needed to slow down all kinds of rotative or linear movement. Their relatively long strokes offer sufficient safety 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 customised dampers, same as with the oil dampers with fixings on both ends and the gas springs (see extra chapter) - even single pieces.

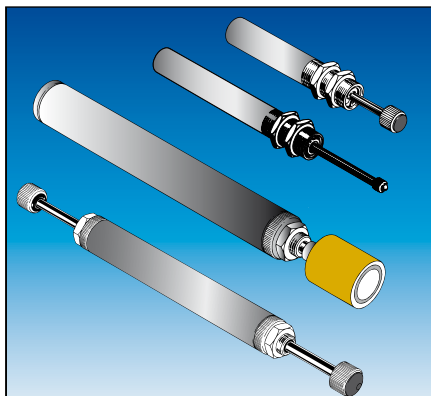
The Dictator production programme is very comprehensive and thus offers solutions for a broad spectrum of applications. The most important characteristics of the Dictator final dampers are:

- 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 authorisation for fire protection applications



### Technical Data

Diameter piston rod	4, 6, 8.5, 10, 12, 25 mm (as standard)
Diameter cylinder	14, 20, 28, 35, 69 mm (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	20 mm to 1000 mm
Damping fluids	hydraulic oil, biological oil (on demand also with FDA authorisation)
Damping forces	up to 12.000 N



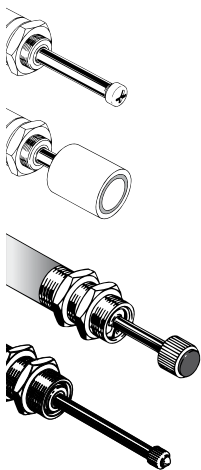
## Final Damper Variations

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 80 °C compared to 120 °C of the standard magnets). Furthermore the neodym 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 damped 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**)

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## Final Damper Variations, cont.

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### 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 misadjustment by mistake is almost impossible. It is however only available for dampers of the  $\varnothing$  28 mm 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.

### Dampers for Fire Protection Doors

To slow down fire protection doors/gates in each of the final positions you have to use special, approved dampers. Because of the high safety risks due to improper operation these dampers are checked in a permanent test at the National Material Testing Office (MPA) in Dortmund, Germany. In addition this office also checks on their production and twice a year takes some dampers from the actual production to also check them in a permanent test.

On the following pages the dampers approved for the use on fire protection doors are marked.

### 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 03.077.00 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.

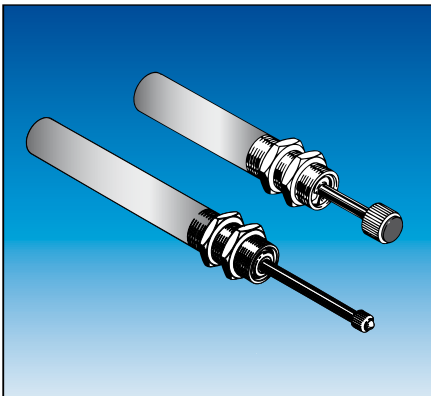
But DICTATOR would be glad to do this work for you. Just fill in the questionnaires on pages 03.072.00 and 03.073.00 and send it to us.

### Overview Production Range of Final Dampers

Final Dampers	Series					
	4	6	8,5	10	12	25
ø piston rod [mm]	4	6	8,5	10	12	25
ø cylinder [mm]	14	20	28	28	35	69
Stroke max. [mm]	50	75	120	200	500	1000
Damping force max. [N] <i>(depending on the stroke: the shorter the stroke, the stronger the damping force)</i>	1750	3100	5200	5200	17500	22000
Type of adjustment	ZR	ZR	NR, ZR	ZR	ZR	ZR
Type of damper - single (EDH) - bidirectional (ZDH)	x	x	x x	x x	x o	x
End fitting piston rod - damper EDH - damper ZDH	PF, K, M	PF, K, M	PF, M PF	PF, M PF	PF, M	point
Resetting of the piston rod - damper EDH - damper ZDH <i>(customised dampers on request)</i>	RF, M	RF, M	RF, M a, aeg	RF, M a, aeg bg	RF, M a, aeg bg	RF bg
Damping	k, ABS	k, ABS	k, p ABS	k, p ABS	k, p ABS	k, p
Material piston rod - hard chromed - AISI 304 - AISI 316	x o o	x o o	x x o	x x o	x o o	x o o
Material cylinder - steel nickel-plated - steel zinc-plated - steel powder-coated - AISI 304 - AISI 316	x o o o o	x o o o o	o x o x o	o x o x o	o x o o o	x o o o o
Temperature range 0° to +60 °C to +80 °C to -30 °C	x o o	x o o	x o o	x o o	x o o	x o o
Damping medium - hydraulic oil - biological oil - silicone oil	x o o	x o o	x o o	x o o	x o o	x 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 safety valve  
 x standard  
 o on request

For explications please see the previous pages.



## Final Dampers Series EDH 14

For impact loads up to 100 kg

The series EDH 14 comprises the smallest standard final dampers. The diameter of the piston rod of 4 mm allows them to be used with accordingly short strokes for loads up to 100 kg.

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

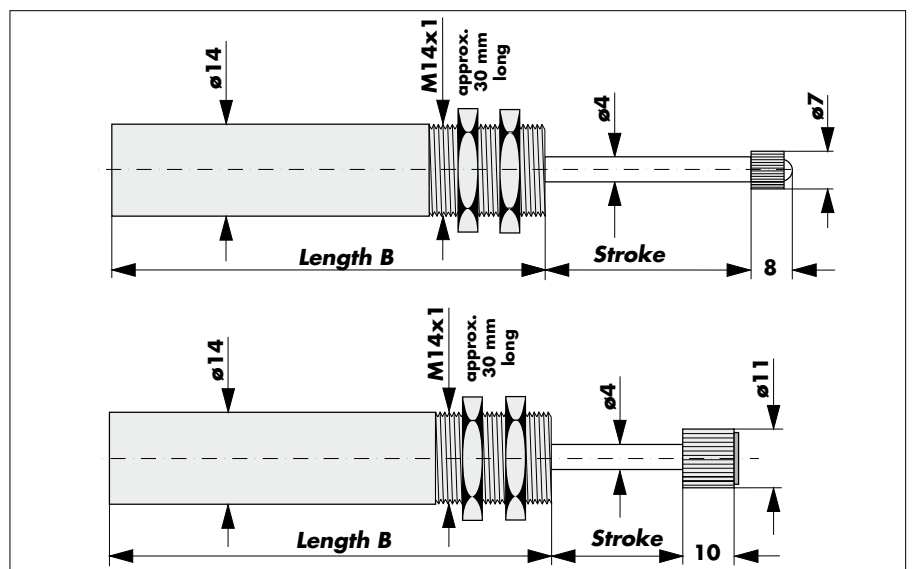
The dampers EDH 14 are available with and without overload safety valve (ABS).

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

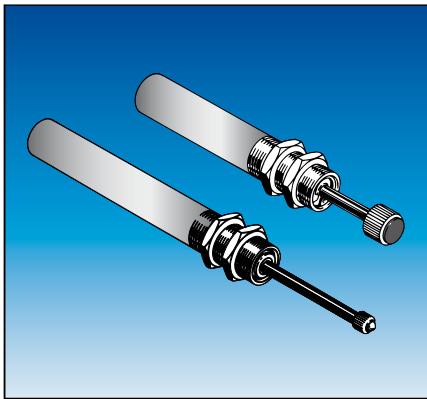
Finish	nickel-plated, piston rod hard chromed
Adjustment	pulling and turning of the piston rod
Types of damping	constant, ABS
End fittings for the piston rod	buffer, ball head (for rotatory motion)
Fixing	thread on cylinder with two nuts
Impact speed	0.1 to 0.9 m/s
Correction factor (see p. 03.078.00)	$f_k = 2.0$
Returning force (internal spring)	30 N
Energy per stroke	max. 16 Nm
Ø piston rod / Ø cylinder	4 mm / 14 mm
Length of stroke	max. 50 mm
Strokes per minute	maximum 10
Operating temperature	0° to 60 °C (on request: -30 °C, +80 °C)

### 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 [mm]	Impact load max. [kg]	Damping force max. [N]	Length B [mm]
201923	201823	201920	201820	20	100	1750	87
201924	201824	201921	201821	35	75	900	102
201925	201825	201922	201822	50	50	700	117



## Final Dampers Series EDH 20

For impact loads up to 250 kg

The construction of the series EDH 20 mostly corresponds to the series EDH 14. Due to the larger diameter of 6 mm of the piston rod it can slow down impact loads up to 250 kg. Please keep in mind that the longer the stroke the less is the maximum admissible impact load (see table below).

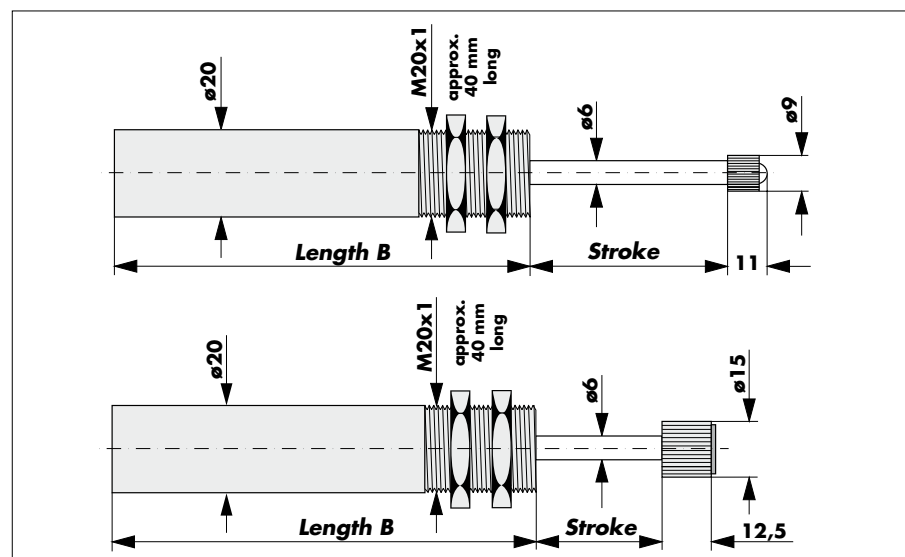
The damping force can continuously be adjusted by turning the piston rod.

The final dampers EDH 20 are available 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

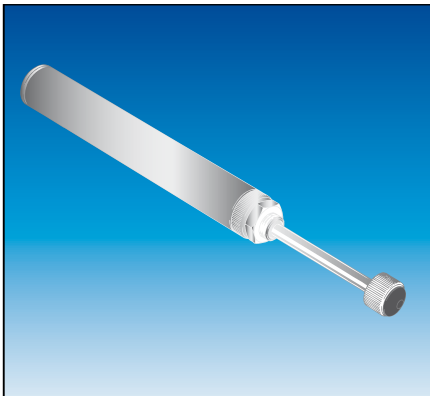
Finish	nickel-plated, piston rod hard chromed
Adjustment	Pulling and turning of the piston rod
Types of damping	constant, ABS
End fittings for the piston rod	buffer, ball head (for rotary motion)
Fixing	thread on cylinder with two nuts
Impact speed	0.1 to 0.9 m/s
Correction factor (see p. 03.078.00)	$f_k = 2.0$
Returning force (internal spring)	30 N
Energy per stroke	max. 54 Nm
Ø piston rod / Ø cylinder	6 mm / 20 mm
Length of stroke	max. 75 mm
Strokes per minute	maximum 10
Operating temperature	0° to 60 °C (on request: -30 °C, +80 °C)

### 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 [mm]	Impact load max. [kg]	Damping force max. [N]	LengthB [mm]
201915	201815	201911	201811	25	250	3100	107
201916	201816	201912	201812	50	125	2150	132
201917	201817	201913	201813	75	75	1440	157



### Final Dampers Series EDH 28

**For impact loads up to 3000 kg - Return spring, one fixing thread**

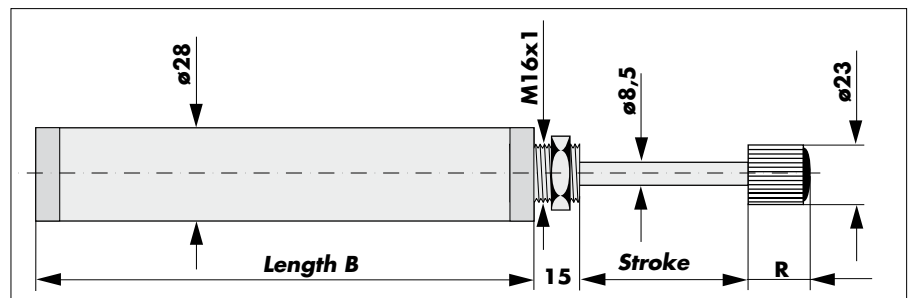
The series EDH 28 is the one of the final dampers offering the greatest variety: many different stroke lengths, with and without return spring, also in AISI 304 and AISI 316, different possibilities of adjusting, some types approved for the use on fire protection doors. For this series we also offer 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 120 mm.

### 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	0.08 to 2.0 m/s
Correction factor (see p. 03.078.00)	$f_k = 2.5$
Returning force (internal spring)	30 N (from 120 mm stroke: 40 N)
Energy per stroke	max. 154 Nm
Ø piston rod / Ø cylinder	8.5 mm / 28 mm
Length of stroke	max. 120 mm
Strokes per minute	maximum 10
Operating temperature	0° to 60 °C (on request: -30 °C, +80 °C)

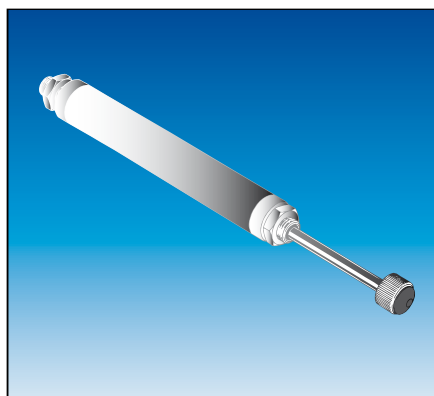
### Dimensions



### Order Information Standard Types

Part no.	Stroke [mm]	Impact load max. [kg]	Damping force max. [N]	Energy/stroke max. [Nm]	Length B [mm]	Buffer size R [mm]	Damping type	Adjustment
200000	50	3000	5200	154	130	14	k	NR
200400	50	3000	5200	149	157	25	ABS	ZR
200002	50	3000	5200	154	130	25	k	ZR
200100	70	3000	4400	154	159	14	k	NR
200410	70	3000	4400	149	192	25	ABS	ZR
200102	70	3000	4400	154	159	25	k	ZR
200209*	75	3000	3100	154	185	25	k	ZR
200200	100	3000	3100	154	193	14	k	NR
200420	100	3000	3100	149	225	25	ABS	ZR
200202	100	3000	3100	154	193	25	k	ZR
200206*	100	3000	3100	154	257	25	k	ZR
200300	120	3000	2600	154	212	14	k	NR
200302	120	3000	2600	154	212	25	k	ZR

\* Damper with **Approval for fire protection doors**, no. of certificate DO 18.3



## Final Dampers Series EDH 28

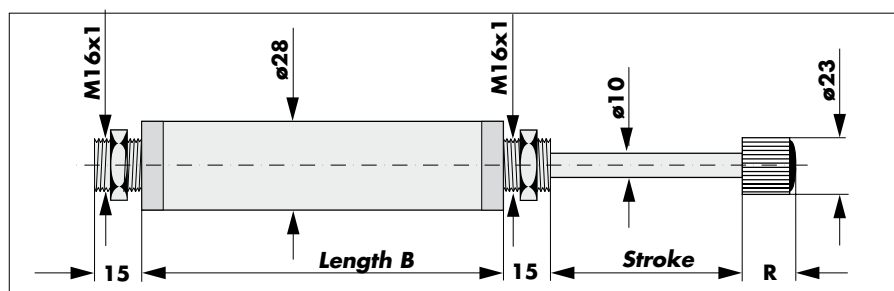
For impact loads up to 3000 kg - Return spring, two fixing threads

For applications where you need a damper EDH 28 with a longer stroke (120 mm to 200 mm) we furnish the version with two fixing threads and a  $\varnothing$  10 mm 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	0.08 to 2.0 m/s
Correction factor (see p. 03.078.00)	$f_k = 2.5$
Returning force (internal spring)	30 N (from 120 mm stroke: 40 N)
Energy per stroke	max. 154 Nm
$\varnothing$ piston rod / $\varnothing$ cylinder	10 mm / 28 mm
Length of stroke	max. 200 mm
Strokes per minute	maximum 10
Operating temperature	0° to 60 °C (on request: -30 °C, +80 °C)

### Dimensions

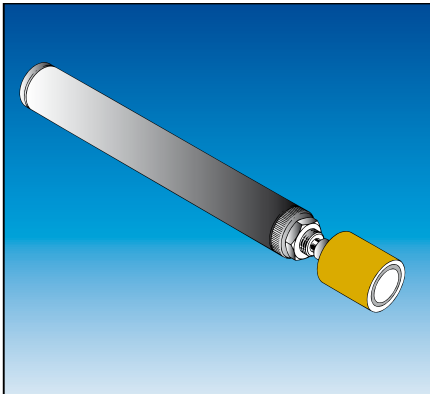


### Order Information Standard Types

Part no.	Stroke [mm]	Impact load max. [kg]	Damping force max. [N]	Energy/stroke max. [Nm]	Length B [mm]	Buffer size R [mm]	Damping type	Adjustment
200207*	90	3000	3100	154	220	25	k	ZR
200203	100	3000	3100	154	200	25	k	ZR
200303	120	3000	3100	154	220	25	k	ZR
203115-28	200	3000	2400	149	314	25	ABS	ZR

\* Damper with **Approval for fire protection doors**, no. of certificate DO 18.3, diameter of piston rod 8.5 mm





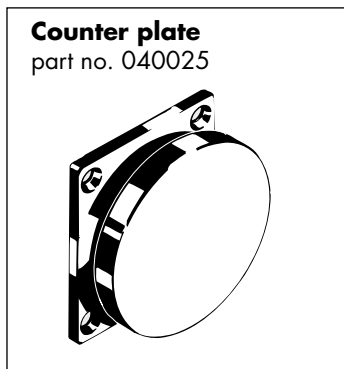
## Final Dampers Series EDH M 28

**For impact loads up to 3000 kg - 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.

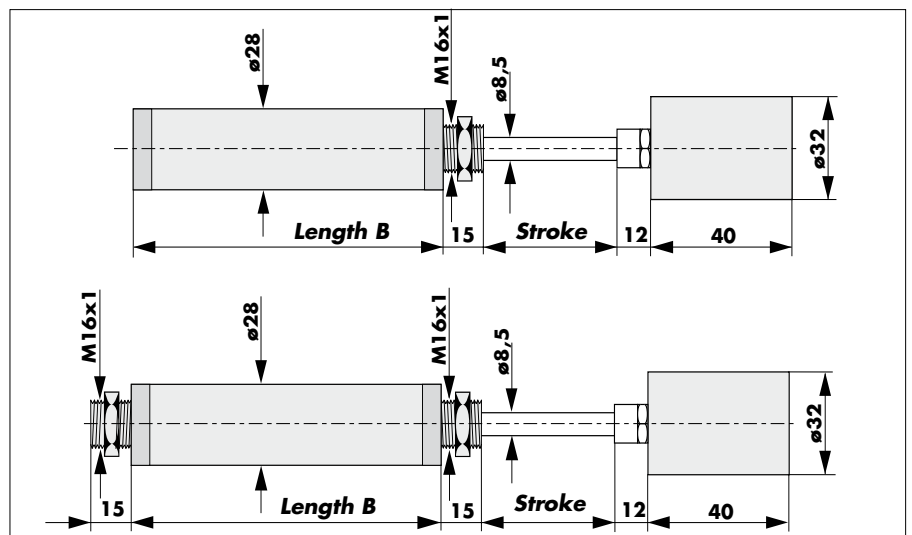
As counterpiece for the permanent magnet on the piston rod you either need an even iron area or a separate counter plate (part no. 040025).

### 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	0.08 to 2.0 m/s
Correction factor (see p. 03.078.00)	$f_k = 2.5$
Returning force	0 N
Energy per stroke	max. 154 Nm
Ø piston rod / Ø cylinder	8.5 or 10 mm / 28 mm
Length of stroke	max. 200 mm
Strokes per minute	maximum 10
Operating temperature	0° to 60 °C (on request: -30 °C, +80 °C)

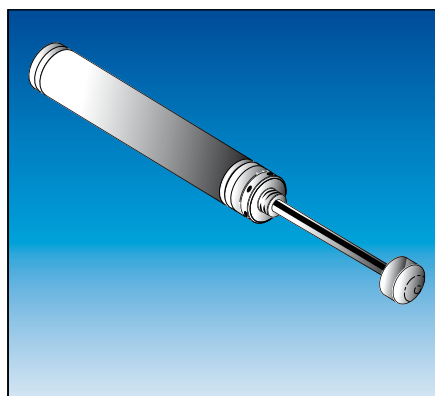
### Dimensions



### Order Information Standard Types

\* Damper with **Approval for fire protection doors**  
no. of certificate DO 18.3

Part no.	Stroke [mm]	Impact load max. [kg]	Damping force max. [N]	Energy per stroke max. [Nm]	Length B [mm]	Damping type	Fixing thread
203150*	50	3000	5200	154	130	k	1
200101	70	3000	4400	154	163	k	1
203015*	120	3000	2600	149	220	k	2
200600-28	200	3000	2400	149	329	k	2



## Final Dampers Series EDH 28 in Stainless Steel

**For impact loads up to 1000 kg - Return spring, one fixing thread**

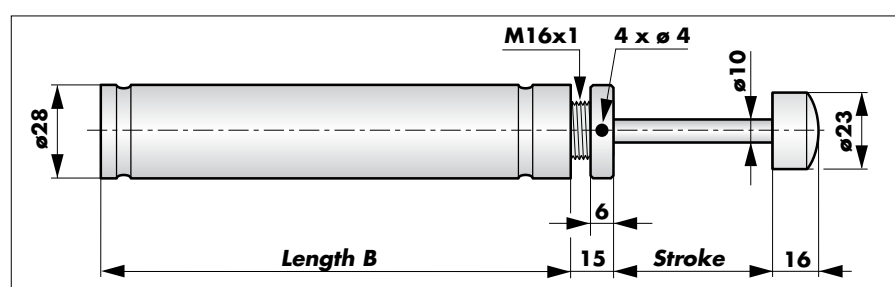
Final dampers of the series EDH 28 also can be produced in stainless steel. They are designed e.g. for applications in the food processing industry (AISI 304) or in tunnels (AISI 316).

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

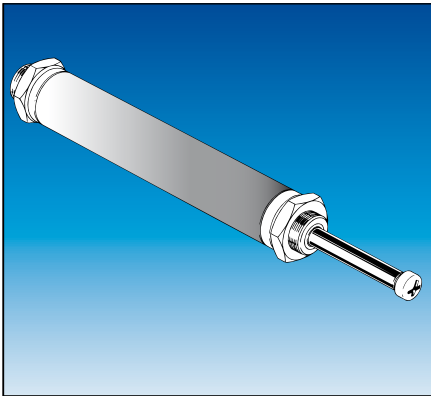
Finish	AISI 304 (standard ) or AISI 316
Adjustment	stepped adjustment
Types of damping	constant, ABS, progressive
End fitting for the piston rod	buffer from Delrin
Fixing	one thread at the front of the cylinder
Impact speed	0.1 to 2.0 m/s
Correction factor (see p. 03.078.00)	$f_k = 2.5$
Returning force (internal spring)	30 N (from 120 mm stroke: 40 N)
Energy per stroke	max. 149 Nm
Ø piston rod / Ø cylinder	10 mm / 28 mm
Length of stroke	max. 200 mm
Strokes per minute	maximum 10
Operating temperature	0° to 60 °C (on request: -30 °C, +80 °C)

### Dimensions



### Order Information Standard Types

Part no.	Stroke [mm]	Impact load max. [kg]	Damping force max. [N]	Energy per stroke max. [Nm]	Length B [mm]	Damping type	Material
200520	50	1000	5200	149	130	k	AISI304
200525	100	1000	3100	149	193	k	AISI304
200530	200	1000	2400	149	314	k	AISI304



## Final Dampers Series EDH 35

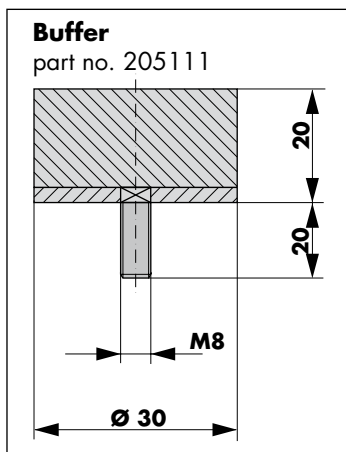
**For impact loads up to 6000 kg - Return spring, two fixing threads**

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.

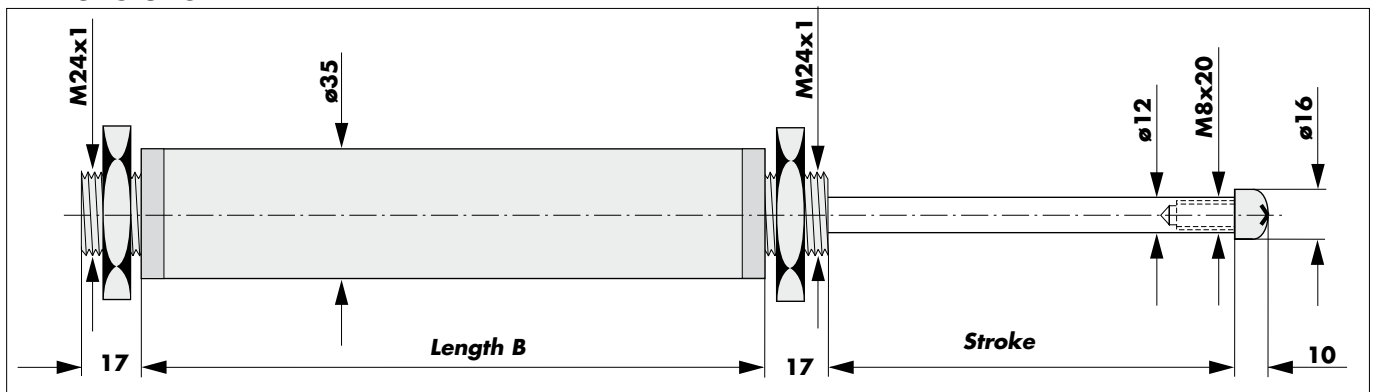
The field of application comprises heavy sliding gates, shifting racks in storage rooms, machine slides.

### Technical Data



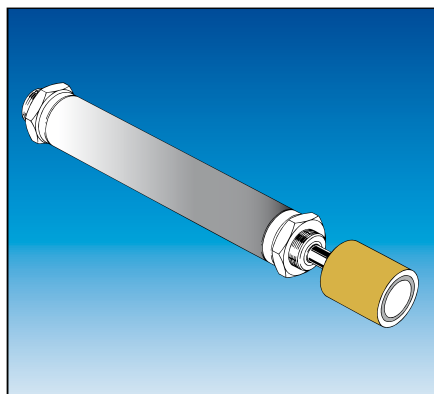
Finish	zinc-plated, piston rod hard chromed
Adjustment	stepped adjustment
Types of damping	constant, progressive
End fitting for the piston rod	inside thread M8x20 with screw
Fixing	threads at both ends of the cylinder
Impact speed	0.08 to 2.0 m/s
Correction factor (see p. 03.078.00)	$f_k = 2.5$
Returning force (internal spring)	45 N - 60 N
Energy per stroke	max. 438 Nm
Ø piston rod / Ø cylinder	12 mm / 35 mm
Length of stroke	max. 500 mm
Strokes per minute	maximum 10
Operating temperature	0° to 60 °C (on request: -30 °C, +80 °C)

### Dimensions



### Order Information Standard Types

Part no.	Stroke [mm]	Impact load max. [kg]	Damping force max. [N]	Energy per stroke max. [Nm]	Length B [mm]	Damping type	Returning force max. [N]
200309	50	6000	17500	438	184	k	45
200310	70	6000	12500	438	204	k	45
200311	100	6000	8800	438	230	k	48
200312	150	6000	5800	438	288	k	50
200500	200	6000	4400	438	330	k	50
200320	500	6000	1800	438	739	k	60



## Final Dampers Series EDH M 35

**For impact loads up to 6000 kg - Resetting by magnet**

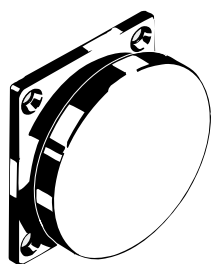
The technical data of the DICTATOR final dampers series EDH M 35 correspond to those of the series EDH 35. The only difference is the missing internal return spring. When the door is opened the magnet pulls the piston rod back to its extended position.

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).

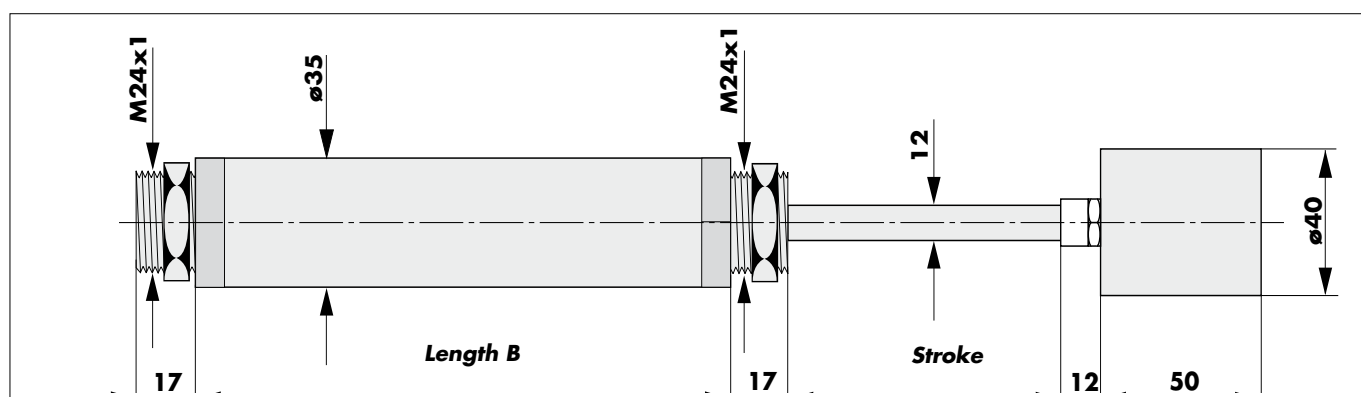
### Technical Data

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	0.08 to 2.0 m/s
Correction factor (see p. 03.078.00)	$f_k = 2.5$
Returning force	0 N
Energy per stroke	max. 438 Nm
Ø piston rod / Ø cylinder	12 mm / 35 mm
Length of stroke	max. 500 mm
Strokes per minute	maximum 10
Operating temperature	0° to 60 °C (on request: -30 °C, +80 °C)

**Counter plate**  
part no. 040025



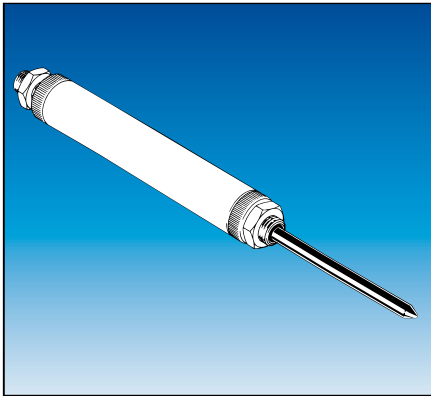
### Dimensions



### Order Information Standard Types

\* Damper with **Approval for fire protection doors**  
no. of certificate DO 18.3

Part no.	Stroke [mm]	Impact load	Damping force max. [kg]	Energy per stroke max. [N]	Length B [mm] max. [Nm]	Damping type	Returning force max. [N]
200313	100	6000	8800	438	224	k	0
200600*	200	6000	4400	438	330	k	0



## Final Dampers Series EDH 69

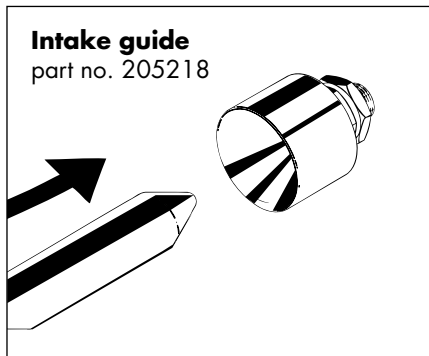
**For impact loads up to 15000 kg - Return spring, two fixing threads**

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.

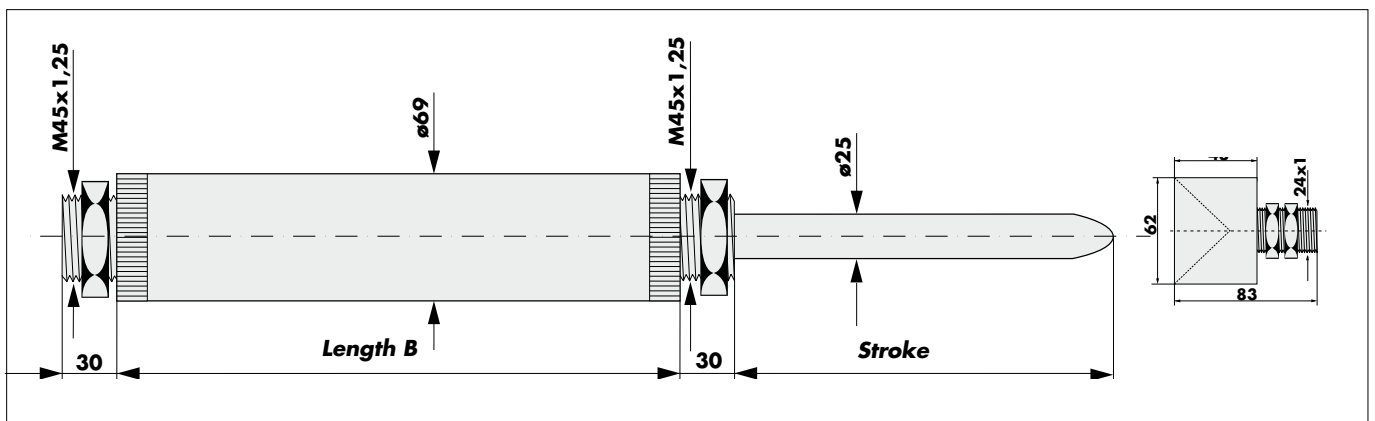
As counter piece for the piston rod we furnish an intake guide.

### Technical Data



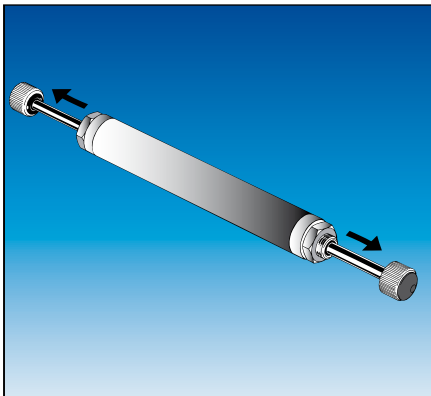
Finish	zinc-plated, piston rod hard chromed
Adjustment	stepped adjustment
Types of damping	constant, progressive
End of piston rod	tip (standard) or thread
Fixing	threads at both ends of the cylinder
Impact speed	0.1 to 2.0 m/s
Correction factor (see p. 03.078.00)	$f_k = 2.5$
Returning force (internal spring)	80 N
Energy per stroke	max. 4000 Nm
Ø piston rod / Ø cylinder	25 mm / 69 mm
Length of stroke	max. 1000 mm
Strokes per minute	maximum 10
Operating temperature	0° to 60 °C (on request: -30 °C, +80 °C)

### Dimensions



### Order Information Standard Types

Part no.	Stroke [mm]	Impact load max. [kg]	Damping force max. [N]	Energy per stroke max. [Nm]	Length B [mm]	Damping type	Returning force max. [N]
200780	100	15000	12000	4000	297	k	80
200800	200	15000	12000	4000	397	k	80
200820	300	15000	10000	4000	520	k	80
200840	400	15000	8000	4000	620	k	80
200940	1000	15000	6000	4000	1420	k	80



## Bi-Directional Final Dampers Series ZDH a 28

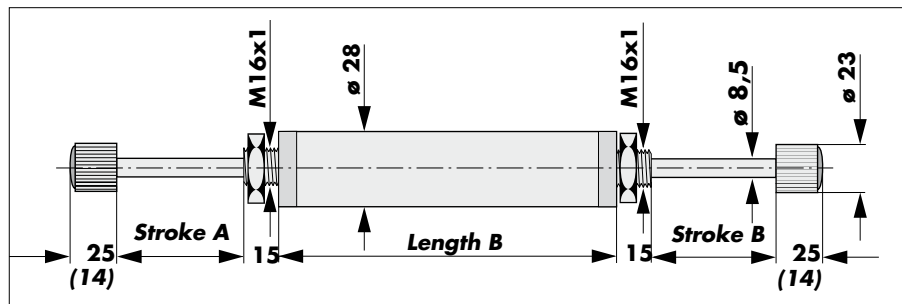
**For impact loads up to 1000 kg - Both sides with return spring**

The final dampers of the series ZDH a 28 are characterised 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	0.1 to 2.0 m/s
Correction factor (see p. 03.078.00)	$f_k = 2.5$
Returning force (internal spring)	min. 30 N, max. 60 N
Energy per stroke	max. 165 Nm
Ø piston rod / Ø cylinder	8.5 mm / 28 mm
Length of stroke	max. 200 mm
Strokes per minute	maximum 10
Operating temperature	0° to 60 °C (on request: -30 °C, +80 °C)

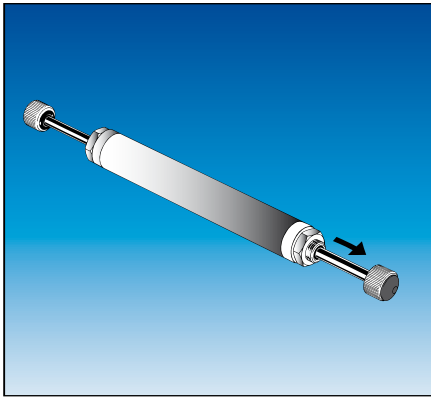
### Dimensions



### Order Information Standard Types

Part no.	Stroke A [mm]	Stroke B [mm]	Impact load max. [kg]	Damping force max. [N]	Energy per stroke max. [Nm]	Returning force max. [N]	Length B [mm]	Damping type	Adjustment
210000	50	50	560	4300	120	45	137	k	NR
210001	50	50	1000	5000	135	45	165	p	NR
212000	70	70	500	3500	130	50	164	k	NR
210410	70	70	700	3200	150	35	232	ABS	ZR
210400	65	65	700	3200	125	30	260	ABS	ZR
210420*	60	80	700	4200	125	30	260	ABS	ZR
216000	100	100	500	2400	130	50	221	k	NR
214000	120	120	500	1700	130	60	235	k	NR
218000	100	100	1000	2800	165	50	260	p	NR
213000	120	120	1000	1900	165	60	232	p	NR

\* Length of thread at stroke A: 44 mm



## Bi-Directional Final Dampers Series ZDH aeg 28

**For impact loads up to 1000 kg - Return spring for one side only**

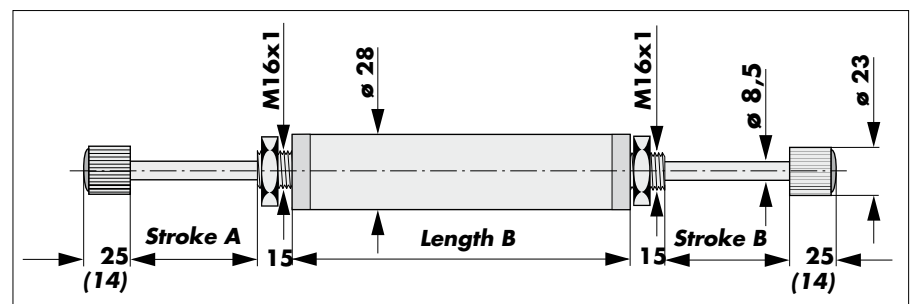
The final dampers of the series ZDH aeg 28 only have on one side (stroke A) a return spring that automatically returns the piston rod. The piston rod on the other side (stroke B) is pushed out by the entering piston rod A. Dampers of this type are often used on sliding doors.

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	0.1 to 2.0 m/s
Correction factor (see p. 03.078.00)	$f_k = 2.5$
Returning force (stroke A)	min. 30 N, max. 50 N
Energy per stroke	max. 160 Nm
Ø piston rod / Ø cylinder	8.5 mm / 28 mm
Length of stroke	max. 200 mm
Strokes per minute	maximum 10
Operating temperature	0° to 60 °C (on request: -30 °C, +80 °C)

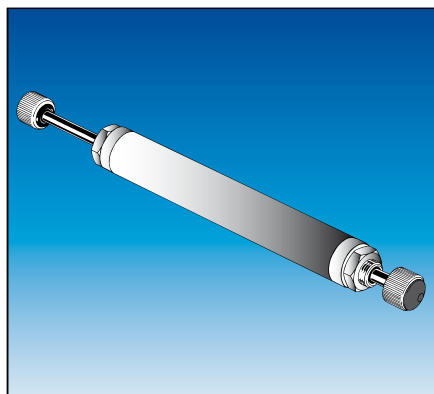
### Dimensions



### Order Information Standard Types

Part no.	Stroke A [mm]	Stroke B [mm]	Impact load max. [kg]	Damping force max. [N]	Energy per stroke max. [Nm]	Returning force max. [N]	Length B [mm]	Damping type	Adjustment
203190	50	50	1000	5000	135	0/45	220	p	ZR
211000*	70	50	560	4300	120	20/0	137	k	NR
203191	70	70	1000	4000	160	0/50	260	p	ZR
212300	80	80	800	4200	140	0/50	291	p	NR
217000	100	100	500	2400	130	0/50	328	k	NR

\* **Attention:** The side A piston rod of damper 211000 extends automatically only 20 mm. The missing 50 mm will be pushed out only when side B piston rod enters.



## Bi-Directional Final Dampers Series ZDH bg 28

**For impact loads up to 560 kg - No return spring**

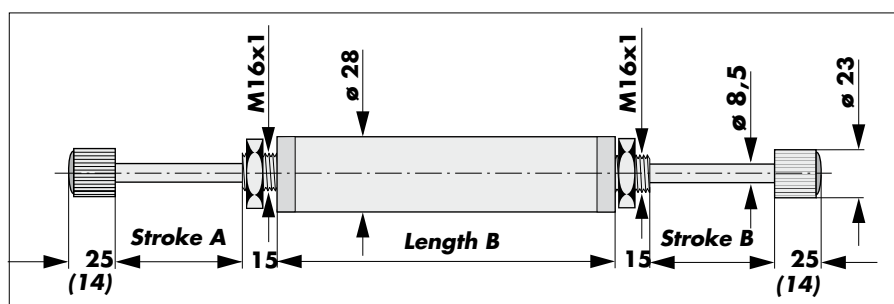
The final dampers ZDH bg 28 have no return spring. Each piston rod is pushed out by the opposite piston rod when it enters. The damper ZDH bg 28 is mounted directly on the moving object, thus damping it in both final positions.

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	0.1 to 2.0 m/s
Correction factor (see p. 03.078.00)	$f_k = 2.5$
Returning force (no spring)	0
Energy per stroke	max. 130 Nm
Ø piston rod / Ø cylinder	8.5 mm / 28 mm
Length of stroke	max. 120 mm
Strokes per minute	maximum 10
Operating temperature	0° to 60 °C (on request: -30 °C, +80 °C)

### Dimensions

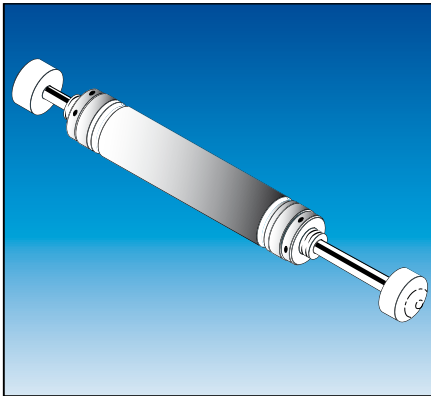


### Order Information Standard Types

Part no.	Stroke A [mm]	Stroke B [mm]	Impact load max. [kg]	Damping force max. [N]	Energy per stroke max. [Nm]	Returning force max. [N]	Length B [mm]	Damping type	Adjustment
210110	50	50	560	4300	120	0	137	k	NR
203195*	55	55	560	5000	120	0	132	k	ZR
203162	120	120	500	1700	130	0	208	k	ZR

\* cylinder ø 35 mm, buffer ø 23 mm, piston rod ø 12 mm, thread on one side M24x1, length 17 mm





## Bi-Directional Final Dampers ZDH a 28 in AISI 304/316 For impact loads up to 500 kg - Both sides with return spring

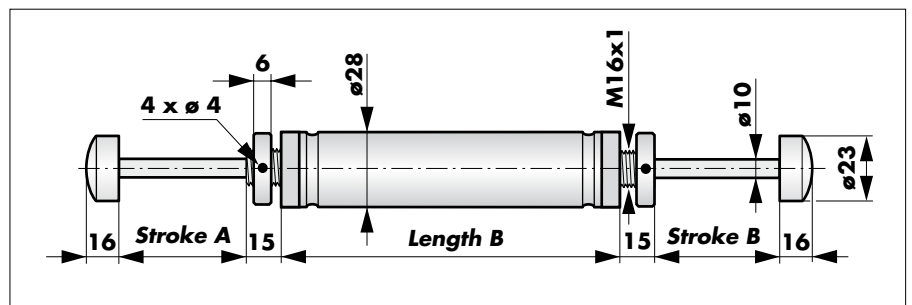
The final dampers of the series ZDH a 28 can also be produced in stainless steel. They are designed for the use in the food processing industry (AISI 304) and in tunnels (AISI 316).

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

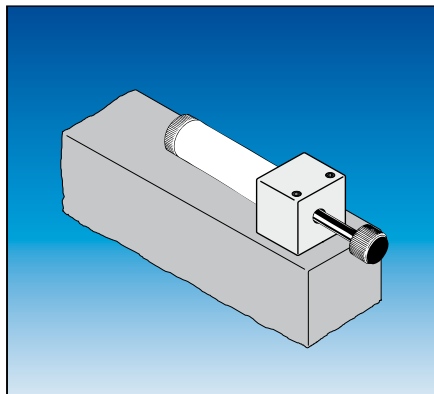
Finish	AISI 304 (standard) or AISI 316
Adjustment	stepped adjustment
Types of damping	constant, ABS, progressive
End fitting for the piston rod	buffer from Delrin
Fixing	threads at both ends of the cylinder
Impact speed	0.1 to 2.0 m/s
Correction factor (see p. 03.078.00)	$f_k = 2.5$
Returning force (internal spring)	30 N (from 120 mm stroke: 40 N)
Energy per stroke	max. 160 Nm
Ø piston rod / Ø cylinder	10 mm / 28 mm
Length of stroke	max. 200 mm
Strokes per minute	maximum 10
Operating temperature	0° to 60 °C (on request: -30 °C, +80 °C)

### Dimensions



### Order Information Standard Types

Part no.	Stroke A [mm]	Stroke B [mm]	Impact load max. [kg]	Damping force max. [N]	Energy per stroke max. [Nm]	Returning force max. [N]	Length B [mm]	Damping type	Adjustment
210525	100	100	500	2400	130	50	221	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.

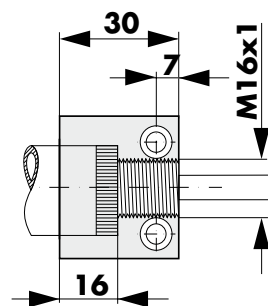
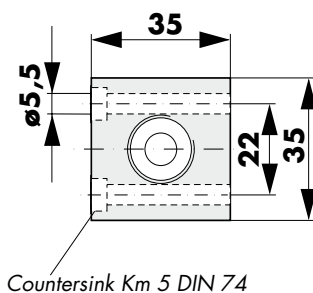
## Technical Data

Fixing block	aluminium
Fixing bracket	steel zinc-plated

## Dimensions

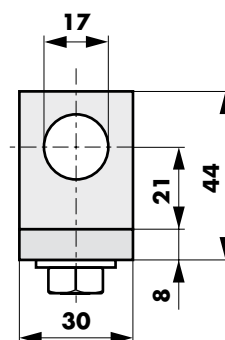
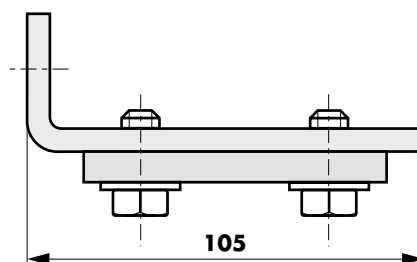
### Fixing block

part no. 205199



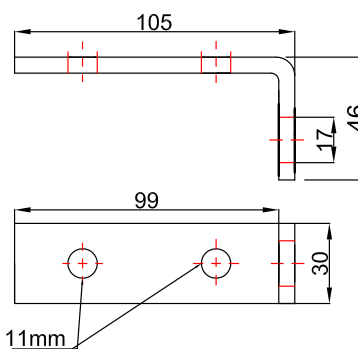
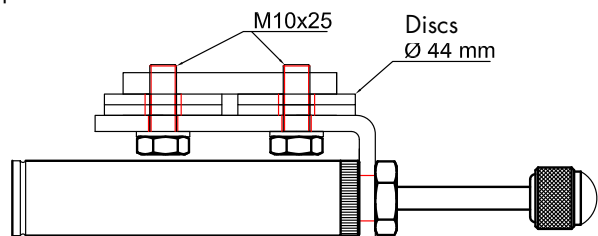
### Fixing bracket

part no. 700159

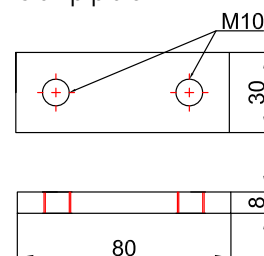


### Fixing bracket XL

part no. 700159XL



### Clamp plate



## Order Information

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