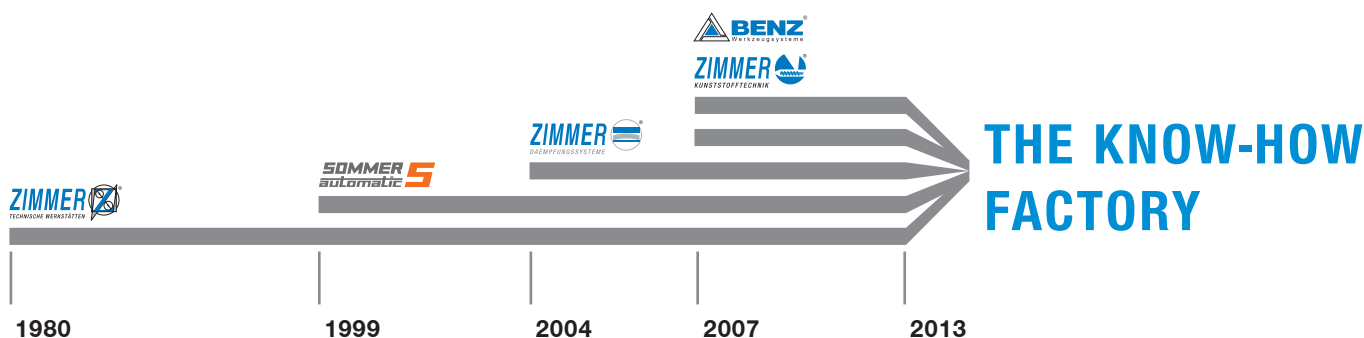


ZIMMER GROUP COMMITTED TO OUR CUSTOMERS



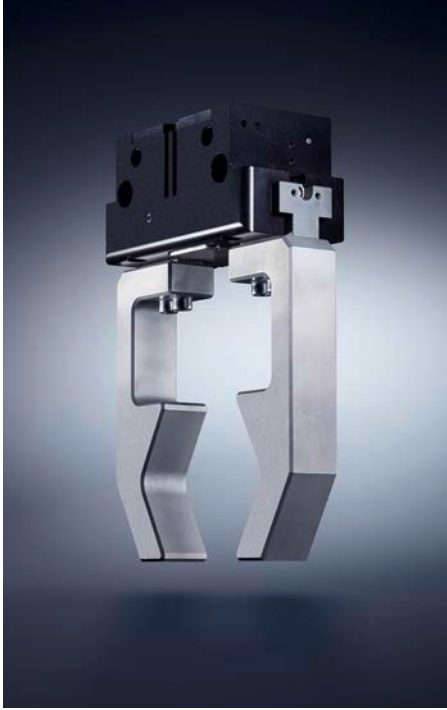
WE HAVE SUCCEEDED FOR YEARS BY OFFERING OUR CUSTOMERS INNOVATIVE AND INDIVIDUALIZED SOLUTIONS. ZIMMER HAS GROWN CONTINUOUSLY AND TODAY WE HAVE REACHED A NEW MILESTONE: THE ESTABLISHMENT OF THE KNOW-HOW FACTORY. IS THERE A SECRET TO OUR SUCCESS?

Foundation. Excellent products and services have always been the foundation of our company's growth. Zimmer is a source of ingenious solutions and important technical innovations. This is why customers with high expectations for technology frequently find their way to us. When things get tricky, Zimmer Group is in its best form.

Style. We have an interdisciplinary approach to everything we do, resulting in refined process solutions in six areas of technology. This applies not just to development but to production as well. Zimmer Group serves all industries and stands ready to resolve even unique and highly individualized problems. Worldwide.

Motivation. Customer orientation is perhaps the most important factor of our success. We are a service provider in the complete sense of the word. Even our decision to identify ourselves as Zimmer Group reflects this reality. With Zimmer Group, our customers now have a single, centralized contact for all of their needs. We approach each customer's situation with a high level of competence and a broad range of possible solutions.

TECHNOLOGIES



HANDLING TECHNOLOGY

WITH MORE THAN 30 YEARS OF EXPERIENCE AND INDUSTRY KNOWLEDGE, OUR PNEUMATIC, HYDRAULIC, AND ELECTRICAL HANDLING COMPONENTS AND SYSTEMS ARE GLOBAL LEADERS.

Components. More than 2000 standardized gripper systems, positioning systems, robotools, and much more. We offer a complete selection of technologically superior products that are ready for rapid delivery.

Semistandard. Our modular approach to design enables custom configurations and high rates of innovation for process automation.

Systems. We are particularly strong in providing custom system solutions for handling technologies, robotics, and vacuum engineering.



DAMPING TECHNOLOGY

INDUSTRIAL DAMPING TECHNOLOGY AND SOFT CLOSE PRODUCTS EXEMPLIFY THE INNOVATION AND PIONEERING SPIRIT OF THE KNOW-HOW FACTORY.

Industrial damping technology. Whether standard or customized solutions, our products stand for the highest cycle rates and maximum energy absorption with minimal space requirements.

Soft close. Development and mass production of pneumatic and hydraulic dampers with extraordinary quality and rapid delivery.

OEM and direct. Whether they need components, returning mechanisms, or complete production lines – we are the trusted partner of many prestigious customers.

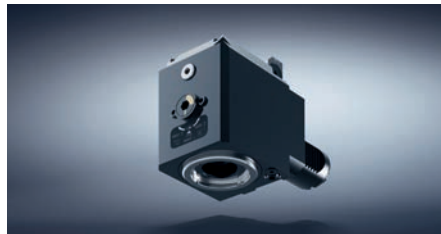


LINEAR TECHNOLOGY

WE DEVELOP LINEAR COMPONENTS AND SYSTEMS THAT ARE INDIVIDUALLY ADAPTED TO OUR CUSTOMERS' NEEDS.

Clamping and braking elements. We offer more than 4000 types for profiled and rounded rails as well as for a variety of guide systems from all manufacturers. It makes no difference whether you prefer manual, automatic, electric, or hydraulic drive.

Individualized systems. The unique functionality and precision of our clamping and braking elements open up numerous possibilities for custom applications such as active or semi-active braking and damping.



PROCESS TECHNOLOGY

MAXIMUM EFFICIENCY IS ESSENTIAL FOR SYSTEMS AND COMPONENTS USED IN PROCESS TECHNOLOGY. HIGH-LEVEL CUSTOM SOLUTIONS ARE OUR TRADEMARK.

A rich reservoir of experience. Our know-how ranges from the development of materials, processes, and tools through product design to production of series products. Challenge us!

Deep production capabilities. The Zimmer Group pairs these capabilities with flexibility, quality, and precision, even when making custom products.

Series production. We manufacture demanding products out of metal (MIM), elastomers, and plastics with flexibility and speed.

TOOLING TECHNOLOGY

ZIMMER GROUP DEVELOPS INNOVATIVE WOOD AND METAL PROCESSING TOOL SYSTEMS FOR ALL INDUSTRIES. NUMEROUS CUSTOMERS CHOOSE US AS THEIR SYSTEMS AND INNOVATION PARTNER.

Knowledge and experience. Industry knowledge and a decades-long development partnership for exchangeable assemblies, tool interfaces, and tool systems predestine us for new challenges around the world.

Components. We deliver numerous standard components from stock and develop innovative, customized systems for OEM and end customers – far beyond just the metal and wood processing industries.

Variety. Whether you have machining centres, lathes, or flexible production cells, the power tools, holders, assemblies, and drilling heads of Zimmer Group are ready for action.

MACHINE TOOLING TECHNOLOGY

AS A DRIVING FORCE IN OUR INDUSTRY, WE DELIVER HIGH-VALUE SOLUTIONS IN THE FIELD OF MECHANICAL ENGINEERING, FULLY ACCORDING TO THE NEEDS OF OUR CUSTOMERS.

Development partner. We accompany you from brainstorming to inspection of the final machine, always according to your expectations.

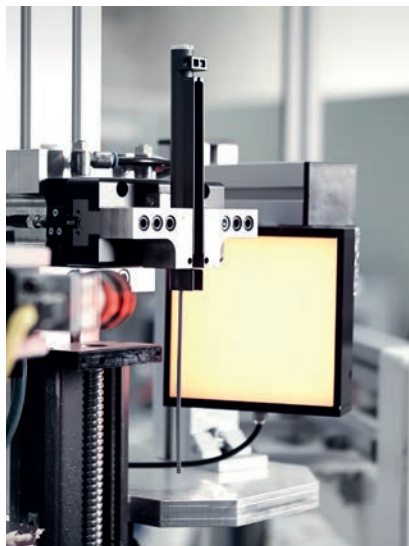
Components. We deliver series products and modules, five-axis heads, motor spindles, gearbox swivelling heads, add-on assemblies, and motors.

Systems. The Know-how Factory stands for solutions in the fields of mechanical engineering systems, specialty solutions, custom assemblies, and mechanical modules. We manufacture and configure multiple-spindle and large-angles as well as large boring heads.

THE KNOW-HOW FACTORY



**HANDLING
TECHNOLOGY**



**DAMPING
TECHNOLOGY**



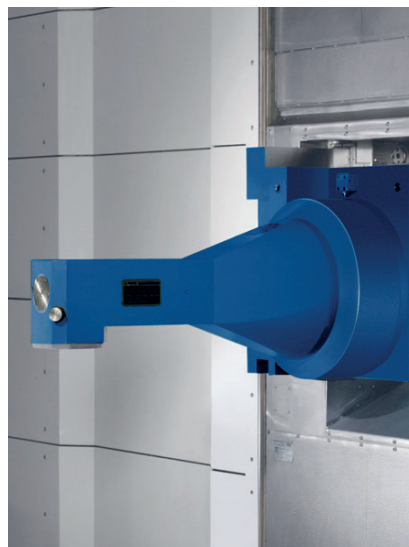
**LINEAR
TECHNOLOGY**



**PROCESS
TECHNOLOGY**



**TOOLING
TECHNOLOGY**



**MACHINE TOOLING
TECHNOLOGY**

COMPLETE PROGRAM IN OVERVIEW

INDUSTRIAL SHOCK ABSORBERS

1



TECHNICAL INFORMATION

INDUSTRIAL SHOCK ABSORBERS

1 page 8-19



COMPONENTS

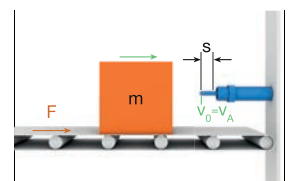
INDUSTRIAL SHOCK ABSORBERS

1 page 20-57



SPECIAL SOLUTIONS AND SYSTEMS INDUSTRIAL SHOCK ABSORBERS

1 page 58-60



CALCULATIONS

INDUSTRIAL SHOCK ABSORBERS

1 page 61-67

PLEASE MARK:

2



CHECK LIST

INDUSTRIAL SHOCK ABSORBERS

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SOFT CLOSE DAMPERS



TECHNICAL INFORMATION

SOFT CLOSE

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COMPONENTS

SOFT CLOSE

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SYSTEMS

SOFT CLOSE

2 page 88-93



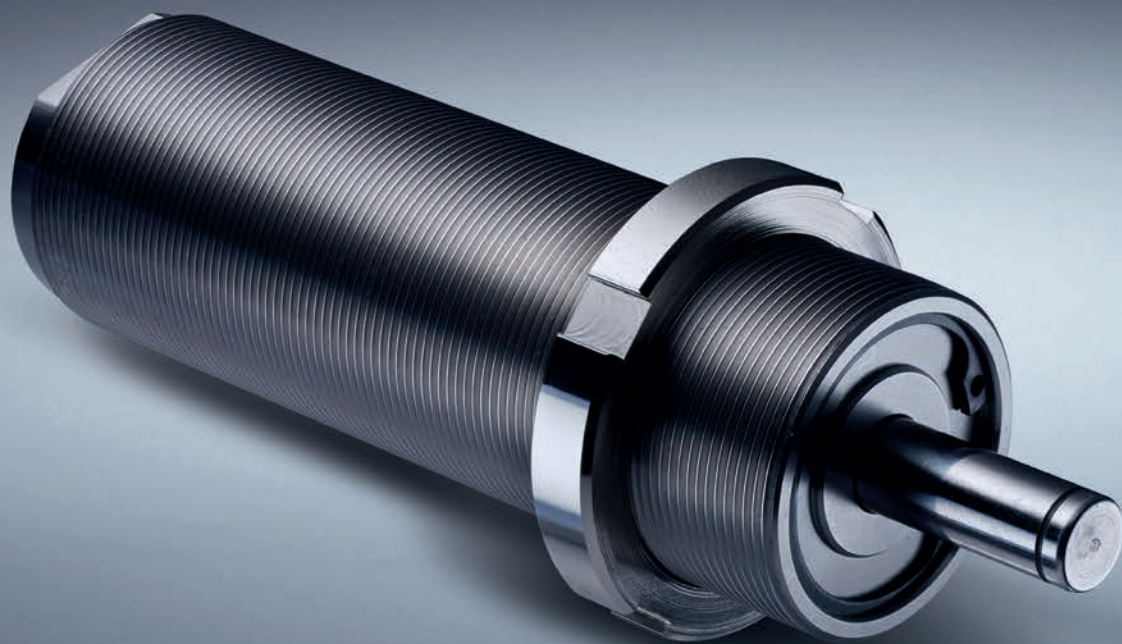
SPECIAL SOLUTIONS

SOFT CLOSE

2 page 94-95

For Usage Notes, see pages 96-97

POWERSTOP **INDUSTRIAL SHOCK ABSORBERS**



COMPONENTS. SYSTEMS. THE DIFFERENCES

► DEFINITION OF COMPONENTS



► Versatile components

Zimmer Group offers a wide variety of standard components right at your disposal as well as semi-standard components adapted to your needs.

- Components from Zimmer Group are of the highest level of quality and can be supplied for integration into your existing or newly developed systems.
- Take advantage of our expert sales advice. We would be happy to help you.

► DEFINITION OF SYSTEMS



► Universal units

Zimmer Group is not only a specialist for individual components, but also develops complete systems for your specific applications.

- Our expert consulting and flexible, innovative development would be happy to help and advise you.

INDUSTRIAL SHOCK ABSORBERS IN OVERVIEW

POWERSTOP

TECHNICAL INFORMATION

Design	13
Product comparison	14
Accessories	18

COMPONENTS – PRODUCT OVERVIEW

SIZE	MODEL	STROKE [MM]	MAX. ENERGY ABSORPTION OPERATION PER STROKE [NM]	
M4x0.5	HIGH ENERGY	3	0,5	20
M5x0.5	HIGH ENERGY	4	0,8	22
M6x0.5	HIGH ENERGY	4	1,5	24
M8x0.75	HIGH ENERGY	5	3–4	26
M8x0.75R	STANDARD ENERGY	5	1,5	26
M8x1	HIGH ENERGY	5	3–4	28
M8x1R	STANDARD ENERGY	5	1,5	28
M10x1	HIGH ENERGY	8	4–12	30
M10x1R	STANDARD ENERGY	8	3	30
M12x1	HIGH ENERGY	10	10–18	32
M12x1R	STANDARD ENERGY	10	9	32
M14x1	HIGH ENERGY	12	18–32	34
M14x1R	STANDARD ENERGY	12	20	34
M14x1.5	HIGH ENERGY	12	18–32	36
M14x1.5R	STANDARD ENERGY	12	20	36
M20x1.5	HIGH ENERGY	15	35–80	38
M20x1.5R	STANDARD ENERGY	15	32	38
M20x1.5L	HIGH ENERGY	30	100–120	40
M25x1.5	HIGH ENERGY	25	100–210	42
M25x1.5R	STANDARD ENERGY	25	90	42
M25x1.5L	HIGH ENERGY	40	250–350	44
M27x1.5	HIGH ENERGY	25	100–210	46
M27x1.5R	STANDARD ENERGY	25	90	46
M27x3	HIGH ENERGY	25	100–210	48
M27x3R	STANDARD ENERGY	25	90	48
M33x1.5	HIGH ENERGY	30	300–350	50
M33x1.5R	STANDARD ENERGY	30	180	50
M33x1.5L	HIGH ENERGY	50	450–500	52
M45x1.5	HIGH ENERGY	25	600–650	54
M45x1.5R	STANDARD ENERGY	25	350	54
M45x1.5L	HIGH ENERGY	50	1.000–1.200	56

SPECIAL SOLUTIONS AND SYSTEMS

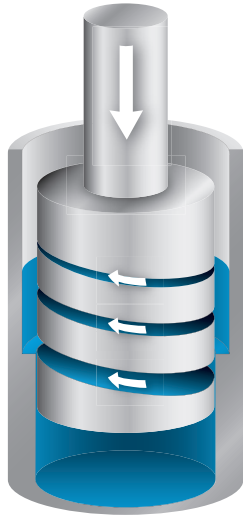
58

BASES FOR CALCULATIONS

Bases for calculation	61
Load cases and formulas	62



INDUSTRIAL SHOCK ABSORBERS

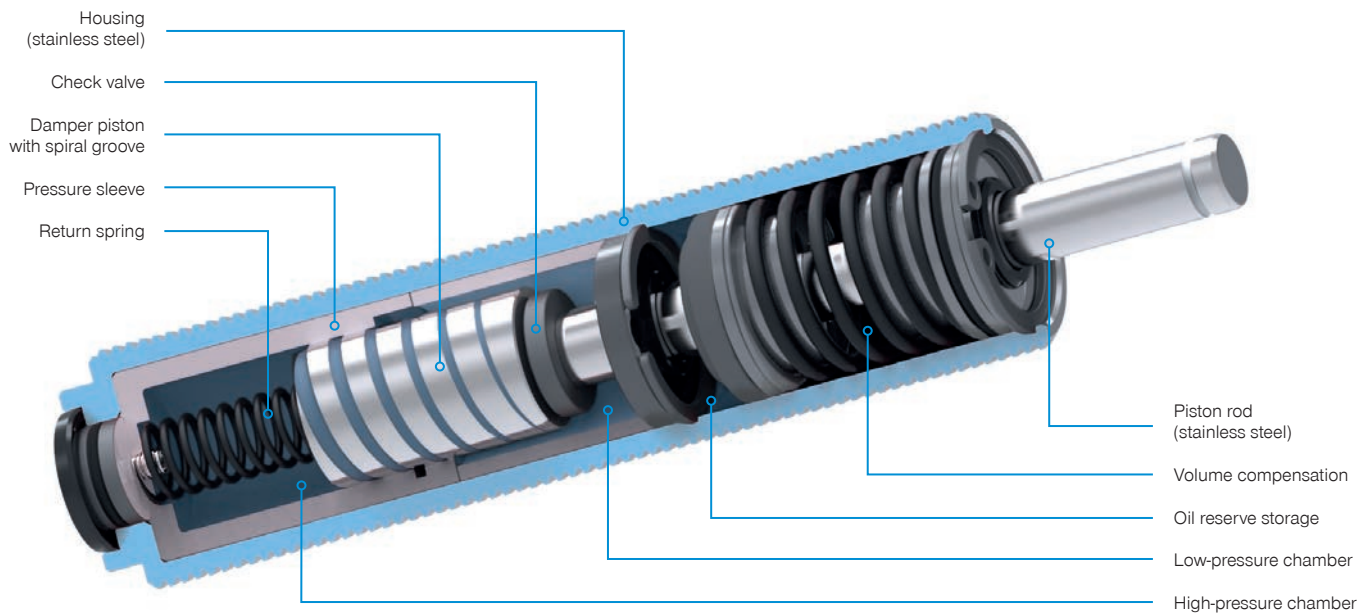


The unique spiral groove technology is a defining feature of PowerStop industrial shock absorbers. Unlike conventional industrial shock absorbers that utilize throttle bores, the damping in this case is caused by a constantly narrowing spiral groove. Along with maximum energy absorption and gentle damping, PowerStop shock absorbers offer substantial advantages with their technological advances.

Our know-how – your advantages:

- ▶ The highest quality for the most extreme demands and loads
- ▶ High power consumption thanks to maximum utilization in each piston position
- ▶ Customized damping characteristic design for customer specific solutions
- ▶ Low-vibration and precise braking due to the constantly narrowing spiral groove
- ▶ Less wear thanks to the hydrostatic piston guide
- ▶ Longer durability and high operating safety thanks to the oil reserve
- ▶ Corrosion protection from using stainless steel
- ▶ Suitability for use in a pressure chamber up to 10 bar (only applies to the high energy variant)

DESIGN

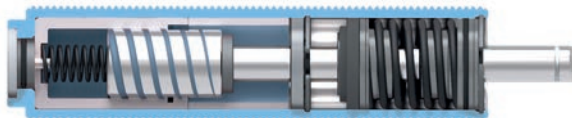


FUNCTIONAL SEQUENCE



1. Home position

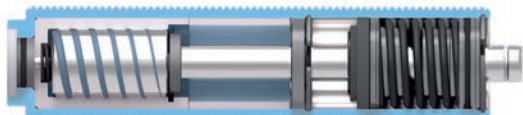
Check valve is opened and the high-pressure chamber is filled with oil



2. Retraction with damping

External force (impact) pushes the piston rod in together with the piston

- ▶ Pressure build-up in the high-pressure chamber
- ▶ Check valve closes
- ▶ Oil flows from the high-pressure chamber into the low-pressure chamber and the oil reserve storage via the spiral groove
- ▶ Damping via the throttling effect of the spiral groove
- ▶ The volume compensation spring uses compression to compensate for the volume of the retracting piston rod



3. Returning

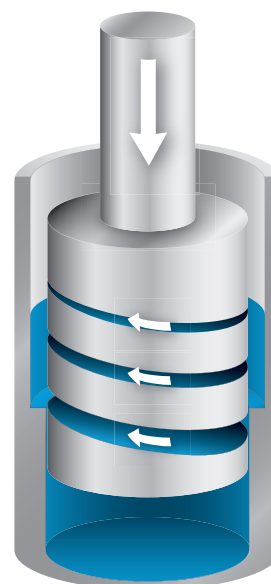
Removal of external force from the piston rod

- ▶ Return spring pushes the piston rod back together with the piston
- ▶ Check valve opens for quick oil return flow
- ▶ Oil flows from the low-pressure chamber back into the high-pressure chamber via the check valve

POWERSTOP INDUSTRIAL SHOCK ABSORBERS

Spiral groove technology as a damping principle.

In PowerStop shock absorbers, a circumferential, narrowing spiral groove provides the throttling effect necessary for damping. During this process, kinetic energy is converted into heat, which is subsequently released into the surroundings.

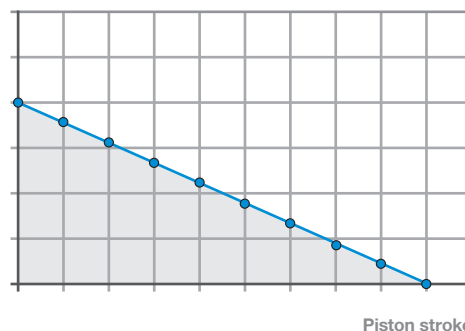


Damping characteristics

- ▶ The spiral groove makes constant damping possible. In relation to fluid mechanics, this reduces the load on the oil to a minimum. At the same time, it enables maximum energy absorption capacity.

▶ Spiral groove technology

Throttle surface

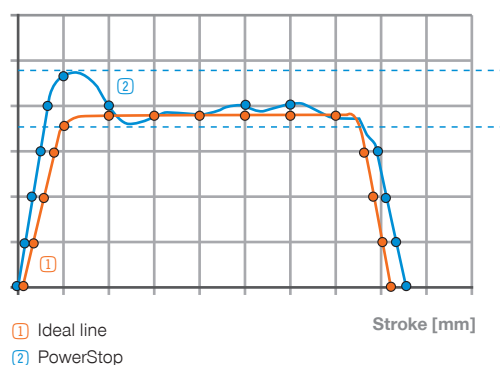


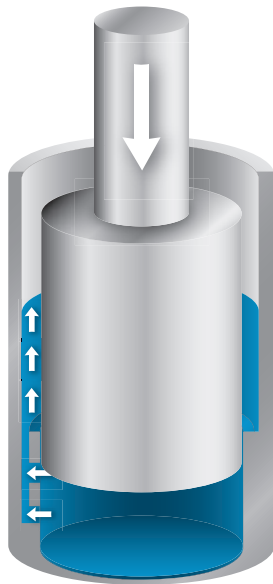
Damping curve

- ▶ The constantly narrowing spiral groove results in a low-vibration, almost ideal damping characteristic curve. This not only protects the components in question, but also allows optimum energy absorption in every piston position. The best performance for optimum damping as well as smooth braking are the result of the PowerStop shock absorber.

▶ Spiral groove technology

Force [N]



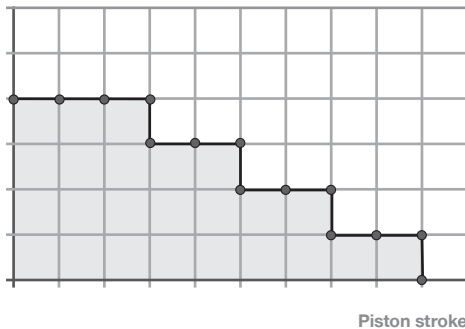


CONVENTIONAL INDUSTRIAL SHOCK ABSORBERS

A conventional industrial shock absorber with a traditional design pushes oil out through a throttle bore put in a sleeve. The kinetic energy is converted into heat by throttling the flow.

► Throttle bores

Throttle surface

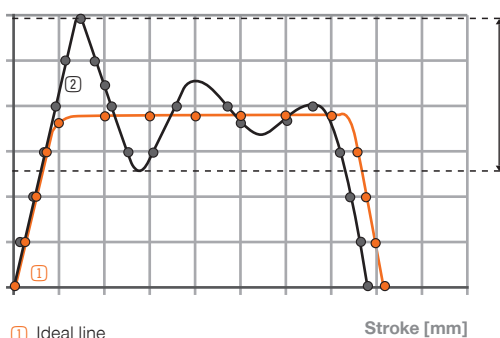


Damping characteristics

- Damping characteristic stems from the throttle bores arranged along the entire stroke. This provides a graduated characteristic. This damping principle requires that the oil be forcefully redirected, putting a severe load on it.

► Throttle bores

Force [N]



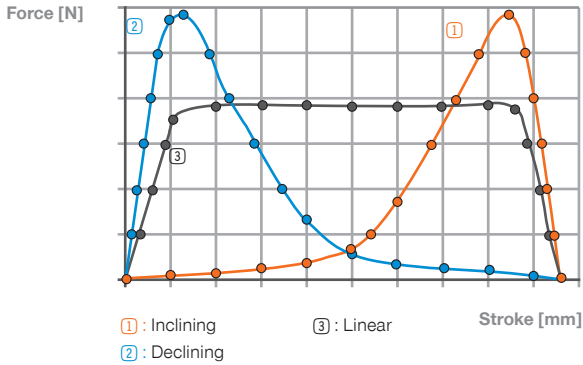
- ① Ideal line
- ② Conventional damper

Damping curve

- The characteristic curve is marked by the cascading, inconsistent damping characteristics that cause fluctuations in the force curve. This, in turn, leads to damaging vibrations in the system, which should be avoided with a shock absorber.

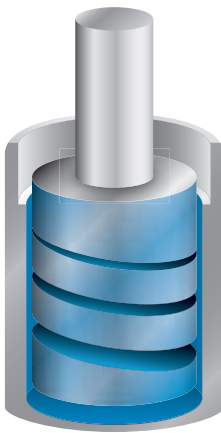
POWERSTOP

UNIQUE SELLING POINTS



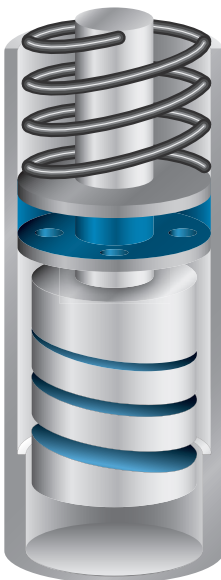
Individual damping characteristics

- The spiral groove makes it possible for the shock absorber to provide unique, customized damping characteristics. This means the characteristics can be adjusted with a declining curve for weak end position damping, with a progressive curve for a gentle increase in damping or linearly for a constant force curve.



Hydrostatic piston guide

- Another advantage of spiral groove technology is the hydrostatic piston guide. Since, during damping, the oil drains via the spiral groove, oil is between the piston and pressure sleeve during the entire stroke. The moving parts are separated from each other by a lubricating film, which minimizes wear. Therefore, the system guarantees a long runtime and is highly reliable for improved safety during production.



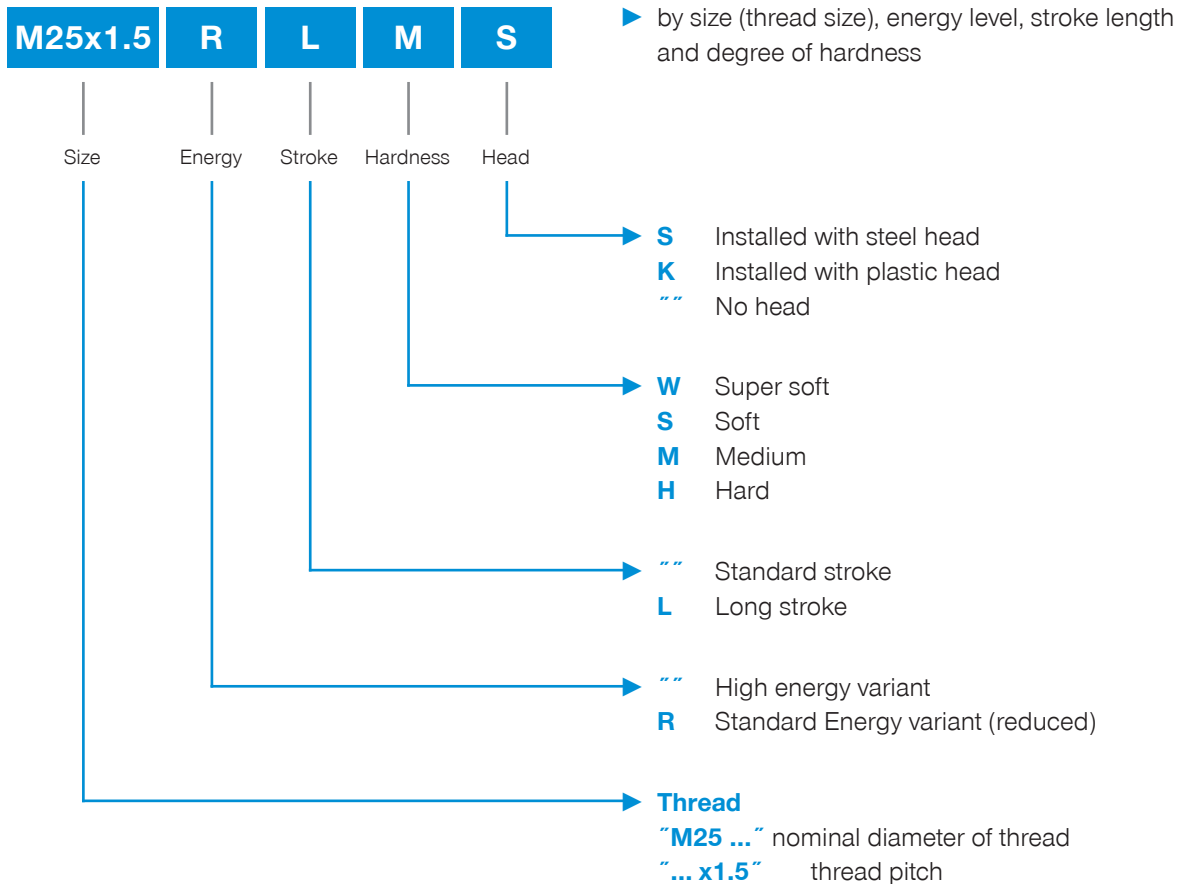
Oil reserve

- Along with the spiral groove, high-energy PowerStop shock absorbers feature another innovative solution, the oil reserve. This enables the equalization of volume using a spring. The shock absorber is filled with oil so that the volume compensation spring is under initial tension. This creates a chamber with an oil reserve that acts as an external hydraulic accumulator. Readjusting the spring can compensate for oil loss. This results in a longer operating time for the shock absorber.

NOTES ON ORDERING

INDUSTRIAL SHOCK ABSORBERS

Selection of industrial shock absorbers



Notes:

- ▶ The degree of hardness specifies the speed range (from degree of hardness W to H; speed decreases as hardness increases)
- ▶ The energy absorption and the impact speed can be determined using the formulas and calculations listed in the attachment
- ▶ The impact head must be ordered together with the shock absorber by using the shock absorber's order number

Impact head:



- ▶ **Steel head (S)**
Using a steel head reduces the surface pressure during impact due to the enlarged surface. The steel head is mostly used for soft materials on the opposite side
- ▶ **Plastic head (K)**
Using a plastic head is recommended for reducing the amount of noise that is generated

ACCESSORIES

INDUSTRIAL SHOCK ABSORBERS



Locknut

Steel locknut

A nut made of nickel-plated steel is supplied for each shock absorber. An additional nut is required for installation in a hole with no threading.

Stainless steel locknut

Alternatively, a nut made from stainless steel provides increased corrosion protection.



Stop sleeve

The PowerStop may not be used as a fixed stop. Using a stop sleeve is recommended in this case. This lets you set the end stop individually using the additional locknut by screwing the sleeve onto the outer thread of the shock absorber.



Clamping flange

You can use a clamping flange, into which the shock absorber can be screwed, to connect the shock absorber to the construction more easily. The clamping flange is fastened to the construction with the supplied screws.



Side load adapter/air barrier adapter

This component addresses two requirements at the same time:

Side load adapter:

A side load adapter must be provided if the system applies a force to the shock absorber at an impact angle higher than the permitted misalignment of 2°. This increases the permitted impact angle up to 30°.

Air barrier adapter:

An air barrier adapter is recommended if there is increased dirt build up. Connecting a compressed air supply enables an air cushion to protect the shock absorbers from the ingress of dirt particles.



Cooling nut

The energy absorption per hour (at an ambient temperature of 20 °C) can be increased up to 1.5 x by using an aluminum cooling nut so that the 70 °C operating temperature of the PowerStop shock absorber is not exceeded even during shorter cycle times. This enables the use of shorter cycle times.

TAKE ADVANTAGE OF OUR COMPREHENSIVE SERVICE!



- ▶ CUSTOMER SERVICE AND TECHNICAL CONSULTATION
- ▶ DIRECT CATALOG REQUIREMENTS ON THE INTERNET
- ▶ CAD DATA, 3D MODELS, OPERATING INSTRUCTIONS

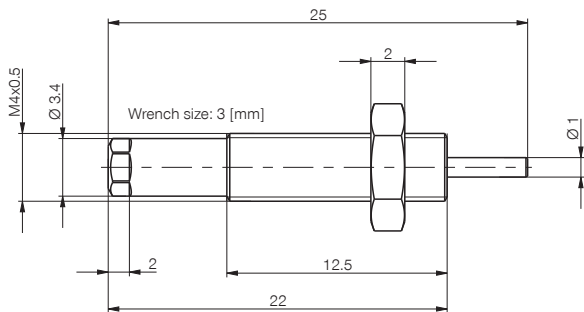
INDUSTRIAL SHOCK ABSORBER

SIZE M4X0.5

1
Size M4X0.5 / Industrial shock absorber



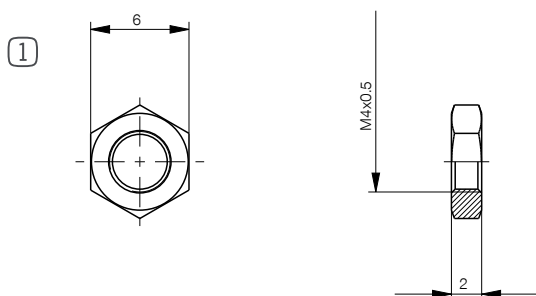
- ▶ Angle of Impact max. 2 [°]
- ▶ Weight with locknut 2 [g]
- ▶ Piston return time 0.15 [s]
- ▶ Min. return force 1 [N]
- ▶ Max. return force 2 [N]
- ▶ Permitted temperature range -10 ... +70 [°C]



▶ Technical data

Max. energy absorption		Stroke	Impact speed		
Continuous operation			Emergency stop operation		
per stroke	per hour		per stroke	min.	max.
[Nm]	[Nm/h]		[Nm]		[m/s]
0.5	1,200	-	3	0.2	2

HIGH ENERGY



► Size: **M4X0.5**

Pos.	Accessories	Weight	Order no.
①	Stainless steel locknut	1 [g]	MVM4X0.5
①	Steel locknut	1 [g]	MSM4X0.5

Maximum fastening torque of locknut: 2 [Nm]

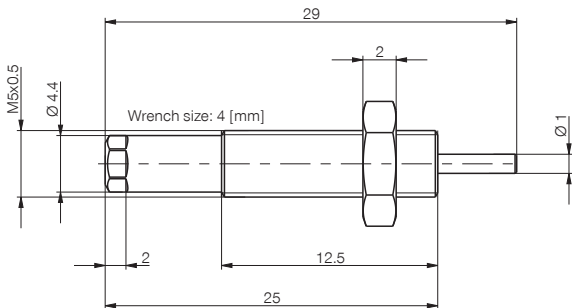
INDUSTRIAL SHOCK ABSORBER

SIZE M5X0.5

1
Size M5X0.5 / Industrial shock absorber



- ▶ Angle of Impact max. 2 [°]
- ▶ Weight with locknut 3 [g]
- ▶ Piston return time 0.15 [s]
- ▶ Min. return force 1 [N]
- ▶ Max. return force 2 [N]
- ▶ Permitted temperature range -10 ... +70 [°C]



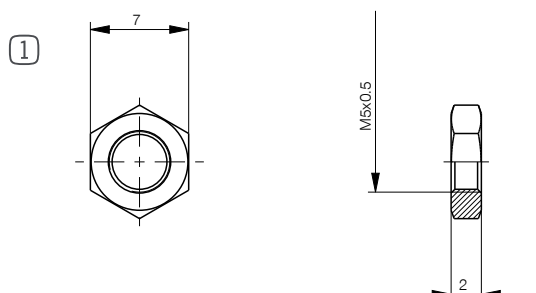
▶ Technical data

Max. energy absorption		Stroke		Impact speed	
Continuous operation		Emergency stop operation		min.	max.
per stroke	per hour	per stroke	[mm]	[m/s]	
[Nm]	[Nm/h]	[Nm]			
0.8	1,800	-	4	0.2	2

Order No.

M5X0.5M

HIGH ENERGY



► Size: **M5X0.5**

Pos.	Accessories	Weight	Order no.
①	Stainless steel locknut	1 [g]	MVM5X0.5
①	Steel locknut	1 [g]	MSM5X0.5

Maximum fastening torque of locknut: 2 [Nm]

INDUSTRIAL SHOCK ABSORBER

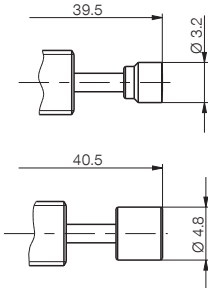
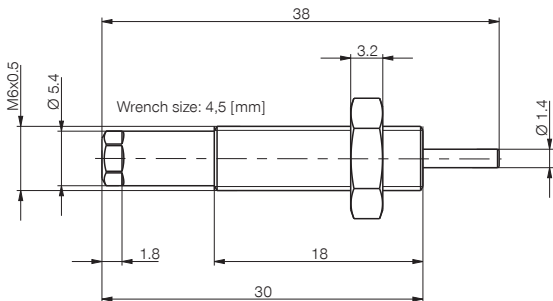
SIZE M6X0.5

1
Size M6X0.5 / Industrial shock absorber



PowerStop®

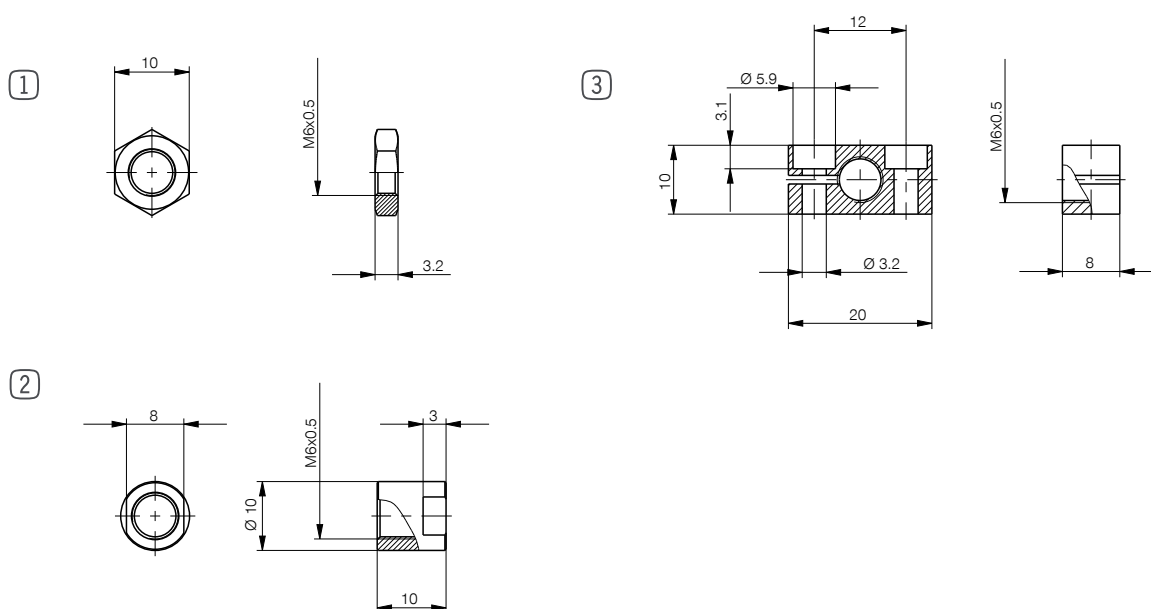
- ▶ Angle of Impact max. 2 [°]
- ▶ Weight with locknut 5 [g]
- ▶ Piston return time 0.15 [s]
- ▶ Min. return force 1 [N]
- ▶ Max. return force 3 [N]
- ▶ Permitted temperature range -10 ... +70 [°C]



S: assembled with steel head

K: assembled with plastic head

		► Technical data					
		Max. energy absorption		Stroke	Impact speed		
		Continuous operation	Emergency stop operation				
Order No.		per stroke	per hour	per stroke	min.	max.	
		[Nm]	[Nm/h]	[Nm]	[mm]	[m/s]	
HIGH ENERGY	M6X0.5MK	1.5	3,200	-	4	0.8	2.2
	M6X0.5MS	1.5	3,200	-	4	0.8	2.2
	M6X0.5M	1.5	3,200	-	4	0.8	2.2
	M6X0.5SK	1.5	3,200	-	4	1.8	3.5
	M6X0.5SS	1.5	3,200	-	4	1.8	3.5
	M6X0.5S	1.5	3,200	-	4	1.8	3.5



► Size: **M6X0.5**

Pos.	Accessories	Weight	Order no.
①	Steel locknut	2 [g]	MSM6X0.5
①	Stainless steel locknut	2 [g]	MVM6X0.5
②	Stop sleeve*	8 [g]	MAH6x0.5
③	Clamping flange	10 [g]	MKF6X0.5

Maximum fastening torque of locknut: 4 [Nm]

*inclusive Stainless-Steel locknut MVM

INDUSTRIAL SHOCK ABSORBER

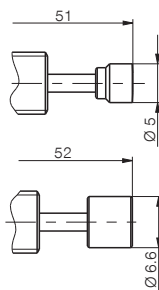
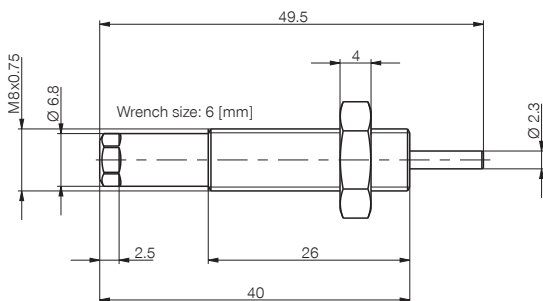
SIZE M8X0.75

1
Size M8X0.75 / Industrial shock absorber



PowerStop®

- ▶ Angle of Impact max. 2 [°]
- ▶ Weight with locknut 15 [g]
- ▶ Piston return time 0.15 [s]
- ▶ Min. return force 1 [N]
- ▶ Max. return force 4 [N]
- ▶ Permitted temperature range -10 ... +70 [°C]

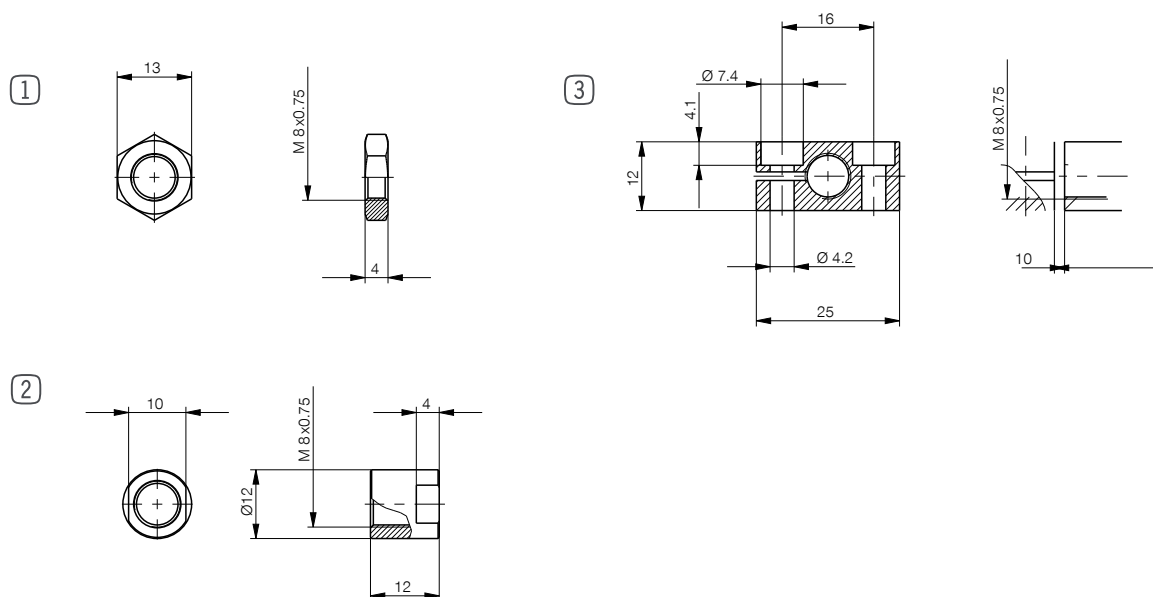


S: assembled with steel head

K: assembled with plastic head

		Technical data					
		Max. energy absorption		Stroke	Impact speed		
		Continuous operation	Emergency stop operation		min.	max.	
Order No.		per stroke	per hour	per stroke	[m/s]		
HIGH ENERGY	M8X0.75MK	4	9,000	-	5	0.8	2.2
	M8X0.75MS	4	9,000	-	5	0.8	2.2
	M8X0.75M	4	9,000	-	5	0.8	2.2
	M8X0.75SK	3	8,000	-	5	1.8	3.5
	M8X0.75SS	3	8,000	-	5	1.8	3.5
	M8X0.75S	3	8,000	-	5	1.8	3.5

		Technical data					
		Max. energy absorption		Stroke	Impact speed		
		Continuous operation	Emergency stop operation		min.	max.	
Order No.		per stroke	per hour	per stroke	[m/s]		
STANDARD ENERGY	M8X0.75RMK	1.5	5,000	-	5	0.8	2.2
	M8X0.75RMS	1.5	5,000	-	5	0.8	2.2
	M8X0.75RM	1.5	5,000	-	5	0.8	2.2
	M8X0.75RSK	1.5	5,000	-	5	1.8	3.5
	M8X0.75RSS	1.5	5,000	-	5	1.8	3.5
	M8X0.75RS	1.5	5,000	-	5	1.8	3.5



► Size: **M8X0.75**

Pos.	Accessories	Weight	Order no.
①	Steel locknut	3 [g]	MSM8X0.75
①	Stainless steel locknut	3 [g]	MVM8X0.75
②	Stop sleeve*	10 [g]	MAH8X0.75
③	Clamping flange	20 [g]	MKF8X0.75

Maximum fastening torque of locknut: 6 [Nm]

*inclusive Stainless-Steel locknut MVM

INDUSTRIAL SHOCK ABSORBER

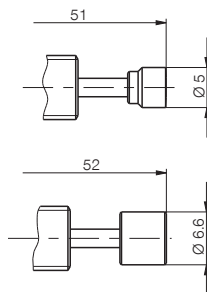
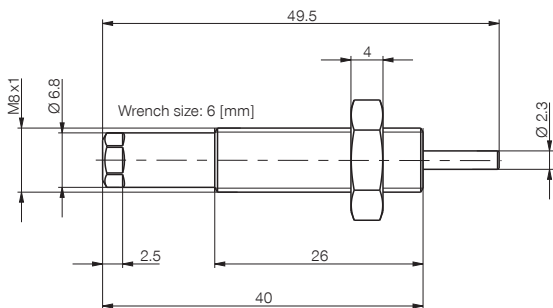
SIZE M8X1

1
Size M8X1 / Industrial shock absorber



PowerStop®

- ▶ Angle of Impact max. 2 [°]
- ▶ Weight with locknut 15 [g]
- ▶ Piston return time 0.15 [s]
- ▶ Min. return force 1 [N]
- ▶ Max. return force 4 [N]
- ▶ Permitted temperature range -10 ... +70 [°C]

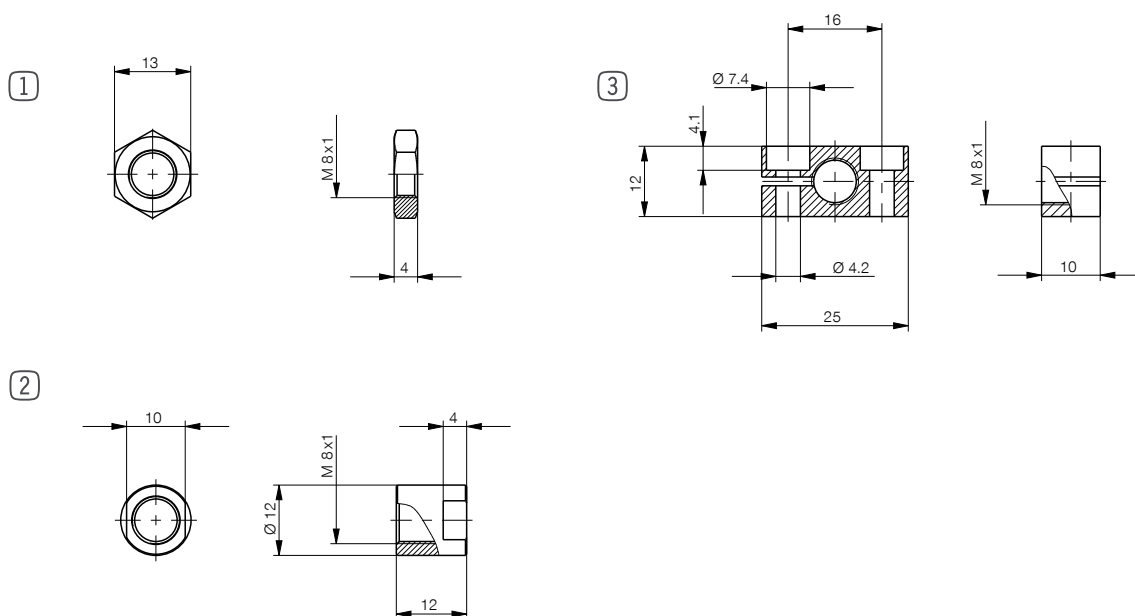


S: assembled with steel head

K: assembled with plastic head

		Technical data					
		Max. energy absorption		Stroke	Impact speed		
		Continuous operation	Emergency stop operation		min.	max.	
Order No.		per stroke	per hour	per stroke	[m/s]		
HIGH ENERGY	M8X1S	3	8,000	-	5	1.8	3.5
	M8X1SS	3	8,000	-	5	1.8	3.5
	M8X1SK	3	8,000	-	5	1.8	3.5
	M8X1M	4	9,000	-	5	0.8	2.2
	M8X1MS	4	9,000	-	5	0.8	2.2
	M8X1MK	4	9,000	-	5	0.8	2.2

		Technical data					
		Max. energy absorption		Stroke	Impact speed		
		Continuous operation	Emergency stop operation		min.	max.	
Order No.		per stroke	per hour	per stroke	[m/s]		
STANDARD ENERGY	M8X1RS	1.5	5,000	-	5	1.8	3.5
	M8X1RSS	1.5	5,000	-	5	1.8	3.5
	M8X1RSK	1.5	5,000	-	5	1.8	3.5
	M8X1RM	1.5	5,000	-	5	0.8	2.2
	M8X1RMS	1.5	5,000	-	5	0.8	2.2
	M8X1RMK	1.5	5,000	-	5	0.8	2.2



► Size: **M8X1**

Pos.	Accessories	Weight	Order no.
①	Steel locknut	3 [g]	MSM8X1
①	Stainless steel locknut	3 [g]	MVM8X1
②	Stop sleeve*	10 [g]	MAH8X1
③	Clamping flange	20 [g]	MKF8X1

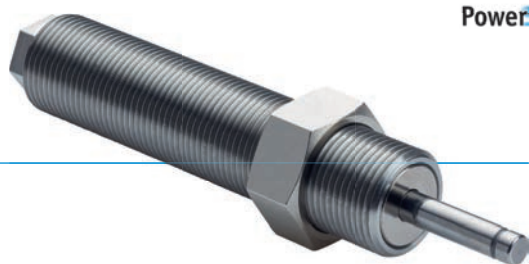
Maximum fastening torque of locknut: 6 [Nm]

*inclusive Stainless-Steel locknut MVM

INDUSTRIAL SHOCK ABSORBER

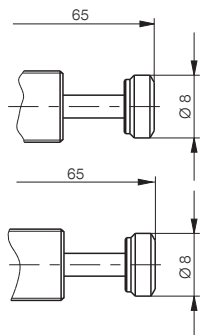
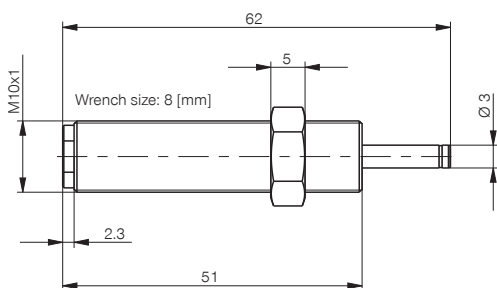
SIZE M10X1

1
Size M10X1 / Industrial shock absorber



PowerStop

- ▶ **Angle of Impact max.** 2 [°]
- ▶ **Weight with locknut** 25 [g]
- ▶ **Piston return time** 0.15 [s]
- ▶ **Min. return force** 4 [N]
- ▶ **Max. return force** 10 [N]
- ▶ **Permitted temperature range** -10 ... +70 [°C]

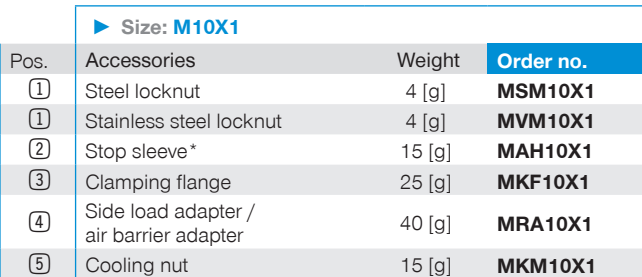


S: assembled with steel head

K: assembled with plastic head

		▶ Technical data						
		Max. energy absorption		Stroke		Impact speed		
		Continuous operation	Emergency stop operation			min.	max.	
		per stroke	per hour	per stroke	[mm]	[m/s]		
Order No.		[Nm]	[Nm/h]	[Nm]				
HIGH ENERGY	M10X1W	4	9,000	-	8	1.8	4	
	M10X1WS	4	9,000	-	8	1.8	4	
	M10X1WK	4	9,000	-	8	1.8	4	
	M10X1S	10	18,000	-	8	1.8	3.5	
	M10X1SS	10	18,000	-	8	1.8	3.5	
	M10X1SK	10	18,000	-	8	1.8	3.5	
	M10X1M	12	20,000	-	8	0.8	2.2	
	M10X1MS	12	20,000	-	8	0.8	2.2	
	M10X1MK	12	20,000	-	8	0.8	2.2	
	M10X1H	12	20,000	-	8	0.2	1.2	
	M10X1HS	12	20,000	-	8	0.2	1.2	
	M10X1HK	12	20,000	-	8	0.2	1.2	

		▶ Technical data						
		Max. energy absorption		Stroke		Impact speed		
		Continuous operation	Emergency stop operation			min.	max.	
		per stroke	per hour	per stroke	[mm]	[m/s]		
Order No.		[Nm]	[Nm/h]	[Nm]				
STANDARD ENERGY	M10X1RS	3	8,000	-	8	1.8	3.5	
	M10X1RSS	3	8,000	-	8	1.8	3.5	
	M10X1RSK	3	8,000	-	8	1.8	3.5	
	M10X1RM	3	8,000	-	8	0.8	2.2	
	M10X1RMS	3	8,000	-	8	0.8	2.2	
	M10X1RMK	3	8,000	-	8	0.8	2.2	
	M10X1RH	3	8,000	-	8	0.2	1.2	
	M10X1RHS	3	8,000	-	8	0.2	1.2	
	M10X1RHK	3	8,000	-	8	0.2	1.2	



*inclusive Stainless-Steel locknut MVM

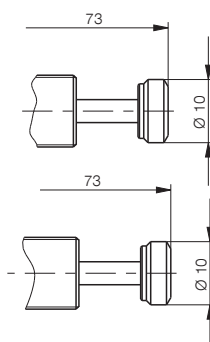
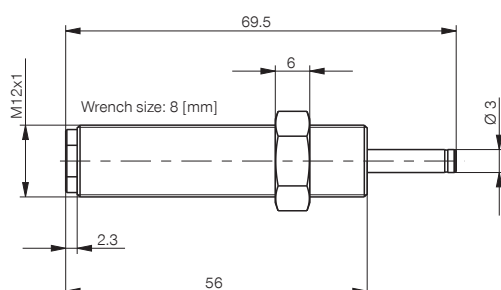
INDUSTRIAL SHOCK ABSORBER

SIZE M12X1



PowerStop®

- ▶ **Angle of Impact max.** 2 [°]
- ▶ **Weight with locknut** 35 [g]
- ▶ **Piston return time** 0.2 [s]
- ▶ **Min. return force** 6 [N]
- ▶ **Max. return force** 10 [N]
- ▶ **Permitted temperature range** -10 ... +70 [°C]

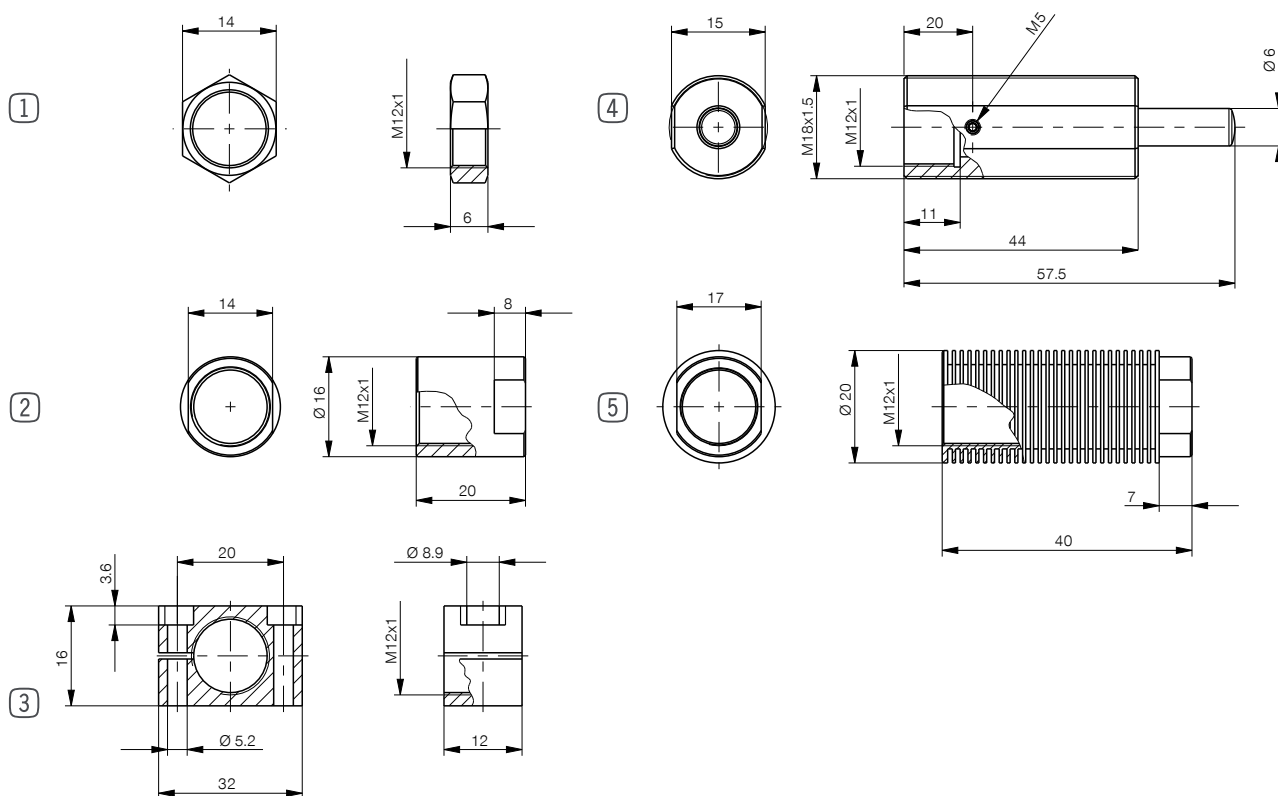


S: assembled with steel head

K: assembled with plastic head

		▶ Technical data					
		Max. energy absorption		Stroke	Impact speed		
		Continuous operation	Emergency stop operation				
Order No.		per stroke	per hour	per stroke	min.	max.	
		[Nm]	[Nm/h]	[Nm]	[mm]	[m/s]	
HIGH ENERGY	M12X1W	10	18,000	-	10	1.8	4
	M12X1WS	10	18,000	-	10	1.8	4
	M12X1WK	10	18,000	-	10	1.8	4
	M12X1S	16	30,000	22	10	1.8	3.5
	M12X1SS	16	30,000	22	10	1.8	3.5
	M12X1SK	16	30,000	22	10	1.8	3.5
	M12X1M	18	33,000	25	10	0.8	2.2
	M12X1MS	18	33,000	25	10	0.8	2.2
	M12X1MK	18	33,000	25	10	0.8	2.2
	M12X1H	18	33,000	27	10	0.2	1.2
	M12X1HS	18	33,000	27	10	0.2	1.2
	M12X1HK	18	33,000	27	10	0.2	1.2

		▶ Technical data					
		Max. energy absorption			Stroke	Impact speed	
		Continuous operation		Emergency stop operation		min.	max.
		per stroke	per hour	per stroke			
STANDARD ENERGY	Order No.	[Nm]	[Nm/h]	[Nm]	[mm]	[m/s]	
	M12X1RS	9	20,000	-	10	1.8	3.5
	M12X1RSS	9	20,000	-	10	1.8	3.5
	M12X1RSK	9	20,000	-	10	1.8	3.5
	M12X1RM	9	20,000	-	10	0.8	2.2
	M12X1RMS	9	20,000	-	10	0.8	2.2
	M12X1RMK	9	20,000	-	10	0.8	2.2
	M12X1RH	9	20,000	-	10	0.2	1.2
	M12X1RHS	9	20,000	-	10	0.2	1.2
	M12X1RHK	9	20,000	-	10	0.2	1.2



► Size: **M12X1**

Pos.	Accessories	Weight	Order no.
①	Steel locknut	4 [g]	MSM12X1
①	Stainless steel locknut	4 [g]	MVM12X1
②	Stop sleeve*	20 [g]	MAH12X1
③	Clamping flange	40 [g]	MKF12X1
④	Side load adapter / air barrier adapter	60 [g]	MRA12X1
⑤	Cooling nut	20 [g]	MKM12X1

Maximum fastening torque of locknut: 10 [Nm]

*inclusive Stainless-Steel locknut MVM

INDUSTRIAL SHOCK ABSORBER

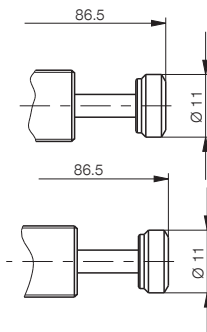
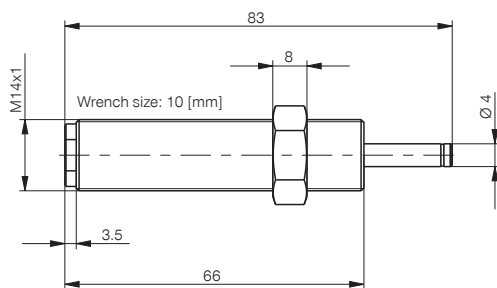
SIZE M14X1

1
Size M14X1 / Industrial shock absorber



PowerStop

- ▶ **Angle of Impact max.** 2 [°]
- ▶ **Weight with locknut** 60 [g]
- ▶ **Piston return time** 0.2 [s]
- ▶ **Min. return force** 8 [N]
- ▶ **Max. return force** 15 [N]
- ▶ **Permitted temperature range** -10 ... +70 [°C]

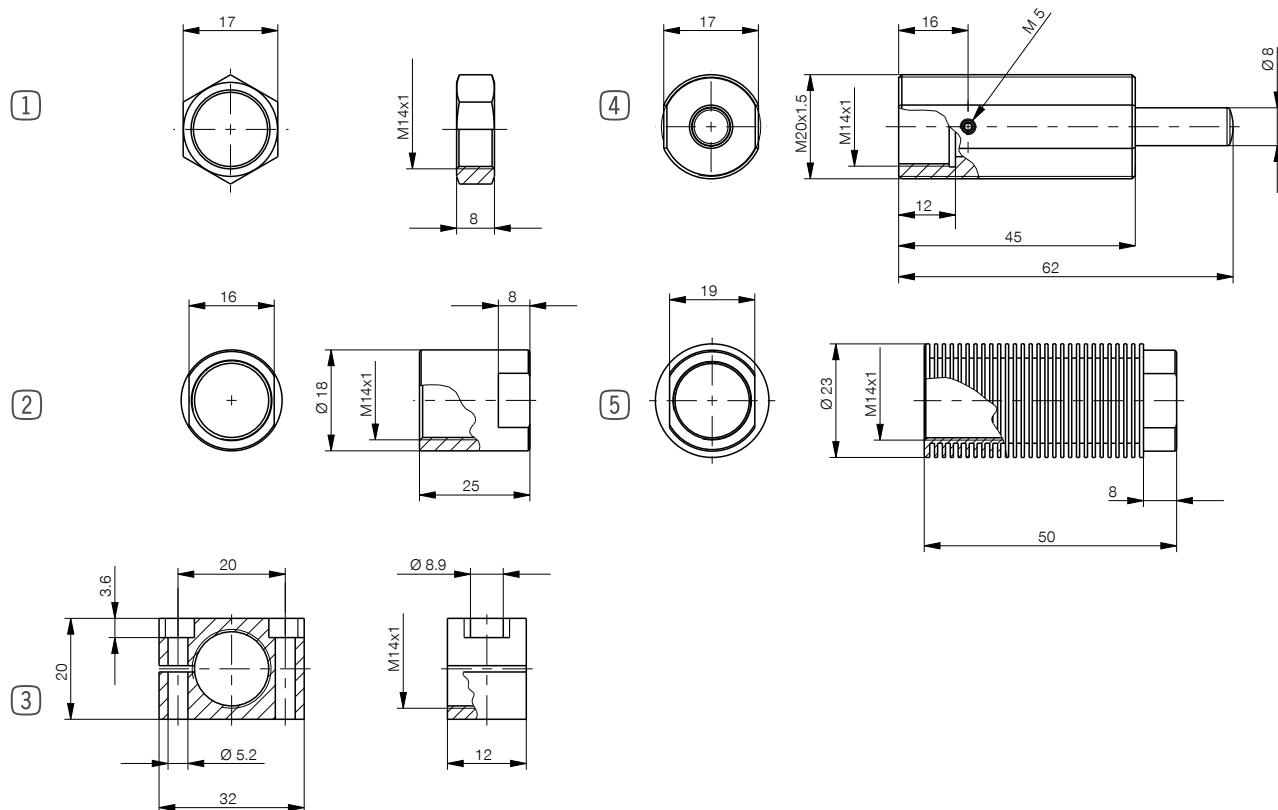


S: assembled with steel head

K: assembled with plastic head

		▶ Technical data					
		Max. energy absorption			Stroke	Impact speed	
		Continuous operation		Emergency stop operation		min.	max.
		per stroke	per hour	per stroke			
Order No.		[Nm]	[Nm/h]	[Nm]	[mm]	[m/s]	
HIGH ENERGY	M14X1HK	32	50,000	45	12	0.2	1.2
	M14X1HS	32	50,000	45	12	0.2	1.2
	M14X1H	32	50,000	45	12	0.2	1.2
	M14X1MK	32	50,000	40	12	0.8	2.2
	M14X1MS	32	50,000	40	12	0.8	2.2
	M14X1M	32	50,000	40	12	0.8	2.2
	M14X1SK	30	45,000	35	12	1.8	3.5
	M14X1SS	30	45,000	35	12	1.8	3.5
	M14X1S	30	45,000	35	12	1.8	3.5
	M14X1WK	18	33,000	-	12	1.8	4
	M14X1WS	18	33,000	-	12	1.8	4
	M14X1W	18	33,000	-	12	1.8	4

		▶ Technical data					
		Max. energy absorption			Stroke	Impact speed	
		Continuous operation		Emergency stop operation		min.	max.
		per stroke	per hour	per stroke			
Order No.		[Nm]	[Nm/h]	[Nm]	[mm]	[m/s]	
STANDARD ENERGY	M14X1RHK	20	35,000	-	12	0.2	1.2
	M14X1RHS	20	35,000	-	12	0.2	1.2
	M14X1RH	20	35,000	-	12	0.2	1.2
	M14X1RMK	20	35,000	-	12	0.8	2.2
	M14X1RMS	20	35,000	-	12	0.8	2.2
	M14X1RM	20	35,000	-	12	0.8	2.2
	M14X1RSK	20	35,000	-	12	1.8	3.5
	M14X1RSS	20	35,000	-	12	1.8	3.5
	M14X1RS	20	35,000	-	12	1.8	3.5



► Size: **M14X1**

Pos.	Accessories	Weight	Order no.
①	Steel locknut	8 [g]	MSM14X1
①	Stainless steel locknut	8 [g]	MVM14X1
②	Stop sleeve*	30 [g]	MAH14X1
③	Clamping flange	50 [g]	MKF14X1
④	Side load adapter / air barrier adapter	90 [g]	MRA14X1
⑤	Cooling nut	30 [g]	MKM14X1

Maximum fastening torque of locknut: 30 [Nm]

*inclusive Stainless-Steel locknut MVM

INDUSTRIAL SHOCK ABSORBER

SIZE M14X1.5

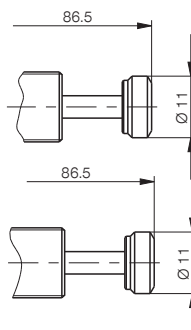
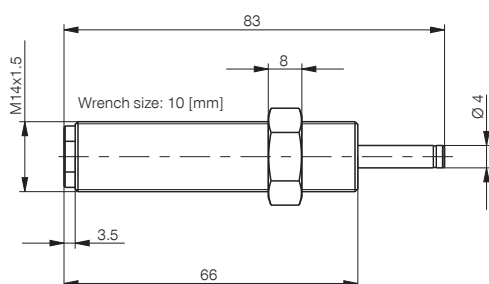
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Size M14X1.5 / Industrial shock absorber



PowerStop

- ▶ **Angle of Impact max.** 2 [°]
- ▶ **Weight with locknut** 60 [g]
- ▶ **Piston return time** 0.2 [s]
- ▶ **Min. return force** 8 [N]
- ▶ **Max. return force** 15 [N]
- ▶ **Permitted temperature range** -10 ... +70 [°C]



S: assembled with steel head

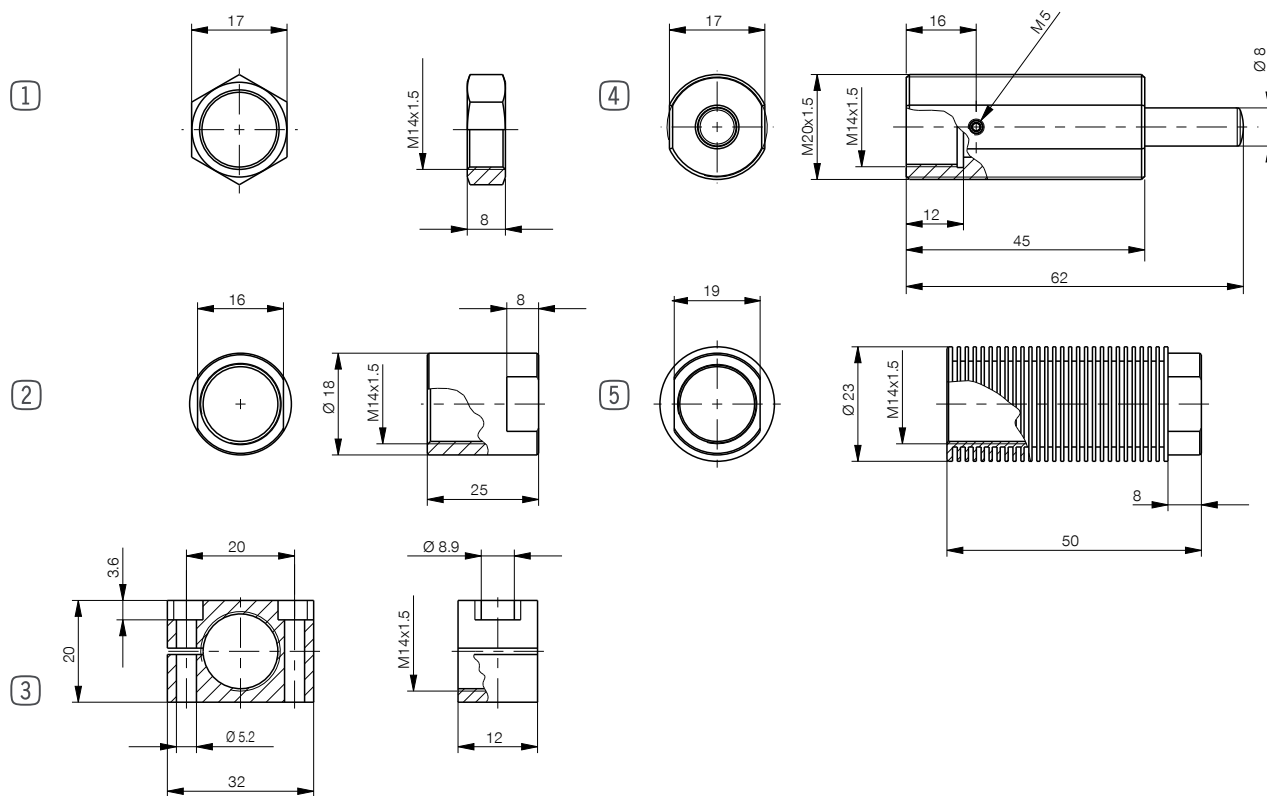
K: assembled with plastic head

▶ Technical data

Order No.	Max. energy absorption		Stroke		Impact speed	
	Continuous operation		Emergency stop operation			
	per stroke	per hour	per stroke		min.	max.
	[Nm]	[Nm/h]	[Nm]	[mm]	[m/s]	
M14X1.5HK	32	50,000	45	12	0.2	1.2
M14X1.5HS	32	50,000	45	12	0.2	1.2
M14X1.5H	32	50,000	45	12	0.2	1.2
M14X1.5MK	32	50,000	40	12	0.8	2.2
M14X1.5MS	32	50,000	40	12	0.8	2.2
M14X1.5M	32	50,000	40	12	0.8	2.2
M14X1.5SK	30	45,000	35	12	1.8	3.5
M14X1.5SS	30	45,000	35	12	1.8	3.5
M14X1.5S	30	45,000	35	12	1.8	3.5
M14X1.5WK	18	33,000	-	12	1.8	4
M14X1.5WS	18	33,000	-	12	1.8	4
M14X1.5W	18	33,000	-	12	1.8	4

▶ Technical data

Order No.	Max. energy absorption		Stroke		Impact speed	
	Continuous operation		Emergency stop operation			
	per stroke	per hour	per stroke		min.	max.
	[Nm]	[Nm/h]	[Nm]	[mm]	[m/s]	
M14X1.5RHK	20	35,000	-	12	0.2	1.2
M14X1.5RHS	20	35,000	-	12	0.2	1.2
M14X1.5RH	20	35,000	-	12	0.2	1.2
M14X1.5RMK	20	35,000	-	12	0.8	2.2
M14X1.5RMS	20	35,000	-	12	0.8	2.2
M14X1.5RM	20	35,000	-	12	0.8	2.2
M14X1.5RSK	20	35,000	-	12	1.8	3.5
M14X1.5RSS	20	35,000	-	12	1.8	3.5
M14X1.5RS	20	35,000	-	12	1.8	3.5



► Size: **M14X1.5**

Pos.	Accessories	Weight	Order no.
①	Steel locknut	8 [g]	MSM14X1.5
①	Stainless steel locknut	8 [g]	MVM14X1.5
②	Stop sleeve*	30 [g]	MAH14X1.5
③	Clamping flange	50 [g]	MKF14X1.5
④	Side load adapter / air barrier adapter	90 [g]	MRA14X1.5
⑤	Cooling nut	30 [g]	MKM14X1.5

Maximum fastening torque of locknut: 30 [Nm]

*inclusive Stainless-Steel locknut MVM

INDUSTRIAL SHOCK ABSORBER

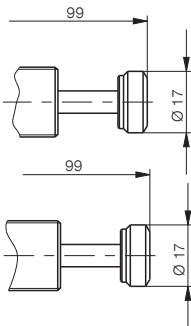
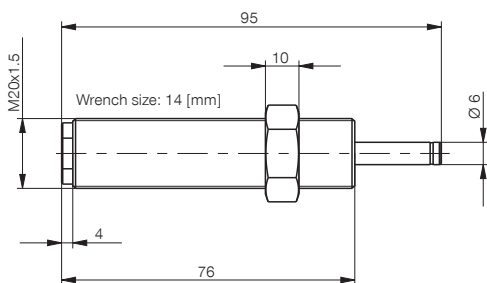
SIZE M20X1.5

1
Size M20X1.5 / Industrial shock absorber



PowerStop®

- ▶ Angle of Impact max. 2 [°]
- ▶ Weight with locknut 120 [g]
- ▶ Piston return time 0.3 [s]
- ▶ Min. return force 15 [N]
- ▶ Max. return force 30 [N]
- ▶ Permitted temperature range -10 ... +70 [°C]

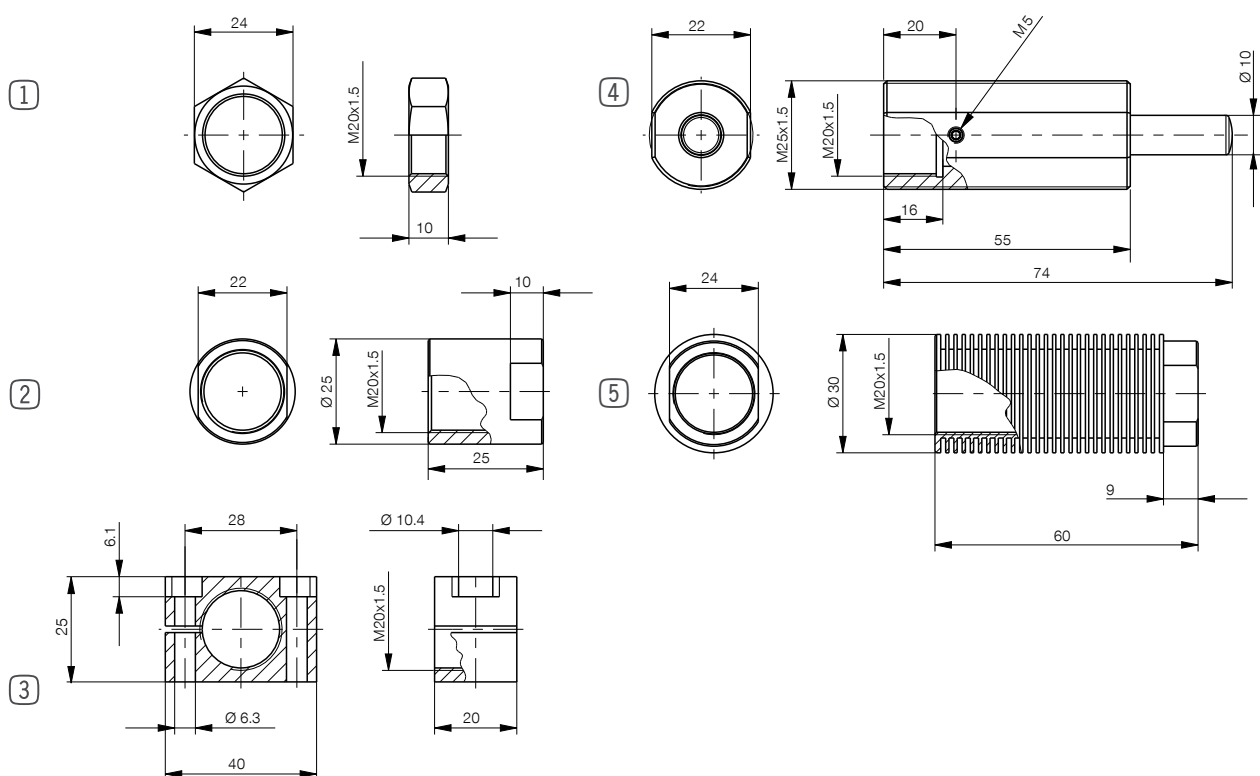


S: assembled with steel head

K: assembled with plastic head

		▶ Technical data					
		Max. energy absorption		Stroke		Impact speed	
		Continuous operation		Emergency stop operation			
		per stroke	per hour	per stroke		min.	max.
Order No.		[Nm]	[Nm/h]	[Nm]	[mm]	[m/s]	
HIGH ENERGY	M20X1.5W	35	40,000	-	15	1.8	4
	M20X1.5WS	35	40,000	-	15	1.8	4
	M20X1.5WK	35	40,000	-	15	1.8	4
	M20X1.5S	70	70,000	100	15	1.8	3.5
	M20X1.5SS	70	70,000	100	15	1.8	3.5
	M20X1.5SK	70	70,000	100	15	1.8	3.5
	M20X1.5M	80	80,000	120	15	0.8	2.2
	M20X1.5MS	80	80,000	120	15	0.8	2.2
	M20X1.5MK	80	80,000	120	15	0.8	2.2
	M20X1.5H	80	80,000	150	15	0.2	1.2
	M20X1.5HS	80	80,000	150	15	0.2	1.2
	M20X1.5HK	80	80,000	150	15	0.2	1.2

		▶ Technical data					
		Max. energy absorption		Stroke		Impact speed	
		Continuous operation		Emergency stop operation			
		per stroke	per hour	per stroke		min.	max.
Order No.		[Nm]	[Nm/h]	[Nm]	[mm]	[m/s]	
STANDARD ENERGY	M20X1.5RS	32	40,000	-	15	1.8	3.5
	M20X1.5RSS	32	40,000	-	15	1.8	3.5
	M20X1.5RSK	32	40,000	-	15	1.8	3.5
	M20X1.5RM	32	40,000	-	15	0.8	2.2
	M20X1.5RMS	32	40,000	-	15	0.8	2.2
	M20X1.5RMK	32	40,000	-	15	0.8	2.2
	M20X1.5RH	32	40,000	-	15	0.2	1.2
	M20X1.5RHS	32	40,000	-	15	0.2	1.2
	M20X1.5RHK	32	40,000	-	15	0.2	1.2



► Size: **M20X1.5**

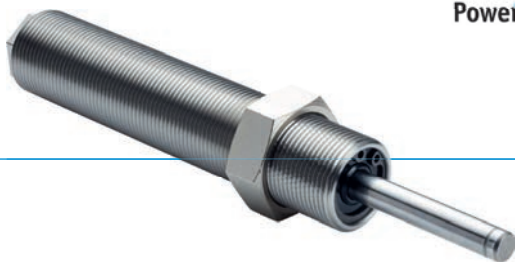
Pos.	Accessories	Weight	Order no.
①	Steel locknut	18 [g]	MSM20x1.5
①	Stainless steel locknut	18 [g]	MVM20X1.5
②	Stop sleeve*	60 [g]	MAH20X1.5
③	Clamping flange	110 [g]	MKF20X1.5
④	Side load adapter / air barrier adapter	160 [g]	MRA20X1.5
⑤	Cooling nut	45 [g]	MKM20X1.5

Maximum fastening torque of locknut: 50 [Nm]

*inclusive Stainless-Steel locknut MVM

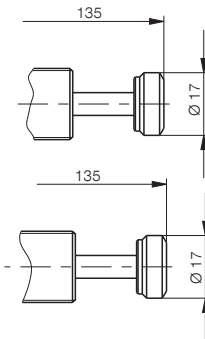
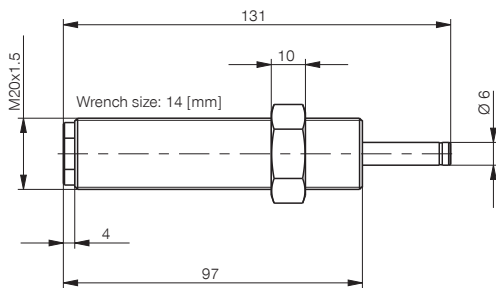
INDUSTRIAL SHOCK ABSORBER

SIZE M20X1.5L



PowerStop®

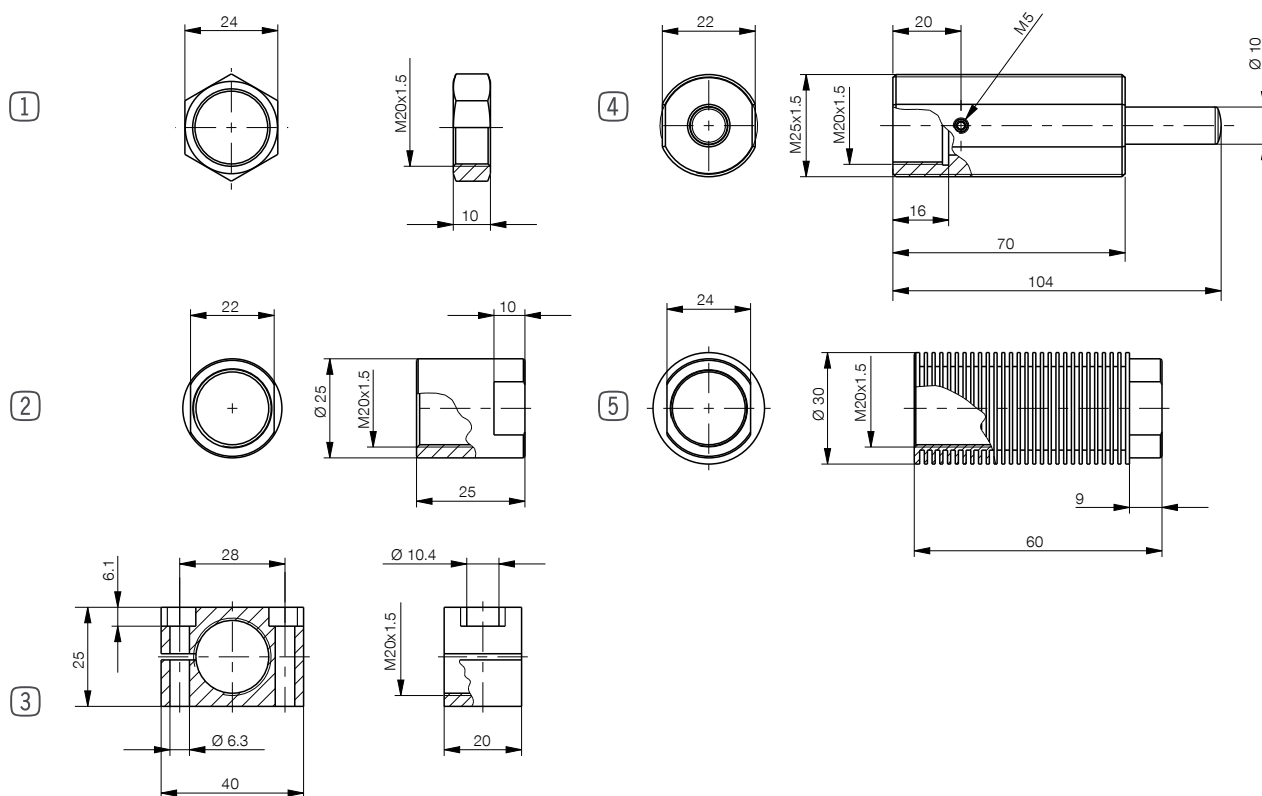
- ▶ Angle of Impact max. 2 [°]
- ▶ Weight with locknut 160 [g]
- ▶ Piston return time 0.5 [s]
- ▶ Min. return force 10 [N]
- ▶ Max. return force 25 [N]
- ▶ Permitted temperature range -10 ... +70 [°C]



S: assembled with steel head

K: assembled with plastic head

		▶ Technical data					
		Max. energy absorption		Stroke	Impact speed		
		Continuous operation	Emergency stop operation				
Order No.		per stroke	per hour	per stroke	min.	max.	
		[Nm]	[Nm/h]	[Nm]	[mm]	[m/s]	
HIGH ENERGY	M20X1.5LS	100	100,000	170	30	1.8	3.5
	M20X1.5LSS	100	100,000	170	30	1.8	3.5
	M20X1.5LSK	100	100,000	170	30	1.8	3.5
	M20X1.5LM	120	120,000	220	30	0.8	2.2
	M20X1.5LMS	120	120,000	220	30	0.8	2.2
	M20X1.5LMK	120	120,000	220	30	0.8	2.2



► Size: **M20X1.5L**

Pos.	Accessories	Weight	Order no.
①	Steel locknut	18 [g]	MSM20x1.5
①	Stainless steel locknut	18 [g]	MVM20X1.5
②	Stop sleeve*	60 [g]	MAH20X1.5
③	Clamping flange	110 [g]	MKF20X1.5
④	Side load adapter / air barrier adapter	210 [g]	MRA20X1.5L
⑤	Cooling nut	45 [g]	MKM20X1.5

Maximum fastening torque of locknut: 50 [Nm]

*inclusive Stainless-Steel locknut MVM

INDUSTRIAL SHOCK ABSORBER

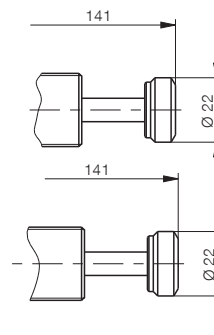
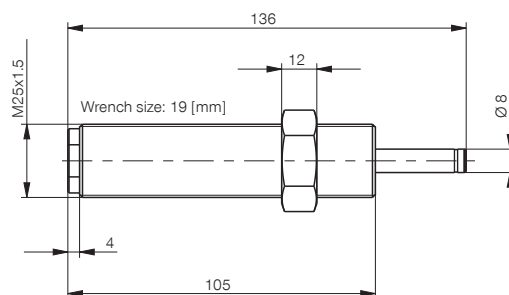
SIZE M25X1.5

1
Size M25X1.5 / Industrial shock absorber



PowerStop®

- ▶ **Angle of Impact max.** 2 [°]
- ▶ **Weight with locknut** 270 [g]
- ▶ **Piston return time** 0.4 [s]
- ▶ **Min. return force** 25 [N]
- ▶ **Max. return force** 50 [N]
- ▶ **Permitted temperature range** -10 ... +70 [°C]



S: assembled with steel head

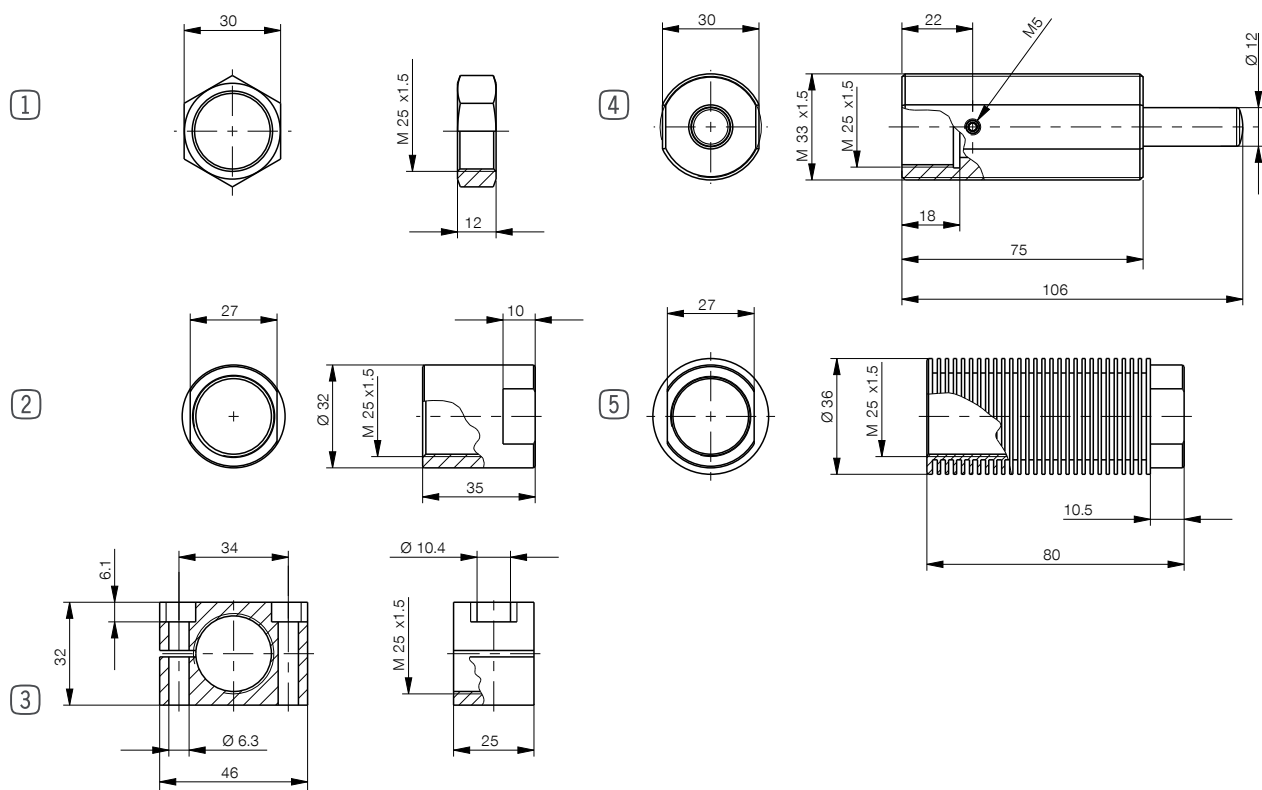
K: assembled with plastic head

▶ Technical data

		▶ Technical data					
		Max. energy absorption			Stroke	Impact speed	
		Continuous operation		Emergency stop operation		min.	max.
		per stroke	per hour	per stroke			
Order No.		[Nm]	[Nm/h]	[Nm]	[mm]	[m/s]	
HIGH ENERGY	M25X1.5HK	210	120,000	450	25	0.2	1.2
	M25X1.5HS	210	120,000	450	25	0.2	1.2
	M25X1.5H	210	120,000	450	25	0.2	1.2
	M25X1.5MK	210	120,000	400	25	0.8	2.2
	M25X1.5MS	210	120,000	400	25	0.8	2.2
	M25X1.5M	210	120,000	400	25	0.8	2.2
	M25X1.5SK	190	100,000	350	25	1.8	3.5
	M25X1.5SS	190	100,000	350	25	1.8	3.5
	M25X1.5S	190	100,000	350	25	1.8	3.5
	M25X1.5WK	100	100,000	-	25	1.8	4
	M25X1.5WS	100	100,000	-	25	1.8	4
	M25X1.5W	100	100,000	-	25	1.8	4

▶ Technical data

		► Technical data					
		Max. energy absorption		Stroke		Impact speed	
		Continuous operation		Emergency stop operation			
Order No.		per stroke	per hour	per stroke		min.	max.
		[Nm]	[Nm/h]	[Nm]	[mm]		[m/s]
STANDARD ENERGY	M25X1.5RHK	90	80,000	-	25	0.2	1.2
	M25X1.5RHS	90	80,000	-	25	0.2	1.2
	M25X1.5RH	90	80,000	-	25	0.2	1.2
	M25X1.5RMK	90	80,000	-	25	0.8	2.2
	M25X1.5RMS	90	80,000	-	25	0.8	2.2
	M25X1.5RM	90	80,000	-	25	0.8	2.2
	M25X1.5RSK	90	80,000	-	25	1.8	3.5
	M25X1.5RSS	90	80,000	-	25	1.8	3.5
	M25X1.5RS	90	80,000	-	25	1.8	3.5



► Size: **M25X1.5**

Pos.	Accessories	Weight	Order no.
①	Steel locknut	33 [g]	MSM25X1.5
①	Stainless steel locknut	33 [g]	MVM25X1.5
②	Stop sleeve*	130 [g]	MAH25X1.5
③	Clamping flange	200 [g]	MKF25X1.5
④	Side load adapter / air barrier adapter	390 [g]	MRA25X1.5
⑤	Cooling nut	70 [g]	MKM25X1.5

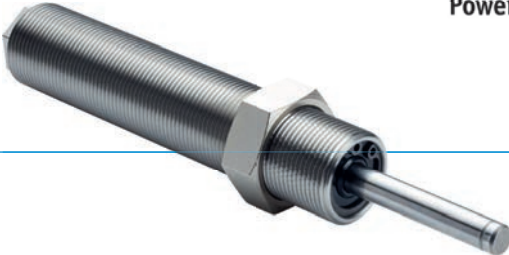
Maximum fastening torque of locknut: 60 [Nm]

*inclusive Stainless-Steel locknut MVM

INDUSTRIAL SHOCK ABSORBER

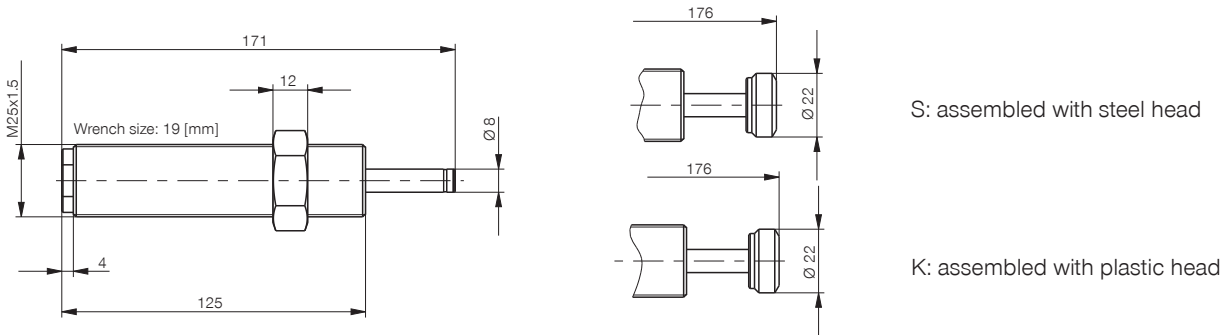
SIZE M25X1.5L

1
Size M25X1.5L / Industrial shock absorber

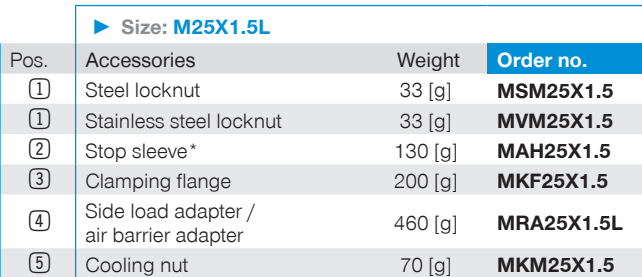


PowerStop

- ▶ **Angle of Impact max.** 2 [°]
- ▶ **Weight with locknut** 340 [g]
- ▶ **Piston return time** 0.6 [s]
- ▶ **Min. return force** 25 [N]
- ▶ **Max. return force** 55 [N]
- ▶ **Permitted temperature range** -10 ... +70 [°C]



		Technical data					
		Max. energy absorption			Stroke	Impact speed	
		Continuous operation		Emergency stop operation		min.	max.
		per stroke	per hour	per stroke	[mm]		
HIGH ENERGY	Order No.	[Nm]	[Nm/h]	[Nm]		[m/s]	
	M25X1.5LS	250	135,000	500	40	1.8	3.5
	M25X1.5LSS	250	135,000	500	40	1.8	3.5
	M25X1.5LSK	250	135,000	500	40	1.8	3.5
	M25X1.5LM	350	150,000	750	40	0.8	2.2
	M25X1.5LMS	350	150,000	750	40	0.8	2.2
	M25X1.5LMK	350	150,000	750	40	0.8	2.2

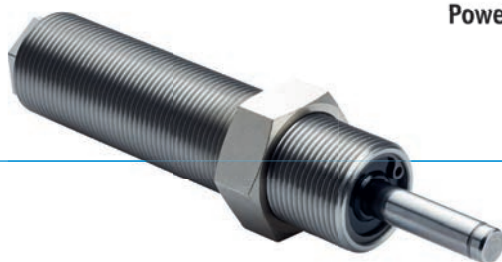


*inclusive Stainless-Steel locknut MVM

INDUSTRIAL SHOCK ABSORBER

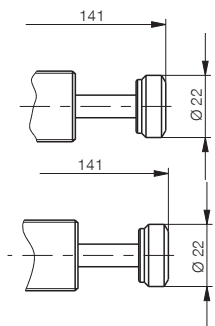
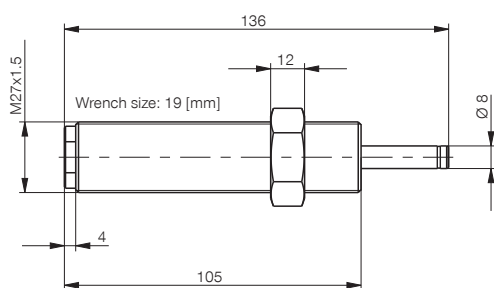
SIZE M27X1.5

1
Size M27X1.5 / Industrial shock absorber



PowerStop®

- ▶ Angle of Impact max. 2 [°]
- ▶ Weight with locknut 340 [g]
- ▶ Piston return time 0.4 [s]
- ▶ Min. return force 25 [N]
- ▶ Max. return force 50 [N]
- ▶ Permitted temperature range -10 ... +70 [°C]

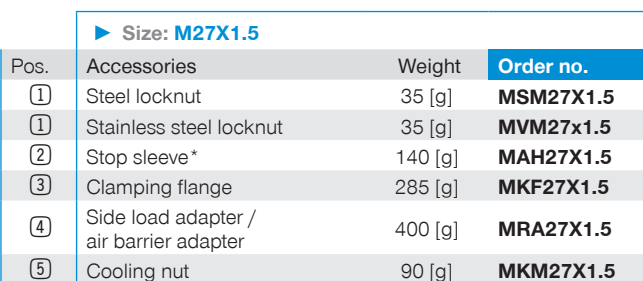


S: assembled with steel head

K: assembled with plastic head

		▶ Technical data					
		Max. energy absorption			Stroke	Impact speed	
		Continuous operation		Emergency stop operation			
		per stroke	per hour	per stroke		min.	max.
Order No.		[Nm]	[Nm/h]	[Nm]	[mm]	[m/s]	
HIGH ENERGY	M27X1.5W	100	100,000	-	25	1.8	4
	M27X1.5WS	100	100,000	-	25	1.8	4
	M27X1.5WK	100	100,000	-	25	1.8	4
	M27X1.5S	190	100,000	350	25	1.8	3.5
	M27X1.5SS	190	100,000	350	25	1.8	3.5
	M27X1.5SK	190	100,000	350	25	1.8	3.5
	M27X1.5M	210	120,000	400	25	0.8	2.2
	M27X1.5MS	210	120,000	400	25	0.8	2.2
	M27X1.5MK	210	120,000	400	25	0.8	2.2
	M27X1.5H	210	120,000	450	25	0.2	1.2
	M27X1.5HS	210	120,000	450	25	0.2	1.2
	M27X1.5HK	210	120,000	450	25	0.2	1.2

		▶ Technical data					
		Max. energy absorption			Stroke	Impact speed	
		Continuous operation		Emergency stop operation			
		per stroke	per hour	per stroke		min.	max.
STANDARD ENERGY	Order No.	[Nm]	[Nm/h]	[Nm]	[mm]	[m/s]	
	M27X1.5RS	90	80,000	-	25	1.8	3.5
	M27X1.5RSS	90	80,000	-	25	1.8	3.5
	M27X1.5RSK	90	80,000	-	25	1.8	3.5
	M27X1.5RM	90	80,000	-	25	0.8	2.2
	M27X1.5RMS	90	80,000	-	25	0.8	2.2
	M27X1.5RMK	90	80,000	-	25	0.8	2.2
	M27X1.5RH	90	80,000	-	25	0.2	1.2
	M27X1.5RHS	90	80,000	-	25	0.2	1.2
M27X1.5RHK	90	80,000	-	25	0.2	1.2	



* inclusive Stainless-Steel locknut MVM

INDUSTRIAL SHOCK ABSORBER

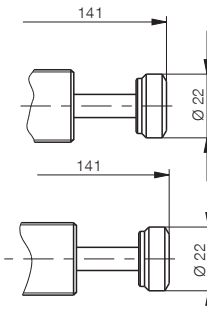
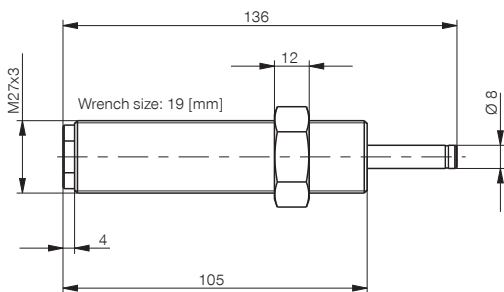
SIZE M27X3

1
Size M27X3 / Industrial shock absorber



PowerStop®

- ▶ **Angle of Impact max.** 2 [°]
- ▶ **Weight with locknut** 340 [g]
- ▶ **Piston return time** 0.4 [s]
- ▶ **Min. return force** 25 [N]
- ▶ **Max. return force** 50 [N]
- ▶ **Permitted temperature range** -10 ... +70 [°C]

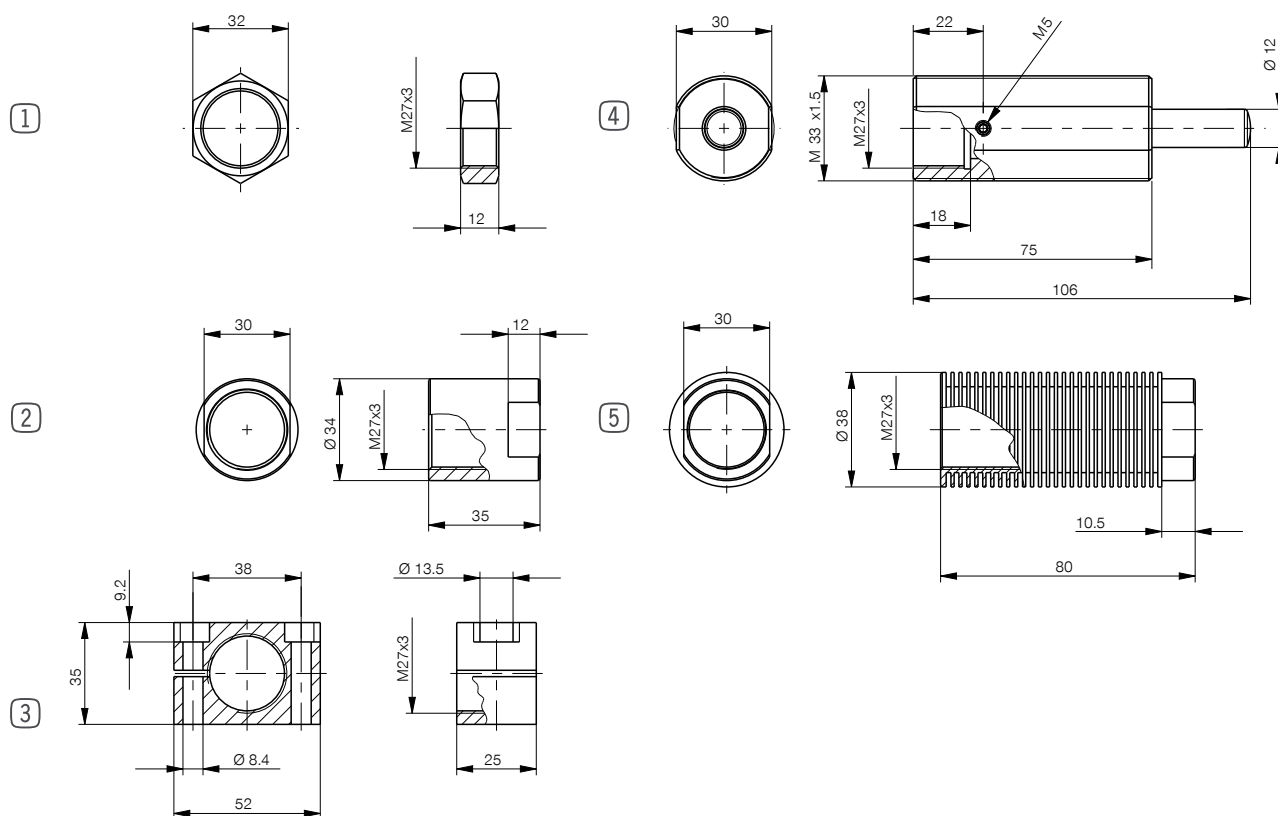


S: assembled with steel head

K: assembled with plastic head

		▶ Technical data					
		Max. energy absorption			Stroke	Impact speed	
		Continuous operation		Emergency stop operation			
		per stroke	per hour	per stroke		min.	max.
Order No.		[Nm]	[Nm/h]	[Nm]	[mm]	[m/s]	
HIGH ENERGY	M27X3W	100	100,000	-	25	1.8	4
	M27X3WS	100	100,000	-	25	1.8	4
	M27X3WK	100	100,000	-	25	1.8	4
	M27X3S	190	100,000	350	25	1.8	3.5
	M27X3SS	190	100,000	350	25	1.8	3.5
	M27X3SK	190	100,000	350	25	1.8	3.5
	M27X3M	210	120,000	400	25	0.8	2.2
	M27X3MS	210	120,000	400	25	0.8	2.2
	M27X3MK	210	120,000	400	25	0.8	2.2
	M27X3H	210	120,000	450	25	0.2	1.2
	M27X3HS	210	120,000	450	25	0.2	1.2
	M27X3HK	210	120,000	450	25	0.2	1.2

		▶ Technical data					
		Max. energy absorption			Stroke	Impact speed	
		Continuous operation		Emergency stop operation		min.	max.
		per stroke	per hour				
STANDARD ENERGY	Order No.	[Nm]	[Nm/h]	[Nm]	[mm]	[m/s]	
	M27X3RS	90	80,000	-	25	1.8	3.5
	M27X3RSS	90	80,000	-	25	1.8	3.5
	M27X3RSK	90	80,000	-	25	1.8	3.5
	M27X3RM	90	80,000	-	25	0.8	2.2
	M27X3RMS	90	80,000	-	25	0.8	2.2
	M27X3RMK	90	80,000	-	25	0.8	2.2
	M27X3RH	90	80,000	-	25	0.2	1.2
	M27X3RHS	90	80,000	-	25	0.2	1.2
	M27X3RHK	90	80,000	-	25	0.2	1.2



► Size: **M27X3**

Pos.	Accessories	Weight	Order no.
①	Steel locknut	35 [g]	MSM27X3
①	Stainless steel locknut	35 [g]	MVM27X3
②	Stop sleeve*	140 [g]	MAH27X3
③	Clamping flange	285 [g]	MKF27X3
④	Side load adapter / air barrier adapter	400 [g]	MRA27X3
⑤	Cooling nut	90 [g]	MKM27X3

Maximum fastening torque of locknut: 60 [Nm]

*inclusive Stainless-Steel locknut MVM

INDUSTRIAL SHOCK ABSORBER

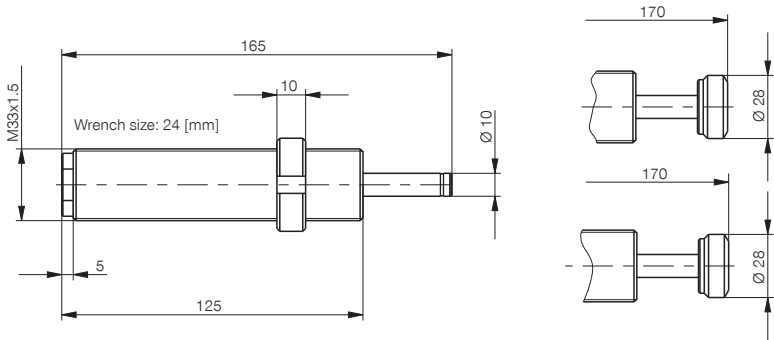
SIZE M33X1.5

1
Size M33X1.5 / Industrial shock absorber



PowerStop®

- ▶ Angle of Impact max. 2 [°]
- ▶ Weight with locknut 610 [g]
- ▶ Piston return time 0.4 [s]
- ▶ Min. return force 30 [N]
- ▶ Max. return force 55 [N]
- ▶ Permitted temperature range -10 ... +70 [°C]



S: assembled with steel head

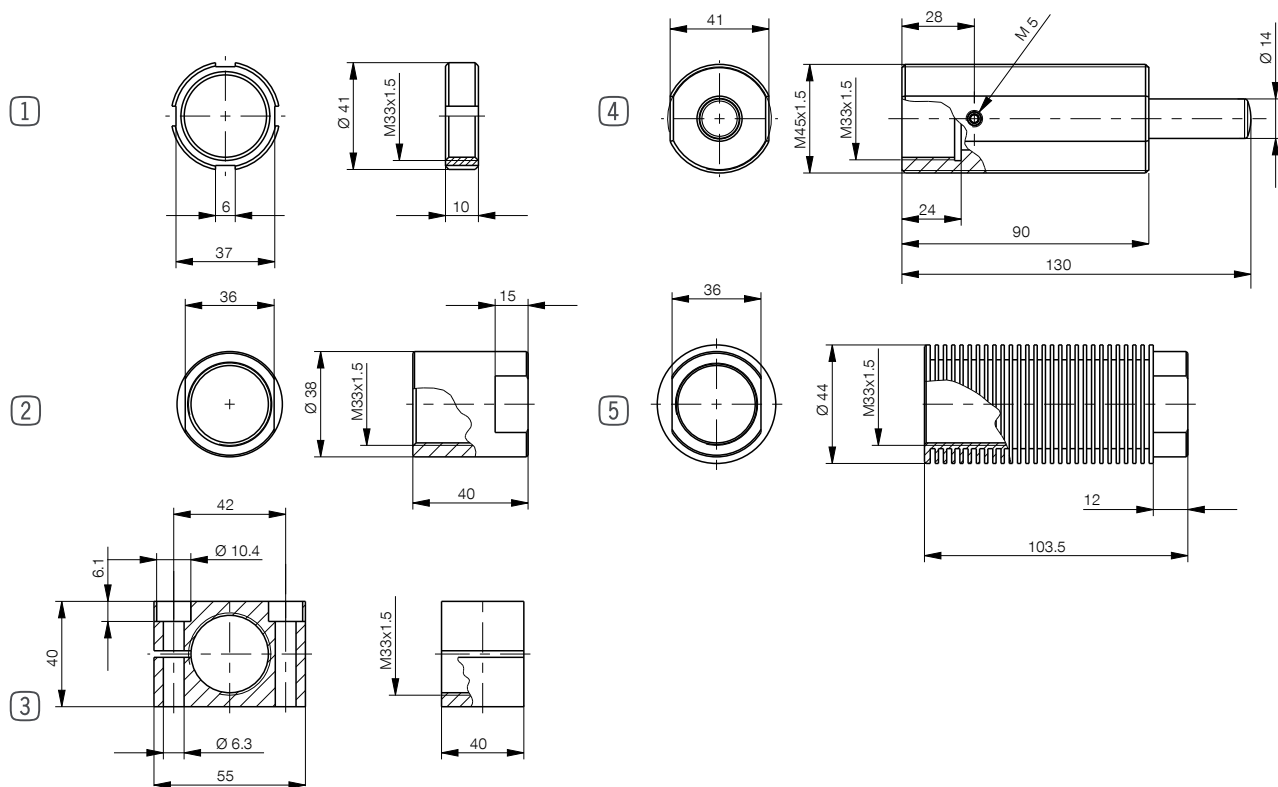
K: assembled with plastic head

▶ Technical data

Max. energy absorption			Stroke	Impact speed	
Continuous operation		Emergency stop operation			
per stroke	per hour	per stroke		min.	max.
[Nm]	[Nm/h]	[Nm]	[mm]	[m/s]	
300	120,000	500	30	1.8	3.5
300	120,000	500	30	1.8	3.5
300	120,000	500	30	1.8	3.5
350	140,000	750	30	0.8	2.2
350	140,000	750	30	0.8	2.2
350	140,000	750	30	0.8	2.2
350	140,000	850	30	0.2	1.2
350	140,000	850	30	0.2	1.2
350	140,000	850	30	0.2	1.2

▶ Technical data

Max. energy absorption		Stroke		Impact speed	
Continuous operation		Emergency stop operation			
per stroke	per hour	per stroke		min.	max.
[Nm]	[Nm/h]	[Nm]	[mm]		[m/s]
180	100,000	-	30	1.8	3.5
180	100,000	-	30	1.8	3.5
180	100,000	-	30	1.8	3.5
180	100,000	-	30	0.8	2.2
180	100,000	-	30	0.8	2.2
180	100,000	-	30	0.8	2.2
180	100,000	-	30	0.2	1.2
180	100,000	-	30	0.2	1.2
180	100,000	-	30	0.2	1.2



► Size: **M33X1.5**

Pos.	Accessories	Weight	Order no.
①	Steel locknut	32 [g]	MSM33X1.5
①	Stainless steel locknut	32 [g]	MVM33X1.5
②	Stop sleeve*	150 [g]	MAH33X1.5
③	Clamping flange	450 [g]	MKF33X1.5
④	Side load adapter / air barrier adapter	900 [g]	MRA33X1.5
⑤	Cooling nut	140 [g]	MKM33X1.5


Maximum fastening torque of locknut: 80 [Nm]

*inclusive Stainless-Steel locknut MVM

INDUSTRIAL SHOCK ABSORBER

SIZE M33X1.5L

1
Size M33X1.5L / Industrial shock absorber



► **Angle of Impact max.** 2 [°]

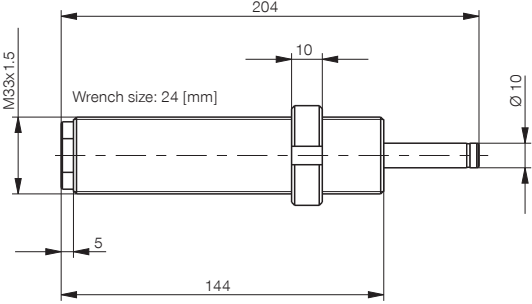
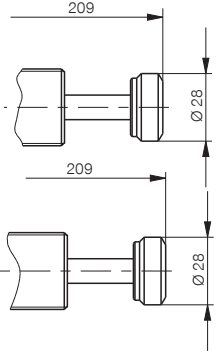
► **Weight with locknut** 700 [g]

► **Piston return time** 0.8 [s]

► **Min. return force** 30 [N]

► **Max. return force** 55 [N]

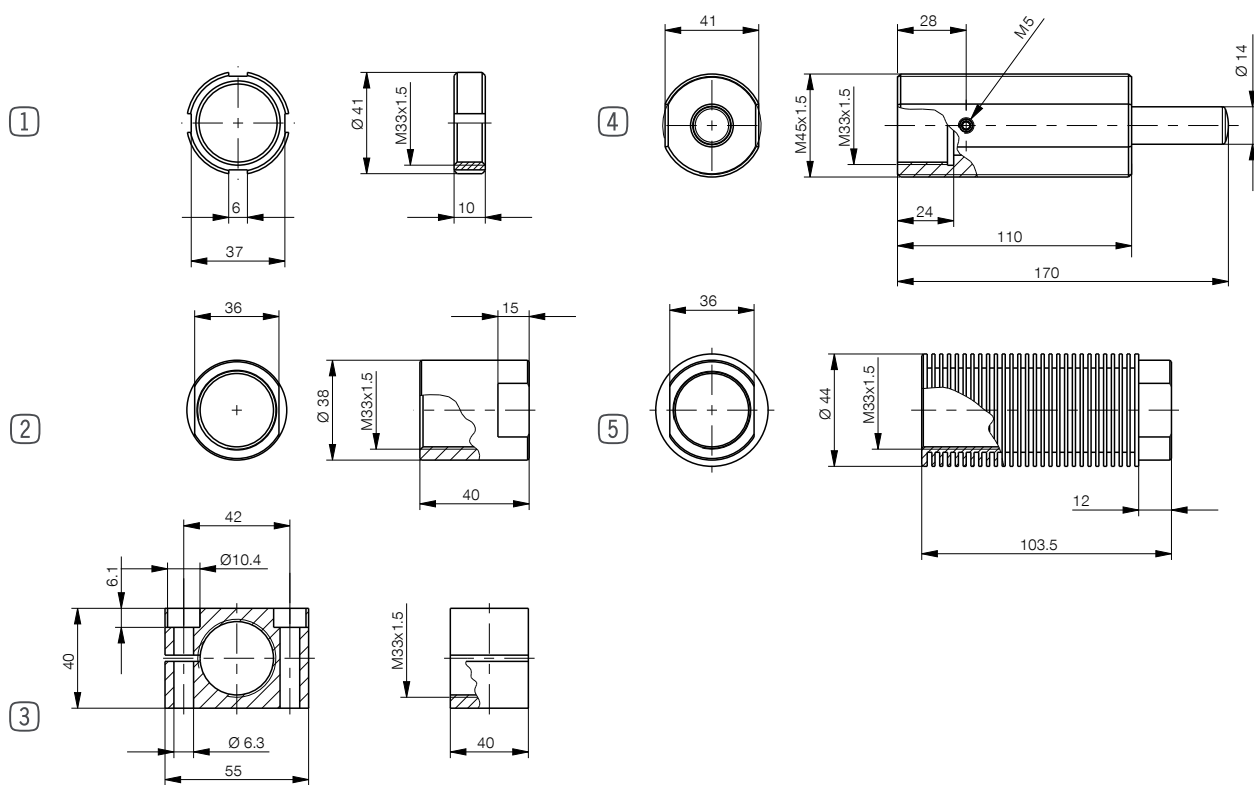
► **Permitted temperature range** -10 ... +70 [°C]

S: assembled with steel head

K: assembled with plastic head

		► Technical data					
		Max. energy absorption		Stroke	Impact speed		
		Continuous operation		Emergency stop operation			
Order No.		per stroke	per hour	per stroke	min.	max.	
		[Nm]	[Nm/h]	[Nm]	[mm]	[m/s]	
HIGH ENERGY	M33X1.5LS	450	170,000	1100	50	1.8	3.5
	M33X1.5LSS	450	170,000	1100	50	1.8	3.5
	M33X1.5LSK	450	170,000	1100	50	1.8	3.5
	M33X1.5LM	500	180,000	1200	50	0.8	2.2
	M33X1.5LMS	500	180,000	1200	50	0.8	2.2
	M33X1.5LMK	500	180,000	1200	50	0.8	2.2



► Size: **M33X1.5L**

Pos.	Accessories	Weight	Order no.
①	Steel locknut	32 [g]	MSM33X1.5
①	Stainless steel locknut	32 [g]	MVM33X1.5
②	Stop sleeve*	150 [g]	MAH33X1.5
③	Clamping flange	450 [g]	MKF33X1.5
④	Side load adapter / air barrier adapter	1100 [g]	MRA33X1.5L
⑤	Cooling nut	140 [g]	MKM33X1.5

Maximum fastening torque of locknut: 80 [Nm]

*inclusive Stainless-Steel locknut MVM

INDUSTRIAL SHOCK ABSORBER

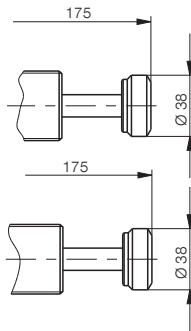
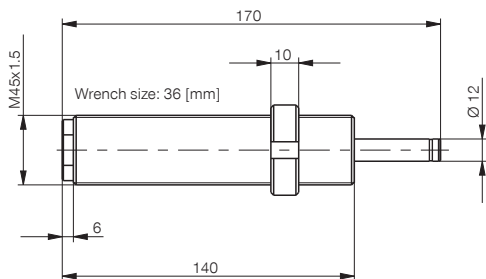
SIZE M45X1.5

1
Size M45X1.5 / Industrial shock absorber



PowerStop®

- ▶ **Angle of Impact max.** 2 [°]
- ▶ **Weight with locknut** 1230 [g]
- ▶ **Piston return time** 0.4 [s]
- ▶ **Min. return force** 30 [N]
- ▶ **Max. return force** 60 [N]
- ▶ **Permitted temperature range** -10 ... +70 [°C]

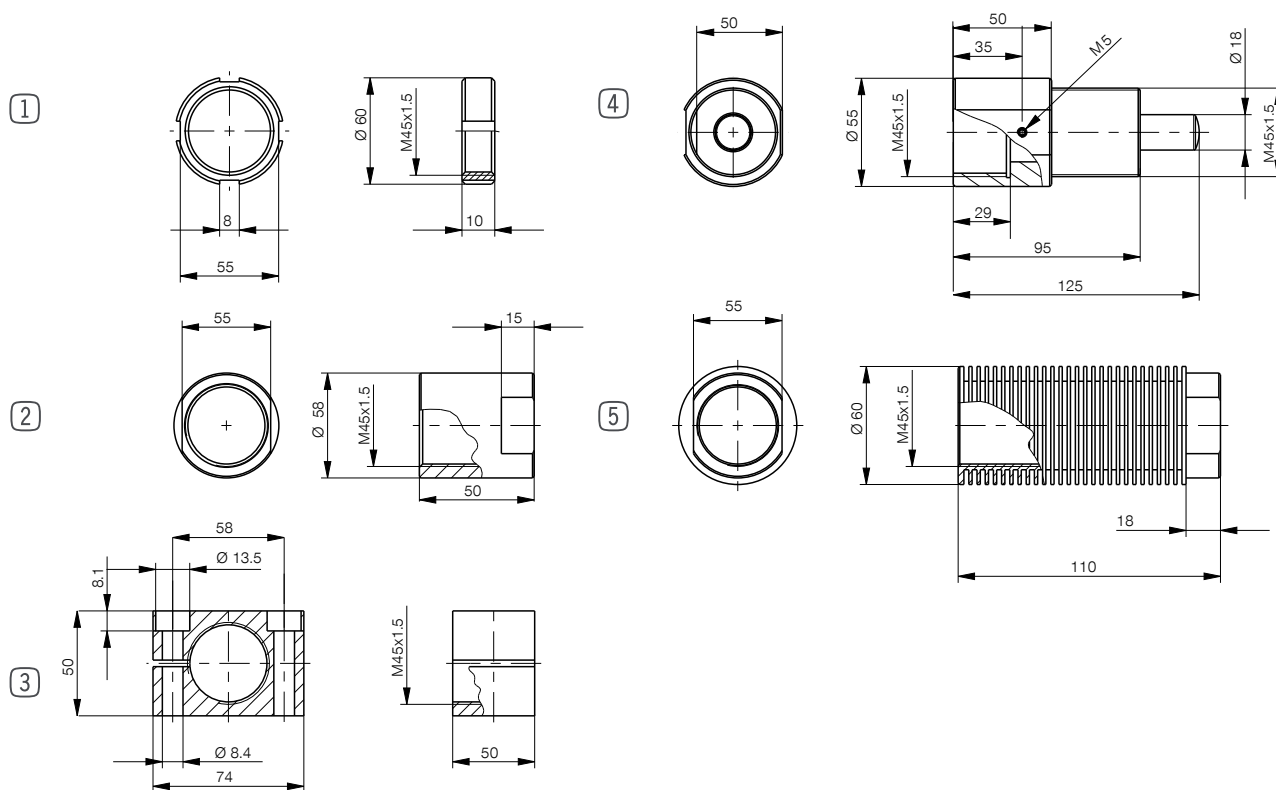


S: assembled with steel head

K: assembled with plastic head

		▶ Technical data						
		Max. energy absorption			Stroke	Impact speed		
		Continuous operation		Emergency stop operation		min.	max.	
		per stroke	per hour	per stroke				
		[Nm]	[Nm/h]	[Nm]	[mm]	[m/s]		
HIGH ENERGY	Order No.							
	M45X1.5S	600	150,000	1400	25	1.8		3.5
	M45X1.5SS	600	150,000	1400	25	1.8		3.5
	M45X1.5SK	600	150,000	1400	25	1.8		3.5
	M45X1.5M	650	170,000	1500	25	0.8		2.2
	M45X1.5MS	650	170,000	1500	25	0.8		2.2
	M45X1.5MK	650	170,000	1500	25	0.8		2.2
	M45X1.5H	650	170,000	1600	25	0.2		1.2
	M45X1.5HS	650	170,000	1600	25	0.2		1.2
	M45X1.5HK	650	170,000	1600	25	0.2		1.2

		▶ Technical data						
		Max. energy absorption			Stroke	Impact speed		
		Continuous operation		Emergency stop operation		min.	max.	
		per stroke	per hour	per stroke				
		[Nm]	[Nm/h]	[Nm]	[mm]	[m/s]		
STANDARD ENERGY	Order No.							
	M45X1.5RS	350	140,000	-	25	1.8		3.5
	M45X1.5RSS	350	140,000	-	25	1.8		3.5
	M45X1.5RSK	350	140,000	-	25	1.8		3.5
	M45X1.5RM	350	140,000	-	25	0.8		2.2
	M45X1.5RMS	350	140,000	-	25	0.8		2.2
	M45X1.5RMK	350	140,000	-	25	0.8		2.2
	M45X1.5RH	350	140,000	-	25	0.2		1.2
	M45X1.5RHS	350	140,000	-	25	0.2		1.2
	M45X1.5RHK	350	140,000	-	25	0.2		1.2



► Size: **M45X1.5**

Pos.	Accessories	Weight	Order no.
①	Steel locknut	100 [g]	MSM45X1.5
①	Stainless steel locknut	100 [g]	MVM45X1.5
②	Stop sleeve*	200 [g]	MAH45X1.5
③	Clamping flange	870 [g]	MKF45X1.5
④	Side load adapter / air barrier adapter	1100 [g]	MRA45X1.5
⑤	Cooling nut	280 [g]	MKM45X1.5


Maximum fastening torque of locknut: 100 [Nm]

*inclusive Stainless-Steel locknut MVM

INDUSTRIAL SHOCK ABSORBER

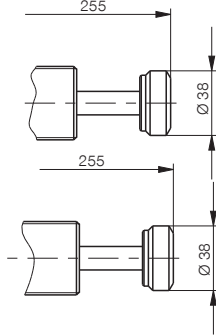
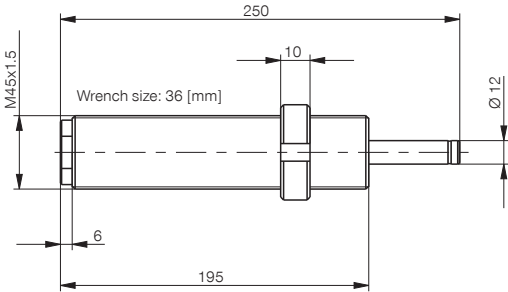
SIZE M45X1.5L

1
Size M45X1.5L / Industrial shock absorber



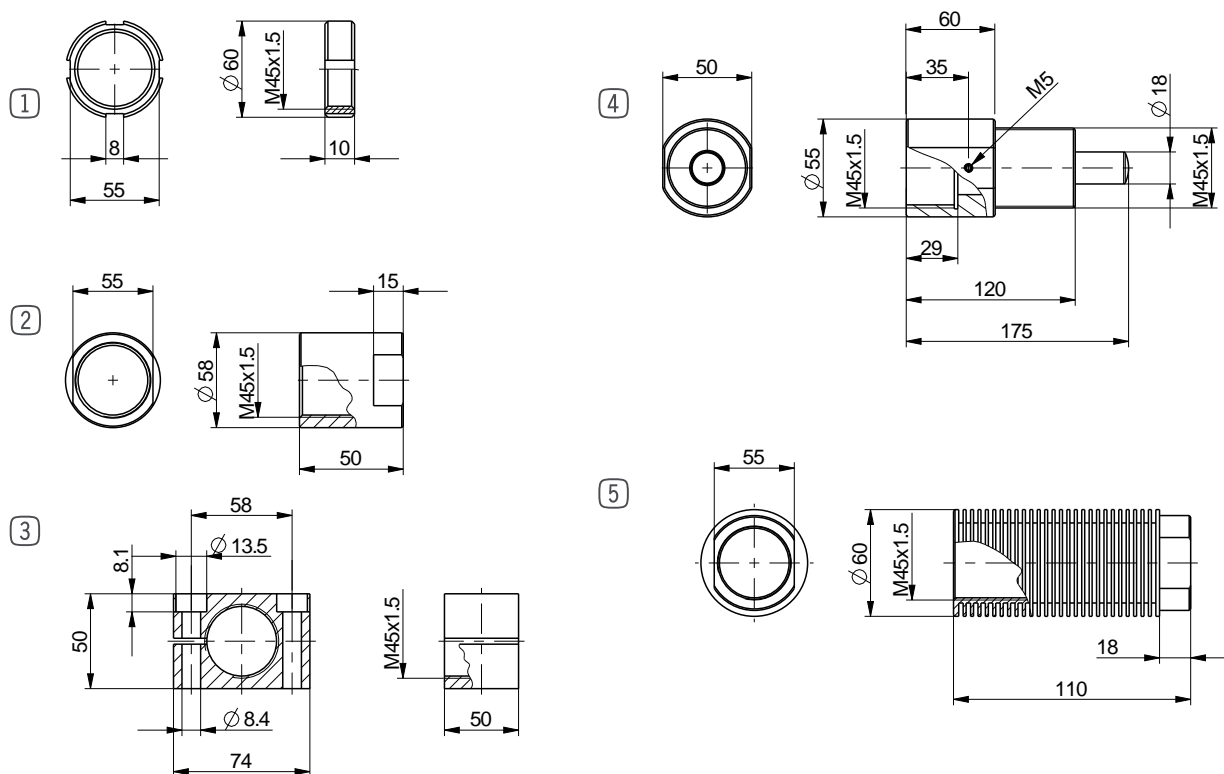
PowerStop®

- ▶ Angle of Impact max. 2 [°]
- ▶ Weight with locknut 1670 [g]
- ▶ Piston return time 0.8 [s]
- ▶ Min. return force 50 [N]
- ▶ Max. return force 130 [N]
- ▶ Permitted temperature range -10 ... +70 [°C]



S: assembled with steel head
K: assembled with plastic head

		Technical data					
		Max. energy absorption			Stroke	Impact speed	
		Continuous operation		Emergency stop operation			
		per stroke	per hour	per stroke		min.	max.
HIGH ENERGY	Order No.	[Nm]	[Nm/h]	[Nm]	[mm]	[m/s]	
	M45X1.5LS	1000	200,000	2600	50	1.8	3.5
	M45X1.5LSS	1000	200,000	2600	50	1.8	3.5
	M45X1.5LSK	1000	200,000	2600	50	1.8	3.5
	M45X1.5LM	1200	220,000	2800	50	0.8	2.2
	M45X1.5LMS	1200	220,000	2800	50	0.8	2.2
	M45X1.5LMK	1200	220,000	2800	50	0.8	2.2



► Size: **M45X1.5L**

Pos.	Accessories	Weight	Order no.
①	Steel locknut	100 [g]	MSM45X1.5
①	Stainless steel locknut	100 [g]	MVM45X1.5
③	Clamping flange	870 [g]	MKF45X1.5
④	Side load adapter / air barrier adapter	1400 [g]	MRA45X1.5L
⑤	Cooling nut	280 [g]	MKM45X1.5

SPECIAL SOLUTIONS AND SYSTEMS

INDUSTRIAL SHOCK ABSORBERS

► SPECIAL SOLUTIONS

Certifications and approvals



- Upon customer request, we develop components and systems that meet various approval specifications, certification requirements or standards classifications
- Examples of these include CE marking or EC type examination, explosion protection, electric protection type, RoHS conformity, freedom from paint-wetting impairment substances, cleanroom classification, medical product approval, suitability for foodstuffs, sea water resistance

Shock absorber with bellows



- A bellows made from Teflon is firmly connected to the shock absorber
- Offers protection from liquids such as coolants, oil mist and cleaning agents as well as protection from chips and dirt

Heavy load emergency stop damper



- Customer specific special solutions for robot gantry systems
- Dampers made from coated steel with an energy absorption of 6,500 Nm per stroke
- The damper has a damping stroke of 100 mm and an outer diameter of 60 mm

Sliding door dampers



- Customer specific special solutions for sliding door dampers
- Dampers made from high strength aluminium with an energy absorption of 100 Nm per stroke
- The damper has a damping stroke of 30 mm and an outer diameter of 20 mm

► SPECIAL SOLUTIONS

1

Adjustable shock absorber



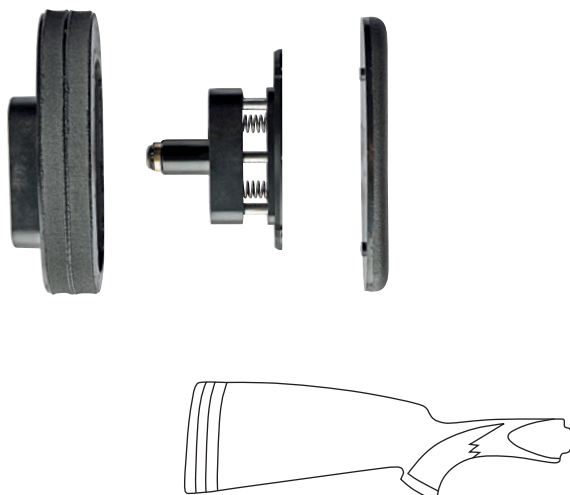
- Manually adjustable hardness degree (speed range)
- Combination of spiral groove technology with an adjustable bypass bore
- Custom adjustment to different load ranges

I-Class emergency stop shock absorber



- The intelligent solution for emergency stop applications where the shock absorber is operated constantly but shock absorption only occurs in an emergency
- Damping is triggered only after reaching a preset speed
- For example, use on machine tool axles that do not require damping during workpiece machining, but which move with rapid traverse in the event of an emergency stop

Rifle stock recoil absorber



- Recoil absorber with spiral groove technology integrated into a rifle stock
- The system features an all-purpose rifle stock that is suitable for any type of rifle
- Dampens recoil when firing a shot by approx. 50%

SPECIAL SOLUTIONS AND SYSTEMS

INDUSTRIAL SHOCK ABSORBERS

► SYSTEMS

Hip joint damper



- Dampers for prosthetic hip joints with a stepless adjustable step length and damping force
- Damping occurs in the pull and push positions via two different damping characteristics

Knee joint



ottobock.



- Prosthetic knee joints from Ottobock with Zimmer Group damping systems
- The exchange of knowledge and cooperation over many years allows patients to have an almost natural gait
- High power density for the smallest space

Knee joint dampers



- Damper for prosthetic knee joints with stepless adjustable damping force
- Damping occurs in the pull and push positions via two different damping characteristics

CALCULATIONS

BASES OF CALCULATIONS

► GENERAL

1

► Overview of formula symbols

Formula symbols	Explanation	Unit
m	Mass to be damped	kg
J	Moment of inertia	kg·m ²
g	Gravitational acceleration g=9.81m/s ²	m/s ²
h	Height	m
s	Shock absorber stroke	m
F	External drive force	N
M	External drive torque	Nm
v _o	Initial velocity	m/s
v _k	Constant velocity	m/s
v _A	Impact velocity	m/s
ω _o	Initial angular velocity	1/s
ω _k	Constant angular velocity	1/s
ω _A	Impact angular velocity	1/s
W ₁	Kinetic energy at impact	Nm
W ₂	Additional kinetic energy at the stroke	Nm
W ₃	Total kinetic energy	Nm
P	Total energy absorption per hour	Nm/h
z	Number of strokes per hour	1/h
R	Shock absorber distance of the rotation centre	m
L	Distance of mass of the rotation centre	m
β	Pitch angle	°
μ	Coefficient of friction	-

► General formulas

Energy	Formula
Kinetic energy at impact	Translational movement: $W_1 = \frac{1}{2} \cdot m \cdot v_A^2$ Rotational movement: $W_1 = \frac{1}{2} \cdot J \cdot \omega_A^2 = \frac{1}{2} \cdot m \cdot \left(v_A \cdot \frac{L}{R}\right)^2$
Total kinetic energy	$W_3 = W_1 + W_2$
Total energy absorption per hour	$P = W_3 \cdot z$

- Calculation of W₁, W₂ and v_A according to the example cases listed below, where they are classified into translational and rotational movements

CALCULATIONS

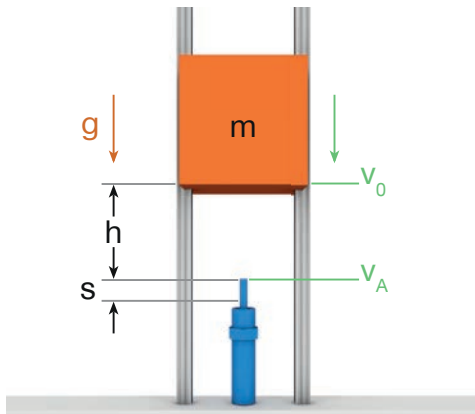
LOAD CASES AND FORMULAS

1

Formulas and calculations / Industrial shock absorbers

► FORM OF MOVEMENT: TRANSLATIONAL

1. Free falling mass

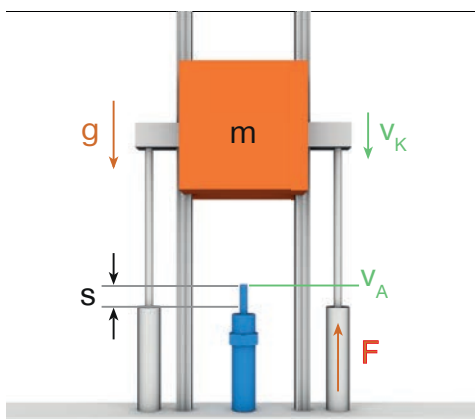


$$W_1 = \frac{1}{2} \cdot m \cdot v_0^2 + m \cdot g \cdot h$$

$$W_2 = m \cdot g \cdot s$$

$$v_A = \sqrt{v_0^2 + 2 \cdot g \cdot h}$$

2. Downward moving mass at constant velocity

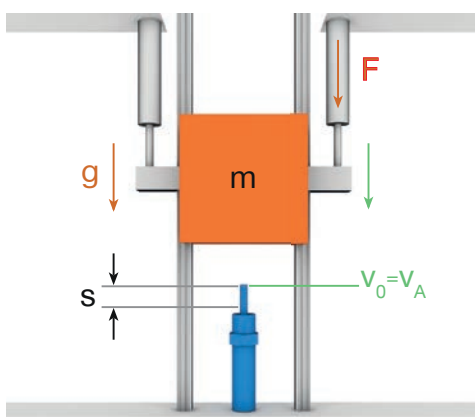


$$W_1 = \frac{1}{2} \cdot m \cdot v_K^2$$

$$W_2 = 0$$

$$v_A = v_K$$

3. Downward moving mass with drive force



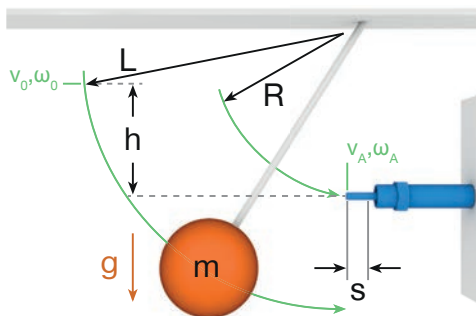
$$W_1 = \frac{1}{2} \cdot m \cdot v_0^2$$

$$W_2 = F \cdot s + m \cdot g \cdot s$$

$$v_A = v_0$$

► FORM OF MOVEMENT: ROTATIONAL

9. Freely oscillating mass



$$W_1 = \frac{1}{2} \cdot J \cdot \omega_0^2 + m \cdot g \cdot h$$

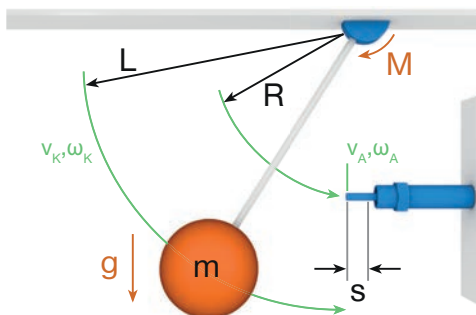
$$= \frac{1}{2} \cdot m \cdot v_0^2 + m \cdot g \cdot h$$

$$W_2 = 0$$

$$v_A = \sqrt{(\omega_0 \cdot L)^2 + 2 \cdot g \cdot h} \cdot \frac{R}{L}$$

$$= \sqrt{v_0^2 + 2 \cdot g \cdot h} \cdot \frac{R}{L}$$

10. Downward moving mass at constant velocity

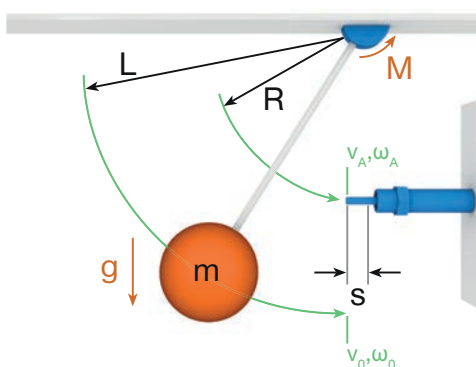


$$W_1 = \frac{1}{2} \cdot J \cdot \omega_K^2 = \frac{1}{2} \cdot m \cdot v_K^2$$

$$W_2 = 0$$

$$v_A = \omega_K \cdot R = v_K \cdot \frac{R}{L}$$

11. Downward moving mass with drive torque



$$W_1 = \frac{1}{2} \cdot J \cdot \omega_0^2 = \frac{1}{2} \cdot m \cdot v_0^2$$

$$W_2 = M \cdot \frac{s}{R}$$

$$v_A = \omega_0 \cdot R = v_0 \cdot \frac{R}{L}$$

CALCULATIONS

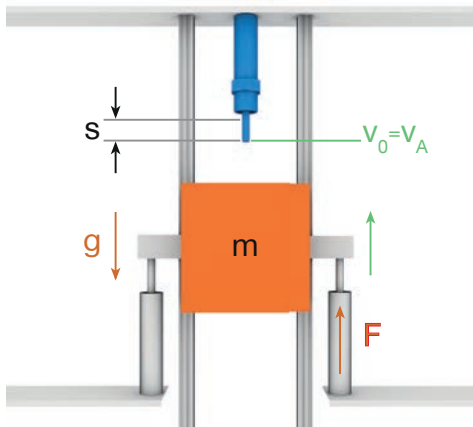
LOAD CASES AND FORMULAS

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Formulas and calculations / Industrial shock absorbers

► FORM OF MOVEMENT: TRANSLATIONAL

4. Upward moving mass with drive force

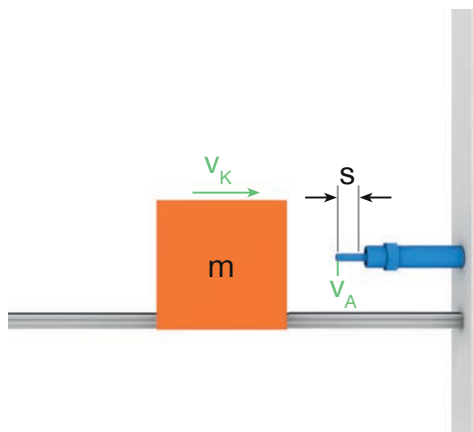


$$W_1 = \frac{1}{2} \cdot m \cdot v_0^2$$

$$W_2 = F \cdot s - m \cdot g \cdot s$$

$$v_A = v_0$$

5. Horizontally moving mass at constant velocity

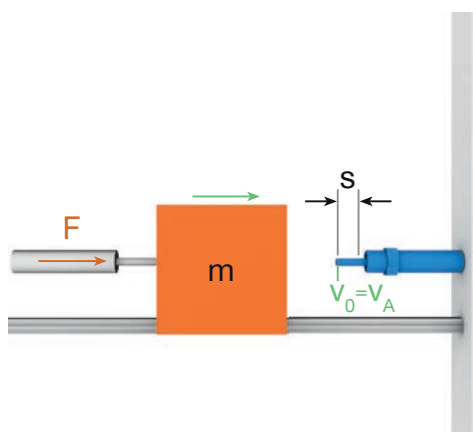


$$W_1 = \frac{1}{2} \cdot m \cdot v_K^2$$

$$W_2 = 0$$

$$v_A = v_K$$

6. Horizontally moving mass with form fit drive force



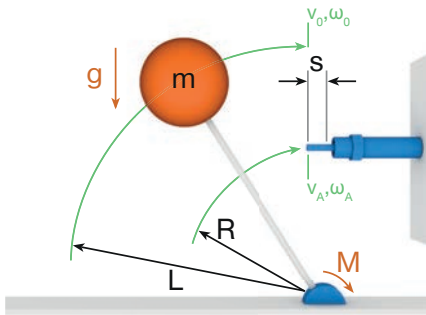
$$W_1 = \frac{1}{2} \cdot m \cdot v_0^2$$

$$W_2 = F \cdot s$$

$$v_A = v_0$$

► FORM OF MOVEMENT: ROTATIONAL

12. Upward moving mass with drive torque

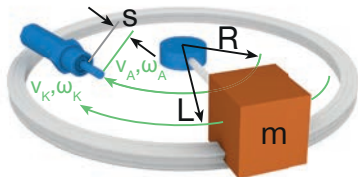


$$W_1 = \frac{1}{2} \cdot J \cdot \omega_0^2 = \frac{1}{2} \cdot m \cdot v_0^2$$

$$W_2 = M \cdot \frac{s}{R}$$

$$v_A = \omega_0 \cdot R = v_0 \cdot \frac{R}{L}$$

13. Horizontally pivoting mass at constant speed

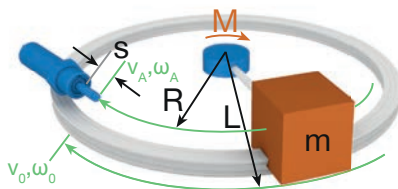


$$W_1 = \frac{1}{2} \cdot J \cdot \omega_K^2 = \frac{1}{2} \cdot m \cdot v_K^2$$

$$W_2 = 0$$

$$v_A = \omega_K \cdot R = v_K \cdot \frac{R}{L}$$

14. Horizontally pivoting mass with form fit drive torque



$$W_1 = \frac{1}{2} \cdot J \cdot \omega_0^2 = \frac{1}{2} \cdot m \cdot v_0^2$$

$$W_2 = M \cdot \frac{s}{R}$$

$$v_A = \omega_0 \cdot R = v_0 \cdot \frac{R}{L}$$

CALCULATIONS

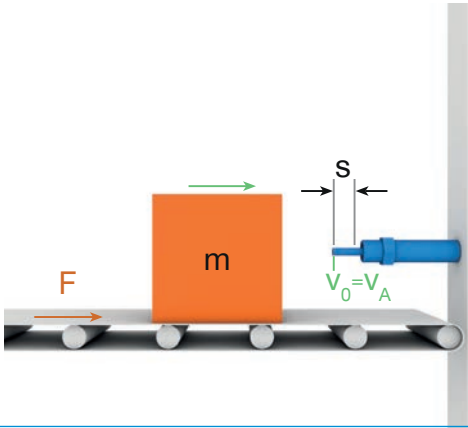
LOAD CASES AND FORMULAS

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Formulas and calculations / Industrial shock absorbers

► FORM OF MOVEMENT: TRANSLATIONAL

7. Horizontally moving mass with frictional drive force

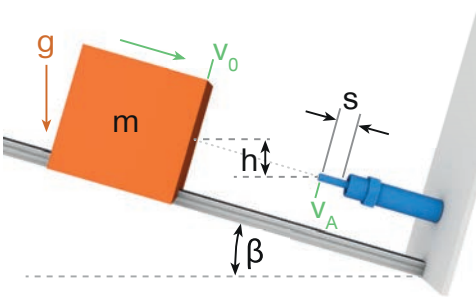


$$W_1 = \frac{1}{2} \cdot m \cdot v_0^2$$

$$W_2 = \mu \cdot m \cdot g \cdot s$$

$$v_A = v_0$$

8. Falling mass on a inclined plane



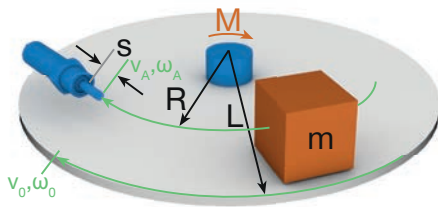
$$W_1 = \frac{1}{2} \cdot m \cdot v_0^2 + m \cdot g \cdot h$$

$$W_2 = \sin\beta \cdot m \cdot g \cdot s$$

$$v_A = \sqrt{v_0^2 + 2 \cdot g \cdot h}$$

► FORM OF MOVEMENT: ROTATIONAL

15. Horizontally pivoting mass with frictional drive torque



$$W_1 = \frac{1}{2} \cdot J \cdot \omega_0^2 = \frac{1}{2} \cdot m \cdot v_0^2$$

$$W_2 = \mu \cdot m \cdot g \cdot s$$

$$v_A = \omega_0 \cdot R = v_0 \cdot \frac{R}{L}$$

Note on rotational movement

- To simplify the calculations, it is assumed that the rotationally moving mass leaves the path at a tangent upon impact on the damper and the damper acts on this tangential path. This process completely converts rotational movement energy to translational movement energy. For small angles, this simplification provides a sufficient approach. In addition, if the mass moment of inertia is unknown, for the calculation it can be assumed that all the mass acts from the center of gravity. Therefore the calculations can be performed using the translational parameters.

CHECK LIST INDUSTRIAL DAMPING TECHNOLOGY

Customer number	<input type="text"/>	Telephone number	<input type="text"/>
Company	<input type="text"/>	Fax number	<input type="text"/>
Contact		E-Mail	<input type="text"/>
Mr. <input type="checkbox"/> Mrs. <input type="checkbox"/>	<input type="text"/>		

Sales database

Editor	<input type="text"/>	Article	<input type="text"/>
Desired Delivery date	<input type="text"/>	Target Price	<input type="text"/>
Quantity	<input type="text"/>	Other	<input type="text"/>
	pot. Quantity (p.a.) <input type="text"/>		

Installation conditions

*SD = Shock absorber

Application

Equivalent SA from Competi-
Max. installation space
SA installation position
Environment

☐ Yes Manufacturer Type Ø/thread

Length (stroke direction) mm Diameter mm

☐ horizontal ☐ vertical ☐ angle ° ☐ Upward ☐ Downward

Temperature min. °C max °C Pressure bar

☐ Chips ☐ Dirt ☐ Oil/Grease Other

Head ☐ No ☐ Yes ☐ SA with installed steel head ☐ SA with installed plastic head

Fixed stop Fixed stop using installation design ☐ Yes ☐ No

Operating conditions

Form of movement-No.

Operating type ☐ Continuous ☐ Emergency stop

Cycle time Strokes/h No. of cycle Strokes

No. of cycles Strokes

Movement ☐ transl. ☐ rotat.

Drive force N Impact angle °

Torque Nm Swivel angle °

SA swivel radius mm Mass swivel radius mm

Speed ☐ transl. ☐ rotat.

min m/s max m/s

min 1/s max 1/s

Mass / Moment of inertia ☐ transl. ☐ rotat.

min kg max kg

min kg m² max kg m²

Accessories

Steel locknut <input type="checkbox"/>	Air barrier adapter <input type="checkbox"/>	Stop sleeve <input type="checkbox"/>	Cooling nut <input type="checkbox"/>
Stainless steel locknut <input type="checkbox"/>	Side load adapter <input type="checkbox"/>	Clamping flange <input type="checkbox"/>	

Special

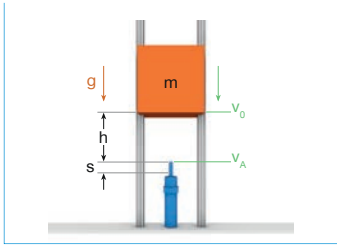
SA with bellow ☐ Approvals (e.g. RoHS, LABS, EG/CE, Ex protection, clean room)

Adjustable SA ☐ Other (oil, characteristic curve, stroke, size, thread type)

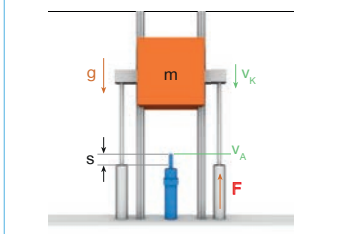
FORMS OF MOVEMENT

Translational

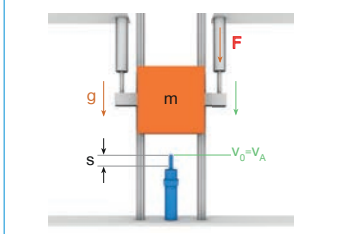
1. Free-falling mass



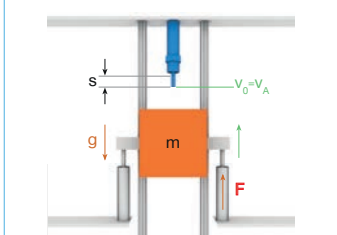
2. Downward moving mass at constant velocity



3. Downward moving mass with drive force

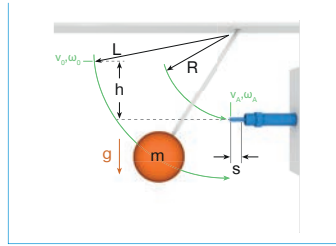


4. Upward moving mass with drive force

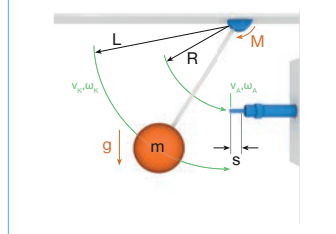


Rotational

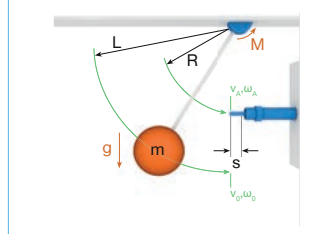
9. Freely oscillating mass



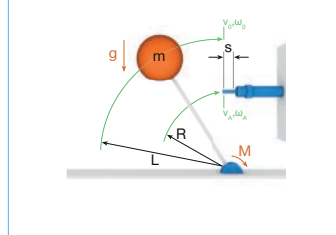
10. Downward moving mass at constant velocity



11. Downward moving mass with drive torque

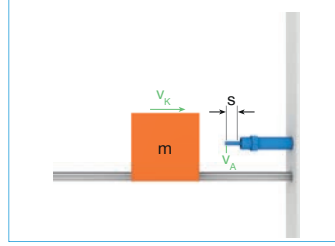


12. Upward moving mass with drive torque

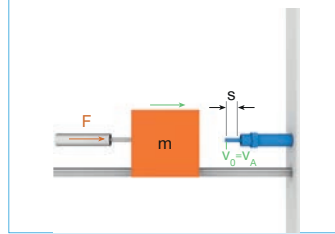


Translational

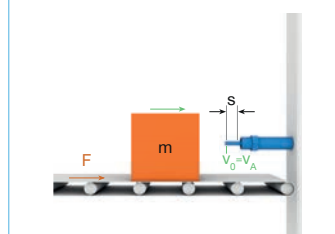
5. Horizontally moving mass at constant velocity



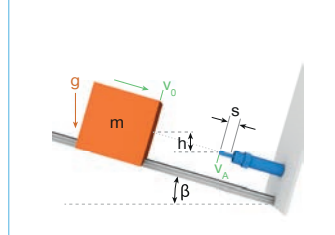
6. Horizontally moving mass with form-locking drive force



7. Horizontal moving mass with frictional drive force

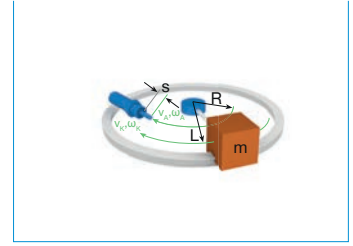


8. Falling mass on an inclined plane

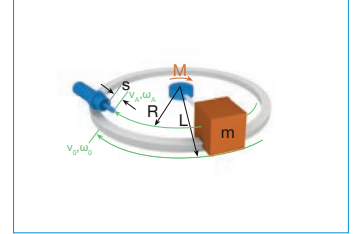


Rotational

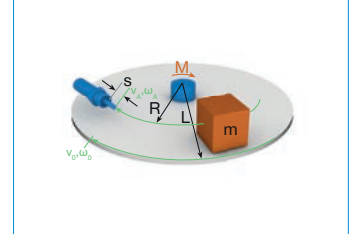
13. Horizontally swinging mass at constant velocity



14. Horizontally swinging mass with form-locking drive torque



15. Horizontal pivoting mass with frictional drive torque



SOFT CLOSE COMPONENTS AND SYSTEMS

2



PNEUMATIC DAMPERS

CLASSIC

2

Zimmer Group's success story in soft close technology goes years back and has its origins in the development and production of pneumatic dampers. The primary distinguishing feature of our pneumatic dampers is their longevity. Our ideas have been tested and proven in real-world applications and are protected by patents.

Damping process

The damping process using a pneumatic damper is characterized by a braking phase with a short stop and subsequent transition into the return phase.

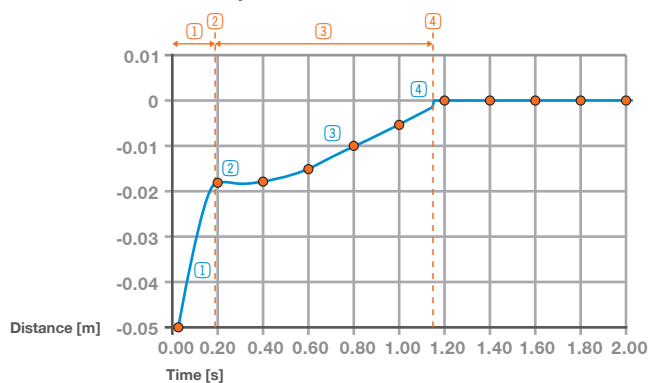
Characteristics

All pneumatic dampers have similar characteristics. They exhibit nearly a parallel shift at various load bearing capacities.

Loading options

The loading options are specified in kilogrammes. This figure represents the horizontally moved mass (such as the drawer weight including the load), which acts on the damper.

► Pneumatic damper characteristic



- ① Phase 1: Strong braking phase
- ② Phase 2: Short stop/reversal point
- ③ Phase 3: Damped return phase closing time
- ④ Returned

FLUID DAMPERS

HIGH PERFORMANCE

Fluid dampers have also been an integral part of Zimmer Group's product portfolio for many years. Our hydraulic dampers exhibit a high level of dependability and great load bearing capacity.

Damping process

The damping process using a fluid damper is characterized by an almost seamless transition from the braking phase to the return phase without stopping in between the two phases.

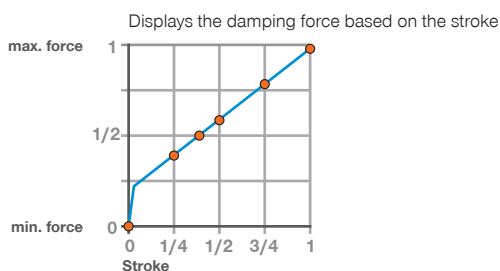
Characteristics

The characteristics differ between linear, linear-constant and S-curve characteristics depending on the fluid damper being used.

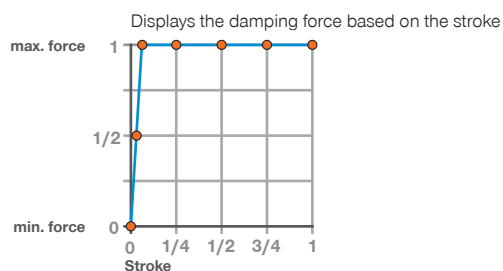
Loading options

The loading options are specified in newtons. This figure represents the axial load on the damper. The force depends on the speed acting upon the damper. We take our measurements at a standard speed of 50 mm/s (other speeds can also be measured to fit needs of customer).

► Linear fluid damper characteristic



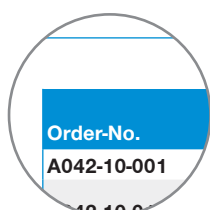
► Linear-constant fluid damper characteristic



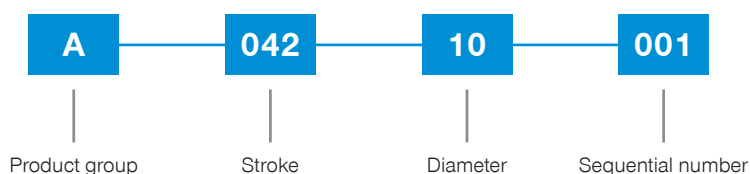
EXPLANATION ITEM NUMBERS AND FREE-RUN

Explanation of item numbers

The item numbers consist of the product group, the stroke (in mm), the diameter (in mm) as well as a sequential number.



► Example: „Calmo“



This refers to a pneumatic (air) damper with a 42 mm stroke, a diameter of 10 mm and the product version is 001.

- Product group/division:
- A:** Air (pneumatic damper)
 - B:** Fitting
 - D:** Miscellaneous
 - E:** Self-closing return
 - F:** Fluid
 - S:** Set



Definition of free-run

In many cases, the damping process is interrupted in the last millimetres to ensure that the system is securely closed. This is necessary, for example, when using busts or if there are synchronisation problems in the system. This closing support is called free-run.

SOFT CLOSE PROGRAMM

COMPONENTS

DAMPING OF DRAWERS



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DAMPING OF SLIDING DOORS



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RETROFIT SETS LID DAMPING AND HINGE DAMPING



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SYSTEMS

DAMPING OF DRAWERS



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Hinge damping	95
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COMPONENTS. SYSTEMS. THE DIFFERENCES

► DEFINITION OF COMPONENTS



► Multi-faceted modules

The Zimmer Group offers a large selection of standardized components that are at your disposal.

- Our components are individual dampers that can be integrated into an existing or newly designed customer system.
- With the components from Zimmer Group, we provide you with multi-faceted modules for your personal systems.

► DEFINITION OF SYSTEMS



► Universal units

The Zimmer Group not only specialises in individual components, but also develops complete damping units.

- In addition to our components, a self-closing mechanism is directly built into our systems.
- The systems from Zimmer Group give you customized units for your specific applications.

COMPONENTS

MULTI-FACETED MODULES

► GLOBAL PRODUCT GROUP INFORMATION



2

Components / Soft Close

EXPERTISE

THE ZIMMER GROUP IS ONE OF THE LEADING MANUFACTURERS AND DEVELOPERS OF SOFT CLOSE COMPONENTS.

Our expertise is rooted in many years of experience in the fields of both pneumatic and hydraulic damping.

The design, development and production of our products takes place in-house. Even the production plants for our products are designed and built by Zimmer Group.

If nothing else, we owe our success to the work of our highly qualified employees.

QUALITY – MADE IN GERMANY

QUALITY AND RELIABILITY, JUST SOME OF THE STRENGTHS OF ZIMMER GROUP.

We guarantee our high standard of quality through 100% inspection of our products.

We strive to continuously improve our products using constant statistical process inspection.

Even the above-average high level of automation of our production contributes to quality assurance and improvement.

This enables us to guarantee our products' high performance and longevity.

CORE SKILLS

ZIMMER GROUP'S CORE FOCUS IS IN THE FIELD OF FURNITURE TECHNOLOGY, SPECIFICALLY IN THE DAMPING OF:

DRAWERS, SLIDING DOORS, LIDS AND HINGES

Our intelligent and innovative solutions are also very popular outside of the field of furniture technology.

The range of potential applications is immense and ideal for expanding to additional fields of use.

DRAWER DAMPING

DAMPING WITH COMFORT DRAWER

▶ PRODUCT ADVANTAGES



- ▶ **Components for drawers**
Drawer damping has securely established itself as an indispensable standard.
- ▶ The Zimmer Group specializes in drawer damping and supplies the optimal soft close comfort for your products.
- ▶ Our components for drawer damping turn heads thanks to the multitude of options for integration into customers' systems. Due to the high adaptability of our designs, we can offer a wide range of standard products as well as solutions designed specifically for a customer.
- ▶ **Precise – adaptable – tested:**
Our components for drawer damping.

Version: **Galante**



▶ Geometry

ø of damper [mm]	Stroke [mm]
7.8	35

▶ Product characteristics

Hydraulic damping
Flexible
Space-saving

▶ Technical data

Order No.	Housing length [mm]	Head shape/Connection	Mass to be stopped [kg]	Free-run	Integrated spring channel	Piston rod	Miscellaneous characteristics
F035-08-002	80	Coupler with TPE head (2 components)	25	Yes	No	Steel	Damper moves outwards automatically

Version: **Piccolo**



▶ Geometry

ø of damper [mm]	Stroke [mm]
9,2	35

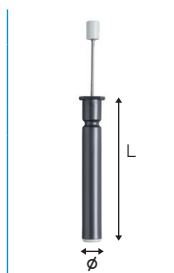
▶ Product characteristics

Pneumatic damping
Small
Solid

▶ Technical data

Order No.	Housing length [mm]	Head shape/Connection	Mass to be stopped [kg]	Free-run	Integrated spring channel	Piston rod	Miscellaneous characteristics
A035-09-019	68	Cylindrical head shape	15	Yes	No	Plastic	

Version: Calmo



► Geometry

Ø of damper [mm]	Stroke [mm]
10.4	42

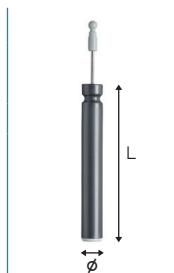
► Product characteristics

Pneumatic damping
Easy to assemble
Highest Comfort

► Technical data

Order No.	Housing length [mm]	Head shape/Connection	Mass to be stopped [kg]	Free-run	Integrated spring channel	Piston rod	Miscellaneous characteristics
A042-10-006	69.6	Tubing head Di = 4mm, Do = 7mm	20	Yes	No	Steel	No collar (shorter)
A042-10-011	69.6	Magnetic head with magnet	20	Yes	No	Steel	No collar (shorter) suitable for use for food processing
A042-10-012	80.4	1.5 mm steel piston rod without head	20	Yes	No	Steel	
A042-10-014	69.6	Magnetic head with magnet	20	Yes	No	Steel	No collar (shorter)
A042-10-016	80.4	Magnetic head with magnet	20	Yes	No	Steel	
A042-10-020	80.4	Magnetic head with magnet	20	Yes	No	Steel	Chamfer on magnet head

Version: Bajo



► Geometry

Ø of damper [mm]	Stroke [mm]
10.4	48

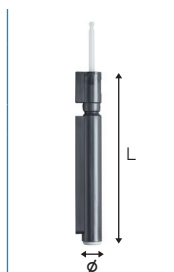
► Product characteristics

Pneumatic damping
Simple
Universal
Powerful

► Technical data

Order No.	Housing length [mm]	Head shape/Connection	Mass to be stopped [kg]	Free-run	Integrated spring channel	Piston rod	Miscellaneous characteristics
A048-10-000	78.1	Ball head	25	Yes	No	Steel	
A048-10-006	78.1	Ball head	25	Yes	No	Steel	Suitable for use for food processing
A048-10-008	78.1	90° angled piston rod	25	Yes	No	Steel	
A048-10-009	86.1	Magnetic head with magnet	25	Yes	No	Steel	
A048-10-010	78.1	1.5 mm steel piston rod without head	25	Yes	No	Steel	

Version: Placido



► Geometry

Ø of damper [mm]	Stroke [mm]
10.4	50

► Product characteristics

Pneumatic damping
Gentle
Durable

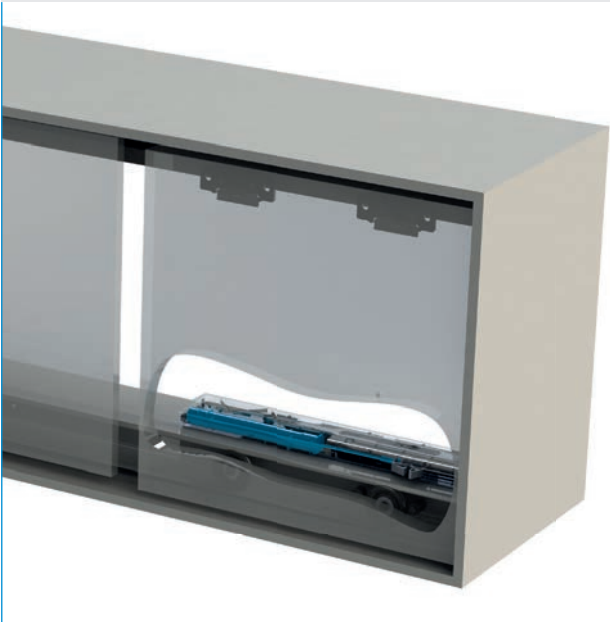
► Technical data

Order No.	Housing length [mm]	Head shape/Connection	Mass to be stopped [kg]	Free-run	Integrated spring channel	Piston rod	Miscellaneous characteristics
A050-10-001	95.5	Ball head	25	Yes	Yes	Plastic	
A050-10-002	95.4	Cylindrical head shape	25	Yes	Yes	Plastic	
A050-10-022	95.4	Ball head	25	Yes	Yes	Steel	

SLIDING DOOR DAMPING

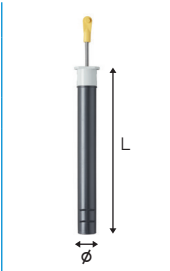
DAMPING IN TREND

▶ PRODUCT ADVANTAGES



- ▶ **Components for sliding doors**
Sliding doors are given increasingly greater attention in the residential, working and sleeping areas due to their potential for space-saving applications.
- ▶ The Zimmer Group offers the newest soft close technology for this growing market.
- ▶ Due to their high adaptability, our components for sliding door damping are easily integrated into our customers' railing system.
- ▶ **Intelligent – efficient – reliable**
Discover our components for sliding door damping on the following pages.

Version: **Adagio**



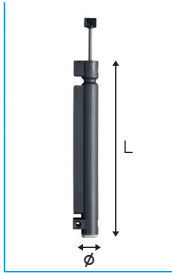
▶ Geometry	
ø of damper [mm]	Stroke [mm]
16	110

- ▶ **Product characteristics**
Pneumatic damping
Extension damping*
Powerful

* Extension damping = damped extension of the piston rod

▶ Technical data							
Order No.	Housing length [mm]	Head shape/Connection	Mass to be stopped [kg]	Free-run	Integrated spring channel	Piston rod	Miscellaneous characteristics
A110-15-010	147.1	Coupler	80	No	No	Steel	Extension
A110-15-028	147.1	Coupler	80	Yes	No	Steel	Extension

Version: Silento



► Geometry

Ø of damper [mm]	Stroke [mm]
15.5	110

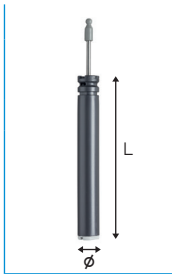
► Product characteristics

Pneumatic damping
Highest Comfort
Efficient

► Technical data

Order No.	Housing length [mm]	Head shape/Connection	Mass to be stopped [kg]	Free- run	Integrated spring channel	Piston rod	Miscellaneous characteristics
A110-15-004	164	Coupler	15	Yes	Yes	Steel	Spring channel
A110-15-005	164	Coupler	35	Yes	Yes	Steel	Spring channel
A110-15-006	164	Coupler	50	Yes	Yes	Steel	Spring channel

Version: Quieto



► Geometry

Ø of damper [mm]	Stroke [mm]
15.5	70

► Product characteristics

Pneumatic damping
Robust
Practical

► Technical data

Order No.	Housing length [mm]	Head shape/Connection	Mass to be stopped [kg]	Free- run	Integrated spring channel	Piston rod	Miscellaneous characteristics
A070-15-001	118.7	Ball head	60	Yes	No	Steel	
A070-15-003	118.7	No head	60	Yes	No	Steel	

LID DAMPING

CLOSING WITHOUT SLAMMING

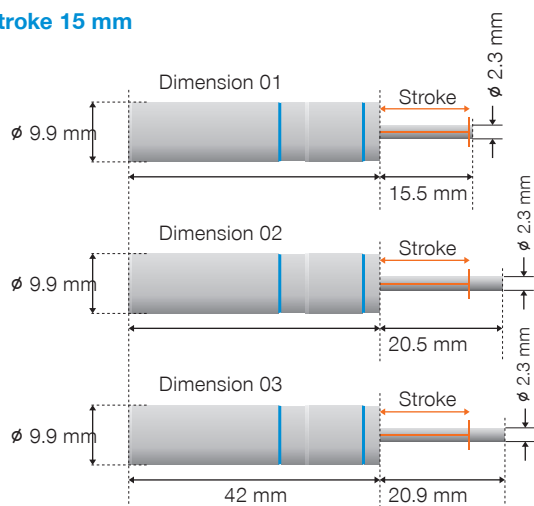
▶ PRODUCT ADVANTAGES



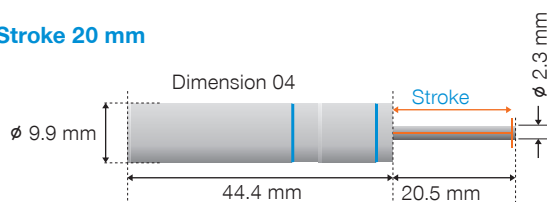
- ▶ **Components for lids**
Closing is often associated with “slamming”.
- ▶ The Zimmer Group uses its products to get rid of this association.
- ▶ The defining features of our components for lid damping are their adaptability and the wealth of available variants.
- ▶ Our Fluid Stop series is pivotal in emphasizing these features.
Various dimensions, force or damping characteristics – we offer the perfect product to suit your needs.
- ▶ **Small – strong – robust – adaptable:**
Get to know our Fluid Stop series for lid damping.

▶ PRODUCT DIFFERENCES

Stroke 15 mm



Stroke 20 mm



- ▶ **Available dimensions**
The Fluid Stop series is available in various dimensions.
- ▶ They differ in stroke, piston rod length and overall length.
- ▶ Further dimensions upon request.

▶ Designations for order versions on pages 80/81

- Dimension 01** = Characteristic 01 // Characteristic 02
- Dimension 02** = Characteristic 03
- Dimension 03** = Characteristic 04
- Dimension 04** = Characteristic 05 // Characteristic 06

► SELECTION ACCORDING TO FORCE

Order No.	► Maximum force Specification in N							
	0	50	100	150	200	250	300	350
F015-10-024		■						
F015-10-025		■						
F015-10-040			■					
F015-10-039				■				
F015-10-018				■				
F015-10-026					■			
F015-10-019						■		
F015-10-027							■	
F015-10-016								■
F015-10-030								■
F015-10-020								■
F015-10-028								■
F015-10-031								■
F020-10-008								■
F020-10-009								■
F020-10-010								■
F020-10-011								■
F020-10-012								■
F020-10-002								■
F020-10-005								■
F020-10-003								■

All values measured at 50 mm/s

► Available forces

The fluid stop series is available for various forces.

- Further customer specific adjustments upon request.

► Product characteristics

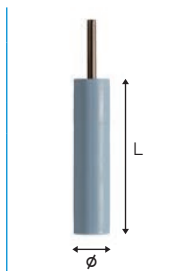
Hydraulic damping
Easily adaptable
Small
Strong
Robust
Variable



LID DAMPING

CLOSING WITHOUT SLAMMING

Giganto Characteristics 01



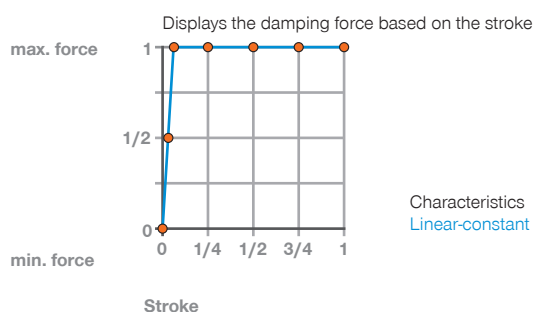
► Geometry

Housing length [mm]	Ø of damper [mm]	Piston rod length [mm]	Ø of piston rod [mm]	Stroke [mm]
42	9.9	15.5	2.3	15

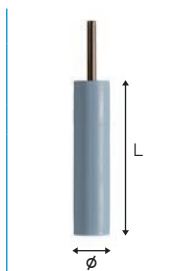
► Technical data

Order No.	Maximum force [N]
F015-10-024	40 ± 30
F015-10-040	85 ± 30
F015-10-039	135 ± 50
F015-10-019	185 ± 50
F015-10-016	210 ± 50
F015-10-020	270 ± 50

► Force diagram



Giganto Characteristics 02



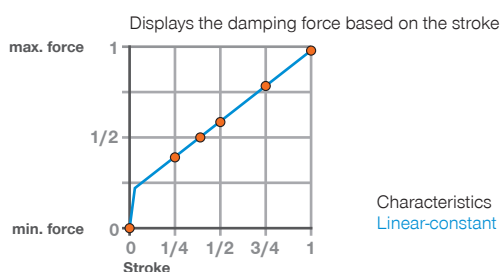
► Geometry

Housing length [mm]	Ø of damper [mm]	Piston rod length [mm]	Ø of piston rod [mm]	Stroke [mm]
42	9.9	15.5	2.3	15

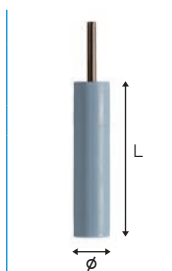
► Technical data

Order No.	Maximum force [N]
F015-10-030	245 ± 50
F015-10-031	340 ± 50

► Force diagram



Giganto Characteristics 03



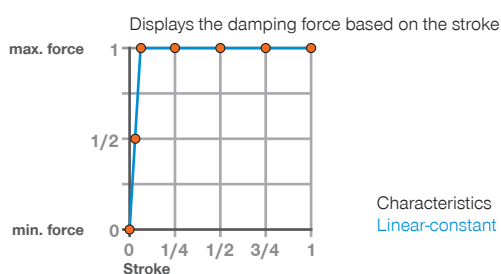
► Geometry

Housing length [mm]	Ø of damper [mm]	Piston rod length [mm]	Ø of piston rod [mm]	Stroke [mm]
42	9.9	20.5	2.3	15

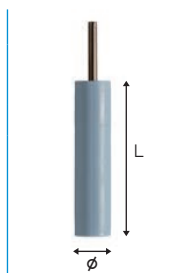
► Technical data

Order No.	Maximum force [N]
F015-10-018	135 ± 50

► Force diagram



Giganto Characteristics 04



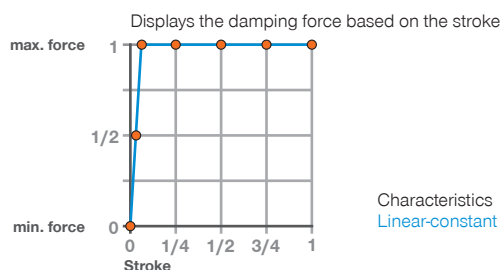
► Geometry

Housing length [mm]	ø of damper [mm]	Piston rod length [mm]	ø of piston rod [mm]	Stroke [mm]
42	9.9	20.9	2.3	15

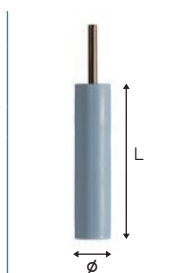
► Technical data

Order No.	Maximum force [N]
F015-10-025	40 ± 30
F015-10-026	150 ± 50
F015-10-027	200 ± 50
F015-10-028	300 ± 50

► Force diagram



Giganto Characteristics 05



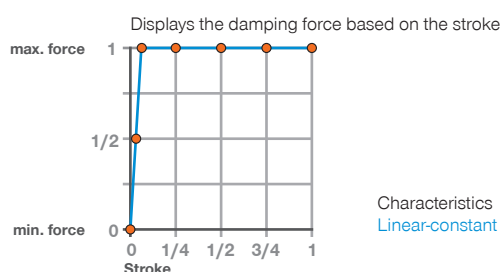
► Geometry

Housing length [mm]	ø of damper [mm]	Piston rod length [mm]	ø of piston rod [mm]	Stroke [mm]
44.4	9.9	20.5	2.3	20

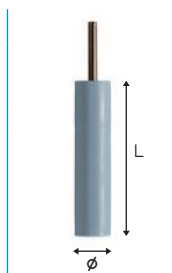
► Technical data

Order No.	Maximum force [N]
F020-10-002	300 ± 50

► Force diagram



Giganto Characteristics 06



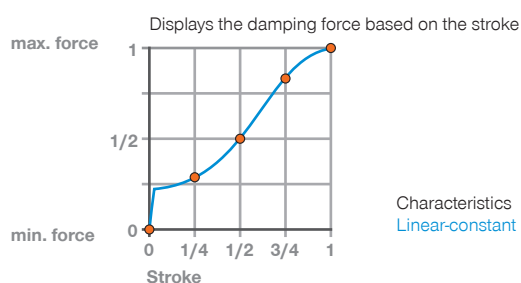
► Geometry

Housing length [mm]	ø of damper [mm]	Piston rod length [mm]	ø of piston rod [mm]	Stroke [mm]
44,4	9.9	20.5	2.3	20

► Technical data

Order No.	Maximum force [N]
F020-10-008	95 ± 40
F020-10-009	140 ± 50
F020-10-010	180 ± 50
F020-10-011	225 ± 50
F020-10-012	290 ± 50
F020-10-003	300 ± 50 *
F020-10-005	300 ± 50 *

► Force diagram



*Differences F1: Refer to table on page 79

HINGE DAMPING

THE EPITOME OF STABILITY AND FLEXIBILITY

▶ PRODUCT ADVANTAGES



- ▶ **Components for hinges**
Hinges represent connectability and stability as well as movement and design flexibility.
- ▶ The Zimmer Group has made this core principle a guideline by combining widely available expertise and flexible adaptability.
- ▶ Our components for hinge damping are retrofit solutions that can be easily integrated and implemented. Customers particularly appreciate the easy handling of the customisable damping force, which can be adjusted to the door weight after assembly.
- ▶ **Powerful – flexible – sophisticated**
Learn more about “Volpino”, our component for hinge damping.

Version: **Volpino**



▶ Geometry

Housing length [mm]	Stroke [mm]
49.7	15

▶ Product characteristics

Hydraulic damping
Can be retrofitted
High force

▶ Technical data

Order No.	Ø of concealed hinge* [mm]	Colour of pressure piece	Miscellaneous characteristics
B015-10-004	26	Dark grey RAL 7039	Adjustable concealed damping
B015-10-007	26	Light grey RAL 7035	Adjustable concealed damping
B015-10-003	35	Dark grey RAL 7039	Adjustable concealed damping
B015-10-006	35	Light grey RAL 7035	Adjustable concealed damping

* Adjustment to the hinge upon request

RETROFIT SETS FOR HINGE DAMPING

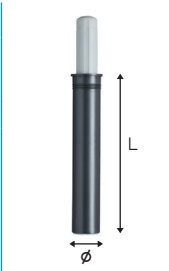
SHOCK ABSORPTION

▶ PRODUCT ADVANTAGES



- ▶ **Components for hinges and lids**
Our product portfolio also contains retrofit solutions for hinge and lid damping.
- ▶ Our products' soft head guarantees the most gentle and quietest closing possible.
- ▶ The retrofit solutions are available as individual dampers or in a set with the appropriate mounting. They can be mounted onto the cabinet easily and quickly either via the mounting or by drilling holes.
- ▶ **Compact – handy – customer friendly**
this best describes our retrofit sets for hinge and lid damping.

Version: **Piano**



▶ Geometry	
Ø of damper [mm]	Stroke [mm]
9.7	19.5

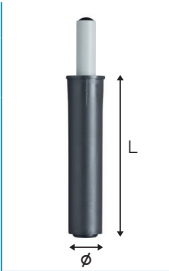
- ▶ **Product characteristics**
Pneumatic damping
Elastic impact head
For drilling holes (Ø 10mm/56mm deep)
Available with holder
Integrated return spring



Holder

▶ Technical data					
Order No.	Housing length [mm]	Head shape/Connection	Mass to be stopped [kg]	Free-run	Miscellaneous characteristics
A019-10-002	56	Pressure piece (light grey) with elastomer head	6	No	Damping with return

Version: **Pianino**



▶ Geometry	
Ø of damper [mm]	Stroke [mm]
9.9	15

- ▶ **Product characteristics**
Pneumatic damping
Elastic impact head
For drilling holes (Ø 10mm/45mm deep)
Available with holder

▶ Technical data					
Order No.	Housing length [mm]	Head shape/Connection	Mass to be stopped [kg]	Free-run	Miscellaneous characteristics
A015-09-001	45.8	Pressure piece (light grey) with elastomer head	4	No	Damping with return

Accessories: **Holder**

D000-00-011	Mounting for Piano and Pianino, Colour light grey RAL 7035
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SYSTEMS AND CUSTOMER SPECIFIC SOLUTIONS

INDIVIDUAL PRODUCTS

► GLOBAL PRODUCT GROUP INFORMATION

2

Systems and customer specific solutions / Soft Close



EXPERTISE

THE ZIMMER GROUP IS ONE OF THE LEADING MANUFACTURERS AND DEVELOPERS OF SOFT CLOSE SYSTEMS AND CUSTOMER SPECIFIC SOLUTIONS.

We develop the **systems** ourselves as standard solutions, but how they are used is up to the customer.

Customer specific solutions are developed and implemented within a customer project.

Due to the development activity of recent years, we can provide our customers with target-oriented advice and offer custom-made solutions.

QUALITY – MADE IN GERMANY

THE ZIMMER GROUP STANDS FOR QUALITY AT THE HIGHEST LEVEL – MADE IN GERMANY.

At Zimmer Group, we apply the same quality requirements to systems and customer specific solution as we do to our standard components.

This consists of inspecting critical characteristics as well as 100% performance inspection.

Depending on the quantity, this quality control is implemented either with partial or full automation.

All of our products meet the requirements from the corresponding standards.

CORE SKILLS

THE ZIMMER GROUP CAN REFER BACK TO ITS CORE EXPERTISE WHILE SUCCESSFULLY DEVELOPING AND PRODUCING SYSTEMS AND CUSTOMER SPECIFIC SOLUTIONS:

Customer orientation

For us, our customers' needs come first.

Solution orientation

We focus our attention on the solution, not the problem.

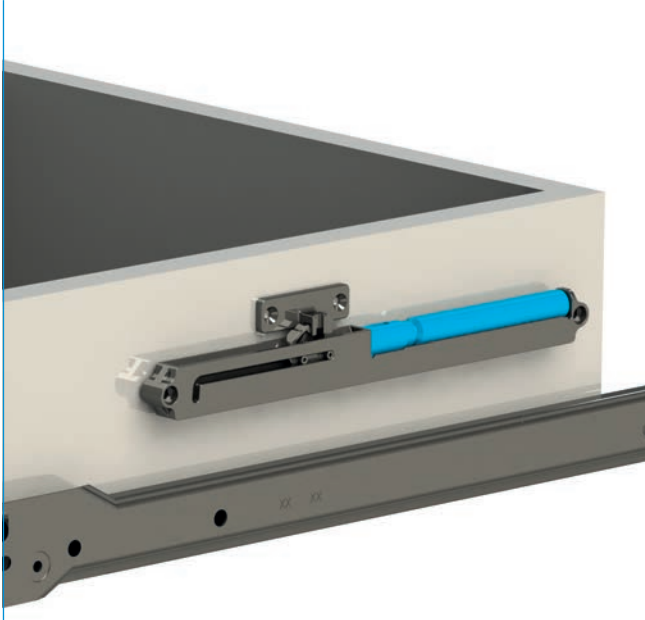
Future orientation

Our outlook on new challenges is always at the forefront.

SYSTEMS

UNIVERSAL UNITS

► SPECIFIC PRODUCT GROUP INFORMATION



► Systems and components

Along with components, the Zimmer Group also offers complete, nearly universal and immediately usable systems.

- Our systems are complete damping units with an integrated self-closing mechanism. Our customers can integrate the systems directly into their rails without requiring that the rails already be equipped with a corresponding returning mechanism.

► Universal – Innovative – Versatile

These are the core attributes of our systems.

Function:

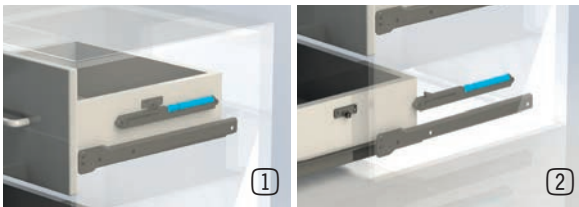
► Drawer and sliding door damping

Our systems demonstrate a similar function

► Elements

The soft close system consists of a damping unit with an integrated self-closing mechanism and a locking lever. In addition, there is an actuator available in different versions depending on the application.

Drawer



① Drawer home position

- The Retro soft close system is screwed onto the cabinet frame. The actuator is fastened to the drawer.

② Closing the drawer

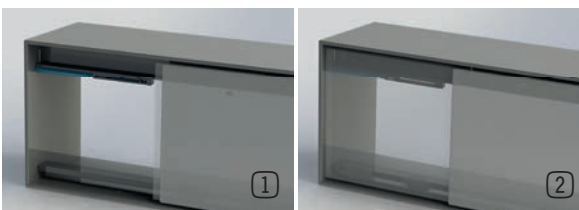
- The actuator fastened to the drawer moves inwards with the drawer and edges its way toward the Retro soft close system fastened to the cabinet frame in the process.

If the actuator reaches the system, the system's locking lever is triggered by the actuator and fixed in place.

At this point, the damping and self-closing phase begins:

Soft close!

Sliding door



① Sliding door home position

- The Silento Forte soft close system is fastened to the rail. The actuator is fastened to the sliding door. The specific fastening options differ depending on the application.

② Closing the sliding door

- The actuator fastened to the sliding door engages the system locking lever. The self-closing mechanism is triggered in the process.

At this point, the damping and self-closing phase begins:

Soft close!

RETRO

SYSTEM FOR DRAWER DAMPING

▶ PRODUCT ADVANTAGES



▶ Characteristics

- ▶ The Retro soft close system consists of a damping unit with an integrated self-closing mechanism.
- ▶ It is available individually or in a set with various actuators.
- ▶ The system's geometry derives primarily from its function. The focus has been placed on a visually functional design taking up the smallest amount of space.
- ▶ Retro stands out due to its high loading capacity of 25 kg per unit.
- ▶ Two systems per drawer are recommended to attain the most symmetrical closing behaviour possible.
- ▶ Even drawers with higher loading weights can be equipped with Retro by installing several systems.
- ▶ Retro's core strengths are its versatile potential applications and its high level of flexibility.
- ▶ During development, special emphasis was placed on designing a universally usable system.

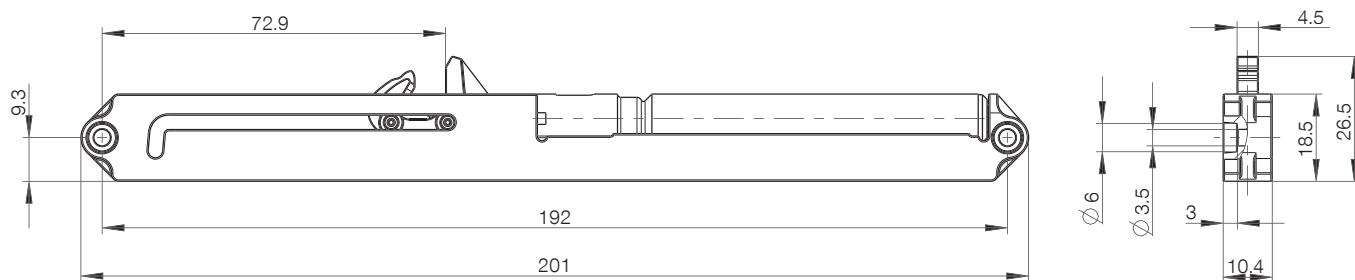
▶ Product characteristics

Pneumatic damping

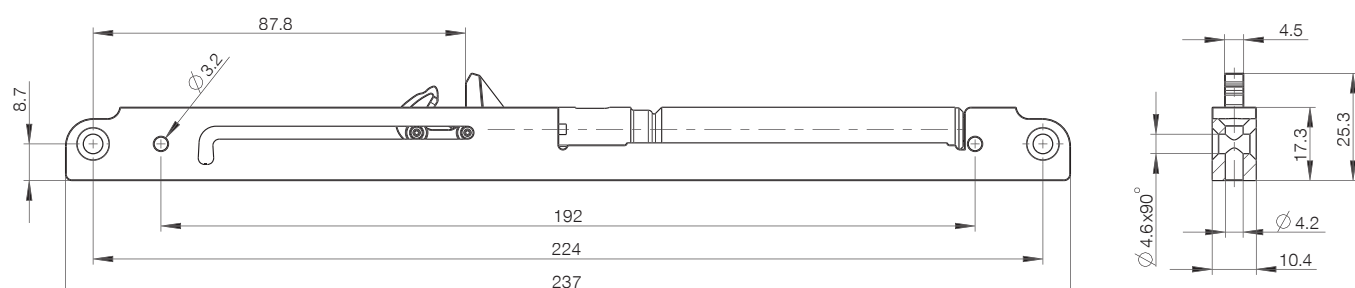
Retro is also ideal for retrofitting a drawer that did not previously have a damping or self-closing mechanism.

Retro can also be integrated into smaller sliding doors.

Retro 2 dimensions



Retro 4 dimensions



► APPLICATIONS + SETS

System Retro 2 + Retro 4

► Geometry

Housing width [mm]	Housing height [mm]	Stroke [mm]
10.4	18.5	50

Order No.	Housing length [mm]	Distance between fastening points [mm]	Mass to be stopped [kg]	Free- run	Integrated spring channel	Piston rod	Miscellaneous characteristics	Type
E050-10-003	201	• 192 •	25	Yes	Yes	Plastic	Low locking lever	R 2
E050-10-025	201	• 192 •	25	Yes	Yes	Plastic	High locking lever	R 2
E050-10-024	237	• 224 •	25	Yes	Yes	Plastic	High locking lever	R 4

Roller slide



- Retro is mounted on the frame.
It is located **between the frame and the drawer**.
- The actuator is mounted on the **side** of the drawer.
- For installation in a roller slide, a **narrow actuator** is available.

Undermount slide



- Retro is mounted on the frame.
It is located **above the drawer**.
- The actuator is mounted **on the top edge** of the drawer.
- **The same actuator as the roller slide** is used for installation in an undermount slide.

Single-wall frame



- Retro is mounted on the frame.
It is located **on the bottom of the drawer between the frame and drawer**.
- The actuator is mounted on the **bottom** of the drawer.
- For installation in a single-wall frame, **actuators of three different widths are available** to guarantee a precise fit for each frame width.

System sets Retro 2 + actuator

► Technical data

Order No.	Drawer slide system	Type
S050-10-011	Roller and undermount slide	Retro 2
S050-10-012	Single-wall frame: 16 mm	Retro 2
S050-10-013	Single-wall frame: 19 mm	Retro 2
S050-10-025	Single-wall frame: 20.5 mm	Retro 2



Activator for
roller and under-
mount slide



Activator for single-wall frame
(different versions)

SILENTO FORTE

SYSTEM FOR SLIDING DOOR DAMPING

▶ PRODUCT ADVANTAGES



▶ Characteristics

The Silento Forte soft close system consists of a damping unit with an integrated self-closing mechanism.

- ▶ It is available individually (in different versions) or in a set with an actuator.
- ▶ Silento Forte stands out due to its high loading capacity of 15 - 50 kg per unit.
- ▶ Silento Forte's core strengths are its versatile range of potential applications and its high level of flexibility.
- ▶ During development, special emphasis was placed on designing a universally usable system.

▶ Product characteristics

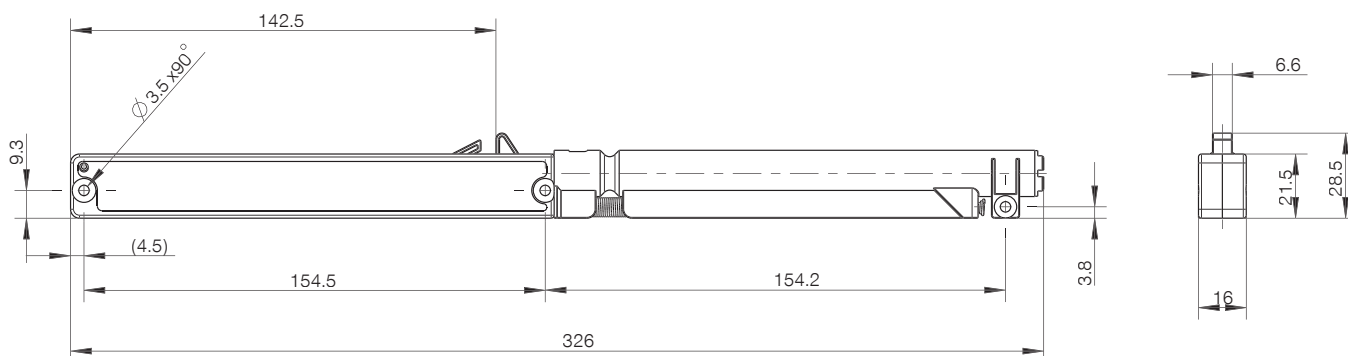
Pneumatic damping

Silento Forte is also ideal for retrofitting a sliding door that did not previously have a damping or self-closing mechanism.

Silento Forte can also be integrated into larger drawers or apothecary cabinet drawers.

Silento Forte can be installed in most common sliding doors.

Silento Forte dimensions



► APPLICATIONS + SETS

System Silento Forte

► Geometry

Housing width [mm]	Housing height [mm]	Stroke [mm]
16	22.8	110

Order No.	Housing length [mm]	Distance between fastening points [mm]	Mass to be stopped [kg]	Free-run	Integrated spring channel	Piston rod	Miscellaneous characteristics
E110-15-006	326	• 154.5 • 154.2 •	15	Yes	Yes	Steel	Housing with counterbore
E110-15-094	326	• 154.5 • 154.2 •	25	Yes	Yes	Steel	Housing with counterbore
E110-15-007	326	• 154.5 • 154.2 •	35	Yes	Yes	Steel	Housing with counterbore
E110-15-008	326	• 154.5 • 154.2 •	50	Yes	Yes	Steel	Housing with counterbore
E110-15-009	326	• 154.5 • 154.2 •	50	No	Yes	Steel	Housing with counterbore

Function



- Silento Forte is integrated in the rail/on the frame. The actuator is fastened to the sliding door
- Silento Forte is mounted on the sliding door. The actuator is fastened in the rail/on the frame.
- Actuator upon request.

CUSTOMER SPECIFIC SOLUTIONS

SYSTEMS AND COMPONENTS

► SPECIFIC PRODUCT GROUP INFORMATION



► Individualized products

Individuality is gaining more and more importance. Flexibility and the inventive spirit is in high demand.

- The Zimmer Group is a qualified and reliable partner in developing customer specific solutions. The demand for custom-fitted products is enormous.

- Intensive dialogue with our customers is very important to us. We design and produce in-house. We encourage the developing process from the first concept to series production.

In this way, we can meet the demands of our customers accurately and at the highest level of quality.

- We draw attention by adapting proven developments to our customers' specific wishes in terms of appearance, function and movement.

► Custom – customer-oriented – trendsetting

Here are some products that have been developed for and with customers for already existing projects.

Damping of drawers:



Application example 1.1



Application example 1.2



Application example 1.3

- Compact and efficient units
- 1.1 Ball roller rail/Telescopic rail
- 1.2 Undermount rail
- 1.3 Undermount rail

Hinge Damping:



Application example 2.1

- 2.1 High damping force in a small area with a 7 mm stroke.

► SYSTEMS AND COMPONENTS

Sliding door damping:



Application example 3.1



Application example 3.2



Application example 3.3



Application example 3.4



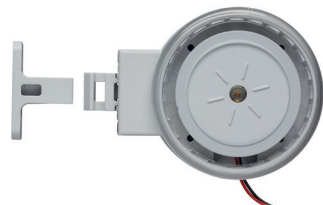
Application example 3.5

- 3.1 For sliding doors between 15 and 50 kg. Installation in the rail. Various actuators available.
- 3.2 For sliding doors between 15 and 50 kg. Ideal for retrofitting. Extension damper.
- 3.3 For sliding doors between 15 and 30 kg.
- 3.4 For sliding doors between 25 and 50 kg. Works in all directions.
- 3.5 Centre door damping.

Miscellaneous applications:



4.1 Damping lids used in caravanning



4.2 Touch latch unit



4.3 Window toggle catch

- 4.1 Lid fittings for damping lids used in caravan.
- 4.2 Touch latch unit with integrated LED lamp.
- 4.3 Infinitely adjustable window toggle catch for caravan windows.

USAGE NOTE

GENERAL

The contents of this catalog are not legally binding and are intended solely for informational purposes. Any final agreement will be in the form of a written order confirmation from ZIMMER GMBH, which occurs only subject to the respective current General Terms and Conditions of Sale and Delivery of ZIMMER GMBH. These can be found online at www.zimmer-group.com.

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Furthermore, the respective laws, guidelines from TÜV, guidelines from the respective trade association and VDE stipulations shall apply.

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STANDARDS

Zimmer Group has a quality management system certified in accordance with ISO 9001:2008.

Zimmer Group has an environmental management system certified in accordance with ISO 14001:2004.

USAGE NOTE

INDIVIDUAL

INDIVIDUAL „INDUSTRIAL DAMPING TECHNOLOGY“ – DIRECTIVES, LAWS AND STANDARDS

Harmonized EU directives

The products of the Zimmer Group comply with the standardized and harmonized directives and standards of the European Union, which apply to products for the EU single market.

CE-relevant harmonized EU directives:

The industrial shock absorbers from the Zimmer Group meet the requirements of the respective harmonized EU directives, as long as they are relevant to them. However, the following guidelines do not define a scope of validity for industrial shock absorbers:

- ▶ In accordance with the Machinery Directive, industrial shock absorbers are components for installing in machines, which means neither a EC Declaration of Conformity nor a EC Type Examination are required. In addition, no Manufacturer's Declaration is needed either.
- ▶ As per the Pressure Equipment Directive, industrial shock absorbers are components with a low potential for danger, which is why they are omitted from this scope of validity
- ▶ Other harmonized directives contained in the German Equipment and Product Safety Act do not apply for general mechanical engineering application as components. For example, the directives for elevators, ropeways and medical products as well as the ATEX explosion protection directive require a corresponding application of shock absorbers in this area. However, this does not correspond to general use. Instead, they represent special applications that are subject to a separate directive review.
- ▶ Consequently, no general mandatory CE markings exist for the industrial shock absorbers from the Zimmer Group for general use in mechanical engineering, which is why they are not inspected in the relevant certification processes and, therefore, are not provided with the CE marking.

Other harmonized EU directives:

The Waste Electrical and Electronic Equipment Directive (WEEE) and the Restriction of Hazardous Substances directive (RoHS) are also not relevant since hydraulic shock absorbers are not electrical or electronic devices. However, the products can be oriented to the respective ordinances.

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- ▶ CONSTANT DEVELOPMENT OF OUR INDUSTRY EXPERTISE