

Motion Control

Gas Springs – Push Type, Gas Springs – Pull Type
Hydraulic Dampers, Hydraulic Feed Controls
Rotary Dampers



Custom Control of Hand Forces

Customized to suit your applications

The ACE products in this segment enhance the quality of any type of movement. Anyone who wants to raise or lower loads, regulate the feed of an object to the precise millimeter or gently decelerate rotating or linear movements will find the right solution here.

ACE delivers industry leading quality. Our innovative solutions correspond with stringent requirements for ergonomics and individuality, including custom pressurized gas springs.



Industrial Gas Springs – Push Type

The smart way to lift and lower

Anyone who wants to lift or lower loads with control and without excessive strength relies on the industrial gas springs from ACE. These maintenance-free, ready-to-install machine elements, which are available from stock, support sheer muscle power, reliably open and hold.

Available with body diameters of 8 to 70 mm (0.31" to 2.76") and forces from 0 to 13,000 N (2 to 2,925 lbs.), ACE push type gas springs offer a huge variety and maximum service life. The first is achieved thanks to the number of available connections and fittings for simple attachment and the latter with high quality design and materials. Whether they are made of steel or stainless steel, these components make any work easier and are also visually appealing.

Ready-to-install and universally applicable

Modular end fittings and mounting brackets

Calculation program for individual design

Standard with fill/DE-Gas valve

Maintenance-free

Large variety in stock



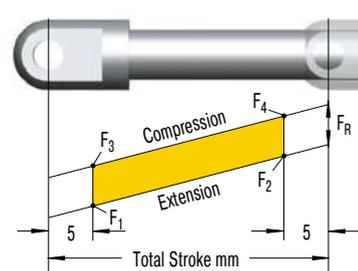
Function of a Gas Spring – Push Type

ACE gas springs are individually filled to a predetermined pressure to suit a customer's requirement (extension Force F_1). The cross-sectional area of the piston rod and filling pressure determines the extension force.

During the compression of the piston rod, nitrogen flows through an orifice in the piston from the full bore side of the piston to the annulus. The nitrogen is compressed by the volume of the piston rod. As the piston rod is compressed the pressure increases, so increasing the reaction force (progression). The force depends on the proportional relationship between the piston rod and the inner tube diameter, which is approximately linear.

Calculation Principles

Force-Stroke Characteristics of Gas Spring (Push Type)



Free calculation service see page 188!

F_1 = nominal force at 20 °C (this is the pressure figure normally used when specifying the gas spring)

F_2 = force in the complete compressed position

When compressing the piston rod, there is an additional friction force caused by the contact pressure of the seals (this **only** occurs **during the compression stroke**):

F_3 = force at the beginning of the compression stroke

F_4 = force at the end of the compression stroke

Gas Springs (Push Type)

TYPES	Progression approx. %	¹ Friction F_R approx. in N
GS-8	29 - 33 ²	10
GS-10	13 - 16 ²	10
GS-12	20 - 35 ²	20
GS-15	30 - 40 ²	20
GS-19	24 - 35 ²	30
GS-22	30 - 40 ²	30
GS-28	63 - 76 ²	40
GS-40	38 - 50 ²	50
GS-70	25	50

¹ Depending on the filling force

² Depending on the stroke

Progression: (the slope of the force line in the diagram above) is due to the reduction of the internal gas volume as the piston rod moves from its initial position to its fully stroked position. The approx. progression values given above for standard springs can be altered on request.

Effect of temperature: The nominal F_1 figure is given at 20 °C. An increase of 10 °C will increase force by 3.4 %.

Filling tolerances: -20 N to +40 N or 5 % to 7 %. Depending on size and extension force the tolerances can differ.

Industrial Gas Springs – Push Type



GS-8 to GS-70

Valve Technology

Individual stroke length and extension forces

Hoods, Shutters, Machine housing, Conveyor systems

Page 150



GS-8-V4A to GS-40-VA

Valve Technology, Stainless Steel

With food grade oil according to FDA approval

Hoods, Shutters, Machine housing, Conveyor systems

Page 160



GST-40 Tandem

Valve Technology

Optimized dual force for heavy flaps and wide angle applications

Hoods, Shutters, Machine housing, Conveyor systems

Page 170

GS-8 to GS-70

Individual stroke length and extension forces

Valve Technology

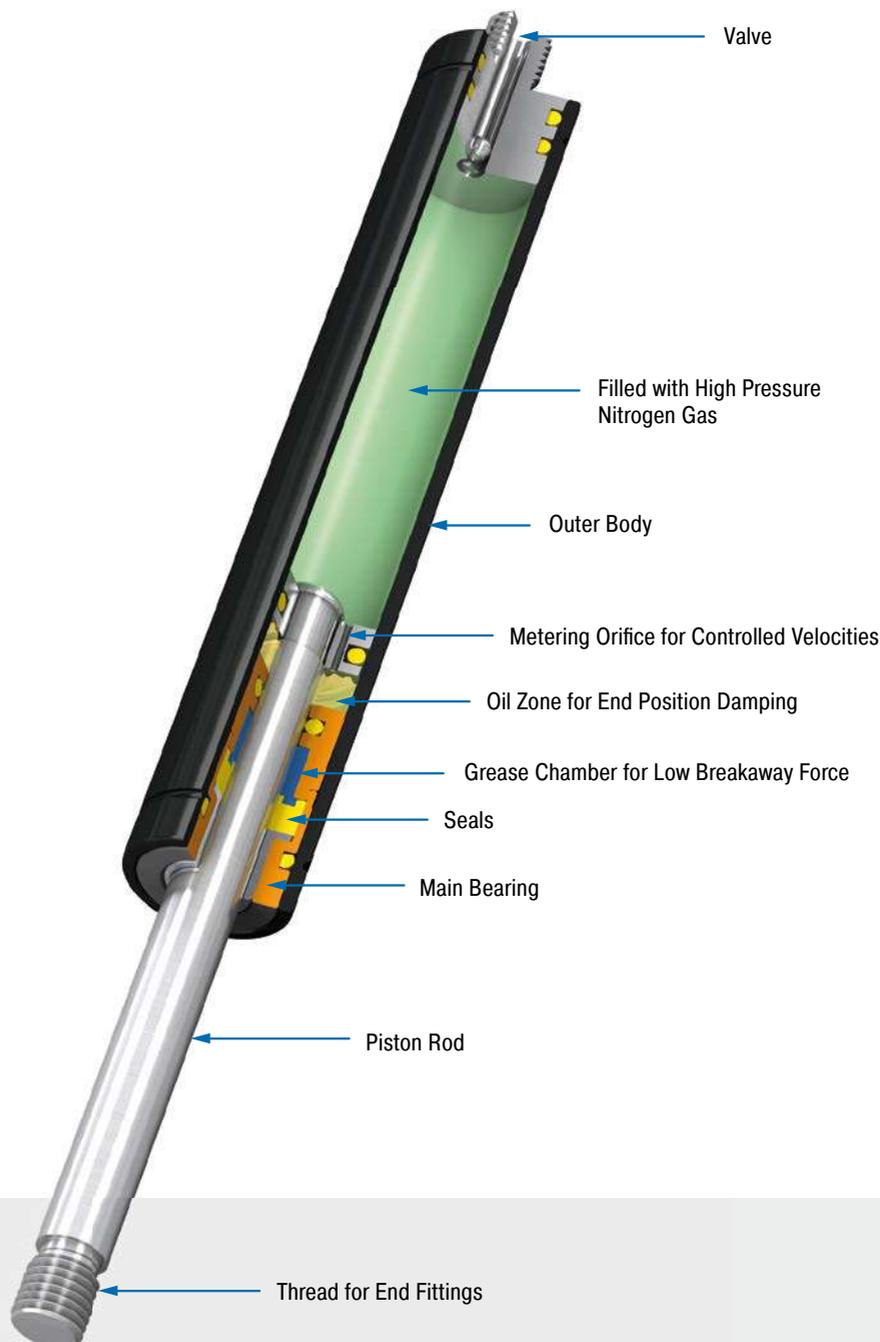
Extension force 10 N to 13,000 N

Stroke 20 mm to 1,000 mm

Universal and tailor made: ACE industrial gas springs offer perfect support of muscle power with forces from 10 to 13,000 N (2 to 2,923 lbs.) with body diameter of 8 to 70 mm (0.31" to 2.76"). These durable and sealed systems are ready for installation, maintenance-free and filled with pressurized nitrogen gas.

They are filled according to individual customer pressure requirements and may be adjusted later by use of a built-in valve. ACE provides free calculation support and designs the gas springs with mounting points specifically for the particular application. A variety of accessories makes assembly even easier and allows universal application of the gas springs.

ACE industrial gas push type springs are used on covers, lids, or other components. They are used in industrial applications, automation and machine building, medical technology as well as in the electronics, automobile and furniture industries.



Technical Data

Extension force: 10 N to 13,000 N

Piston rod diameter: Ø 3 mm to Ø 30 mm

Progression: Approx. 13 % to 76 %
(depending on size and stroke)

Lifetime: Approx. 10,000 m

Operating temperature range: -20 °C to 80 °C

Material: Outer body: Coated steel; Piston rod: Steel or stainless steel with wear-resistant coating; End fittings: Zinc plated steel

Operating fluid: Nitrogen gas and oil

Mounting: We recommend mounting with piston rod downwards to take advantage of the built-in end position damping.

End position damping length: Approx. 5 mm to 70 mm (depending on the stroke)

Positive stop: External positive stop at the end of stroke provided by the customer.

Application field: Hoods, Shutters, Machine housing, Conveyor systems, Control boxes, Furniture industry, Jacking applications, Assembly stations, Vehicle technology, Folding elements

Note: Increased break-away force if unit has not moved for some time.

End fittings: They are interchangeable and if necessary must be positively secured by the customer to prevent unscrewing.

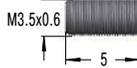
Safety information: Gas springs (push type) should not be installed under pre-tension.

On request: Special oils and other special options. Alternative accessories. Different end position damping and extension speed.

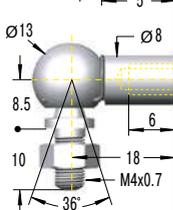
Valve Technology, Extension force 10 N to 100 N (compressed up to 133 N)

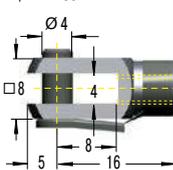
End Fitting
Standard Dimensions
End Fitting
A3.5

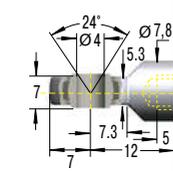
Eye A3.5
max. force 370 N

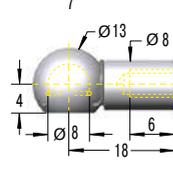
B3.5

Performance and Dimensions

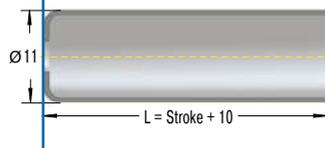
TYPES	Stroke mm	L extended mm	Extension force max. N
GS-8-20	20	72	100
GS-8-30	30	92	100
GS-8-40	40	112	100
GS-8-50	50	132	100
GS-8-60	60	152	100
GS-8-80	80	192	100

Stud Thread B3.5
C3.5

Angle Ball Joint C3.5
max. force 370 N

D3.5

Clevis Fork D3.5
max. force 370 N

E3.5

Swivel Eye E3.5
max. force 370 N

G3.5

Ball Socket G3.5
max. force 370 N

**Rod Shroud
W3.5-8**

Ordering Example

Type (Push Type) → **GS-8-30-AC-30**
 Body 0.31" (8 mm) → **GS-8-30-AC-30**
 Stroke 1.18" (30 mm) → **GS-8-30-AC-30**
 Piston Rod End Fitting A3.5 → **GS-8-30-AC-30**
 Body End Fitting C3.5 → **GS-8-30-AC-30**
 Nominal Force F₁ 7 lbs (30 N) → **GS-8-30-AC-30**

Mounting accessories see from page 212.

**Adjuster Knob
DE-GAS-3.5**

See page 191.

Technical Data
Extension force: 10 N to 100 N (compressed up to 133 N)

Progression: Approx. 29 % to 33 %

Operating temperature range: -20 °C to 80 °C

Material: Outer body: Coated steel; Piston rod: Stainless steel (1.4301/1.4305, AISI 304/303); End fittings: Zinc plated steel

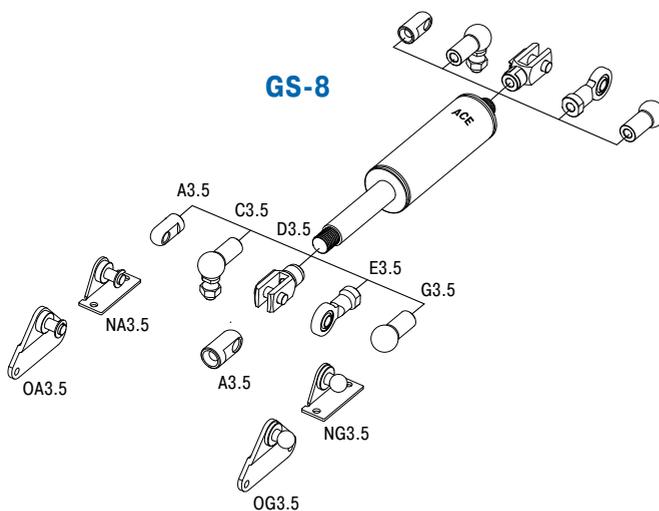
Mounting: We recommend mounting with piston rod downwards to take advantage of the built-in end position damping.

End position damping length: approx. 5 mm (depending on the stroke)

Positive stop: External positive stop at the end of stroke provided by the customer.

Note: Increased break-away force if unit has not moved for some time.

End fittings: They are interchangeable and if necessary must be positively secured by the customer to prevent unscrewing.

Safety information: Gas springs (push type) should not be installed under pre-tension.


Valve Technology, Extension force 10 N to 100 N (compressed up to 116 N)

End Fitting

Standard Dimensions

End Fitting

A3.5



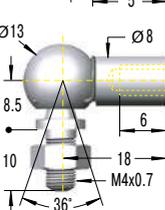
Eye A3.5
max. force 370 N

B3.5



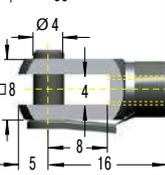
Stud Thread B3.5

C3.5



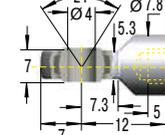
Angle Ball Joint C3.5
max. force 370 N

D3.5



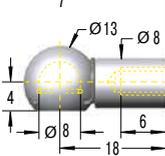
Clevis Fork D3.5
max. force 370 N

E3.5



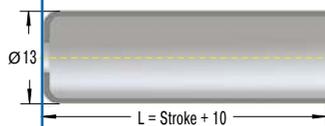
Swivel Eye E3.5
max. force 370 N

G3.5



Ball Socket G3.5
max. force 370 N

Rod Shroud
W3.5-10



Performance and Dimensions

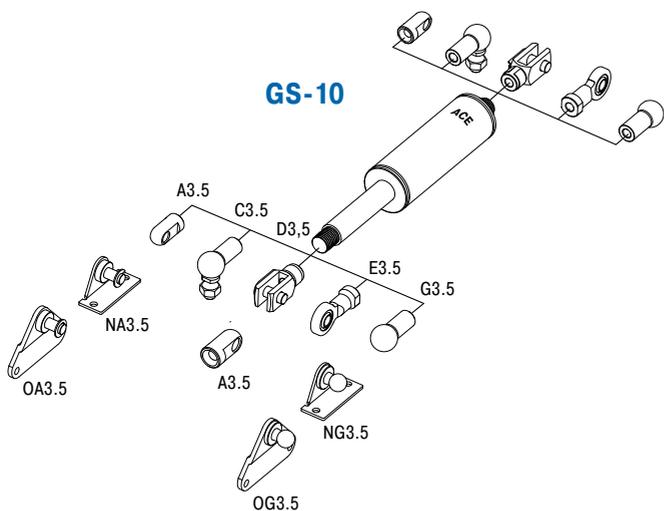
TYPES	Stroke mm	L extended mm	Extension force max. N
GS-10-20	20	72	100
GS-10-30	30	92	100
GS-10-40	40	112	100
GS-10-50	50	132	100
GS-10-60	60	152	100
GS-10-80	80	192	100

Ordering Example

Type (Push Type) _____
 Body 0.39" (10 mm) _____
 Stroke 3.15" (80 mm) _____
 Piston Rod End Fitting A3.5 _____
 Body End Fitting C3.5 _____
 Nominal Force F₁ 13 lbs (60 N) _____

GS-10-80-AC-60

Mounting accessories see from page 212.

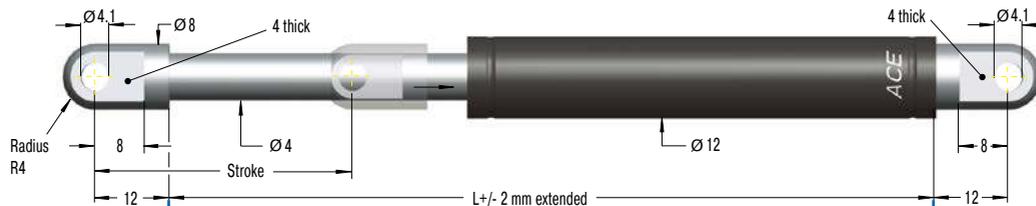


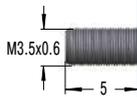
Technical Data

- Extension force:** 10 N to 100 N (compressed up to 116 N)
- Progression:** Approx. 13 % to 16 %
- Operating temperature range:** -20 °C to 80 °C
- Material:** Outer body: Coated steel; Piston rod: Stainless steel (1.4301/1.4305, AISI 304/303); End fittings: Zinc plated steel
- Mounting:** We recommend mounting with piston rod downwards to take advantage of the built-in end position damping.
- End position damping length:** approx. 5 mm (depending on the stroke)
- Positive stop:** External positive stop at the end of stroke provided by the customer.
- Note:** Increased break-away force if unit has not moved for some time.
- End fittings:** They are interchangeable and if necessary must be positively secured by the customer to prevent unscrewing.
- Safety information:** Gas springs (push type) should not be installed under pre-tension.

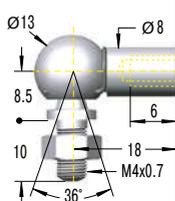
Issue 04.2018 – Specifications subject to change

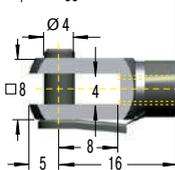
Valve Technology, Extension force 15 N to 180 N (compressed up to 243 N)

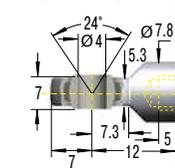
End Fitting
Standard Dimensions
End Fitting
A3.5

Eye A3.5
max. force 370 N

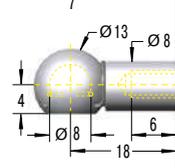
B3.5

Performance and Dimensions

TYPES	Stroke mm	L extended mm	Extension force max. N
GS-12-20	20	72	180
GS-12-30	30	92	180
GS-12-40	40	112	180
GS-12-50	50	132	180
GS-12-60	60	152	180
GS-12-80	80	192	150
GS-12-100	100	232	150
GS-12-120	120	272	120
GS-12-150	150	332	100

Stud Thread B3.5
C3.5

Angle Ball Joint C3.5
max. force 370 N

D3.5

Clevis Fork D3.5
max. force 370 N

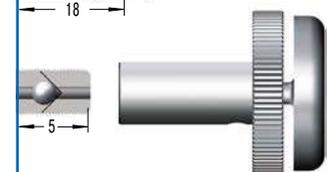
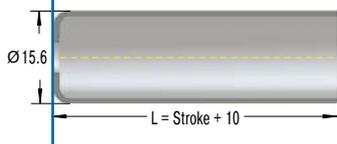
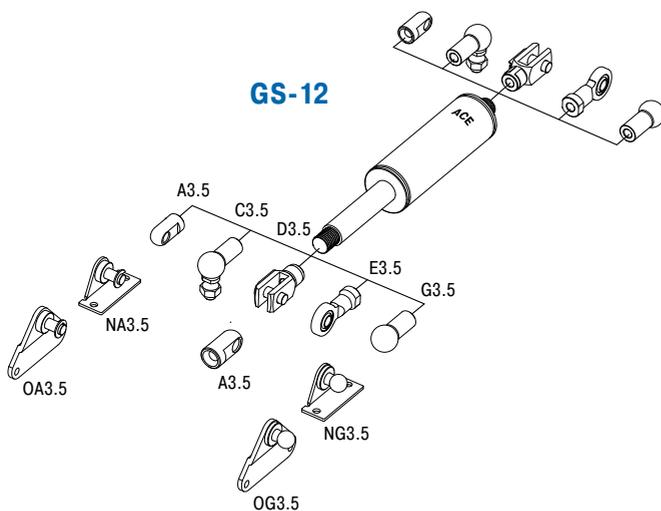
E3.5

Swivel Eye E3.5
max. force 370 N

G3.5

Ball Socket G3.5
max. force 370 N

Ordering Example
GS-12-100-AA-30

Type (Push Type) _____
 Body 0.47" (12 mm) _____
 Stroke 3.94" (100 mm) _____
 Piston Rod End Fitting A3.5 _____
 Body End Fitting A3.5 _____
 Nominal Force F₁ 7 lbs (30 N) _____

Mounting accessories see from page 212.

Rod Shroud W3.5-12

Adjuster Knob DE-GAS-3.5
See page 191.

Technical Data
Extension force: 15 N to 180 N (compressed up to 243 N)

Progression: Approx. 20 % to 35 %

Operating temperature range: -20 °C to 80 °C

Material: Outer body: Coated steel; Piston rod: Stainless steel (1.4301/1.4305, AISI 304/303); End fittings: Zinc plated steel

Mounting: We recommend mounting with piston rod downwards to take advantage of the built-in end position damping.

End position damping length: approx. 10 mm (depending on the stroke)

Positive stop: External positive stop at the end of stroke provided by the customer.

Note: Increased break-away force if unit has not moved for some time.

End fittings: They are interchangeable and if necessary must be positively secured by the customer to prevent unscrewing.

Safety information: Gas springs (push type) should not be installed under pre-tension.

Valve Technology, Extension force 40 N to 400 N (compressed up to 560 N)

End Fitting

Standard Dimensions

End Fitting

A5



Eye A5
max. force 800 N

B5

C5

D5

E5

F5

G5

Rod Shroud
W5-15

Performance and Dimensions

TYPES	Stroke mm	L extended mm	Extension force max. N
GS-15-20	20	67	400
GS-15-40	40	107	400
GS-15-50	50	127	400
GS-15-60	60	147	400
GS-15-80	80	187	400
GS-15-100	100	227	400
GS-15-120	120	267	400
GS-15-150	150	327	400
GS-15-200	200	427	350

Ordering Example

Type (Push Type) _____
 Body 0.61" (15.6 mm) _____
 Stroke 5.91" (150 mm) _____
 Piston Rod End Fitting A5 _____
 Body End Fitting C5 _____
 Nominal Force F₁ 34 lbs (150 N) _____

GS-15-150-AC-150

Mounting accessories see from page 212.

Adjuster Knob
DE-GAS-5
See page 191.

Stud Thread B5

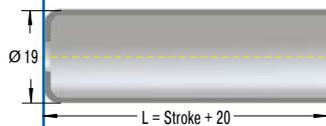
Angle Ball Joint C5
max. force 500 N

Clevis Fork D5
max. force 800 N

Swivel Eye E5
max. force 800 N

Inline Ball Joint F5
max. force 500 N

Ball Socket G5
max. force 500 N



Technical Data

Extension force: 40 N to 400 N (compressed up to 560 N)

Progression: Approx. 30 % to 40 %

Operating temperature range: -20 °C to 80 °C

Material: Outer body: Steel coated with UV paint; Piston rod: Steel with wear-resistant coating; End fittings: Zinc plated steel

Mounting: We recommend mounting with piston rod downwards to take advantage of the built-in end position damping.

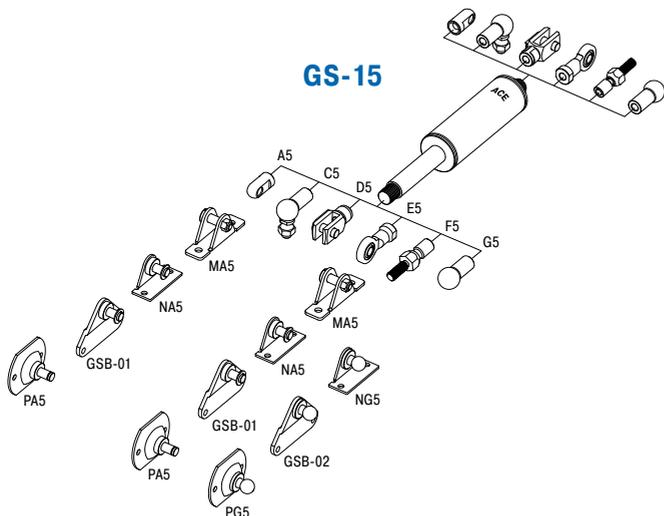
End position damping length: approx. 10 mm (depending on the stroke)

Positive stop: External positive stop at the end of stroke provided by the customer.

Note: Increased break-away force if unit has not moved for some time.

End fittings: They are interchangeable and if necessary must be positively secured by the customer to prevent unscrewing.

Safety information: Gas springs (push type) should not be installed under pre-tension.



Valve Technology, Extension force 50 N to 700 N (compressed up to 560 N)

End Fitting
Standard Dimensions
End Fitting

End Fitting A8
max. force 3,000 N

End Fitting B8
Stud Thread B8

End Fitting C8
Angle Ball Joint C8
max. force 1,200 N
Also available with UNF thread 5/16-18.
Order G5/16.

End Fitting D8
Clevis Fork D8
max. force 3,000 N

End Fitting E8
Swivel Eye E8
max. force 3,000 N

End Fitting F8
Inline Ball Joint F8
max. force 1,200 N

End Fitting G8
Ball Socket G8
max. force 1,200 N

End Fitting H8
Adjuster Knob DE-GAS-8
See page 191.

Rod Shroud W8-19
Ø 23
L = Stroke + 30

Performance and Dimensions

TYPES	Stroke mm	L extended mm	Extension force max. N
GS-19-50	50	164	700
GS-19-100	100	264	700
GS-19-150	150	364	700
GS-19-200	200	464	700
GS-19-250	250	564	600
GS-19-300	300	664	450

Ordering Example
GS-19-150-AC-600
 Type (Push Type) _____
 Body 0.75" (19 mm) _____
 Stroke 5.91" (150 mm) _____
 Piston Rod End Fitting A8 _____
 Body End Fitting C8 _____
 Nominal Force F₁ 135 lbs (600 N) _____

Mounting accessories see from page 212.

Technical Data
Extension force: 50 N to 700 N (compressed up to 560 N)

Progression: Approx. 24 % to 35 %

Operating temperature range: -20 °C to 80 °C

Material: Outer body: Steel coated with UV paint; Piston rod: Steel with wear-resistant coating; End fittings: Zinc plated steel

Mounting: In any position. Hint: We recommend mounting with piston rod downwards to take advantage of the built-in end position damping.

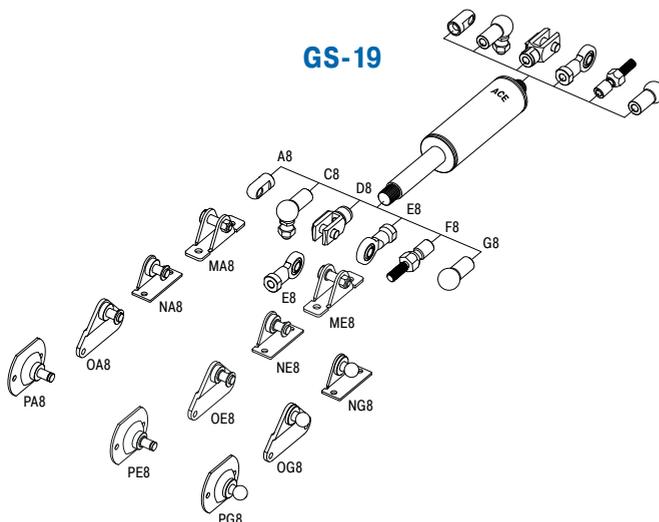
End position damping length: approx. 20 mm to 60 mm (depending on the stroke)

Positive stop: External positive stop at the end of stroke provided by the customer.

Note: Integrated grease chamber reduces friction and wear and optimizes lubrication.

End fittings: They are interchangeable and if necessary must be positively secured by the customer to prevent unscrewing.

Safety information: Gas springs (push type) should not be installed under pre-tension.

GS-19


Valve Technology, Extension force 80 N to 1,300 N (compressed up to 1,820 N)

End Fitting

Standard Dimensions

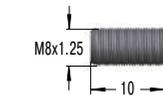
End Fitting

A8



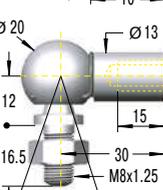
Eye A8
max. force 3,000 N

B8



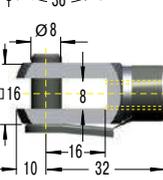
Stud Thread B8

C8



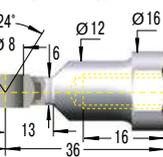
Angle Ball Joint C8
max. force 1,200 N
Also available with UNF thread 5/16-18.
Order G5/16.

D8



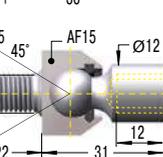
Clevis Fork D8
max. force 3,000 N

E8



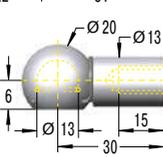
Swivel Eye E8
max. force 3,000 N

F8



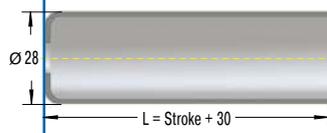
Inline Ball Joint F8
max. force 1,200 N

G8



Ball Socket G8
max. force 1,200 N

Rod Shroud W8-22



Performance and Dimensions

TYPES	Stroke mm	L extended mm	Extension force max. N
GS-22-50	50	164	1,300
GS-22-100	100	264	1,300
GS-22-150	150	364	1,300
GS-22-200	200	464	1,300
GS-22-250	250	564	1,300
GS-22-300	300	664	1,100
GS-22-350	350	764	850
GS-22-400	400	864	650
GS-22-450	450	964	550
GS-22-500	500	1,064	450
GS-22-550	550	1,164	400
GS-22-600	600	1,264	350
GS-22-650	650	1,364	300
GS-22-700	700	1,464	250

Ordering Example

GS-22-150-AE-800
 Type (Push Type) _____
 Body 0.91" (23 mm) _____
 Stroke 5.91" (150 mm) _____
 Piston Rod End Fitting A8 _____
 Body End Fitting E8 _____
 Nominal Force F₁ 180 lbs (800 N) _____

Mounting accessories see from page 212.

Adjuster Knob DE-GAS-8
See page 191.

Technical Data

Extension force: 80 N to 1,300 N (compressed up to 1,820 N)

Progression: Approx. 30 % to 40 %

Operating temperature range: -20 °C to 80 °C

Material: Outer body: Steel coated with UV paint; Piston rod: Steel with wear-resistant coating; End fittings: Zinc plated steel

Mounting: In any position. Hint: We recommend mounting with piston rod downwards to take advantage of the built-in end position damping.

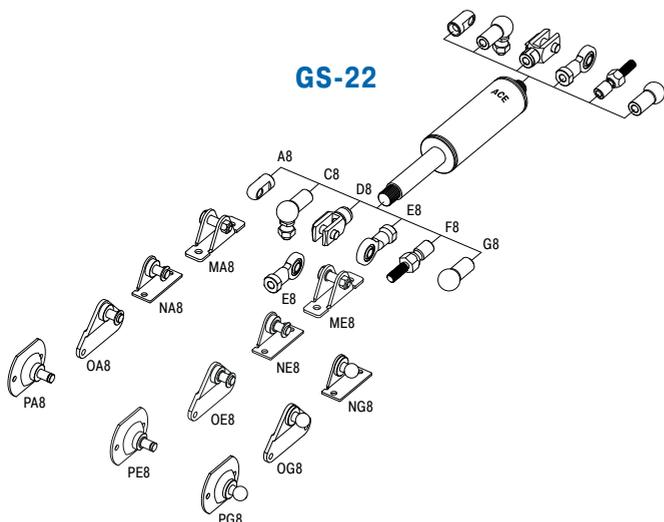
End position damping length: approx. 20 mm to 70 mm (depending on the stroke)

Positive stop: External positive stop at the end of stroke provided by the customer.

Note: Integrated grease chamber reduces friction and wear and optimizes lubrication.

End fittings: They are interchangeable and if necessary must be positively secured by the customer to prevent unscrewing.

Safety information: Gas springs (push type) should not be installed under pre-tension.



Valve Technology, Extension force 150 N to 2,500 N (compressed up to 4,400 N)

End Fitting

Standard Dimensions

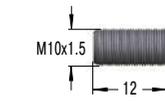
End Fitting

A10



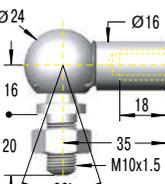
Eye A10
max. force 10,000 N

B10



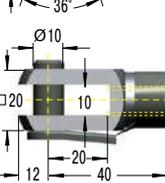
Stud Thread B10

C10



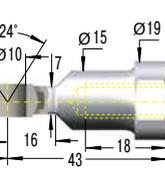
Angle Ball Joint C10
max. force 1,800 N

D10



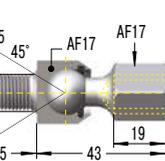
Clevis Fork D10
max. force 10,000 N

E10



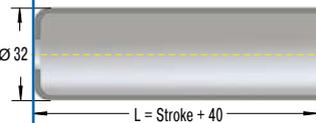
Swivel Eye E10
max. force 10,000 N

F10



Inline Ball Joint F10
max. force 1,800 N

Rod Shroud W10-28



Adjuster Knob DE-GAS-10
See page 191.

Performance and Dimensions

TYPES	Stroke mm	L extended mm	Extension force max. N
GS-28-100	100	262	2,500
GS-28-150	150	362	2,500
GS-28-200	200	462	2,500
GS-28-250	250	562	2,500
GS-28-300	300	662	2,500
GS-28-350	350	762	2,500
GS-28-400	400	862	2,400
GS-28-450	450	962	1,950
GS-28-500	500	1,062	1,600
GS-28-550	550	1,162	1,350
GS-28-600	600	1,262	1,150
GS-28-650	650	1,362	1,000
GS-28-700	700	1,462	900
GS-28-750	750	1,562	800

Ordering Example

GS-28-150-EE-1200

Type (Push Type) _____
 Body 1.1" (28 mm) _____
 Stroke 5.91" (150 mm) _____
 Piston Rod End Fitting E10 _____
 Body End Fitting E10 _____
 Nominal Force F₁ 270 lbs (1,200 N) _____

Mounting accessories see from page 212.

Technical Data

Extension force: 150 N to 2,500 N (compressed up to 4,400 N)

Progression: Approx. 63 % to 76 %

Operating temperature range: -20 °C to 80 °C

Material: Outer body: Steel coated with UV paint; Piston rod: Steel with wear-resistant coating; End fittings: Zinc plated steel

Mounting: In any position. Hint: We recommend mounting with piston rod downwards to take advantage of the built-in end position damping.

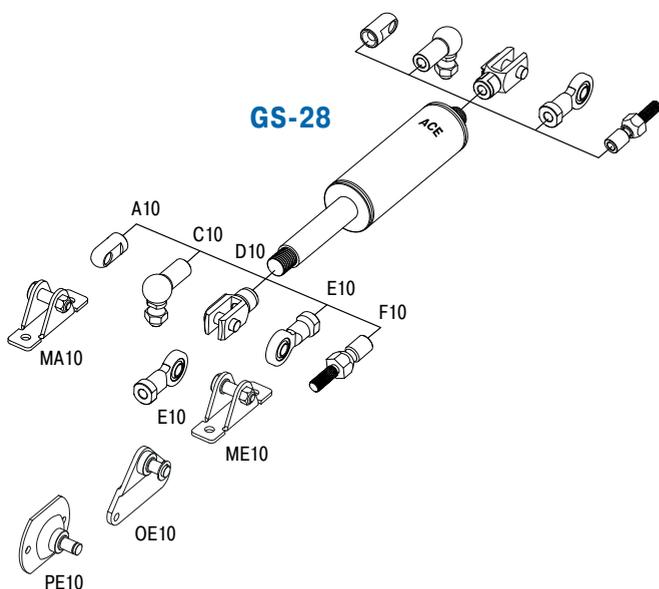
End position damping length: approx. 30 mm to 70 mm (depending on the stroke)

Positive stop: External positive stop at the end of stroke provided by the customer.

Note: Integrated grease chamber reduces friction and wear and optimizes lubrication.

End fittings: They are interchangeable and if necessary must be positively secured by the customer to prevent unscrewing.

Safety information: Gas springs (push type) should not be installed under pre-tension.



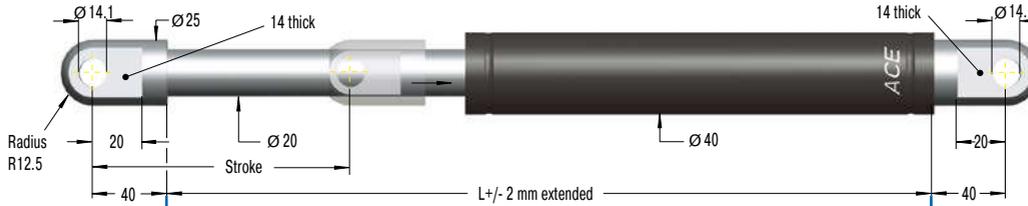
Valve Technology, Extension force 500 N to 5,000 N (compressed up to 7,500 N)

End Fitting

Standard Dimensions

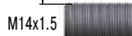
End Fitting

A14



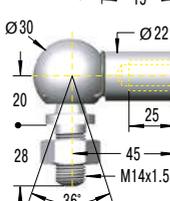
Eye A14
max. force 10,000 N

B14



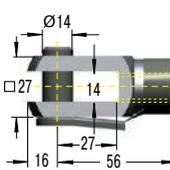
Stud Thread B14

C14



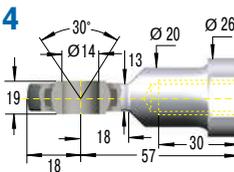
Angle Ball Joint C14
max. force 3,200 N

D14



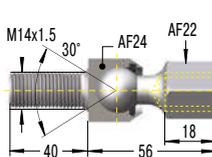
Clevis Fork D14
max. force 10,000 N

E14



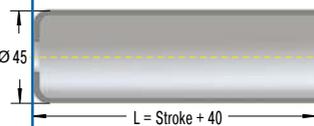
Swivel Eye E14
max. force 10,000 N

F14



Inline Ball Joint F14
max. force 3,200 N

Rod Shroud
W14-40



Performance and Dimensions

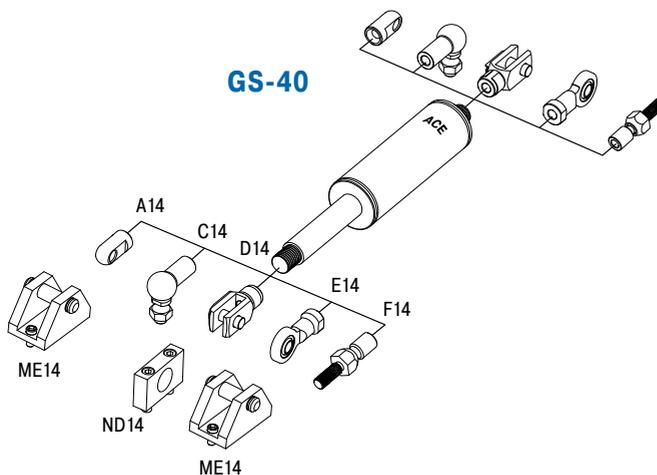
TYPES	Stroke mm	L extended mm	Extension force max. N
GS-40-100	100	317	5,000
GS-40-150	150	417	5,000
GS-40-200	200	517	5,000
GS-40-250	250	617	5,000
GS-40-300	300	717	5,000
GS-40-400	400	917	5,000
GS-40-500	500	1,117	5,000
GS-40-600	600	1,317	4,150
GS-40-800	800	1,717	2,550
GS-40-1000	1,000	2,117	1,700

Ordering Example

GS-40-150-DD-3500

Type (Push Type) _____
 Body 1.57" (40 mm) _____
 Stroke 5.91" (150 mm) _____
 Piston Rod End Fitting D14 _____
 Body End Fitting D14 _____
 Nominal Force F₁ 787 lbs (3,500 N) _____

Mounting accessories see from page 212.



Technical Data

Extension force: 500 N to 5,000 N (compressed up to 7,500 N)

Progression: Approx. 38 % to 50 %

Operating temperature range: -20 °C to 80 °C

Material: Outer body: Steel coated with UV paint; Piston rod: Steel with wear-resistant coating; End fittings: Zinc plated steel

Mounting: In any position. Hint: We recommend mounting with piston rod downwards to take advantage of the built-in end position damping.

End position damping length: approx. 30 mm to 70 mm (depending on the stroke)

Positive stop: External positive stop at the end of stroke provided by the customer.

Note: Integrated grease chamber reduces friction and wear and optimizes lubrication.

End fittings: They are interchangeable and if necessary must be positively secured by the customer to prevent unscrewing.

Safety information: Gas springs (push type) should not be installed under pre-tension.

Adjuster Knob
DE-GAS-14
See page 191.

Valve Technology, Extension force 2,000 N to 13,000 N (compressed up to 16,250 N)

End Fitting

Standard Dimensions

End Fitting

B24 Stud Thread **B24**

D24 Clevis Fork **D24**
max. force 50,000 N

E24 Swivel Eye **E24**
max. force 50,000 N

Rod Shroud W24-70
Ø 80
L = Stroke + 130

Performance and Dimensions			
TYPES	Stroke mm	L extended mm	Extension force max. N
GS-70-100	100	320	13,000
GS-70-200	200	520	13,000
GS-70-300	300	720	13,000
GS-70-400	400	920	13,000
GS-70-500	500	1,120	13,000
GS-70-600	600	1,320	13,000
GS-70-700	700	1,520	13,000
GS-70-800	800	1,720	11,550

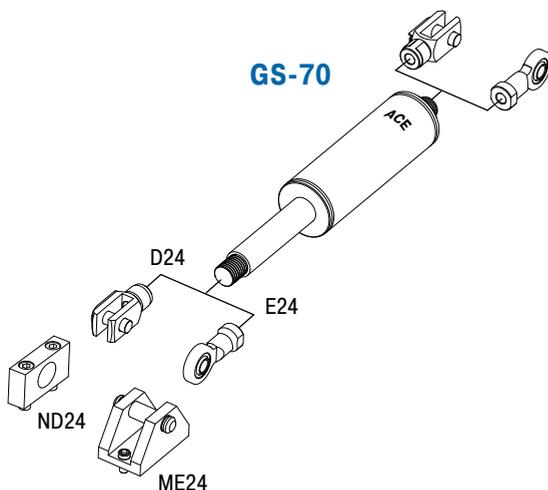
Ordering Example **GS-70-200-EE-8000**

Type (Push Type) _____
 Body 2.76" (70 mm) _____
 Stroke 7.87" (200 mm) _____
 Piston Rod End Fitting E24 _____
 Body End Fitting E24 _____
 Nominal Force F₁ 1,798 lbs (8,000 N) _____

Mounting accessories see from page 212.

Technical Data

- Extension force:** 2,000 N to 13,000 N (compressed up to 16,250 N)
- Progression:** Approx. 25 %
- Operating temperature range:** -20 °C to 80 °C
- Material:** Outer body: Coated steel; Piston rod: Hard chrome plated steel; End fittings: Zinc plated steel
- Mounting:** In any position. Hint: We recommend mounting with piston rod downwards to take advantage of the built-in end position damping.
- End position damping length:** approx. 10 mm to 20 mm (depending on the stroke)
- Positive stop:** External positive stop at the end of stroke provided by the customer.
- Note:** Increased break-away force if unit has not moved for some time.
- End fittings:** They are interchangeable and if necessary must be positively secured by the customer to prevent unscrewing.
- Safety information:** Gas springs (push type) should not be installed under pre-tension.



GS-8-V4A to GS-40-VA

With food grade oil for FDA compliance

Valve Technology, Stainless Steel

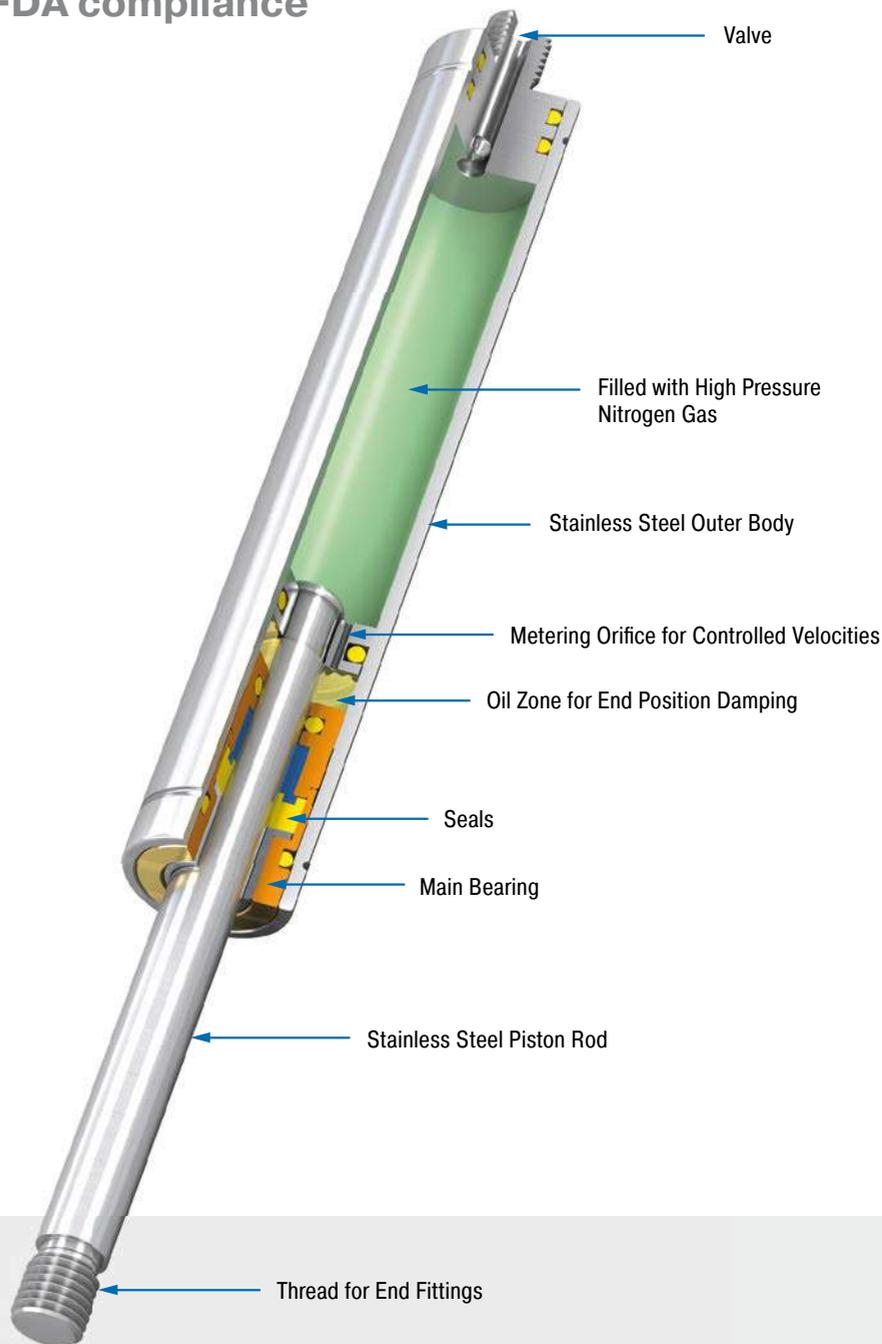
Extension force 10 N to 5,000 N

Stroke 20 mm to 700 mm

Protection against corrosion and superior visual appearance for even more sophisticated requirements: Based on ACE's industrial gas springs GS-8 to 40 made of steel, these models combine all advantages of stainless steel: they look great and are rust free. They are filled with food-grade oil as standard, which conforms to the requirements of FDA 21 CFR 178.3570.

These ACE gas springs not only look good, they are also available in various stroke lengths and extension forces. A comprehensive range of accessories in stainless steel guarantees easy assembly and a broad range of uses.

ACE stainless steel industrial gas springs are used in the automotive sector, in industrial applications, automation and machine building and medical clean room technology as well as in the food, electronics and shipbuilding industries.



Technical Data

Extension force: 10 N to 5,000 N

Piston rod diameter: Ø 3 mm to Ø 20 mm

Progression: Approx. 13 % to 59 %
(depending on size and stroke)

Lifetime: Approx. 10.000 m

Operating temperature range: -20 °C to 80 °C

Material: Outer body, Piston rod, End fittings:
Stainless steel (1.4301/1.4305, AISI 304/303
and 1.4404/1.4571, AISI 316L/316Ti)

Operating fluid: Nitrogen gas and HLP oil
according to DIN 51524, part 2

Mounting: We recommend mounting with
piston rod downwards to take advantage of the
built-in end position damping.

End position damping length: Approx.
5 mm to 30 mm (depending on the stroke)

Positive stop: External positive stop at the
end of stroke provided by the customer.

Application field: Hoods, Shutters, Machine
housing, Conveyor systems, Control boxes,
Furniture industry, Shipbuilding, Food industry,
Pharmaceutical industry, Folding elements

Note: Special oil according to FDA 21 CFR
178.3570 of the food industry

End fittings: They are interchangeable and if
necessary must be positively secured by the
customer to prevent unscrewing.

Safety information: Gas pressure springs
should not be installed under pre-tension.

On request: Special oils and other special
options. Alternative accessories. Different end
position damping and extension speed. Other
gas springs material 1.4404/1.4571, AISI
316L/316Ti (V4A) available on request.

Valve Technology, Stainless Steel, Extension force 10 N to 100 N (compressed up to 131 N)

End Fitting

Standard Dimensions

End Fitting

B3.5 Stud Thread **B3.5**

A3.5-V4A Eye **A3.5-V4A**
max. force 370 N

C3.5-V4A Angle Ball Joint **C3.5-V4A**
max. force 370 N

D3.5-V4A Clevis Fork **D3.5-V4A**
max. force 370 N

G3.5-V4A Ball Socket **G3.5-V4A**
max. force 370 N

Adjuster Knob DE-GAS-3.5
See page 191.

Performance and Dimensions			
TYPES	Stroke mm	L extended mm	Extension force max. N
GS-8-20-V4A	20	72	100
GS-8-30-V4A	30	92	100
GS-8-40-V4A	40	112	100
GS-8-50-V4A	50	132	100
GS-8-60-V4A	60	152	100
GS-8-80-V4A	80	192	100

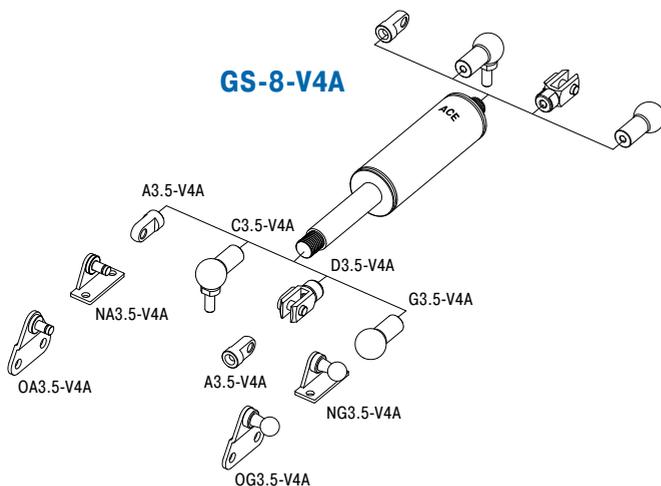
Ordering Example **GS-8-30-AC-30-V4A**

Type (Push Type) _____
 Body 0.31" (8 mm) _____
 Stroke 1.18" (30 mm) _____
 Piston Rod End Fitting A3.5-V4A _____
 Body End Fitting C3.5-V4A _____
 Nominal Force F₁ 7 lbs (30 N) _____
 Material (1.4404/1.4571, AISI 316L/316Ti, V4A) _____

Mounting accessories see from page 220.

Technical Data

- Extension force:** 10 N to 100 N (compressed up to 131 N)
- Progression:** Approx. 28 % to 31 %
- Operating temperature range:** -20 °C to 80 °C
- Material:** Outer body, Piston rod, End fittings: Stainless steel (1.4404/1.4571, AISI 316L/316Ti)
- Mounting:** We recommend mounting with piston rod downwards to take advantage of the built-in end position damping.
- End position damping length:** approx. 5 mm (depending on the stroke)
- Positive stop:** External positive stop at the end of stroke provided by the customer.
- Note:** Special oil according to FDA 21 CFR 178.3570 of the food industry
- End fittings:** They are interchangeable and if necessary must be positively secured by the customer to prevent unscrewing.
- Safety information:** Gas pressure springs should not be installed under pre-tension.



Issue 04.2018 – Specifications subject to change

Valve Technology, Stainless Steel, Extension force 10 N to 100 N (compressed up to 116 N)

End Fitting

Standard Dimensions

End Fitting

B3.5 Stud Thread **B3.5**

A3.5-V4A Eye **A3.5-V4A** max. force 370 N

C3.5-V4A Angle Ball Joint **C3.5-V4A** max. force 370 N

D3.5-V4A Clevis Fork **D3.5-V4A** max. force 370 N

G3.5-V4A Ball Socket **G3.5-V4A** max. force 370 N

Adjuster Knob DE-GAS-3.5 See page 191.

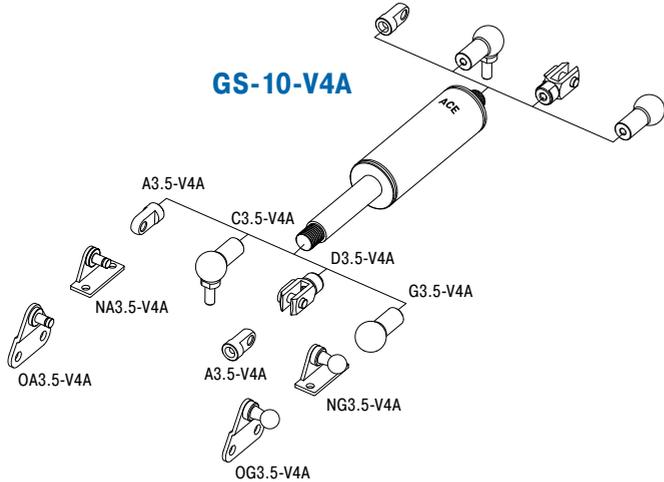
Performance and Dimensions			
TYPES	Stroke mm	L extended mm	Extension force max. N
GS-10-20-V4A	20	72	100
GS-10-30-V4A	30	92	100
GS-10-40-V4A	40	112	100
GS-10-50-V4A	50	132	100
GS-10-60-V4A	60	152	100
GS-10-80-V4A	80	192	100

Ordering Example

GS-10-30-AC-30-V4A

Type (Push Type) _____
 Body 0.39" (10 mm) _____
 Stroke 1.18" (30 mm) _____
 Piston Rod End Fitting A3.5-V4A _____
 Body End Fitting C3.5-V4A _____
 Nominal Force F₁ 7 lbs (30 N) _____
 Material (1.4404/1.4571, AISI 316L/316Ti, V4A) _____

Mounting accessories see from page 220.



Technical Data

- Extension force:** 10 N to 100 N (compressed up to 116 N)
- Progression:** Approx. 13 % to 16 %
- Operating temperature range:** -20 °C to 80 °C
- Material:** Outer body, Piston rod, End fittings: Stainless steel (1.4404/1.4571, AISI 316L/316Ti)
- Mounting:** We recommend mounting with piston rod downwards to take advantage of the built-in end position damping.
- End position damping length:** approx. 5 mm (depending on the stroke)
- Positive stop:** External positive stop at the end of stroke provided by the customer.
- Note:** Special oil according to FDA 21 CFR 178.3570 of the food industry
- End fittings:** They are interchangeable and if necessary must be positively secured by the customer to prevent unscrewing.
- Safety information:** Gas pressure springs should not be installed under pre-tension.

Valve Technology, Stainless Steel, Extension force 15 N to 180 N (compressed up to 225 N)

End Fitting
Standard Dimensions
End Fitting

B3.5

A3.5-V4A

C3.5-V4A

D3.5-V4A

G3.5-V4A

Performance and Dimensions			
TYPES	Stroke mm	L extended mm	Extension force max. N
GS-12-20-V4A	20	72	180
GS-12-30-V4A	30	92	180
GS-12-40-V4A	40	112	180
GS-12-50-V4A	50	132	180
GS-12-60-V4A	60	152	180
GS-12-80-V4A	80	192	150
GS-12-100-V4A	100	232	150
GS-12-120-V4A	120	272	120
GS-12-150-V4A	150	332	100

Ordering Example

GS-12-100-AA-30-V4A

Type (Push Type) _____ ↑

Body 0.47" (12 mm) _____ ↑

Stroke 3.94" (100 mm) _____ ↑

Piston Rod End Fitting A3.5-V4A _____ ↑

Body End Fitting A3.5-V4A _____ ↑

Nominal Force F₁ 7 lbs (30 N) _____ ↑

Material (1.4404/1.4571, AISI 316L/316Ti, V4A) _____ ↑

Stud Thread B3.5

Eye A3.5-V4A
max. force 370 N

Angle Ball Joint C3.5-V4A
max. force 370 N

Clevis Fork D3.5-V4A
max. force 370 N

Ball Socket G3.5-V4A
max. force 370 N

Adjuster Knob DE-GAS-3.5
See page 191.

Mounting accessories see from page 220.

Technical Data
Extension force: 15 N to 180 N (compressed up to 225 N)

Progression: Approx. 20 % to 25 %

Operating temperature range: -20 °C to 80 °C

Material: Outer body, Piston rod, End fittings: Stainless steel (1.4404/1.4571, AISI 316L/316Ti)

Mounting: We recommend mounting with piston rod downwards to take advantage of the built-in end position damping.

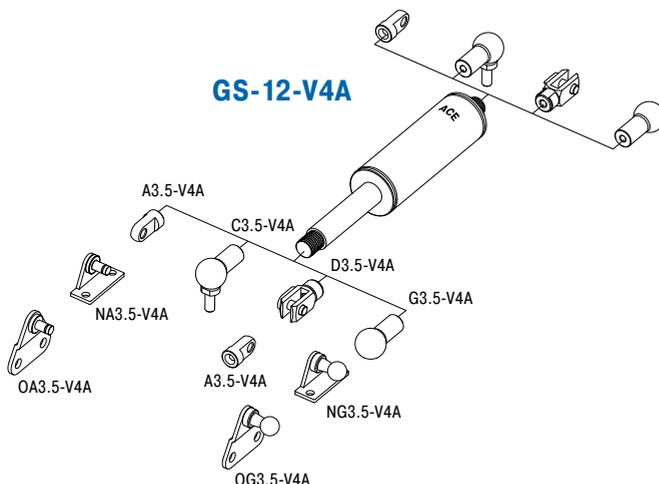
End position damping length: approx. 10 mm (depending on the stroke)

Positive stop: External positive stop at the end of stroke provided by the customer.

Note: Special oil according to FDA 21 CFR 178.3570 of the food industry

End fittings: They are interchangeable and if necessary must be positively secured by the customer to prevent unscrewing.

Safety information: Gas pressure springs should not be installed under pre-tension.

GS-12-V4A


Valve Technology, Stainless Steel, Extension force 40 N to 400 N (compressed up to 612 N)

End Fitting

Standard Dimensions

End Fitting

B5

A5-VA

C5-VA

D5-VA

E5-VA

G5-VA

Rod Shroud W5-15-VA

Performance and Dimensions

TYPES	Stroke mm	L extended mm	Extension force max. N
GS-15-20-VA	20	74	400
GS-15-40-VA	40	114	400
GS-15-50-VA	50	134	400
GS-15-60-VA	60	154	400
GS-15-80-VA	80	194	400
GS-15-100-VA	100	234	400
GS-15-120-VA	120	274	400
GS-15-150-VA	150	334	400

Ordering Example

Type (Push Type) **GS-15-150-AC-150-VA**

Body 0.61" (15.6 mm)

Stroke 5.91" (150 mm)

Piston Rod End Fitting A5-VA

Body End Fitting C5-VA

Nominal Force F₁ 34 lbs (150 N)

Material (1.4301/1.4305, AISI 304/303, VA)

Stud Thread B5

Eye A5-VA
max. force 490 N

Angle Ball Joint C5-VA
max. force 430 N

Clevis Fork D5-VA
max. force 490 N

Swivel Eye E5-VA
max. force 490 N

Ball Socket G5-VA
max. force 430 N

Adjuster Knob DE-GAS-5
See page 191.

Mounting accessories see from page 220.

Technical Data

Extension force: 40 N to 400 N (compressed up to 612 N)

Progression: Approx. 30 % to 53 %

Operating temperature range: -20 °C to 80 °C

Material: Outer body, Piston rod, End fittings: Stainless steel (1.4301/1.4305, AISI 304/303)

Mounting: We recommend mounting with piston rod downwards to take advantage of the built-in end position damping.

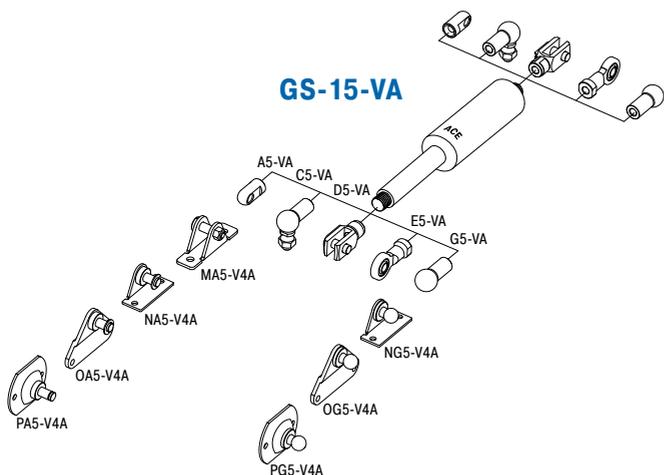
End position damping length: approx. 20 mm (depending on the stroke)

Positive stop: External positive stop at the end of stroke provided by the customer.

Note: Special oil according to FDA 21 CFR 178.3570 of the food industry

End fittings: They are interchangeable and if necessary must be positively secured by the customer to prevent unscrewing.

Safety information: Gas pressure springs should not be installed under pre-tension.



Valve Technology, Stainless Steel, Extension force 50 N to 700 N (compressed up to 924 N)

End Fitting

Standard Dimensions

End Fitting

B8

A8-VA

C8-VA

D8-VA

E8-VA

G8-VA

Rod Shroud W8-19-VA

Performance and Dimensions

TYPES	Stroke mm	L extended mm	Extension force max. N
GS-19-50-VA	50	164	700
GS-19-100-VA	100	264	700
GS-19-150-VA	150	364	700
GS-19-200-VA	200	464	700
GS-19-250-VA	250	564	600
GS-19-300-VA	300	664	450

Ordering Example

GS-19-150-AC-600-VA

Type (Push Type) _____

Body 0.75" (19 mm) _____

Stroke 5.91" (150 mm) _____

Piston Rod End Fitting A8-VA _____

Body End Fitting C8-VA _____

Nominal Force F₁ 135 lbs (600 N) _____

Material (1.4301/1.4305, AISI 304/303, VA) _____

Stud Thread B8

Eye A8-VA
max. force 1,560 N

Angle Ball Joint C8-VA
max. force 1,140 N

Clevis Fork D8-VA
max. force 1,560 N

Swivel Eye E8-VA
max. force 1,560 N

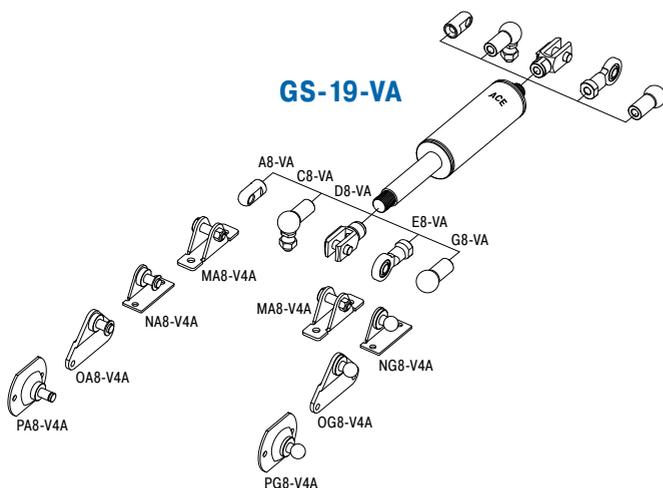
Ball Socket G8-VA
max. force 1,140 N

Adjuster Knob DE-GAS-8
See page 191.

Mounting accessories see from page 220.

Technical Data

- Extension force:** 50 N to 700 N (compressed up to 924 N)
- Progression:** Approx. 28 % to 32 %
- Operating temperature range:** -20 °C to 80 °C
- Material:** Outer body, Piston rod, End fittings: Stainless steel (1.4301/1.4305, AISI 304/303)
- Mounting:** We recommend mounting with piston rod downwards to take advantage of the built-in end position damping.
- End position damping length:** approx. 20 mm (depending on the stroke)
- Positive stop:** External positive stop at the end of stroke provided by the customer.
- Note:** Special oil according to FDA 21 CFR 178.3570 of the food industry
- End fittings:** They are interchangeable and if necessary must be positively secured by the customer to prevent unscrewing.
- Safety information:** Gas pressure springs should not be installed under pre-tension.



End Fitting

Standard Dimensions

End Fitting

B8

A8-VA

C8-VA

D8-VA

E8-VA

G8-VA

Rod Shroud W8-22-VA

Performance and Dimensions			
TYPES	Stroke mm	L extended mm	Extension force max. N
GS-22-50-VA	50	164	1,200
GS-22-100-VA	100	264	1,200
GS-22-150-VA	150	364	1,200
GS-22-200-VA	200	464	1,200
GS-22-250-VA	250	564	1,200
GS-22-300-VA	300	664	1,100
GS-22-350-VA	350	764	850
GS-22-400-VA	400	864	650
GS-22-450-VA	450	964	550
GS-22-500-VA	500	1,064	450
GS-22-550-VA	550	1,164	400
GS-22-600-VA	600	1,264	350
GS-22-650-VA	650	1,364	300
GS-22-700-VA	700	1,464	250

Ordering Example

GS-22-150-AE-800-VA

Type (Push Type) _____

Body 0.91" (23 mm) _____

Stroke 5.91" (150 mm) _____

Piston Rod End Fitting A8-VA _____

Body End Fitting E8-VA _____

Nominal Force F₁ 180 lbs (800 N) _____

Material (1.4301/1.4305, AISI 304/303, VA) _____

Stud Thread B8

Eye A8-VA
max. force 1,560 N

Angle Ball Joint C8-VA
max. force 1,140 N

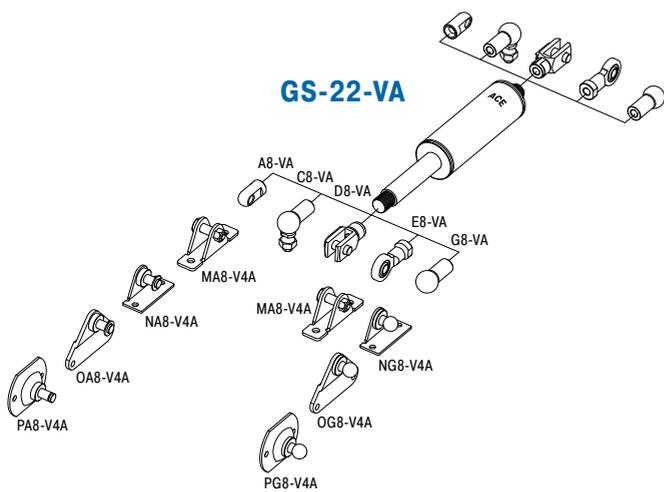
Clevis Fork D8-VA
max. force 1,560 N

Swivel Eye E8-VA
max. force 1,560 N

Ball Socket G8-VA
max. force 1,140 N

Adjuster Knob DE-GAS-8
See page 191.

Mounting accessories see from page 220.



Technical Data

- Extension force:** 100 N to 1,200 N (compressed up to 1,596 N)
- Progression:** Approx. 29 % to 33 %
- Operating temperature range:** -20 °C to 80 °C
- Material:** Outer body, Piston rod, End fittings: Stainless steel (1.4301/1.4305, AISI 304/303)
- Mounting:** We recommend mounting with piston rod downwards to take advantage of the built-in end position damping.
- End position damping length:** approx. 20 mm (depending on the stroke)
- Positive stop:** External positive stop at the end of stroke provided by the customer.
- Note:** Special oil according to FDA 21 CFR 178.3570 of the food industry
- End fittings:** They are interchangeable and if necessary must be positively secured by the customer to prevent unscrewing.
- Safety information:** Gas pressure springs should not be installed under pre-tension.

Issue 04.2018 – Specifications subject to change

Valve Technology, Stainless Steel, Extension force 150 N to 2,500 N (compressed up to 3,975 N)

End Fitting

Standard Dimensions

End Fitting

B10

M10x1.5

Ø 14

Stroke

12

L +/- 2 mm extended

Ø 28

12

Performance and Dimensions

TYPES	Stroke mm	L extended mm	Extension force max. N
GS-28-100-VA	100	262	2,500
GS-28-150-VA	150	362	2,500
GS-28-200-VA	200	462	2,500
GS-28-250-VA	250	562	2,500
GS-28-300-VA	300	662	2,500
GS-28-350-VA	350	762	2,500
GS-28-400-VA	400	862	2,400
GS-28-450-VA	450	962	1,950
GS-28-500-VA	500	1,062	1,600
GS-28-550-VA	550	1,162	1,350
GS-28-600-VA	600	1,262	1,150
GS-28-650-VA	650	1,362	1,000

Stud Thread B10

Eye A10-VA
max. force 3,800 N

Angle Ball Joint C10-VA
max. force 1,750 N

Clevis Fork D10-VA
max. force 3,800 N

Swivel Eye E10-VA
max. force 3,800 N

Adjuster Knob DE-GAS-10
See page 191.

Ordering Example

GS-28-150-EE-1200-VA

Type (Push Type) _____

Body 1.1" (28 mm) _____

Stroke 5.91" (150 mm) _____

Piston Rod End Fitting E10-VA _____

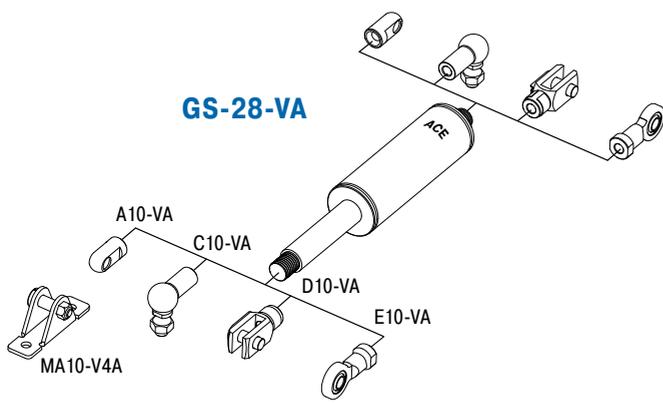
Body End Fitting E10-VA _____

Nominal Force F₁ 270 lbs (1,200 N) _____

Material (1.4301/1.4305, AISI 304/303, VA) _____

Mounting accessories see from page 220.

Issue 04.2018 – Specifications subject to change



Technical Data

Extension force: 150 N to 2,500 N (compressed up to 3,975 N)

Progression: Approx. 53 % to 59 %

Operating temperature range: -20 °C to 80 °C

Material: Outer body, Piston rod, End fittings: Stainless steel (1.4301/1.4305, AISI 304/303)

Mounting: We recommend mounting with piston rod downwards to take advantage of the built-in end position damping.

End position damping length: approx. 20 mm (depending on the stroke)

Positive stop: External positive stop at the end of stroke provided by the customer.

Note: Special oil according to FDA 21 CFR 178.3570 of the food industry

End fittings: They are interchangeable and if necessary must be positively secured by the customer to prevent unscrewing.

Safety information: Gas pressure springs should not be installed under pre-tension.

Stainless Steel Gas Springs (Push Type), V4A

TYPES	Stroke mm	L extended mm	Dimensions see Page
GS-15-20-V4A	20	74	164
GS-15-40-V4A	40	114	164
GS-15-50-V4A	50	134	164
GS-15-60-V4A	60	154	164
GS-15-80-V4A	80	194	164
GS-15-100-V4A	100	234	164
GS-15-120-V4A	120	274	164
GS-15-150-V4A	150	334	164
GS-19-50-V4A	50	164	165
GS-19-100-V4A	100	264	165
GS-19-150-V4A	150	364	165
GS-19-200-V4A	200	464	165
GS-19-250-V4A	250	564	165
GS-19-300-V4A	300	664	165
GS-22-50-V4A	50	164	166
GS-22-100-V4A	100	264	166
GS-22-150-V4A	150	364	166
GS-22-200-V4A	200	464	166
GS-22-250-V4A	250	564	166
GS-22-300-V4A	300	664	166
GS-22-350-V4A	350	764	166
GS-22-400-V4A	400	864	166
GS-22-450-V4A	450	964	166
GS-22-500-V4A	500	1,064	166
GS-22-550-V4A	550	1,164	166
GS-22-600-V4A	600	1,264	166
GS-22-650-V4A	650	1,364	166
GS-22-700-V4A	700	1,464	166
GS-28-100-V4A	100	262	167
GS-28-150-V4A	150	362	167
GS-28-200-V4A	200	462	167
GS-28-250-V4A	250	562	167
GS-28-300-V4A	300	662	167
GS-28-350-V4A	350	762	167
GS-28-400-V4A	400	862	167
GS-28-450-V4A	450	962	167
GS-28-500-V4A	500	1,062	167
GS-28-550-V4A	550	1,162	167
GS-28-600-V4A	600	1,262	167
GS-28-650-V4A	650	1,362	167
GS-40-100-V4A	100	317	168
GS-40-150-V4A	150	417	168
GS-40-200-V4A	200	517	168
GS-40-300-V4A	300	717	168
GS-40-400-V4A	400	917	168
GS-40-500-V4A	500	1,117	168
GS-40-600-V4A	600	1,317	168

Stainless Steel Accessories, V4A

TYPES	Dimensions see Page
A5-V4A	222
C5-V4A	222
D5-V4A	222
E5-V4A	222
G5-V4A	222
A8-V4A	223
C8-V4A	223
D8-V4A	223
E8-V4A	223
G8-V4A	224
A10-V4A	224
C10-V4A	224
D10-V4A	224
E10-V4A	224
A14-V4A	225
C14-V4A	225
D14-V4A	225
E14-V4A	225

GST-40 Tandem

Optimized dual force for heavy flaps and wide angle applications

Valve Technology

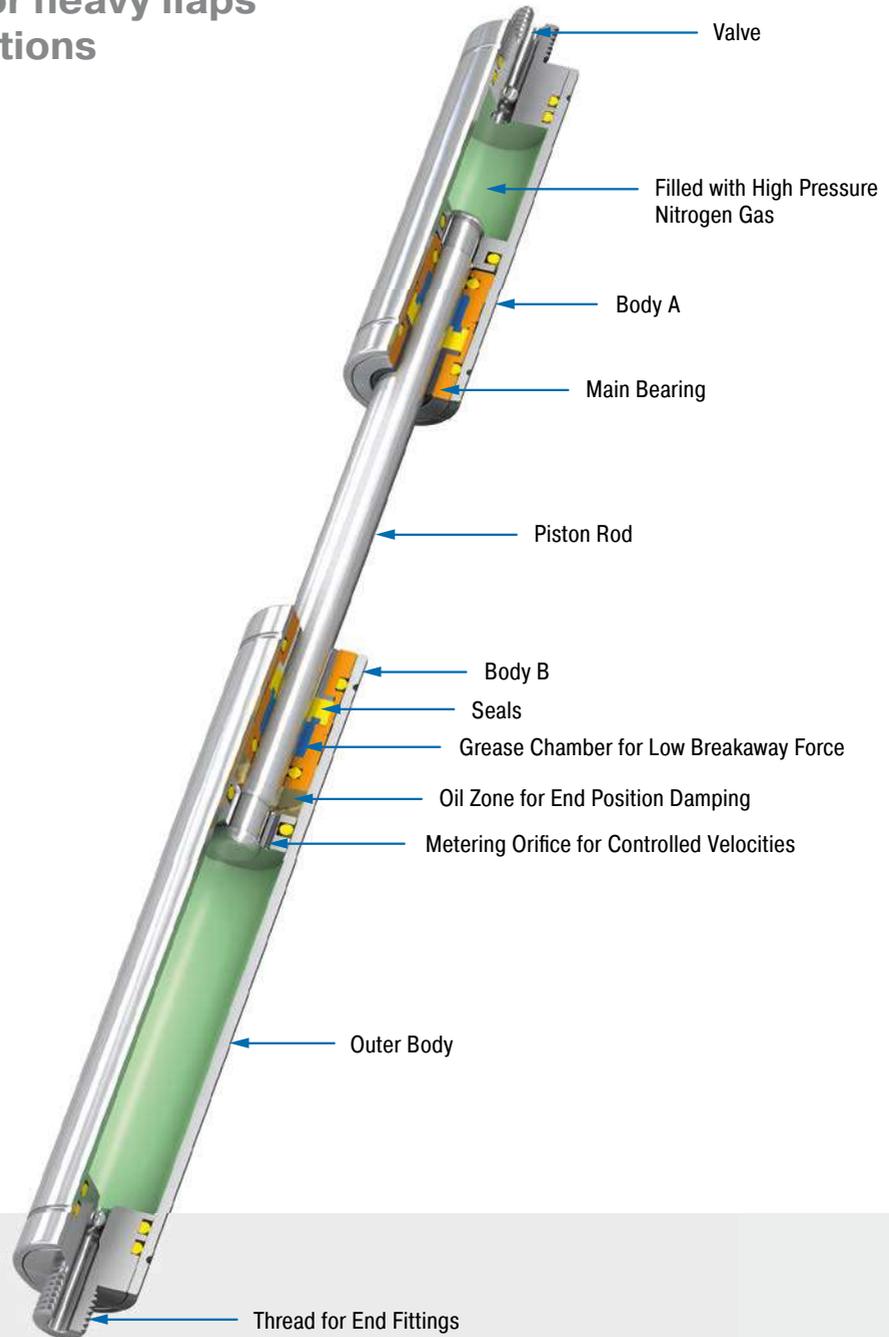
Extension force 300 N to 5,000 N

Stroke 50 mm to 400 mm

Cover two differing force ranges: Tandem gas springs by ACE are maintenance-free and ready-to-install. Two pressure tubes deliver different extension forces and progression curves. With this type of gas spring you cover the different force ranges between the start and end of an application. ACE provides free specification support to deliver a gas spring that meets your specific application needs. We manufacture and adjusted precisely to the required dynamics of the application.

A comprehensive range of accessories guarantees easy assembly and a broad range of uses, are specifically suitable for heavy loads with large opening angle. Stainless steel versions are available to meet environmental or appearance requirements.

Tandem push type gas springs from ACE are used in industrial applications such as in automation and machine building, in the automobile, electronics and furniture industries, but also in medical technology as well as for service hatches.



Technical Data

Extension force: 300 N to 5,000 N

Piston rod diameter: Ø 20 mm

Progression: According to calculation relating to your application.

Lifetime: Approx. 10,000 m

Operating temperature range: -20 °C to 80 °C

Material: Outer body, End fittings: Zinc plated steel; Piston rod: Steel with wear-resistant coating

Operating fluid: Nitrogen gas and oil

Mounting: In any position. Please adopt the mounting points determined by ACE.

End position damping length: Application-specific end position damping and extension speed.

Positive stop: External positive stop at the end of stroke provided by the customer.

Application field: Hoods, Shutters, Machine housing, Conveyor systems, Folding elements, Loading and lifting equipment

Note: These gas springs are tailored to the relevant application and are therefore not available ex stock.

End fittings: They are interchangeable and if necessary must be positively secured by the customer to prevent unscrewing.

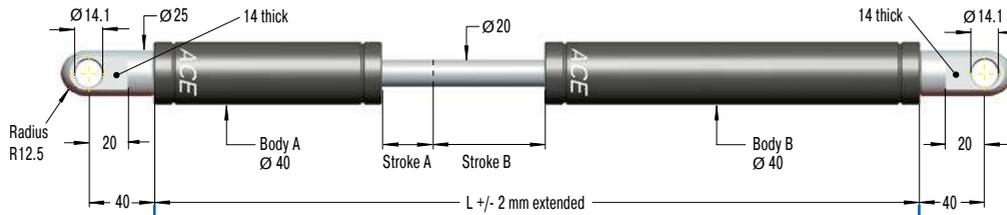
On request: Special oils and other special options. Alternative accessories. Material 1.4301/1.4305, AISI 304/303 (V2A) and 1.4404/1.4571, AISI 316L/316Ti (V4A).

End Fitting

Standard Dimensions

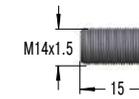
End Fitting

A14



Eye A14
max. force 10,000 N

B14

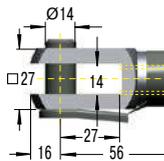


Performance and Dimensions

TYPES	Stroke A mm	Stroke B mm	L extended mm	Extension force max. N
GST-40-50-100	50	100	485	5,000
GST-40-50-150	50	150	585	5,000
GST-40-50-200	50	200	685	5,000
GST-40-70-250	70	250	825	5,000
GST-40-70-300	70	300	925	5,000
GST-40-70-350	70	350	1,025	5,000
GST-40-70-400	70	400	1,125	5,000

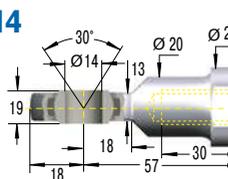
Stud Thread B14

D14



Clevis Fork D14
max. force 10,000 N

E14



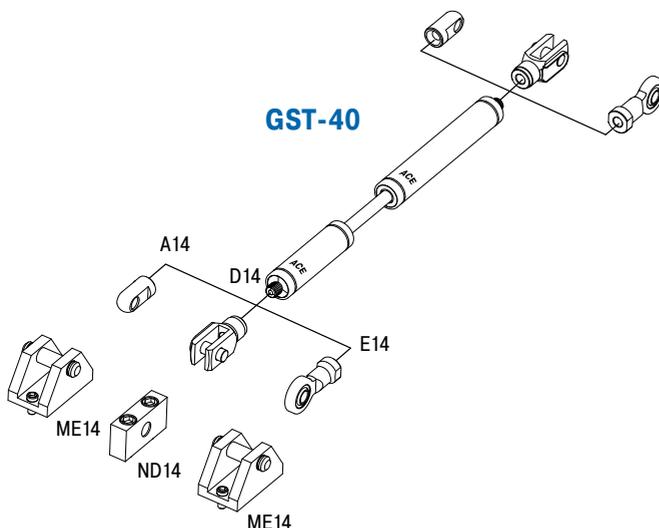
Swivel Eye E14
max. force 10,000 N

Ordering Example

GST-40-50-150-AD-900N-2500N

Type (Tandem Gas Spring) _____
 Body 1.57" (40 mm) _____
 Stroke A 1.97" (50 mm) _____
 Stroke B 5.91" (150 mm) _____
 Body A End Fitting, A14 _____
 Body B End Fitting, D14 _____
 Nominal Force Body A, 202 lbs (900 N) _____
 Nominal Force Body B, 562 lbs (2,500 N) _____

Mounting accessories see from page 220.



Technical Data

Extension force: 300 N to 5,000 N

Progression: According to calculation relating to your application.

Operating temperature range: -20 °C to 80 °C

Material: Outer body, End fittings: Zinc plated steel; Piston rod: Steel with wear-resistant coating

Mounting: In any position. Please adopt the mounting points determined by ACE.

End position damping length: Application-specific end position damping and extension speed.

Positive stop: External positive stop at the end of stroke provided by the customer.

Note: These gas springs are tailored to the relevant application and are therefore not available ex stock.

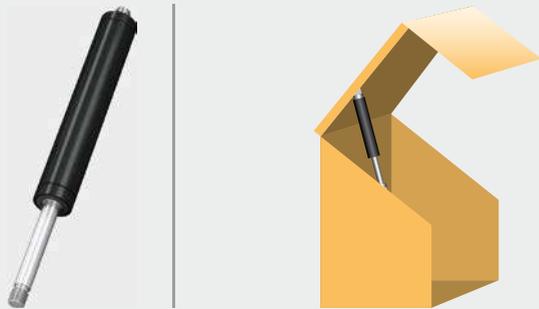
End fittings: They are interchangeable and if necessary must be positively secured by the customer to prevent unscrewing.

Application Examples

GS-12

Safe opening and closing

ACE industrial gas springs (push type) protect samples in an incubator, which is used for chemical and biochemical applications. The plexiglass hood, under which may be found valuable laboratory goods, is securely held open by two maintenance-free, ready-to-install ACE industrial gas springs (push type) of the type GS-12-60-AA-X. With an end-position damping of 5 mm and an extension force of 10 to 180 N, they help to handle the forces generated. The hood is always easily opened and remains in this position. It also remains securely shut when the incubator is in operation.



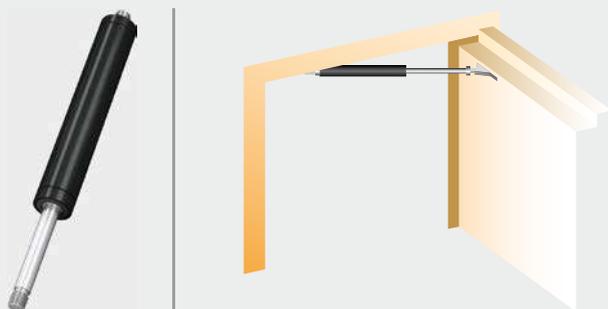
Very small ACE industrial gas springs (push type) enable careful opening and closing movements of a mini-incubator hood, under which may be found laboratory products

GFL Gesellschaft für Labortechnik mbH, 30938 Burgwedel, Germany

GS-19

Doors open and close safely

ACE industrial gas springs make opening and closing doors of rescue helicopters easier. The maintenance-free, sealed systems are installed in the access doors of helicopters of the type EC 135. There, they allow the crew to enter or exit the helicopter quickly, thus contributing to enhanced safety. The GS-19-300-CC gas springs provide a defined retraction speed and secure engagement of the door lock. The integrated end position damper allows gentle closing of the door and saves wear and tear on the valuable, lightweight material.

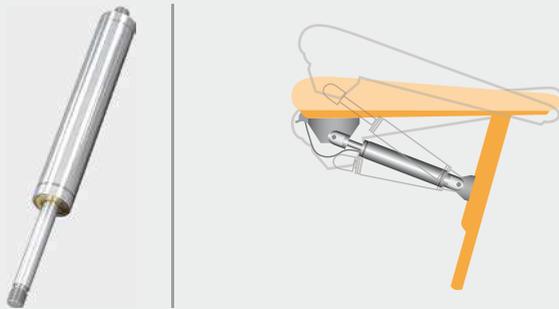


Industrial gas springs: For safe entry and exit

GS-22-VA

Made-to-measure stainless steel gas springs

A special hygiene and toilet chair, designed for children and young people with disabilities, must be firmly lockable in the sit and tilt positions. The practical aid thereby provided for relatives and carers can be attributed to two lockable ACE industrial gas springs (push type) which were especially developed and manufactured for this application and operate on the basis of the so-called tilt-in-space function. This allows the chair to be tilted forwards and backwards and provides significantly more convenience for users and patients. In order to meet all hygiene requirements, the gas springs are constructed in stainless steel.



With inclination angles of 15 degrees to the front and rear, the ACE stainless steel gas springs facilitate the work of nurses
Rifton Equipment, Rifton, New York 12471, USA

GST-40

Tandemly-operated large flaps securely under control

Underground distribution systems are visually advantageous. To facilitate their servicing, the heavy covers of the often large supply systems are brought back to the surface with the help of ACE industrial tandem gas springs (push type). This is quite easily achieved thanks to the use of two pressure pipes, the result of which is two different force ranges. This means fitters must not endure laborious bending and a downward passage into the system of channels. In addition to these advantages, the springs benefit from their long service life and their capacity to be used, as stainless steel variants, in even the most hygienically-sensitive areas.



ACE industrial tandem gas springs (push type) enable easy maintenance of supply boxes by making the heavy flaps easier to operate
Langmatz GmbH, 82467 Garmisch-Partenkirchen, Germany

Issue 04.2018 – Specifications subject to change

Industrial Gas Springs – Pull Type

Alternatives for tight spaces and mounting requirements

If ACE gas push type springs cannot be used due to a lack of space, ACE's industrial gas pull type springs come into their own. These compact assistants with body diameters of 15 to 40 mm (0.59" to 1.57") are effective in the direction of traction and work in the opposite way to the principle of gas push type springs.

This means that the gas pressure in the cylinder draws the piston rod in and, when closing a flap for example, supports the manual force required for a controlled motion. ACE's gas pull type springs are also self-contained, maintenance-free machine elements and equipped with a standard valve to individually regulate the gas pressure, whereby they cover forces between 30 and 5,000 N (7 to 1125 lb). The ability to mount in any orientation and position along with an extensive range of DIN standardized accessories enable universal use.

Compact design

Individual filling valve technology

Calculation program for specific design

Universally applicable



Function of a Gas Spring – Pull Type

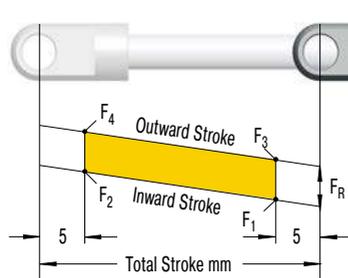
Gas pull type springs work based on the reverse principle of a gas push type spring. They are also individually filled according to customer request to a certain pressure (extension force F_1). However, the piston rod here is pulled inwards by the gas pressure in the cylinder. The higher the pressure, the greater the traction force.

The piston ring surface between the piston rod and the inner tube is decisive for the function. When the piston rod pulls out, the nitrogen from the piston is compressed in the inner tube. The force increase (progression) of the gas spring is due to the rising pressure. The force increase is almost linear.

Free calculation service see page 188!

Calculation Principles

Force-Stroke Characteristics of Traction Gas Spring (Pull Type)



- F_1 = nominal force at 20 °C (this is the pressure figure normally used when specifying the gas spring)
- F_2 = force in the complete extended position
- When extending the piston rod, there is an additional friction force caused by the contact pressure of the seals (this **only** occurs **during the extension stroke**):
- F_3 = force at the beginning of the extension stroke
- F_4 = force at the end of the extension stroke

Gas Springs (Pull Type)

TYPES	Progression approx. %	¹ Friction F_R approx. in N
GZ-15	12 - 22 ²	55 - 140
GZ-19	21 - 28 ²	20 - 40
GZ-28	28 - 30 ²	100 - 200
GZ-40	43 - 45 ²	

¹ Depending on the filling force
² Depending on the stroke

Progression: (the slope of the force line in the diagram above) is due to the reduction of the internal gas volume as the piston rod moves from its initial position to its fully stroked position. The approx. progression values given above for standard springs can be altered on request.

Effect of temperature: The nominal F_1 figure is given at 20 °C. An increase of 10 °C will increase force by 3.4 %.

Filling tolerances: -20 N to +40 N or 5 % to 7 %. Depending on size and extension force the tolerances can differ.

Industrial Gas Springs – Pull Type



GZ-15 to GZ-40

Valve Technology
Very low progression rate
 Hoods, Shutters, Machine housing, Conveyor systems

Page 176



GZ-15-V4A to GZ-40-VA

Valve Technology, Stainless Steel
Very low progression rate with FDA approval
 Hoods, Shutters, Machine housing, Conveyor systems

Page 182

GZ-15 to GZ-40

Very low progression rate

Valve Technology

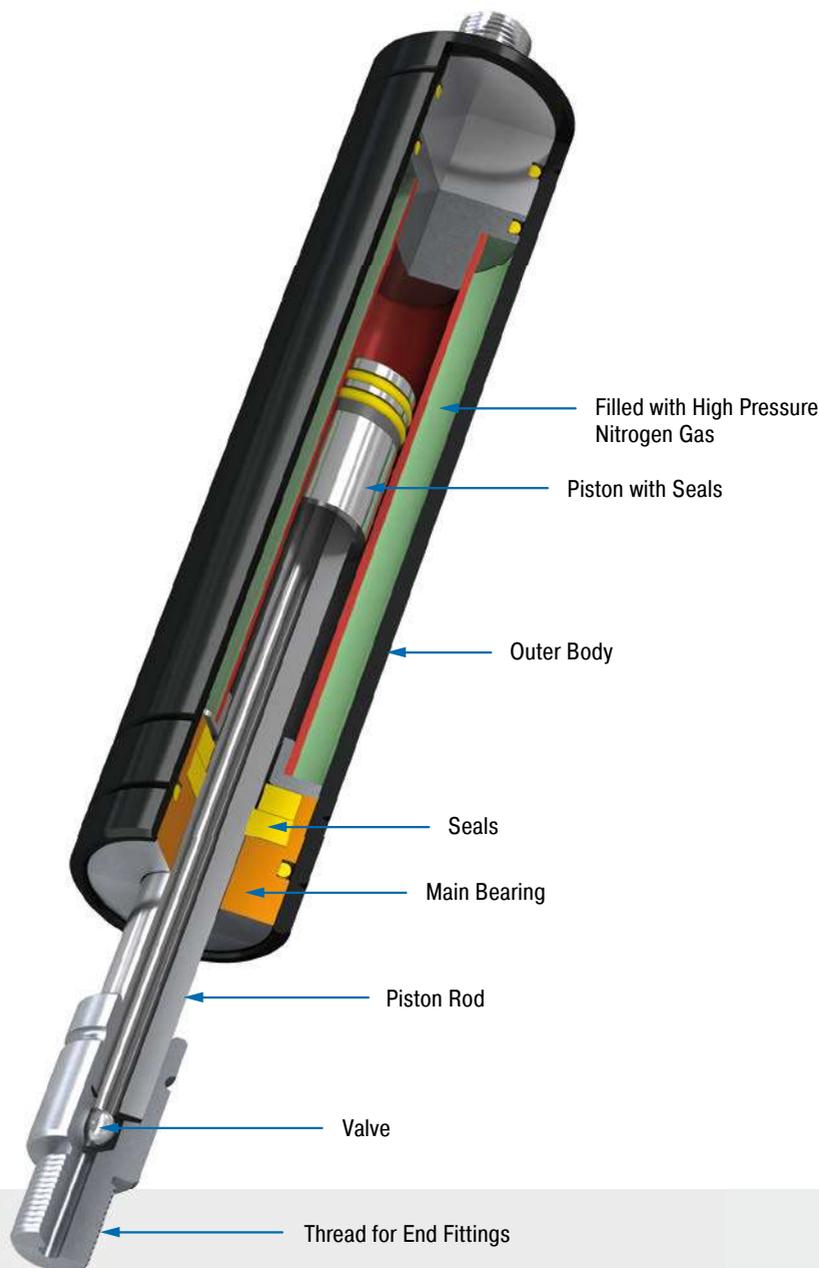
Traction force 40 N to 5,000 N

Stroke 20 mm to 650 mm

The solution to a lack of space: If standard push type gas springs cannot be used due to a lack of space, ACE's industrial pull type gas springs are the solution. They work in the opposite way of standard push type gas springs. The piston rod is retracted when the cylinder is unloaded. The gas pressure in the cylinder draws the piston rod in.

ACE pull type gas springs offer the maximum service life thanks to the solid chrome-plated piston rod and an integrated sliding bearing. The maintenance-free and ready-to-install products are available in body diameters of 15 mm to 40 mm (0.59" to 1.57") as well as forces from 40 N to 5,000 N (8.99 lbs to 1,124 lbs.) and are available from stock with valve and a large selection of accessories. The traction force can be fine-tuned using the adjustment valve.

Gas traction springs from ACE are used in industrial applications, especially in mechanical engineering and in medical technology as well as in the electronics and furniture industries.



Technical Data

Traction force: 40 N to 5,000 N

Piston rod diameter: Ø 4 mm to Ø 28 mm

Progression: Approx. 12 % to 45 %

Lifetime: Approx. 2,000 m

Operating temperature range: -20 °C to 80 °C

Material: Outer body, End fittings: Zinc plated steel; Piston rod: Steel or stainless steel with wear-resistant coating

Operating fluid: Nitrogen gas

Mounting: With piston rod upwards.

End position damping length: Without damping. For end position damping use damping material (e.g. TUBUS or SLAB).

Positive stop: External positive stop at the end of stroke provided by the customer.

Application field: Hoods, Shutters, Machine housing, Conveyor systems, Control boxes, Furniture industry, Shipbuilding, Assembly stations, Vehicle technology, Folding elements

End fittings: They are interchangeable and if necessary must be positively secured by the customer to prevent unscrewing.

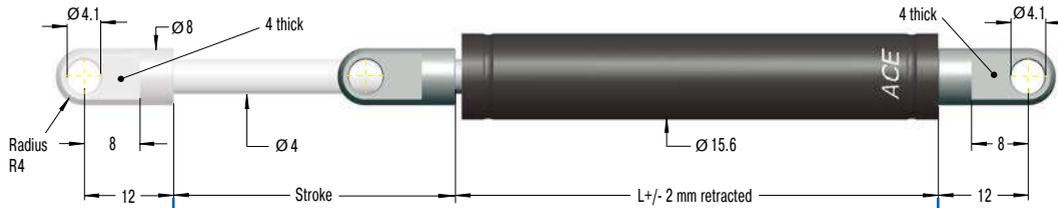
On request: Special oils and other special options. Alternative accessories. Traction gas springs with end position damping also available on request.

Valve Technology, Traction force 50 N to 150 N (extended up to 183 N)

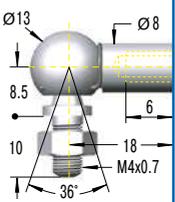
End Fitting

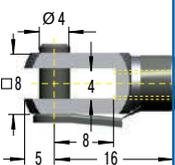
Standard Dimensions

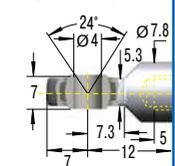
End Fitting

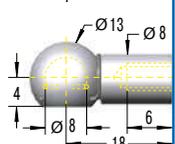
A3.5

Eye A3.5
max. force 370 N

B3.5

Stud Thread B3.5
C3.5

Angle Ball Joint C3.5
max. force 370 N

D3.5

Clevis Fork D3.5
max. force 370 N

E3.5

Swivel Eye E3.5
max. force 370 N

G3.5

Ball Socket G3.5
max. force 370 N

Performance and Dimensions

TYPES	Stroke mm	L retracted mm	Traction force max. N
GZ-15-20	20	87	150
GZ-15-40	40	107	150
GZ-15-50	50	117	150
GZ-15-60	60	127	150
GZ-15-80	80	147	150
GZ-15-100	100	167	150
GZ-15-120	120	187	150
GZ-15-150	150	217	150

Ordering Example

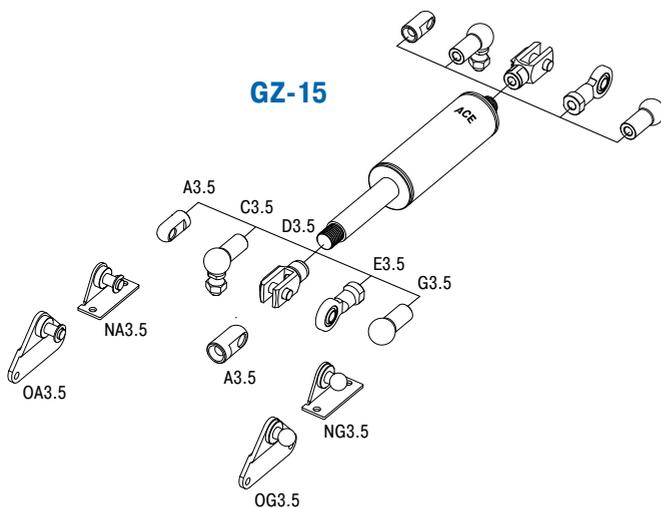
GZ-15-150-AC-V-150
 Type (Pull Type) _____
 Body 0.61" (15.6 mm) _____
 Stroke 5.91" (150 mm) _____
 Piston Rod End Fitting A3.5 _____
 Body End Fitting C3.5 _____
 Adjustable (V) _____
 Traction Force F₁ 34 lbs (150 N) _____

Mounting accessories see from page 212.

Adjuster Knob
DE-GAS-3.5

See page 191.

GZ-15



Technical Data

Traction force: 50 N to 150 N (extended up to 183 N)

Progression: Approx. 12 % to 22 %

Lifetime: Approx. 2,000 m

Operating temperature range: -20 °C to 80 °C

Material: Outer body, End fittings: Zinc plated steel; Piston rod: Stainless steel (1.4301/1.4305, AISI 304/303)

Mounting: With piston rod upwards.

End position damping length: Without damping. For end position damping use damping material (e.g. TUBUS or SLAB).

Positive stop: External positive stop at the end of stroke provided by the customer.

End fittings: They are interchangeable and if necessary must be positively secured by the customer to prevent unscrewing.

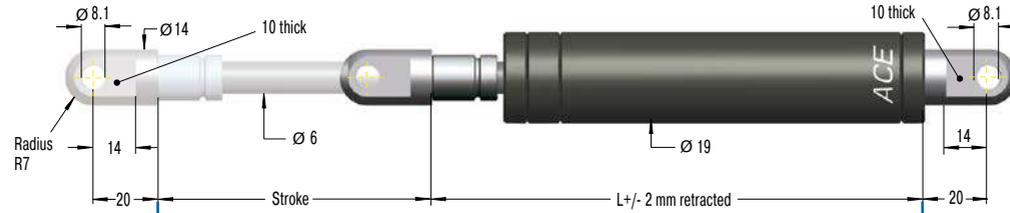
Valve Technology, Traction force 40 N to 350 N (extended up to 448 N)

End Fitting

Standard Dimensions

End Fitting

A8



Eye A8
max. force 3,000 N

B8

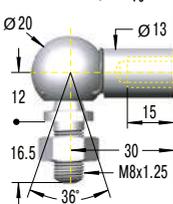


Performance and Dimensions

TYPES	Stroke mm	L retracted mm	Traction force max. N
GZ-19-30	30	112	350
GZ-19-50	50	132	350
GZ-19-100	100	182	350
GZ-19-150	150	232	350
GZ-19-200	200	282	350
GZ-19-250	250	332	350

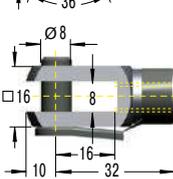
Stud Thread B8

C8



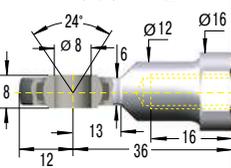
Angle Ball Joint C8
max. force 1,200 N
Also available with UNF thread 5/16-18. Order G5/16.

D8



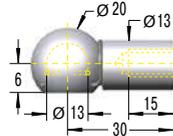
Clevis Fork D8
max. force 3,000 N

E8



Swivel Eye E8
max. force 3,000 N

G8



Ball Socket G8
max. force 1,200 N

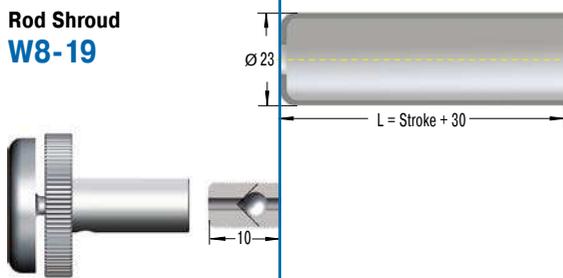
Ordering Example

GZ-19-150-AC-V-250

- Type (Pull Type) _____
- Body 0.75" (19 mm) _____
- Stroke 5.91" (150 mm) _____
- Piston Rod End Fitting A8 _____
- Body End Fitting C8 _____
- Adjustable (V) _____
- Traction Force F₁ 56 lbs (250 N) _____

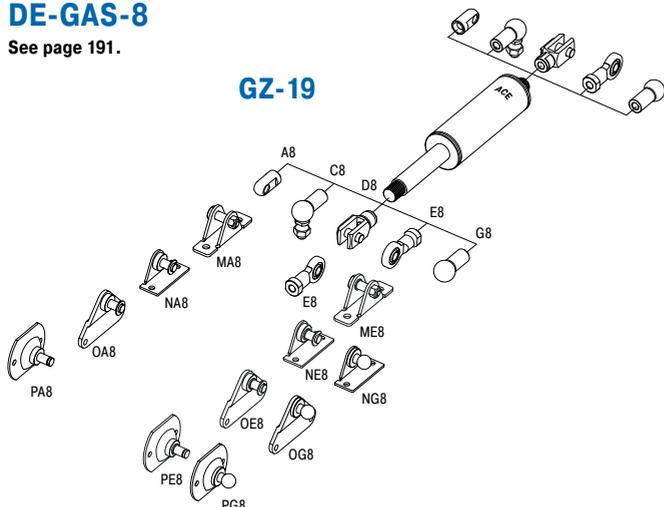
Mounting accessories see from page 212.

Rod Shroud W8-19



Adjuster Knob DE-GAS-8

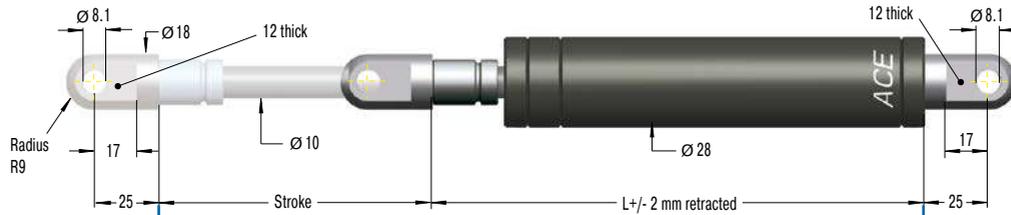
See page 191.

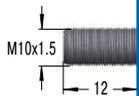
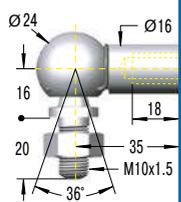


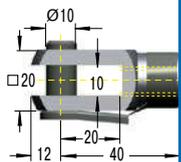
Technical Data

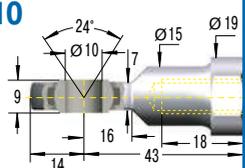
- Traction force:** 40 N to 350 N (extended up to 448 N)
- Progression:** Approx. 21 % to 28 %
- Lifetime:** Approx. 2,000 m
- Operating temperature range:** -20 °C to 80 °C
- Material:** Outer body, End fittings: Zinc plated steel; Piston rod: Steel with wear-resistant coating
- Mounting:** With piston rod upwards.
- End position damping length:** Without damping. For end position damping use damping material (e.g. TUBUS or SLAB).
- Positive stop:** External positive stop at the end of stroke provided by the customer.
- End fittings:** They are interchangeable and if necessary must be positively secured by the customer to prevent unscrewing.

Valve Technology, Traction force 150 N to 1,200 N (extended up to 1,560 N)

End Fitting
Standard Dimensions
End Fitting
A10

Eye A10
 max. force 10,000 N

B10

Stud Thread B10
C10

Angle Ball Joint C10
 max. force 1,800 N

D10

Clevis Fork D10
 max. force 10,000 N

E10

Swivel Eye E10
 max. force 10,000 N

Performance and Dimensions

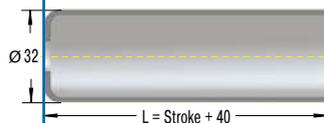
TYPES	Stroke mm	L retracted mm	Traction force max. N
GZ-28-30	30	130	1,200
GZ-28-50	50	150	1,200
GZ-28-100	100	200	1,200
GZ-28-150	150	250	1,200
GZ-28-200	200	300	1,200
GZ-28-250	250	350	1,200
GZ-28-300	300	400	1,200
GZ-28-350	350	450	1,200
GZ-28-400	400	500	1,200
GZ-28-450	450	550	1,200
GZ-28-500	500	600	1,200
GZ-28-550	550	650	1,200
GZ-28-600	600	700	1,200
GZ-28-650	650	750	1,200

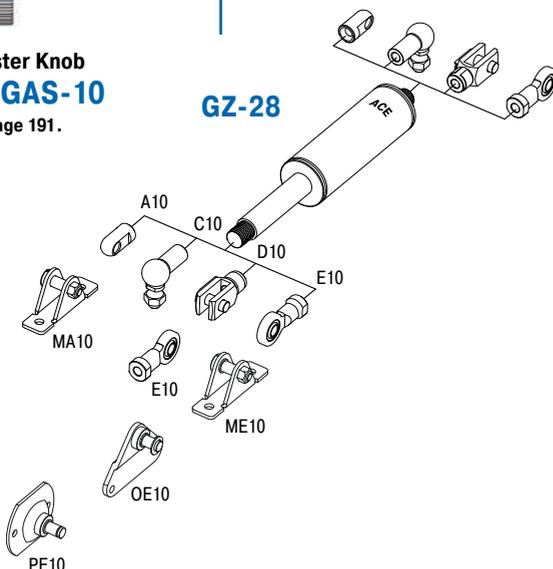
Ordering Example

Type (Pull Type) _____
 Body 1.10" (28 mm) _____
 Stroke 5.91" (150 mm) _____
 Piston Rod End Fitting E10 _____
 Body End Fitting E10 _____
 Adjustable (V) _____
 Traction Force F₁ 180 lbs (800 N) _____

GZ-28-150-EE-V-800

Mounting accessories see from page 212.

Rod Shroud W10-28

Adjuster Knob DE-GAS-10
 See page 191.

GZ-28

Technical Data
Traction force: 150 N to 1,200 N (extended up to 1,560 N)

Progression: Approx. 28 % to 30 %

Lifetime: Approx. 2,000 m

Operating temperature range: -20 °C to 80 °C

Material: Outer body, End fittings: Zinc plated steel; Piston rod: Steel with wear-resistant coating

Mounting: With piston rod upwards.

End position damping length: Without damping. For end position damping use damping material (e.g. TUBUS or SLAB).

Positive stop: External positive stop at the end of stroke provided by the customer.

End fittings: They are interchangeable and if necessary must be positively secured by the customer to prevent unscrewing.

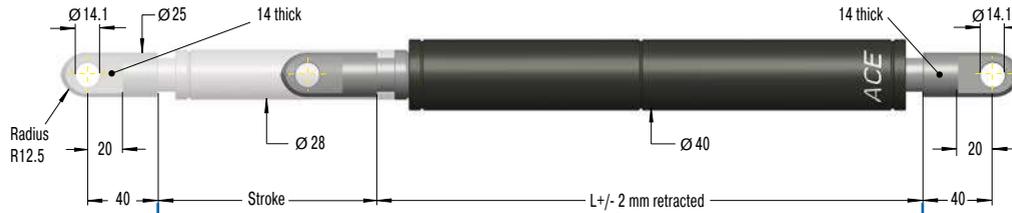
Valve Technology, Traction force 500 N to 5,000 N (extended up to 7,250 N)

End Fitting

Standard Dimensions

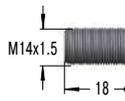
End Fitting

A14



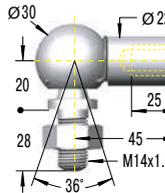
Eye A14
max. force 10,000 N

B14



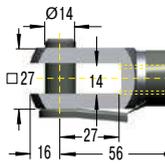
Stud Thread B14

C14



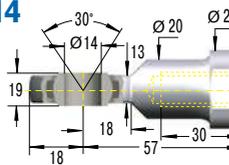
Angle Ball Joint C14
max. force 3,200 N

D14



Clevis Fork D14
max. force 10,000 N

E14



Swivel Eye E14
max. force 10,000 N

Performance and Dimensions

TYPES	Stroke mm	L retracted mm	Traction force max. N
GZ-40-100	100	250	5,000
GZ-40-150	150	325	5,000
GZ-40-200	200	400	5,000
GZ-40-250	250	475	5,000
GZ-40-300	300	550	5,000
GZ-40-400	400	700	5,000
GZ-40-500	500	850	5,000
GZ-40-600	600	1,000	5,000

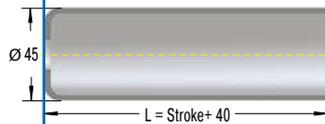
Ordering Example

GZ-40-150-EE-V-800

- Type (Pull Type) _____
- Body 1.57" (40 mm) _____
- Stroke 5.91" (150 mm) _____
- Piston Rod End Fitting E14 _____
- Body End Fitting E14 _____
- Adjustable (V) _____
- Traction Force F₁ 180 lbs (800 N) _____

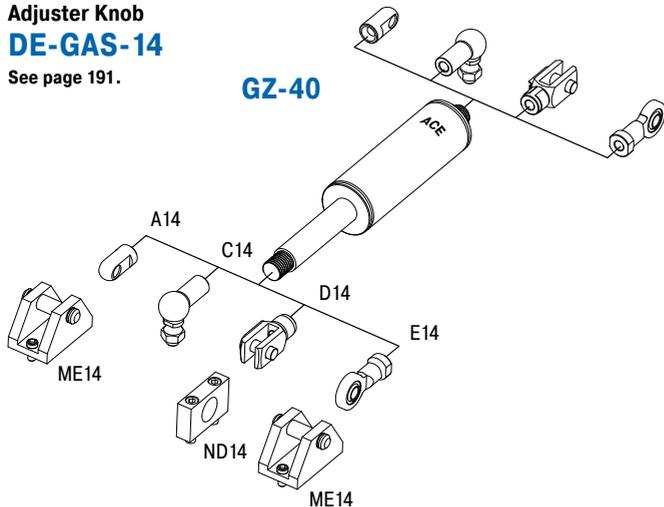
Mounting accessories see from page 212.

Rod Shroud W14-40



Adjuster Knob DE-GAS-14

See page 191.



Technical Data

- Traction force:** 500 N to 5,000 N (extended up to 7,250 N)
- Progression:** Approx. 43 % to 45 %
- Lifetime:** Approx. 2,000 m
- Operating temperature range:** -20 °C to 80 °C
- Material:** Outer body, End fittings: Zinc plated steel; Piston rod: Steel with wear-resistant coating
- Mounting:** With piston rod upwards.
- End position damping length:** Without damping. For end position damping use damping material (e.g. TUBUS or SLAB).
- Positive stop:** External positive stop at the end of stroke provided by the customer.
- End fittings:** They are interchangeable and if necessary must be positively secured by the customer to prevent unscrewing.

ACE Easy Sizing

Just a few simple steps to your perfect ACE Gas Spring

NEW !

1

Select the position of flap and pivot point.

2

Specify your application within our 3D-simulator.

3

Calculate your ACE Gas Springs.

4

Add mounting accessories.

5

Send an order request.

Talk to us!

Sometimes your problems are more complicated than an online tool can solve. ACE application engineers have the skills, knowledge and training to deliver a solution.

1-800-521-3320

The screenshot shows the ACE Easy Sizing web application interface. At the top, there's a navigation bar with 'ACE Controls Inc.' and a search bar. Below that, a main heading reads 'Just a few steps to your perfect fitting gas spring' and 'ACE Sizing Tools & Services'. The interface is divided into several sections: 'ACE Easy Sizing' (with sub-sections for 'Gas Springs (Push Type)' and 'GS-8 to GS-40'), 'Simulation' (showing a 3D model of a gas spring mechanism), 'Hand Force Trajectory' (a graph showing force vs. angle), and 'Configuration' (with dropdown menus for 'End fitting (piston rod)', 'Matching gas springs', 'End fitting (cylinder)', 'Mounting bracket (piston rod)', and 'Mounting bracket (cylinder)'). A 'Calculate Your Gas Spring(s)' button is visible at the bottom left of the configuration area. The interface also includes a 'How to Order' button and a shopping cart icon.

All available at
www.acecontrols.com

Calculations



GZ-15-V4A to GZ-40-VA

Very low progression rate with FDA approval

Valve Technology, Stainless Steel

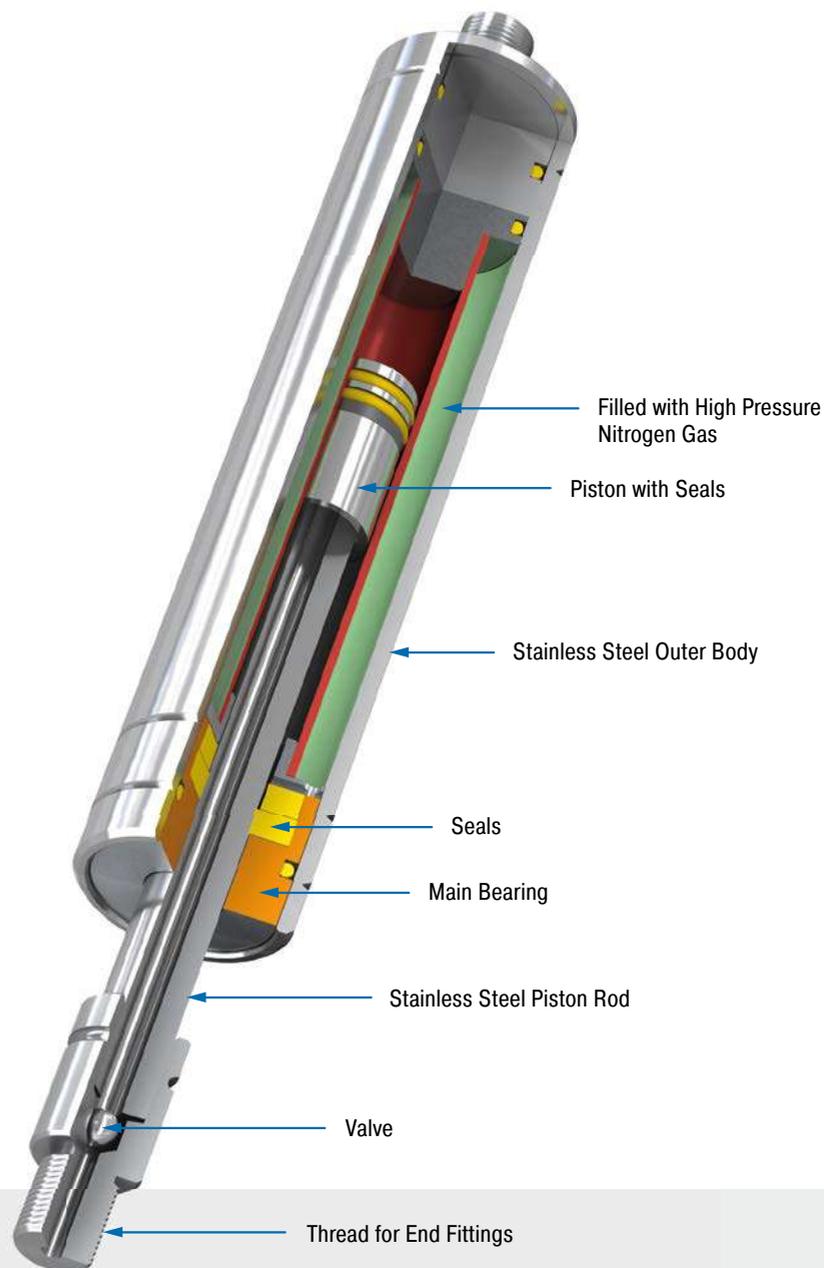
Traction force 40 N to 5,000 N

Stroke 20 mm to 600 mm

Brilliant performance when things become tight: For specific use in tough surroundings or small spaces, the broad spectrum of ACE stainless steel industrial pull type gas springs come in body diameters from 15 to 40 mm (0.59" to 1.57"). These units supplement the comprehensive program of the ACE industrial pull type gas springs with valves.

This high quality design is rust free and is more robust against environmental impact compared with standard gas pull type springs. These stainless steel gas springs are also visually appealing, very durable and available, upon request, in many stroke lengths and traction forces. A comprehensive range of accessories in stainless steel guarantees easy assembly and a broad range of uses.

ACE industrial push type springs made of stainless steel are used in industries such as the chemical and food industry, in automobiles, plant engineering and shipbuilding and also in medical, military, environmental and water supply technology.



Technical Data

Traction force: 40 N to 5,000 N

Piston rod diameter: Ø 4 mm to Ø 28 mm

Progression: Approx. 11 % to 45 %

Lifetime: Approx. 2,000 m

Operating temperature range: -20 °C to 80 °C

Material: Outer body, Piston rod, End fittings: Stainless steel (1.4301/1.4305, AISI 304/303 and 1.4404/1.4571, AISI 316L/316Ti)

Operating fluid: Nitrogen gas

Mounting: With piston rod upwards.

End position damping length: Without damping. For end position damping use damping material (e.g. TUBUS or SLAB).

Positive stop: External positive stop in the pulling direction provided by the customer.

Application field: Hoods, Shutters, Machine housing, Conveyor systems, Control boxes, Furniture industry, Shipbuilding, Food industry, Pharmaceutical industry, Folding elements

End fittings: They are interchangeable and if necessary must be positively secured by the customer to prevent unscrewing.

On request: Special oils and other special options. Alternative accessories. Traction gas springs with end position damping also available on request. Other traction gas springs material 1.4404/1.4571, AISI 316L/316Ti (V4A) available on request.

Valve Technology, Stainless Steel, Traction force 40 N to 350 N (extended up to 448 N)

End Fitting

Standard Dimensions

End Fitting

B8 Stud Thread **B8**

A8-VA Eye **A8-VA**
max. force 1,560 N

C8-VA Angle Ball Joint **C8-VA**
max. force 1,140 N

D8-VA Clevis Fork **D8-VA**
max. force 1,560 N

E8-VA Swivel Eye **E8-VA**
max. force 1,560 N

G8-VA Ball Socket **G8-VA**
max. force 1,140 N

Rod Shroud W8-19-VA

Adjuster Knob DE-GAS-8
See page 191.

Performance and Dimensions

TYPES	Stroke mm	L retracted mm	Traction force max. N
GZ-19-30-VA	30	130	350
GZ-19-50-VA	50	150	350
GZ-19-100-VA	100	200	350
GZ-19-150-VA	150	250	350
GZ-19-200-VA	200	300	350
GZ-19-250-VA	250	350	350

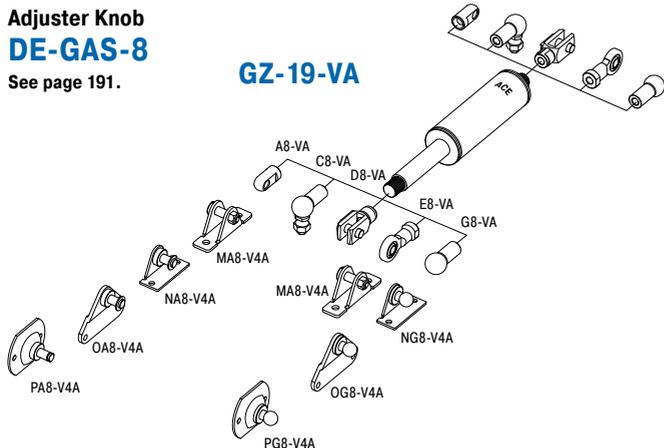
Ordering Example

GZ-19-150-AC-V-150-VA

Type (Pull Type) _____
 Body 0.75" (19 mm) _____
 Stroke 5.91" (150 mm) _____
 Piston Rod End Fitting A8-VA _____
 Body End Fitting C8-VA _____
 Adjustable (V) _____
 Traction Force F₁ 34 lbs (150 N) _____
 Material (1.4301/1.4305, AISI 304/303, VA) _____

Mounting accessories see from page 220.

Adjuster Knob DE-GAS-8
See page 191.



Technical Data

- Traction force:** 40 N to 350 N (extended up to 448 N)
- Progression:** Approx. 23 % to 28 %
- Lifetime:** Approx. 2,000 m
- Operating temperature range:** -20 °C to 80 °C
- Material:** Outer body, Piston rod, End fittings: Stainless steel (1.4301/1.4305, AISI 304/303)
- Mounting:** With piston rod upwards.
- End position damping length:** Without damping. For end position damping use damping material (e.g. TUBUS or SLAB).
- Positive stop:** External positive stop in the pulling direction provided by the customer.
- End fittings:** They are interchangeable and if necessary must be positively secured by the customer to prevent unscrewing.

Issue 04.2018 – Specifications subject to change

Valve Technology, Stainless Steel, Traction force 150 N to 1,200 N (extended up to 1,560 N)

End Fitting

Standard Dimensions

End Fitting

B10

A10-VA

C10-VA

D10-VA

E10-VA

Rod Shroud W10-28-VA

Performance and Dimensions

TYPES	Stroke mm	L retracted mm	Traction force max. N
GZ-28-50-VA	50	165	1,200
GZ-28-100-VA	100	215	1,200
GZ-28-150-VA	150	265	1,200
GZ-28-200-VA	200	315	1,200
GZ-28-250-VA	250	365	1,200
GZ-28-300-VA	300	415	1,200
GZ-28-350-VA	350	465	1,200
GZ-28-400-VA	400	515	1,200
GZ-28-450-VA	450	565	1,200
GZ-28-500-VA	500	615	1,200
GZ-28-550-VA	550	665	1,200
GZ-28-600-VA	600	715	1,200

Ordering Example

GZ-28-150-EE-V-800-VA

Type (Pull Type) _____

Body 1.10" (28 mm) _____

Stroke 5.91" (150 mm) _____

Piston Rod End Fitting E10-VA _____

Body End Fitting E10-VA _____

Adjustable (V) _____

Traction Force F₁ 180 lbs (800 N) _____

Material (1.4301/1.4305, AISI 304/303, VA) _____

Stud Thread B10

Eye A10-VA
max. force 3,800 N

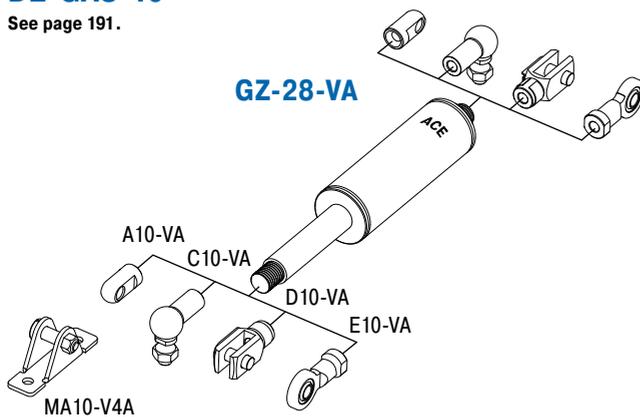
Angle Ball Joint C10-VA
max. force 1,750 N

Clevis Fork D10-VA
max. force 3,800 N

Swivel Eye E10-VA
max. force 3,800 N

Mounting accessories see from page 220.

Adjuster Knob DE-GAS-10
See page 191.



Technical Data

Traction force: 150 N to 1,200 N (extended up to 1,560 N)

Progression: Approx. 29 % to 30 %

Lifetime: Approx. 2,000 m

Operating temperature range: -20 °C to 80 °C

Material: Outer body, Piston rod, End fittings: Stainless steel (1.4301/1.4305, AISI 304/303)

Mounting: With piston rod upwards.

End position damping length: Without damping. For end position damping use damping material (e.g. TUBUS or SLAB).

Positive stop: External positive stop in the pulling direction provided by the customer.

End fittings: They are interchangeable and if necessary must be positively secured by the customer to prevent unscrewing.

Stainless Steel Gas Springs (Pull Type), V4A

TYPES	Stroke mm	L retracted mm	Dimensions see Page
GZ-19-30-V4A	30	130	184
GZ-19-50-V4A	50	150	184
GZ-19-100-V4A	100	200	184
GZ-19-150-V4A	150	250	184
GZ-19-200-V4A	200	300	184
GZ-19-250-V4A	250	350	184
GZ-28-50-V4A	50	165	185
GZ-28-100-V4A	100	215	185
GZ-28-150-V4A	150	265	185
GZ-28-200-V4A	200	315	185
GZ-28-250-V4A	250	365	185
GZ-28-300-V4A	300	415	185
GZ-28-350-V4A	350	465	185
GZ-28-400-V4A	400	515	185
GZ-28-450-V4A	450	565	185
GZ-28-500-V4A	500	615	185
GZ-28-550-V4A	550	665	185
GZ-28-600-V4A	600	715	185
GZ-40-100-V4A	100	250	186
GZ-40-150-V4A	150	325	186
GZ-40-200-V4A	200	400	186
GZ-40-250-V4A	250	475	186
GZ-40-300-V4A	300	550	186
GZ-40-400-V4A	400	700	186
GZ-40-500-V4A	500	850	186
GZ-40-600-V4A	600	1,000	186

Stainless Steel Accessories, V4A

TYPES	Dimensions see Page
A5-V4A	222
C5-V4A	222
D5-V4A	222
E5-V4A	222
G5-V4A	222
A8-V4A	223
C8-V4A	223
D8-V4A	223
E8-V4A	223
G8-V4A	224
A10-V4A	224
C10-V4A	224
D10-V4A	224
E10-V4A	224
A14-V4A	225
C14-V4A	225
D14-V4A	225
E14-V4A	225

We'll Size Industrial Gas Springs for You

And we'll provide all necessary information for installation

To obtain the optimum operation with minimal hand force, gas spring must be properly sized and the mounting points have to be optimally placed.

It is important to identify the following points:

- gas spring size
- required gas spring stroke
- mounting points on flap and frame
- extended length of the gas spring
- required extension force
- hand forces throughout the complete movement on the flap

With our free calculation service you can eliminate the time-consuming calculation and send us your details by fax or e-mail. Just complete the information shown on the following page. Please attach a sketch of your application (a simple hand sketch is sufficient) in side view. Our application engineers will determine the optimum gas springs and mounting points and calculate the ideal situation to satisfy your requirements.

You will receive a quotation showing the opening and closing forces and our recommended mounting points to suit your application.

Example of a Calculation Offer

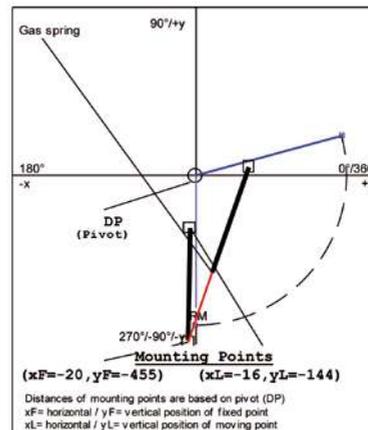
Input data		Identification data	
Start angle	αM : 270 °	Temperature	: 20 °C
Open angle	α : 105 °	Progression	: 42 %
Rd. ctr. grvty.	RM: 410 mm	Friction	: 30 N
Mass	m: 12 kg	Ext. length	: 504 mm
No. gas springs	n: 2		
Radius handforce	RRH: 820 mm		

Required user hand-forces

F1-F2/F3-F4=Hand forces for opening/closing

Angle [°]	F1-F2 [N]	F3-F4 [N]	Length [mm]
270	-13	-14	311
293	37	42	323
317	59	68	363
340	53	63	418
363	34	44	477
375	25	34	504

F1-F4 positive requires clockwise hand force
F1-F4 negative requires counter-clockwise hand force



Input Data

Gas Spring Push type Gas Spring Pull type

Gas spring fixing points

The fixed point of the frame and the moving point of the flap are critical for the optimum operation.

Please attach a sketch of your application!
(A few lines with dimensions are sufficient)

Moving mass* m _____ kg
 Number of gas springs in parallel* n _____ pcs
 Number of movements* _____ /day
 Ambient temperature T _____ °C

If not shown by the sketch:

Radius of center of gravity R_M _____ mm
 Radius of hand force R_H _____ mm
 Starting angle α_M _____ °
 Opening angle α _____ °

* Compulsory information

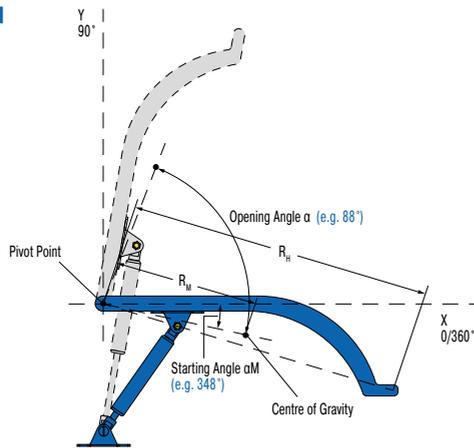
Desired Mounting Fittings

End Fitting		End Fitting
<input type="checkbox"/> A		<input type="checkbox"/> A
<input type="checkbox"/> B		<input type="checkbox"/> B
<input type="checkbox"/> C		<input type="checkbox"/> C
<input type="checkbox"/> D		<input type="checkbox"/> D
<input type="checkbox"/> E		<input type="checkbox"/> E
<input type="checkbox"/> F		<input type="checkbox"/> F
<input type="checkbox"/> G		<input type="checkbox"/> G

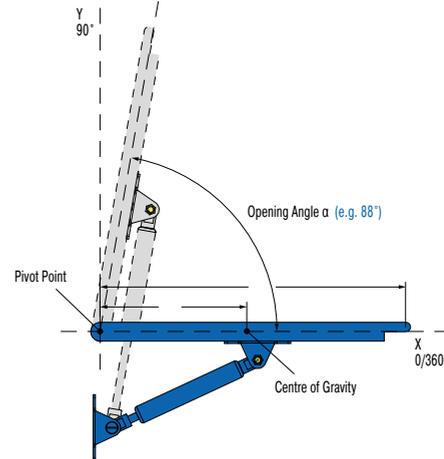
The end fittings are interchangeable

e.g. -CE: C = Angle Ball Joint, E = Swivel Eye

Hood



Flap



Please send us a sketch with dimensions of your application!
Without this sketch we won't be able to calculate.

Comments	
Requirement per year	
Machine type / reference	

Sender

Company		Dept.	
Address		Name	
ZIP / City		Telephone	
Website		E-Mail	

Please complete and fax or email to: (248) 476-2470 or applications@acecontrols.com

Mounting and Safety Instructions

Filling

Gas springs are filled with pure nitrogen gas. Nitrogen is an inert gas that does not burn or explode and is not poisonous. The internal pressure of gas springs can be up to 300 bar (4,350 psi). Do not attempt to open or modify them!

Gas springs are maintenance-free!

ACE gas springs will operate in ambient temperatures from -20 °C to +80 °C.

We can equip our springs with special seals to withstand temperatures as low as -45 °C or as high as +200 °C.

Gas springs should not be placed over heat or in open fire!

ACE gas springs can be stored in any position. Pressure lost through long storage is not to be expected. There are no known negative effects of long-term storage, but there may be a sticking effect the first time you compress a spring. This may require a higher initial force to operate the gas spring for the first time (initial breakaway force).

Mounting

Gas springs should be installed with the piston rod downwards. This position ensures best damping quality. ACE gas springs include an integrated grease chamber which allows for alternative mounting opportunities.

The tolerance for the installation length is generally deemed to be ± 2 mm. If very high demands are placed on durability and stability, please avoid the combination of small diameter + long stroke + high force.

The filling tolerance is -20 N to 40 N or 5 % to 7 %. Depending on size and extension force the tolerances can differ.

Life Time

Generally, ACE gas springs are tested to 70,000 to 100,000 complete strokes. This is equivalent to the seal lifetime (depending on model size) to a distance travelled of 10 km (lifetime of traction gas springs approx. 2 km). During these tests the gas spring must not lose more than 5 % of its pressure. Depending upon the application and operating environment, the service life of these gas springs may be much longer. In practice 500,000 strokes or more have been achieved on some applications.

Disposal/Recycling

Please ask for our disposal recommendations.

Warnings and Liability

All gas springs are marked with the part number, the production date and a warning sign "Do not open high pressure".

We are not responsible for any damages of any kind that arises due to goods that are not marked accordingly.

Valve Actuation with ACE DE-GAS

Simple, safe and reliable

De-gassing for controlled force reduction on valve gas springs

The reduction is made by screwing the DE-Gas on the male screwed end of the gas spring. The drain process is possible through light actuation of the push button. If too much nitrogen is discharged, the gas spring can be refilled by ACE.

Adjustment

1. Hold gas spring valve up.
2. Insert DE-GAS adjuster knob on thread of the valve.
3. Press the DE-GAS adjuster knob with light hand force until you can hear the nitrogen escaping. Press only briefly to avoid too much nitrogen being discharged.
4. After adjustment, remove the DE-GAS adjuster knob, mount the end fittings and test the gas spring in your application. If necessary repeat the procedure.

If you use 2 gas springs in parallel, both gas springs should have the same force to avoid bending forces or side load on the application. If necessary return to ACE to refill both gas springs to the same (average) force.

If too much nitrogen is discharged, the units can be returned to ACE for re-gassing.



DE-GAS

You can also visit our Youtube channel at www.youtube.com/user/acecontrolsglobal

Here, among other things you will find an ACETips video on the topic of DE-GAS!

Gas Spring Refilling Kit

Flexible and easy to use

The ACE gas spring refilling kit offers you the opportunity to fill gas springs on location or adapt them individually. The refilling kit is equipped with all the parts you need to fill gas springs. Very precise filling of the gas springs is possible using the digital manometer. The table for determining the filling pressure of the gas springs is included with the case. The only thing missing from the delivery is the nitrogen.



The refilling kit contains all filling bells and adjuster knobs for the current ACE gas spring range.

Gas springs filled with the refilling kit must be measured on a calibrated measurement system by ACE for repeat production.

The refilling kit suits 200 bar nitrogen bottles with a thread of W24.32x1/14". Other connections are available upon request.

Part number: **GS-FK-C**

Hydraulic Dampers

Multi-talent in speed control

The hydraulic dampers are similar in appearance to the ACE industrial gas springs but are adjusted in the end position and work differently to the DVC family with individual speed adjusters for the push and pull direction. This provide users with the maximum flexibility.

Whether used as drive compensation or safety elements, the retraction and extension speed of these ACE solutions can always be precisely set. This means that the speed of movement can be controlled, synchronisation regulated in both directions and pivoting loads can be compensated. Depending on the model, the push and pull forces are between 30 N and 40,000 N. These maintenance-free, ready-to-install products are available in body diameters of 12 mm to 70 mm and in stroke lengths up to 800 mm.



Hydraulic Dampers



DVC-32 and DVC-2 to DVC-6

Page 194

Adjustable, Without Free Travel

Multi-directional speed adjustment

Cylinder speed controls, Absorption control, Finishing and processing centres



HBD-15 to HBD-40

Page 196

Adjustable

Motion Control at the highest level

Finishing and processing centres, Machine housing, Hoods, Shutters



HB-12 to HB-70

Page 202

Adjustable

Linear motion control

Conveyor systems, Transport systems, Furniture industry, Locking systems

Constant speed rates

Sensitive adjustment

High quality and long lifetime

Easy to mount



DVC-32 and DVC-2 to DVC-6

Multi-directional speed adjustment

Adjustable, Without Free Travel

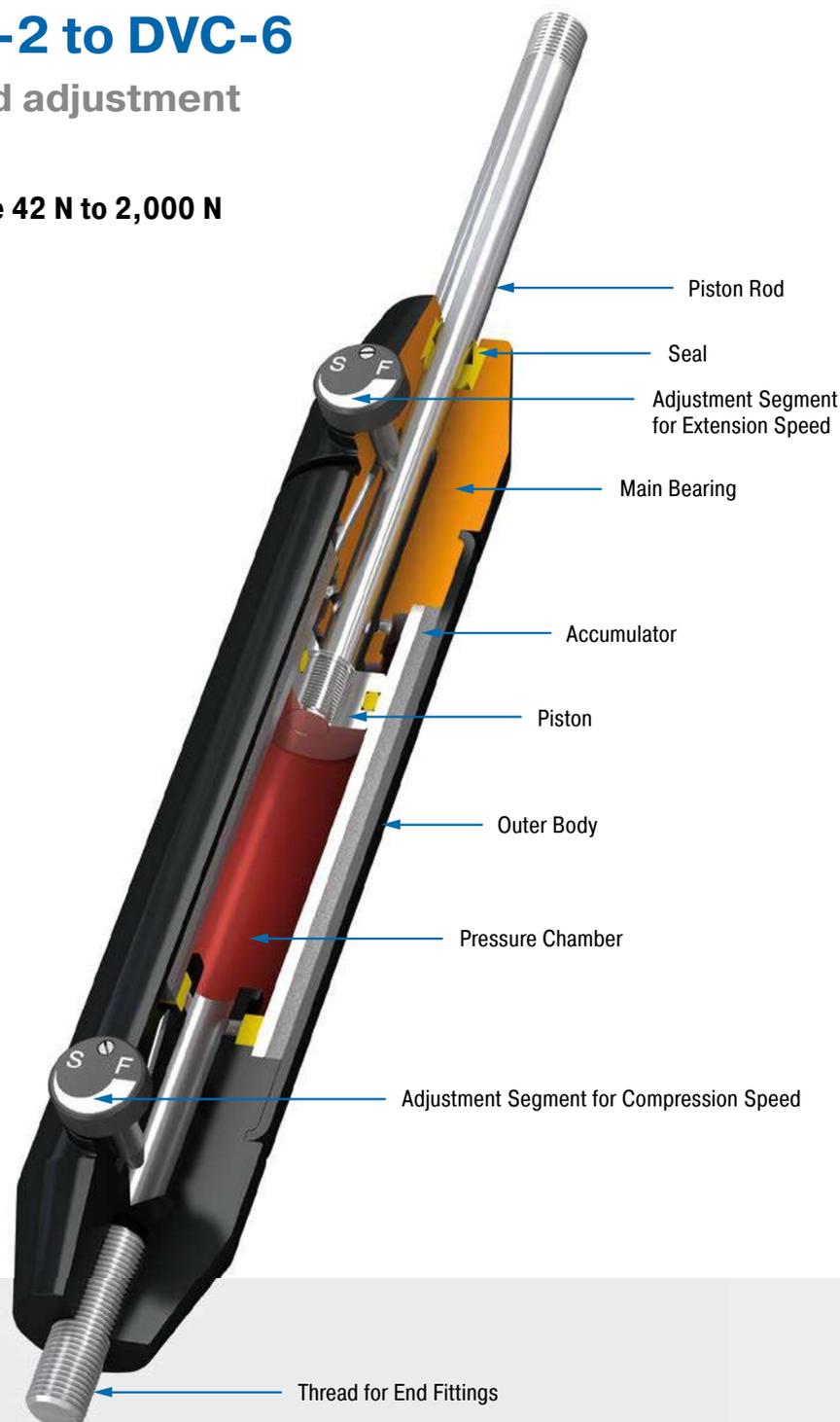
Compression and extension force 42 N to 2,000 N

Stroke 50 mm to 150 mm

Separately regulated in any stroke position: The hydraulic dampers of the product family DVC-32 and DVC-2 to DVC-6 are the first dampers to provide precise, independent, external adjustment of in-and-out speeds. With their individual adjustments for the push and pull direction as well as the bi-directional action, these are suitable as safety or control elements.

The great number of mounting accessories makes assembly of these ACE hydraulic dampers easier and allows these maintenance-free, ready-to-install and self-contained systems universally applicable. Qualitatively high grade, and at the same time simple to use; one of their uses is to absorb swinging loads.

These velocity controllers are used in the automotive sector, automation and machine building as well as in the electronics industry.



Technical Data

Compression and extension force: 42 N to 2,000 N

Outer body diameter: Ø 32 mm

Piston rod diameter: Ø 8 mm

Lifetime: Approx. 10,000 m

Operating temperature range: 0 °C to 65 °C

Adjustment: Steplessly adjustable

Positive stop: External positive stops 1 mm to 1.5 mm before the end of stroke provided by the customer.

Damping medium: Automatic Transmission Fluid (ATF)

Material: Outer body: Coated aluminium; Piston rod: Hard chrome plated steel; End fittings: Zinc plated steel

Mounting: In any position

Application field: Cylinder speed controls, Absorption control, Finishing and processing centres

Note: Increased break-away force if unit has not moved for some time. Damping force can be adjusted after installation.

End fittings: They are interchangeable and if necessary must be positively secured by the customer to prevent unscrewing.

On request: Special oils and other special options. Alternative accessories available on request.

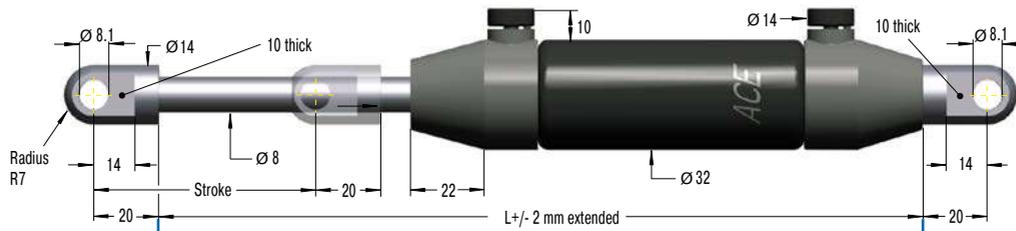
Adjustable, Without Free Travel, Compression and extension force 42 N to 2,000 N

End Fitting

Standard Dimensions

End Fitting

A8



Eye A8
max. force 3,000 N

B8



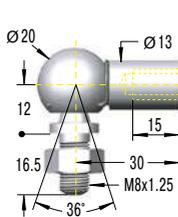
Performance and Dimensions

TYPES	Stroke mm	L extended mm	¹ Compression force max. N
DVC-32-50	50	240	2,000
DVC-32-100	100	340	2,000
DVC-32-150	150	440	2,000

¹ Max. extension force for all stroke lengths 2,000 N.

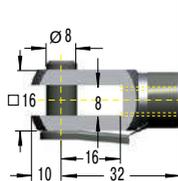
Stud Thread B8

C8



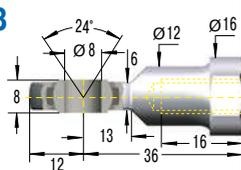
Angle Ball Joint C8
max. force 1,200 N

D8



Clevis Fork D8
max. force 3,000 N

E8



Swivel Eye E8
max. force 3,000 N

Ordering Example

DVC-32-50-DD-CCO

Type (Hydraulic Damper) _____
 Body \varnothing 1.26" (32 mm) omitted at DVC-2 to DVC-6 _____
 Stroke 2" (50 mm) _____
 Piston Rod End Fitting D8 _____
 Body End Fitting D8 _____
 Velocity Controls (Omit prefix for controlled, both directions) _____

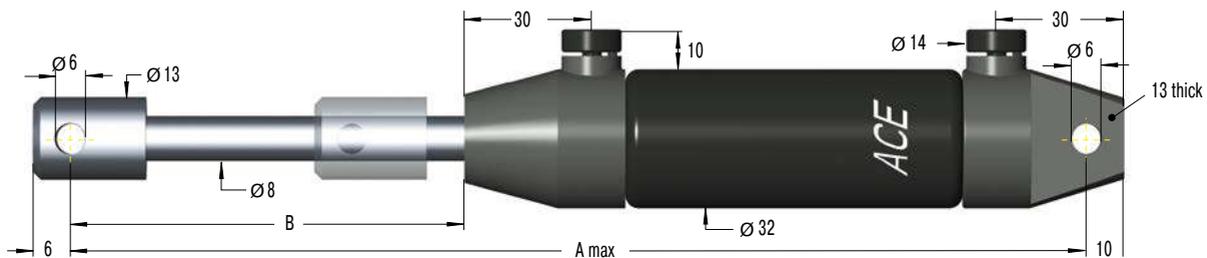
Model Type Prefix

- : Controlled, both directions
 CCO: Controlled, compression only
 CTO: Controlled, tension only

End fittings: They are interchangeable and if necessary must be positively secured by the customer to prevent unscrewing.

Mounting accessories see from page 212.

DVC-2 to DVC-6



Performance and Dimensions

TYPES	Stroke mm	A max. mm	B mm	Compression force max. N	Traction force max. N
DVC-2	50	250	75.4	2,000	2,000
DVC-4	100	351	125	2,000	2,000
DVC-6	150	452	176	2,000	2,000

HBD-15 to HBD-40

Motion Control at the highest level

Adjustable

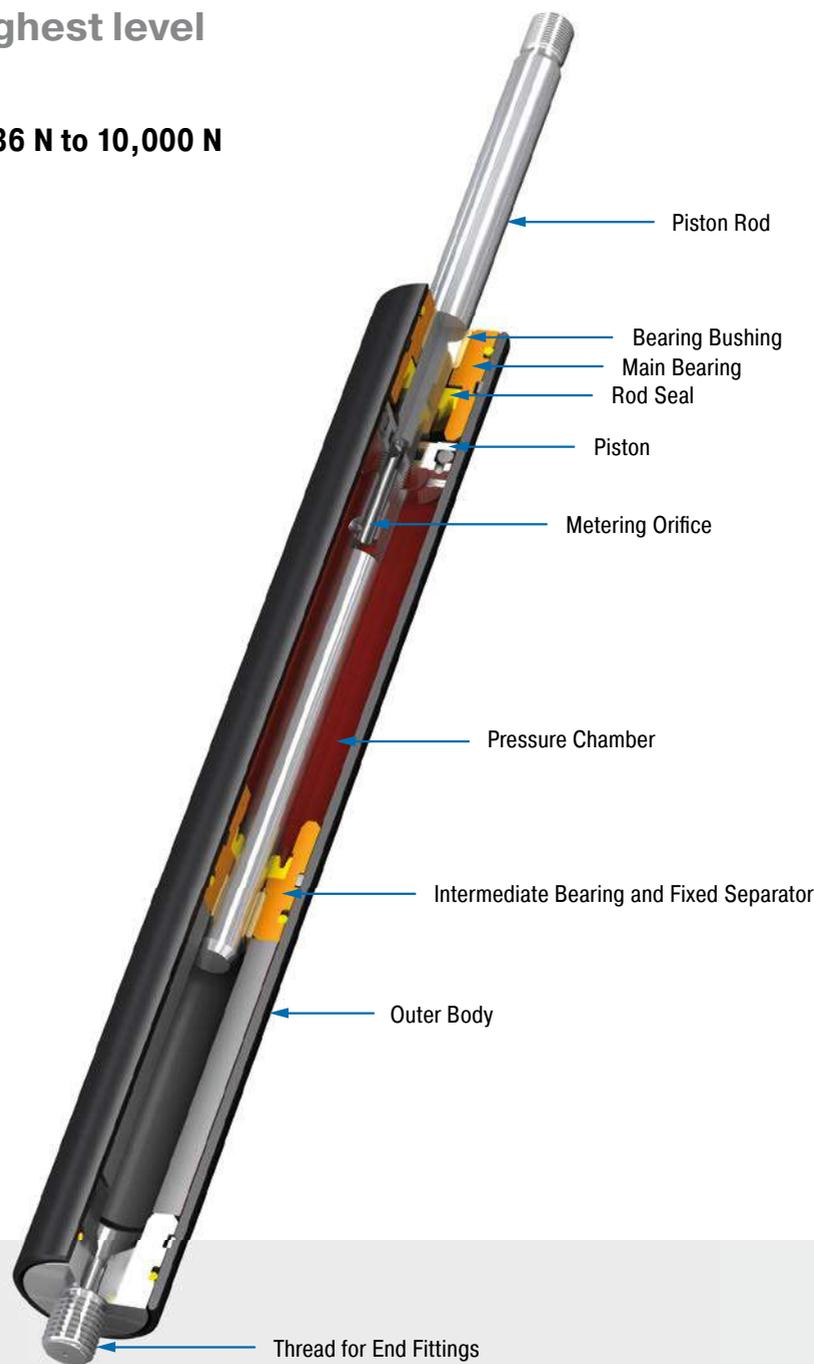
Compression and extension force 36 N to 10,000 N

Stroke 25 mm to 800 mm

ACE Controls HBD hydraulic dampers are maintenance-free, self-contained and sealed units. They are available with body diameters from 15 mm (0.59") to 40 mm (1.57") and with stroke lengths of up to 800 mm (31.5"). Unlike standard hydraulic dampers that include free travel up to 20 % of stroke, these dependable units have no free travel and are ideal for applications that require this level of performance. Double-acting hydraulic dampers are standard. However, a single acting design is available. Adjustment is easily achieved by pulling and turning the rod until the desired damping speed is achieved. The travel speed is adjustable and remains constant throughout the stroke.

The single acting version is controllable in one direction only, with free-flow in the opposite direction. A built-in antilock guard allows adjustment to be made at any damping rate without unit lock up. These reliable units offer long life-cycle performance. A variety of end fittings are available for ease of operation and installation, and are included.

HBD hydraulic dampers are used for process control, machine guards, lids, hatches, fire safety doors, arms for medical equipment, conveyors, swinging loads, machine tools, lift gates, drill feed control, amusement park rides, and more.



Technical Data

Compression and extension force: 36 N to 10,000 N

Outer body diameter: Ø 15 mm to Ø 40 mm

Piston rod diameter: Ø 6 mm to Ø 14 mm

Lifetime: Approx. 10,000 m

Free travel: These units have no free travel and are ideal for applications that require this level of performance.

Operating temperature range: -20 °C to 80 °C

Adjustment: Pull the piston rod out to its fully extended position. While pulling on the rod, turn it clockwise or counter-clockwise until the desired damping is achieved. The adjustment

is multi-turn and correct damping may require several trial and error adjustments. A built-in antilock guard allows adjustments to be made at any damping rate without unit lock up.

Positive stop: External positive stops 1 mm to 1.5 mm before the end of stroke provided by the customer.

Damping medium: Petroleum oil

Material: Outer body: Black anodized aluminium; Piston rod: Hard chrome plated steel; End fittings: Zinc plated steel

Mounting: In any position

Application field: Finishing and processing centers, Machine housing, Hoods, Shutters,

Fire safety doors, Medical technology, Conveyor systems, Swivel units, Tool machines, Lift doors

Note: Increased break-away force if unit has not moved for some time.

End fittings: They are interchangeable and if necessary must be positively secured by the customer to prevent unscrewing.

Safety information: Mechanical Stop required 1 mm to 1.5 mm before end of stroke.

On request: Special oils, damping characteristics, and stroke lengths. Alternative accessories available on request.

Adjustable, Compression and extension force 36 N to 800 N

End Fitting

Standard Dimensions

End Fitting

A5 Eye A5 max. force 800 N

B5 Stud Thread B5

C5 Angle Ball Joint C5 max. force 500 N

D5 Clevis Fork D5 max. force 800 N

E5 Swivel Eye E5 max. force 800 N

Stroke

L +/- 2 extended + max 6 at maximum adjustment

Performance and Dimensions

TYPES	Stroke mm	L extended mm	¹ Compression force max. N
HBD-15-25	25	145	800
HBD-15-50	50	220	800
HBD-15-75	75	295	800
HBD-15-100	100	370	350
HBD-15-150	150	520	300

¹ Max. extension force for all stroke lengths 800 N.

Ordering Example

HBD-15-150-AA-P

Type (Hydraulic Damper) _____

Body 0.59" (15 mm) _____

Stroke 5.91" (150 mm) _____

Piston Rod End Fitting A5 _____

Body End Fitting A5 _____

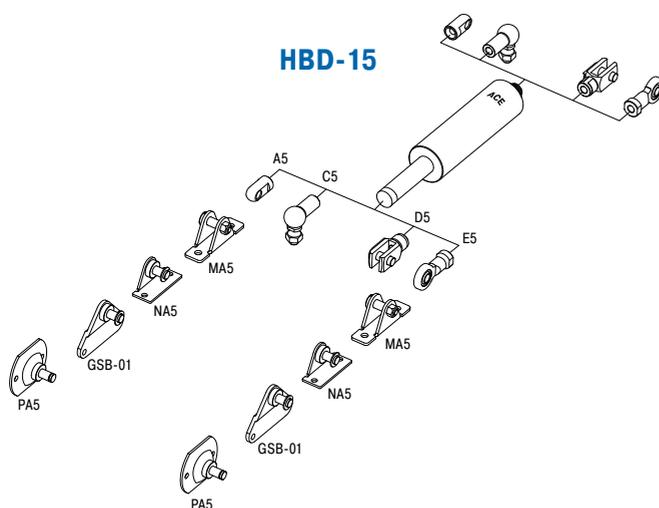
Damping Direction (P = in both directions) _____

Model Type Prefix

P = Damping in both directions
 N = Damping on in stroke only
 M = Damping on out stroke only
 X = Special model suffix

Mounting accessories see from page 212.

HBD-15



Technical Data

Compression and extension force: 36 N to 800 N

Free travel: These units have no free travel and are ideal for applications that require this level of performance.

Operating temperature range: -20 °C to 80 °C

Adjustment: Pull the piston rod out to its fully extended position. While pulling on the rod, turn it clockwise or counter-clockwise until the desired damping is achieved. The adjustment is multi-turn and correct damping may require several trial and error adjustments. A built-in antilock guard allows adjustments to be made at any damping rate without unit lock up.

Material: Outer body: Black anodized aluminium; Piston rod: Hard chrome plated steel; End fittings: Zinc plated steel

Mounting: In any position

End fittings: They are interchangeable and if necessary must be positively secured by the customer to prevent unscrewing.

Safety information: Mechanical Stop required 1 mm to 1.5 mm before end of stroke.

Adjustable, Compression and extension force 50 N to 1,800 N

End Fitting

Standard Dimensions

End Fitting

Performance and Dimensions

TYPES	Stroke mm	L extended mm	¹ Compression force max. N
HBD-22-50	50	238	1,800
HBD-22-100	100	385	1,800
HBD-22-150	150	525	1,800
HBD-22-200	200	685	1,000
HBD-22-250	250	835	1,000
HBD-22-300	300	985	800
HBD-22-350	350	1,135	600
HBD-22-400	400	1,285	400

¹ Max. extension force for all stroke lengths 1,800 N.

Ordering Example

HBD-22-150-AA-P

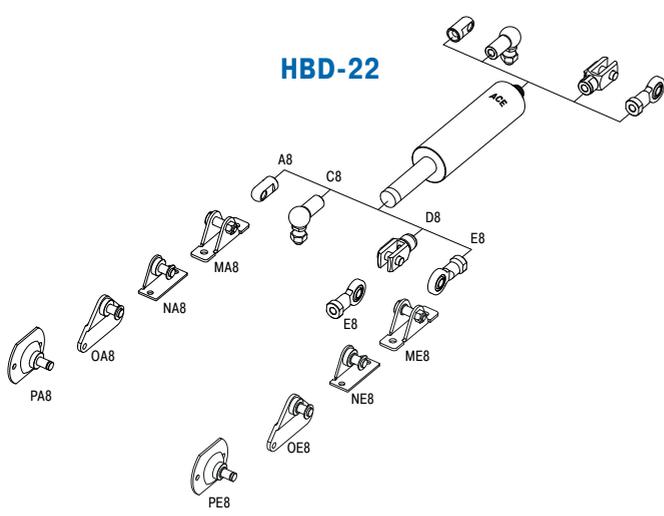
Type (Hydraulic Damper) _____
 Body 0.87" (22 mm) _____
 Stroke 5.90" (150 mm) _____
 Piston Rod End Fitting A8 _____
 Body End Fitting A8 _____
 Damping Direction (P = in both directions) _____

Model Type Prefix

P = Damping in both directions
 N = Damping on in stroke only
 M = Damping on out stroke only
 X = Special model suffix

Mounting accessories see from page 212.

End Fitting Options:
 Eye A8 max. force 3,000 N
 Stud Thread B8
 Angle Ball Joint C8 max. force 1,200 N
 Clevis Fork D8 max. force 3,000 N
 Swivel Eye E8 max. force 3,000 N



Technical Data

Compression and extension force: 50 N to 1,800 N

Free travel: These units have no free travel and are ideal for applications that require this level of performance.

Operating temperature range: -20 °C to 80 °C

Adjustment: Pull the piston rod out to its fully extended position. While pulling on the rod, turn it clockwise or counter-clockwise until the desired damping is achieved. The adjustment is multi-turn and correct damping may require several trial and error adjustments. A built-in antilock guard allows adjustments to be made at any damping rate without unit lock up.

Material: Outer body: Black anodized aluminium; Piston rod: Hard chrome plated steel; End fittings: Zinc plated steel

Mounting: In any position

End fittings: They are interchangeable and if necessary must be positively secured by the customer to prevent unscrewing.

Safety information: Mechanical Stop required 1 mm to 1.5 mm before end of stroke.

Issue 04.2018 – Specifications subject to change

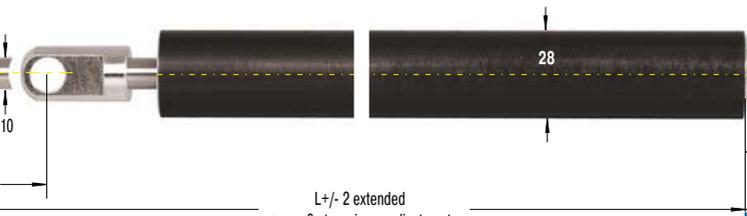
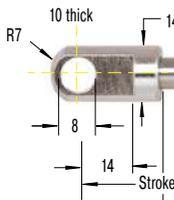
Adjustable, Compression and extension force 70 N to 3,000 N

End Fitting

Standard Dimensions

End Fitting

A8



Eye A8
max. force 3,000 N

B8



Performance and Dimensions

TYPES	Stroke mm	L extended mm	¹ Compression force max. N
HBD-28-50	50	250	3,000
HBD-28-100	100	400	3,000
HBD-28-150	150	550	3,000
HBD-28-200	200	700	3,000
HBD-28-250	250	850	3,000
HBD-28-300	300	1,000	2,500
HBD-28-350	350	1,150	2,000
HBD-28-400	400	1,300	1,500
HBD-28-500	500	1,600	1,000

¹ Max. extension force for all stroke lengths 3,000 N.

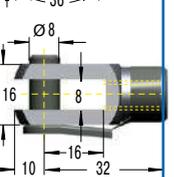
Stud Thread B8

C8



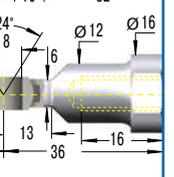
Angle Ball Joint C8
max. force 1,200 N

D8



Clevis Fork D8
max. force 3,000 N

E8



Swivel Eye E8
max. force 3,000 N

Ordering Example

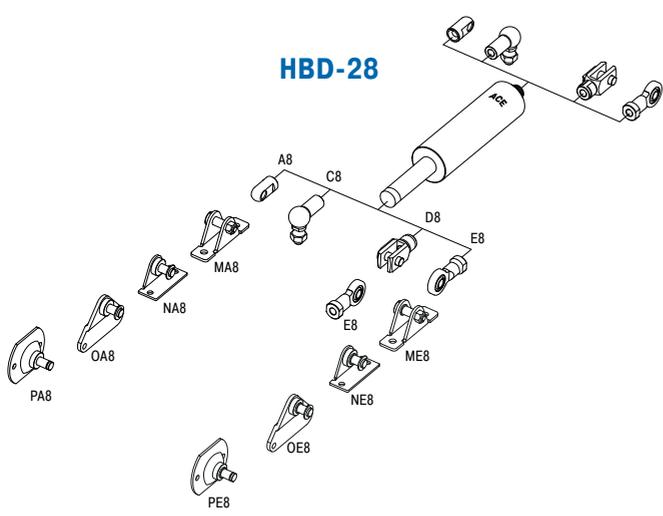
HBD-28-150-AA-P

Type (Hydraulic Damper) _____
 Body 1.10" (28 mm) _____
 Stroke 5.91" (150 mm) _____
 Piston Rod End Fitting A8 _____
 Body End Fitting A8 _____
 Damping Direction (P = in both directions) _____

Model Type Prefix

- P = Damping in both directions
- N = Damping on in stroke only
- M = Damping on out stroke only
- X = Special model suffix

Mounting accessories see from page 212.



Technical Data

- Compression and extension force:** 70 N to 3,000 N
- Free travel:** These units have no free travel and are ideal for applications that require this level of performance.
- Operating temperature range:** -4 °F to 176 °F
- Adjustment:** Pull the piston rod out to its fully extended position. While pulling on the rod, turn it clockwise or counter-clockwise until the desired damping is achieved. The adjustment is multi-turn and correct damping may require several trial and error adjustments. A built-in antilock guard allows adjustments to be made at any damping rate without unit lock up.
- Material:** Outer body: Black anodized aluminium; Piston rod: Hard chrome plated steel; End fittings: Zinc plated steel
- Mounting:** In any position
- End fittings:** They are interchangeable and if necessary must be positively secured by the customer to prevent unscrewing.
- Safety information:** Mechanical Stop required 1 mm to 1.5 mm before end of stroke.

Issue 04.2018 – Specifications subject to change

Adjustable, Compression and extension force 80 N to 10,000 N

End Fitting

Standard Dimensions

End Fitting

Performance and Dimensions

TYPES	Stroke mm	L extended mm	¹ Compression force max. N
HBD-40-100	100	430	10,000
HBD-40-150	150	580	10,000
HBD-40-200	200	730	10,000
HBD-40-300	300	1,030	10,000
HBD-40-400	400	1,330	8,000
HBD-40-500	500	1,630	6,000
HBD-40-600	600	1,930	4,000
HBD-40-700	700	2,230	3,000
HBD-40-800	800	2,530	2,000

¹ Max. extension force for all stroke lengths 10,000 N.

Ordering Example

HBD-40-300-AA-P

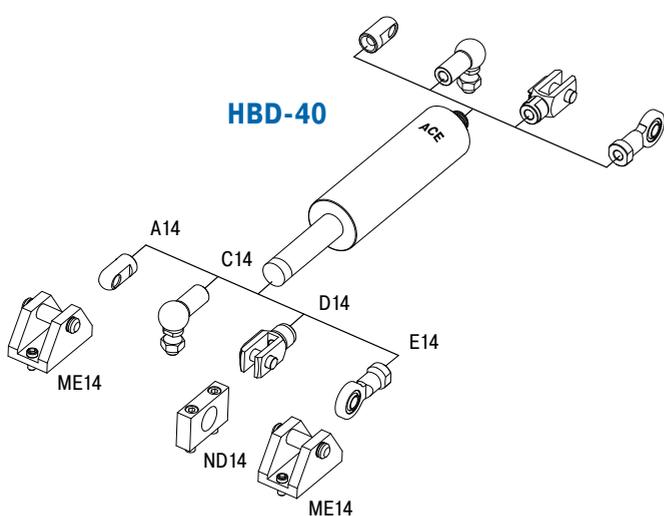
Type (Hydraulic Damper) _____
 Body 1.57" (40 mm) _____
 Stroke 11.81" (300 mm) _____
 Piston Rod End Fitting A14 _____
 Body End Fitting A14 _____
 Damping Direction (P = in both directions) _____

Model Type Prefix

P = Damping in both directions
 N = Damping on in stroke only
 M = Damping on out stroke only
 X = Special model suffix

Mounting accessories see from page 212.

End Fitting Options:
 Eye A14 max. force 10,000 N
 Stud Thread B14
 Angle Ball Joint C14 max. force 3,200 N
 Clevis Fork D14 max. force 10,000 N
 Swivel Eye E14 max. force 10,000 N



Technical Data

Compression and extension force: 80 N to 10,000 N

Free travel: These units have no free travel and are ideal for applications that require this level of performance.

Operating temperature range: -20 °C to 80 °C

Adjustment: Pull the piston rod out to its fully extended position. While pulling on the rod, turn it clockwise or counter-clockwise until the desired damping is achieved. The adjustment is multi-turn and correct damping may require several trial and error adjustments. A built-in antilock guard allows adjustments to be made at any damping rate without unit lock up.

Material: Outer body: Black anodized aluminium; Piston rod: Hard chrome plated steel; End fittings: Zinc plated steel

Mounting: In any position

End fittings: They are interchangeable and if necessary must be positively secured by the customer to prevent unscrewing.

Safety information: Mechanical Stop required 1 mm to 1.5 mm before end of stroke.

Dream it

We. Love. Challenges.



Ok, pure gold or fur-covered are not realistic options.
But if you need a perfect solution for your individual needs, ACE has the tools and expertise to make it happen.

Call our experts
+1 800-521-3220 or go to www.acecontrols.com

HB- 12 to HB-70

Linear motion control

Adjustable

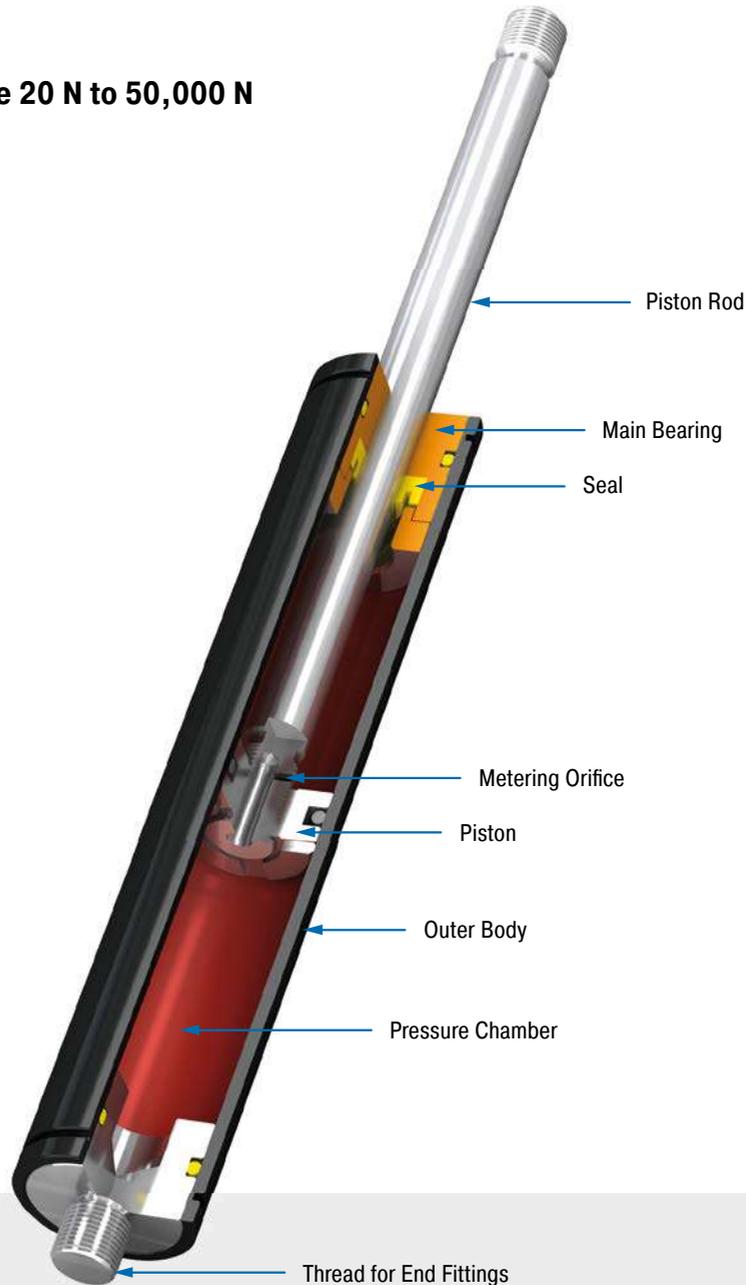
Compression and extension force 20 N to 50,000 N

Stroke 10 mm to 800 mm

High quality and long service life: The hydraulic dampers of the product family HB can also be used as single or double acting brake. Its coated body and piston rods with wear-resistant surface treatment are features of high quality and long service life.

The maintenance free, ready-to-install and closed systems provide a constant feed rate and are adjustable. The control segment on the piston makes adjustment at the end position child's play. Thanks to a broad selection of end fittings the assembly is easy to mount, so that the damper can be universally deployed for damping swinging masses, such as in power or free conveyors.

On automotive, automation and machine building, medical technology or the electronics and furniture industry, these machine elements are found in a number of different areas.



Technical Data

Compression and extension force: 20 N to 50,000 N

Outer body diameter: Ø 12 mm to Ø 70 mm

Piston rod diameter: Ø 4 mm to Ø 30 mm

Lifetime: Approx. 10,000 m

Free travel: Construction of the damper results in a free travel of approx. 20 % of stroke.

Separator piston: Available as a special option without free travel achieved by separator piston and nitrogen accumulator.

Operating temperature range: -20 °C to 80 °C

Adjustment: Achieved by turning the piston rod in its fully extended or fully compressed position.

Positive stop: External positive stops 1 mm to 6 mm before the end of stroke provided by the customer.

Damping medium: Hydraulic oil

Material: Outer body: Coated steel; Piston rod: Steel or stainless steel with wear-resistant coating; End fittings: Zinc plated steel

Mounting: In any position

Application field: Conveyor systems, Transport systems, Furniture industry, Locking systems, Sports equipment

Note: Increased break-away force if unit has not moved for some time.

End fittings: They are interchangeable and if necessary must be positively secured by the customer to prevent unscrewing.

On request: Special oils and other special options. Alternative accessories available on request.

Adjustable, Compression and extension force 20 N to 180 N

End Fitting

Standard Dimensions

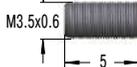
End Fitting

A3.5



Eye A3.5
max. force 370 N

B3.5



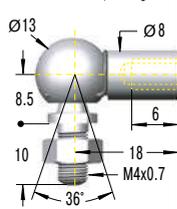
Performance and Dimensions

TYPES	Stroke mm	L extended mm	¹ Compression force max. N
HB-12-10	10	55	180
HB-12-20	20	75	180
HB-12-30	30	95	180
HB-12-40	40	115	180
HB-12-50	50	135	180
HB-12-60	60	155	180
HB-12-70	70	175	180
HB-12-80	80	195	150

¹ Max. extension force for all stroke lengths 180 N.

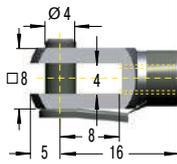
Stud Thread B3.5

C3.5



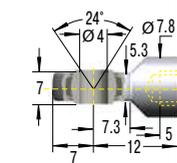
Angle Ball Joint C3.5
max. force 370 N

D3.5



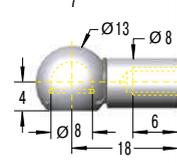
Clevis Fork D3.5
max. force 370 N

E3.5



Swivel Eye E3.5
max. force 370 N

G3.5



Ball Socket G3.5
max. force 370 N

Ordering Example

HB-12-30-AC-M

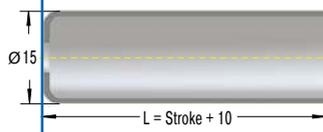
Type (Hydraulic Damper) _____
 Body 0.47" (12 mm) _____
 Stroke 1.18" (30 mm) _____
 Piston Rod End Fitting A3.5 _____
 Body End Fitting C3.5 _____
 Damping Direction (M = out stroke only) _____

Model Type Prefix

P: Damping in both directions
 N: Damping on in stroke only
 M: Damping on out stroke only
 X: Special model suffix

Mounting accessories see from page 212.

Rod Shroud W3.5-12



Technical Data

Compression and extension force: 20 N to 180 N

Free travel: Construction of the damper results in a free travel of approx. 21 % of stroke.

Separator piston: Available as a special option without free travel achieved by separator piston and nitrogen accumulator.

Operating temperature range: -20 °C to 80 °C

Adjustment: Achieved by turning the piston rod in its fully extended or fully compressed position.

Clockwise rotation = increase of the damping

Anti-clockwise rotation = decrease of the damping

Damping force adjustable before installation. Adjustment can add a max. of 6 mm to the L dimension.

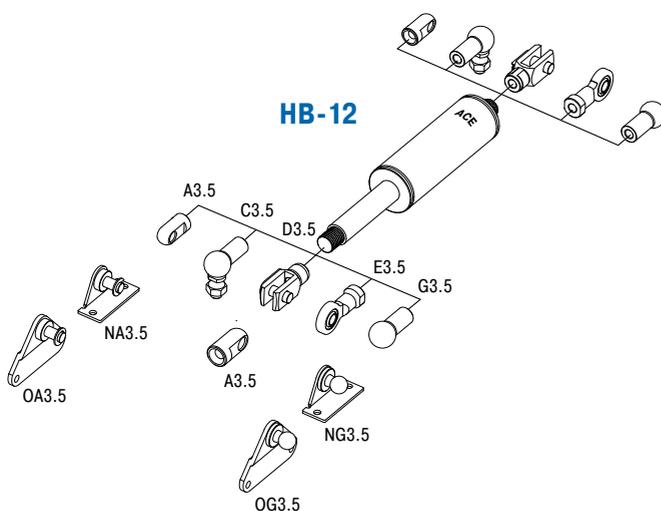
Positive stop: External positive stops 1 mm to 1.5 mm before the end of stroke provided by the customer.

Material: Outer body: Coated steel; Piston rod: Stainless steel (1.4301/1.4305, AISI 304/303); End fittings: Zinc plated steel

Mounting: In any position

Note: Increased break-away force if unit has not moved for some time.

End fittings: They are interchangeable and if necessary must be positively secured by the customer to prevent unscrewing.



Adjustable, Compression and extension force 20 N to 800 N

End Fitting

Standard Dimensions

End Fitting

Performance and Dimensions

TYPES	Stroke mm	L extended mm	¹ Compression force max. N
HB-15-25	25	93	800
HB-15-50	50	143	800
HB-15-75	75	193	800
HB-15-100	100	243	350
HB-15-150	150	343	300

¹ Max. extension force for all stroke lengths 800 N.

Ordering Example

HB-15-150-AA-P

Type (Hydraulic Damper) _____
 Body 0.59" (15 mm) _____
 Stroke 5.91" (150 mm) _____
 Piston Rod End Fitting A5 _____
 Body End Fitting A5 _____
 Damping Direction (P = in both directions) _____

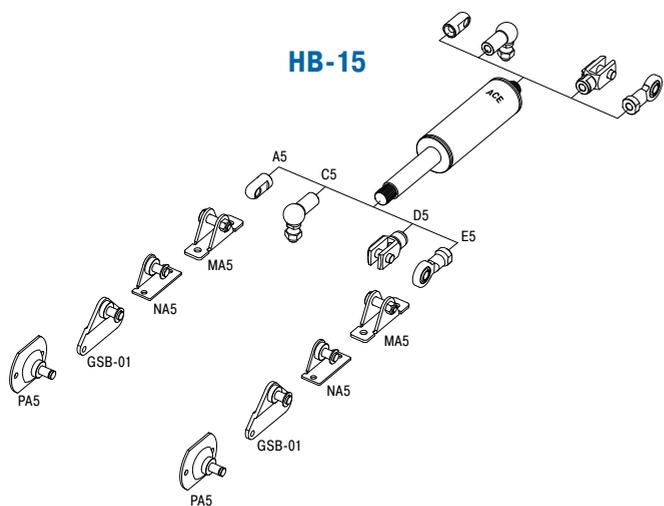
Model Type Prefix

P: Damping in both directions
 N: Damping on in stroke only
 M: Damping on out stroke only
 X: Special model suffix

Mounting accessories see from page 212.

Technical Data

- Compression and extension force:** 20 N to 800 N
- Free travel:** Construction of the damper results in a free travel of approx. 20 % of stroke.
- Separator piston:** Available as a special option without free travel achieved by separator piston and nitrogen accumulator.
- Operating temperature range:** -20 °C to 80 °C
- Adjustment:** Achieved by turning the piston rod in its fully extended or fully compressed position.
 Clockwise rotation = increase of the damping
 Anti-clockwise rotation = decrease of the damping
 Damping force adjustable before installation. Adjustment can add a max. of 6 mm to the L dimension.
- Positive stop:** External positive stops 1 mm to 1.5 mm before the end of stroke provided by the customer.
- Material:** Outer body: Black anodized aluminium; Piston rod: Steel with wear-resistant coating; End fittings: Zinc plated steel
- Mounting:** In any position
- Note:** Increased break-away force if unit has not moved for some time.
- End fittings:** They are interchangeable and if necessary must be positively secured by the customer to prevent unscrewing.



Adjustable, Compression and extension force 30 N to 1,800 N

End Fitting

Standard Dimensions

End Fitting

A8

10 thick, R7, 14, 8, 8, 14, Stroke

B8

M8x1.25, 10

C8

Ø20, Ø13, 12, 15, 17, 30, M8x1.25, 36°

D8

Ø8, 16, 8, 10, 16, 32

E8

24°, Ø8, 16, 12, 13, 36, 16

L +/- 2 extended
+ max 6 at maximum adjustment

Performance and Dimensions			
TYPES	Stroke mm	L extended mm	¹ Compression force max. N
HB-22-50	50	150	1,800
HB-22-100	100	250	1,800
HB-22-150	150	350	1,800
HB-22-200	200	450	1,000
HB-22-250	250	550	1,000
HB-22-300	300	650	800
HB-22-350	350	750	600
HB-22-400	400	850	400

¹ Max. extension force for all stroke lengths 1,800 N.

Ordering Example

HB-22-150-AA-P

Type (Hydraulic Damper) _____

Body 0.87" (22 mm) _____

Stroke 5.90" (150 mm) _____

Piston Rod End Fitting A8 _____

Body End Fitting A8 _____

Damping Direction (P = in both directions) _____

Eye A8
max. force 3,000 N

Stud Thread B8

Angle Ball Joint C8
max. force 1,200 N

Clevis Fork D8
max. force 3,000 N

Swivel Eye E8
max. force 3,000 N

Model Type Prefix

- P: Damping in both directions
- N: Damping on in stroke only
- M: Damping on out stroke only
- X: Special model suffix

Mounting accessories see from page 212.

Technical Data

Compression and extension force: 30 N to 1,800 N

Free travel: Construction of the damper results in a free travel of approx. 20 % of stroke.

Separator piston: Available as a special option without free travel achieved by separator piston and nitrogen accumulator.

Operating temperature range: -20 °C to 80 °C

Adjustment: Achieved by turning the piston rod in its fully extended or fully compressed position.

Clockwise rotation = increase of the damping

Anti-clockwise rotation = decrease of the damping

Damping force adjustable before installation. Adjustment can add a max. of 6 mm to the L dimension.

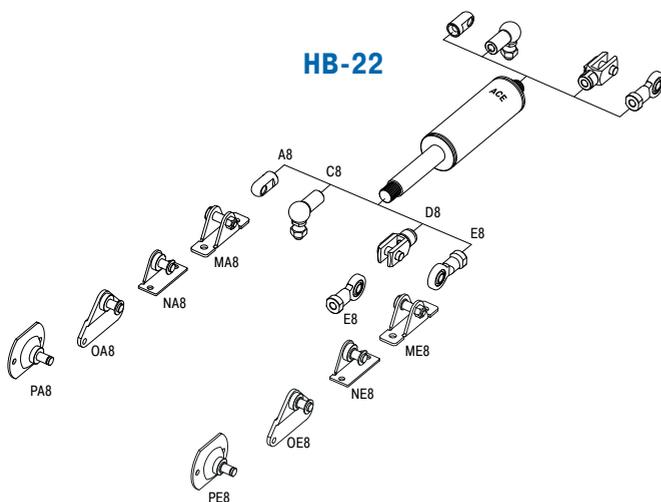
Positive stop: External positive stops 1 mm to 1.5 mm before the end of stroke provided by the customer.

Material: Outer body: Black anodized aluminium; Piston rod: Steel with wear-resistant coating; End fittings: Zinc plated steel

Mounting: In any position

Note: Increased break-away force if unit has not moved for some time.

End fittings: They are interchangeable and if necessary must be positively secured by the customer to prevent unscrewing.



Adjustable, Compression and extension force 30 N to 3,000 N

End Fitting

Standard Dimensions

End Fitting

Performance and Dimensions

TYPES	Stroke mm	L extended mm	¹ Compression force max. N
HB-28-50	50	160	3,000
HB-28-100	100	260	3,000
HB-28-150	150	360	3,000
HB-28-200	200	460	3,000
HB-28-250	250	560	3,000
HB-28-300	300	660	2,500
HB-28-350	350	760	2,000
HB-28-400	400	860	1,500
HB-28-500	500	1,060	1,000

¹ Max. extension force for all stroke lengths 3,000 N.

Ordering Example

HB-28-150-AA-P

Type (Hydraulic Damper) _____
 Body 1.10" (28 mm) _____
 Stroke 5.91" (150 mm) _____
 Piston Rod End Fitting A8 _____
 Body End Fitting A8 _____
 Damping Direction (P = in both directions) _____

Model Type Prefix

P: Damping in both directions
 N: Damping on in stroke only
 M: Damping on out stroke only
 X: Special model suffix

Mounting accessories see from page 212.

End Fitting Options:
 Eye A8 max. force 3,000 N
 Stud Thread B8
 Angle Ball Joint C8 max. force 1,200 N
 Clevis Fork D8 max. force 3,000 N
 Swivel Eye E8 max. force 3,000 N

Technical Data

Compression and extension force: 30 N to 3,000 N

Free travel: Construction of the damper results in a free travel of approx. 20 % of stroke.

Separator piston: Available as a special option without free travel achieved by separator piston and nitrogen accumulator.

Operating temperature range: -20 °C to 80 °C

Adjustment: Achieved by turning the piston rod in its fully extended or fully compressed position.

Clockwise rotation = increase of the damping

Anti-clockwise rotation = decrease of the damping

Damping force adjustable before installation. Adjustment can add a max. of 6 mm to the L dimension.

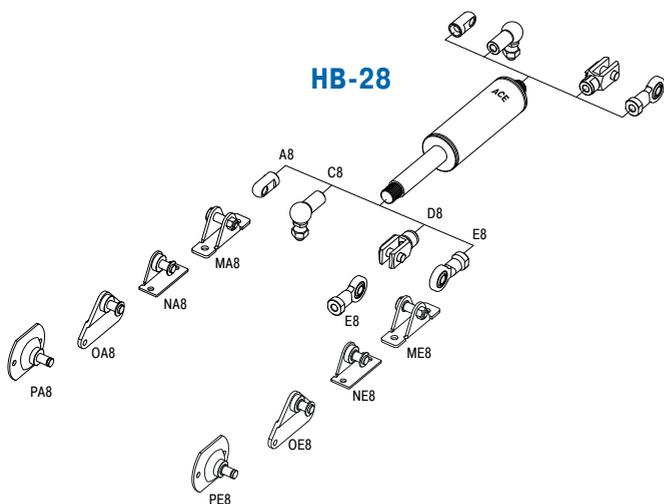
Positive stop: External positive stops 1 mm to 1.5 mm before the end of stroke provided by the customer.

Material: Outer body: Black anodized aluminium; Piston rod: Steel with wear-resistant coating; End fittings: Zinc plated steel

Mounting: In any position

Note: Increased break-away force if unit has not moved for some time.

End fittings: They are interchangeable and if necessary must be positively secured by the customer to prevent unscrewing.



Adjustable, Compression and extension force 30 N to 10,000 N

End Fitting
Standard Dimensions
End Fitting

Performance and Dimensions

TYPES	Stroke mm	L extended mm	¹ Compression force max. N
HB-40-100	100	275	10,000
HB-40-150	150	375	10,000
HB-40-200	200	475	10,000
HB-40-300	300	675	10,000
HB-40-400	400	875	8,000
HB-40-500	500	1,075	6,000
HB-40-600	600	1,275	4,000
HB-40-700	700	1,475	3,000
HB-40-800	800	1,675	3,000

¹ Max. extension force for all stroke lengths 10,000 N.

Ordering Example

HB-40-300-AA-P

Type (Hydraulic Damper) _____ ↑ ↑ ↑ ↑ ↑

Body 1.57" (40 mm) _____ ↑ ↑ ↑ ↑ ↑

Stroke 11.81" (300 mm) _____ ↑ ↑ ↑ ↑ ↑

Piston Rod End Fitting A14 _____ ↑

Body End Fitting A14 _____ ↑

Damping Direction (P = in both directions) _____ ↑

Model Type Prefix

P: Damping in both directions
 N: Damping on in stroke only
 M: Damping on out stroke only
 X: Special model suffix

Mounting accessories see from page 212.

End Fitting Options:

- Eye A14**: max. force 10,000 N
- Stud Thread B14**
- Angle Ball Joint C14**: max. force 3,200 N
- Clevis Fork D14**: max. force 10,000 N
- Swivel Eye E14**: max. force 10,000 N

Technical Data
Compression and extension force: 30 N to 10,000 N

Free travel: Construction of the damper results in a free travel of approx. 20 % of stroke.

Separator piston: Available as a special option without free travel achieved by separator piston and nitrogen accumulator.

Operating temperature range: -20 °C to 80 °C

Adjustment: Achieved by turning the piston rod in its fully extended or fully compressed position.

Clockwise rotation = increase of the damping

Anti-clockwise rotation = decrease of the damping

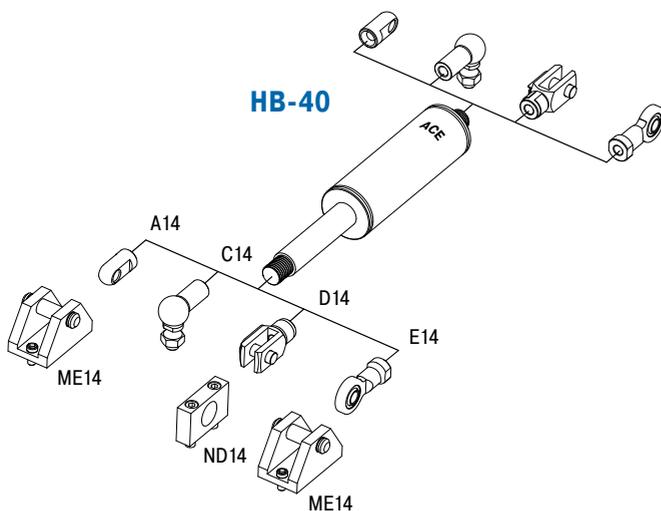
Damping force adjustable before installation. Adjustment can add a max. of 6 mm to the L dimension.

Positive stop: External positive stops 1 mm to 1.5 mm before the end of stroke provided by the customer.

Material: Outer body: Black anodized aluminium; Piston rod: Steel with wear-resistant coating; End fittings: Zinc plated steel

Mounting: In any position

Note: Increased break-away force if unit has not moved for some time.

End fittings: They are interchangeable and if necessary must be positively secured by the customer to prevent unscrewing.


Adjustable, Compression and extension force 2,000 N to 50,000 N

End Fitting

Standard Dimensions

End Fitting

B24 Stud Thread **B24**

D24 Clevis Fork **D24**
max. force 50,000 N

E24 Swivel Eye **E24**
max. force 50,000 N

Performance and Dimensions

TYPES	Stroke mm	L extended mm	¹ Compression force max. N
HB-70-100	111	331	50,000
HB-70-200	211	531	50,000
HB-70-300	311	731	50,000
HB-70-400	411	931	30,300
HB-70-500	511	1,131	21,600
HB-70-600	611	1,331	16,200
HB-70-700	711	1,531	12,600
HB-70-800	811	1,731	10,100

¹ Max. extension force for all stroke lengths 50,000 N.

Ordering Example

HB-70-300-EE-N

Type (Hydraulic Damper) _____
 Body 2.76" (70 mm) _____
 Stroke 11.81" (300 mm) _____
 Piston Rod End Fitting E24 _____
 Body End Fitting E24 _____
 Damping Direction (N = in stroke only) _____

Model Type Prefix

P: Damping in both directions
 N: Damping on in stroke only
 M: Damping on out stroke only
 X: Special model suffix

Mounting accessories see from page 212.

Rod Shroud W24-70

Ø 80
 L = Stroke + 130

Technical Data

Compression and extension force: 2,000 N to 50,000 N

Free travel: Construction of the damper results in a free travel of approx. 20 % of stroke.

Separator piston: Available as a special option without free travel achieved by separator piston and nitrogen accumulator.

Operating temperature range: -20 °C to 80 °C

Adjustment: Achieved by turning the piston rod in its fully extended or fully compressed position.

Clockwise rotation = increase of the damping

Anti-clockwise rotation = decrease of the damping

Damping force adjustable before installation. The adjustment can add a max. of 5 mm to the L dimension.

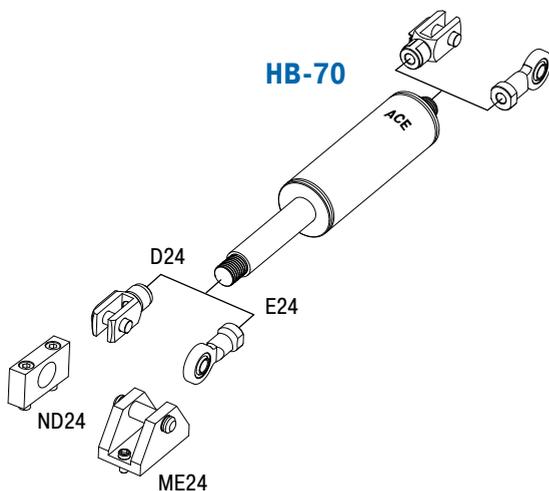
Positive stop: External positive stops 5 mm to 6 mm before the end of stroke provided by the customer.

Material: Outer body: Coated steel; Piston rod: Hard chrome plated steel; End fittings: Zinc plated steel

Mounting: In any position

Note: Increased break-away force if unit has not moved for some time.

End fittings: They are interchangeable and if necessary must be positively secured by the customer to prevent unscrewing.



ACE Digital Tools



For more information about the calculation service see page 188!

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- ▶ PC calculation software & online calculation service
- ▶ Extensive CAD component libraries
- ▶ ACE-YouTube channel with video tips
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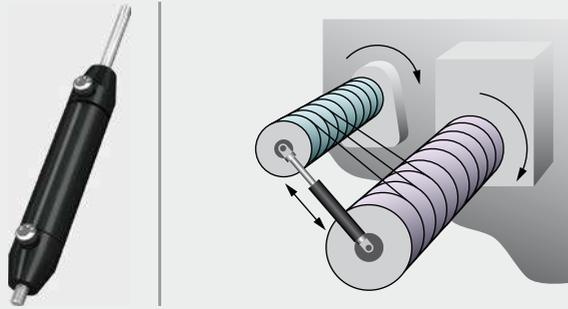
All available at www.acecontrols.com

Application Examples

DVC-32

Precise unreeling

Hydraulic dampers bring the sled movement of this textile machine to a gentle stop. At the turning point of 130 kg reeling spools, a sled should move up and down smoothly without causing a collision at the end of stroke position. The solution was provided by the hydraulic damper DVC-32-100. A self-contained sealed unit, ready to install and maintenance-free these units are ideal for precise control of speeds in both directions of travel. The travel speed is maintained throughout the entire stroke and can be independently adjusted in each direction of travel. Thanks to their compact design and wide choice of mounting accessories, these dampers could be easily integrated into this machine.

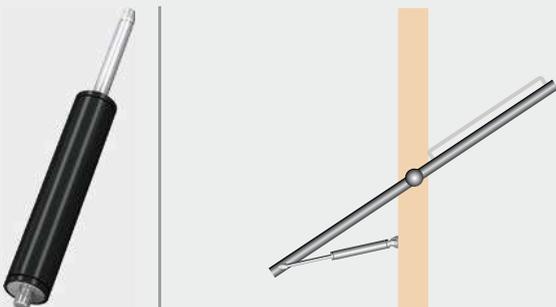


Textile machine unreels threads even better

HB-15

Operating speed of flaps top-regulated

In the past, operators of used-clothes containers could sustain injury because the flaps closed relatively quickly and uncontrollably. Various hydraulic dampers of the type HB-15, which are designed specifically for the type of container, regulate the synchronization of the flap in both directions and thereby serve to regulate the operating speed. To accommodate a range of requirements and to provide optimal protection against theft, different types with different strokes are mounted on flaps without damping, on large flaps with damping and on rotor flaps with damping.



Hydraulic dampers prevent fingers becoming trapped in used-clothes containers as they ensure more gentle opening and closing movements
MCB Milieu & Techniek BV, 4704 SE Roosendaal, Netherlands

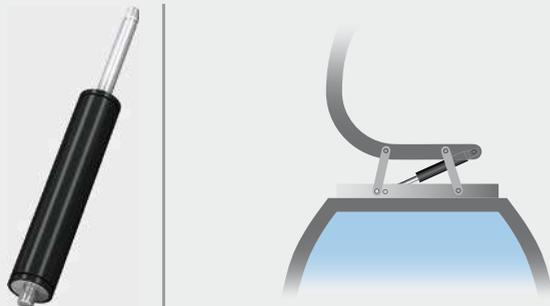
HB-40

Swinging movements cushioned by hydraulic dampers

Passengers always feel the swinging movement involved when cable cars arrive at the ski station. Maintenance-free hydraulic dampers type HB-40-300-EE-X-P cushion these movements perfectly. Designers of the cable cars, connected by means of an articulated joint via a four-point frame and connection guide to the suspension rod, profit from the ability of the adjustable dampers to absorb compressive forces of up to 10,000 N on either side.



Hydraulic dampers for added convenience when operating cable cars



Mounting Accessories for steel gas springs and hydraulic dampers

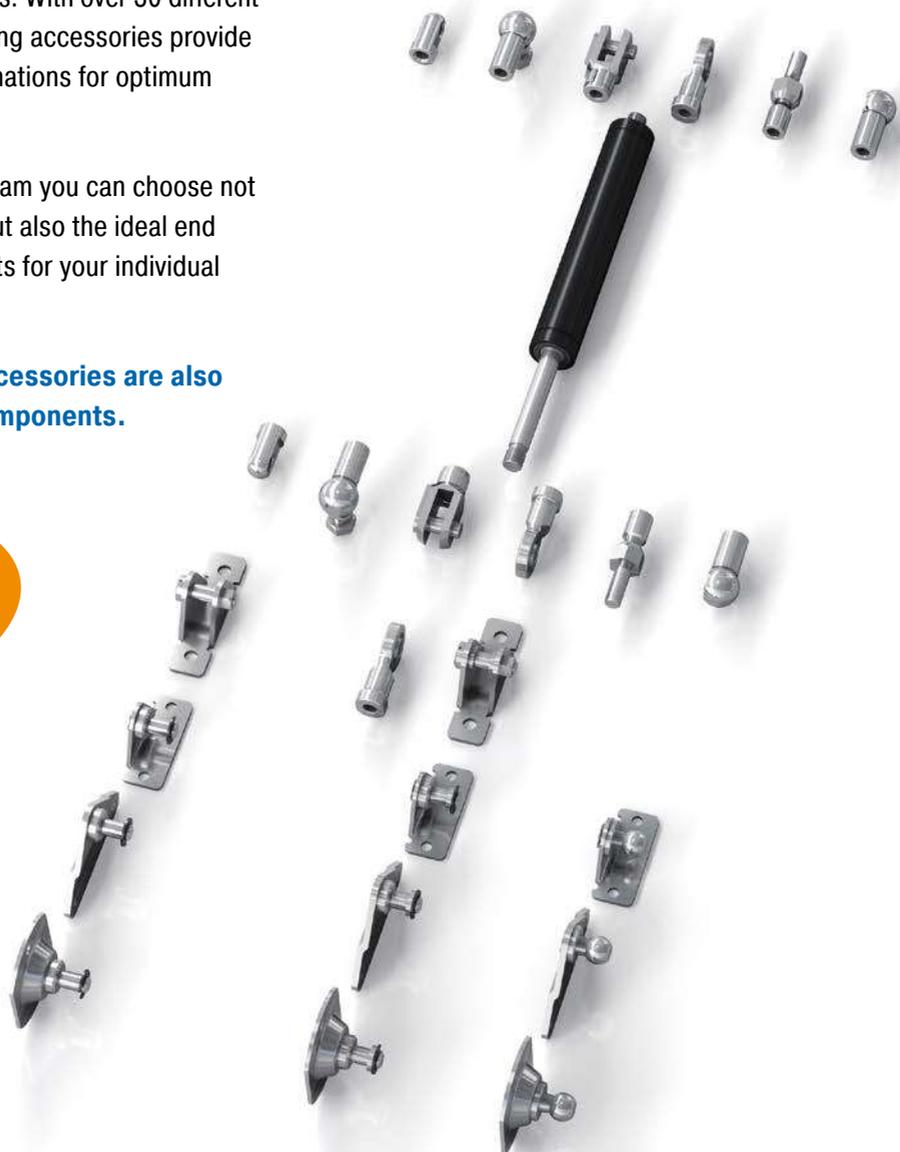
By taking advantage of the very extensive range of ACE end fittings and mounting brackets you can easily and simply install our gas springs and hydraulic dampers. You profit from the variety of DIN standard end fittings such as swivel eyes, clevis forks, angle ball joints, inline ball joints, and included ball sockets.

ACE also offers eye fittings made of wear-resistant steel to meet the higher specification requirements found in industrial applications. With over 30 different types available these mounting accessories provide an extensive range of combinations for optimum installations.

With the ACE selection program you can choose not only your ACE gas springs but also the ideal end fittings and mounting brackets for your individual application example.

The complete range of accessories are also available as individual components.

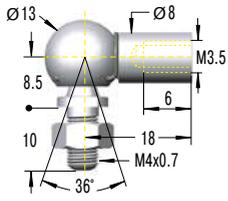
**Infinite
Combinations!**



M3.5x0.6 (for GS-8, GS-10, GS-12, GZ-15, HB-12)

C3.5

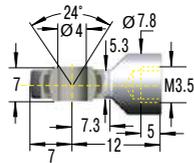
Angle Ball Joint
DIN 71802



¹ max. force 370 N

E3.5

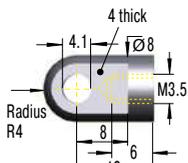
Swivel Eye
DIN 648



¹ max. force 370 N

A3.5

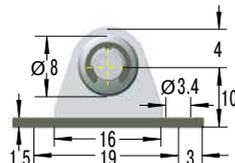
Eye



¹ max. force 370 N

NA3.5

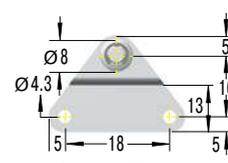
Angle Bracket



¹ max. force 180 N

OA3.5

Side Bracket

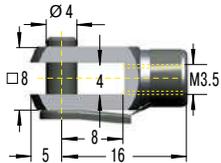


¹ max. force 180 N



D3.5

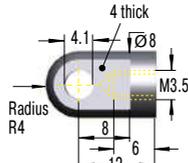
Clevis Fork
DIN 71752



¹ max. force 370 N

A3.5

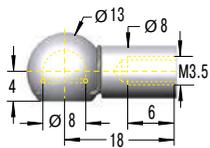
Eye



¹ max. force 370 N

G3.5

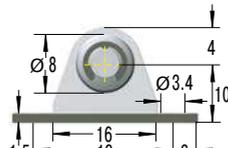
Ball Socket
DIN 71805



¹ max. force 370 N

NG3.5

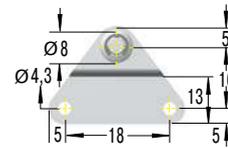
Angle Bracket



¹ max. force 180 N

OG3.5

Side Bracket



¹ max. force 180 N



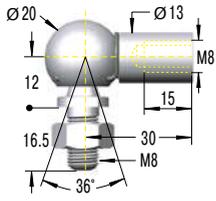
¹ Attention! Max. static load in Newtons. Beware force increase during compression (progression) and observe max. force limit.

M8x1.25

(for GS-19, GS-22, GZ-19, HBD-22, HBD-28, HB-22, HB-28, DVC-32)

C8

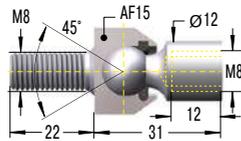
Angle Ball Joint
DIN 71802



¹ max. force 1,200 N

F8

Inline Ball Joint

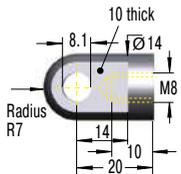


¹ max. force 1,200 N

Attention! Must only be used with compression loads!

A8

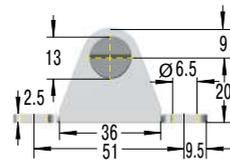
Eye



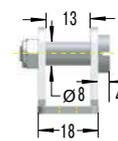
¹ max. force 3,000 N

MA8

Bearing Shoe

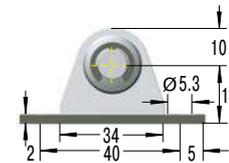


¹ max. force 1,800 N

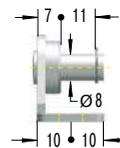


NA8

Angle Bracket

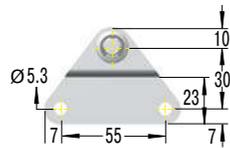


¹ max. force 1,000 N



OA8

Side Bracket

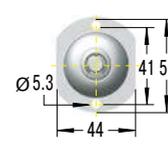


¹ max. force 1,200 N

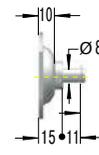


PA8

Round Bracket

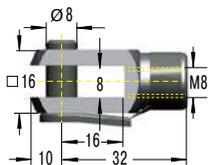


¹ max. force 1,200 N



D8

Clevis Fork
DIN 71752

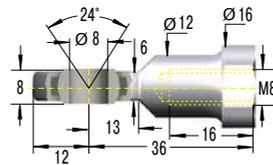


¹ max. force 3,000 N



E8

Swivel Eye
DIN 648



¹ max. force 3,000 N

¹ Attention! Max. static load in Newtons. Beware force increase during compression (progression) and observe max. force limit.

M8x1.25 (for GS-19, GS-22, GZ-19, HBD-22, HBD-28, HB-22, HB-28, DVC-32)

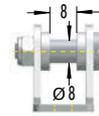
E8
Swivel Eye
DIN 648

¹ max. force 3,000 N



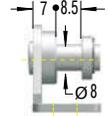
ME8
Bearing Shoe

¹ max. force 1,800 N



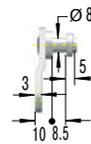
NE8
Angle Bracket

¹ max. force 1,000 N



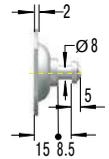
OE8
Side Bracket

¹ max. force 1,200 N



PE8
Round Bracket

¹ max. force 1,200 N



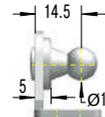
G8
Ball Socket
DIN 71805

¹ max. force 1,200 N



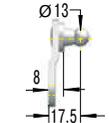
NG8
Angle Bracket

¹ max. force 1,000 N



OG8
Side Bracket

¹ max. force 1,200 N



PG8
Round Bracket

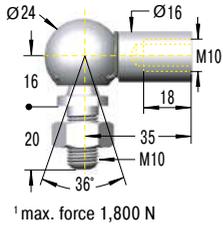
¹ max. force 1,200 N



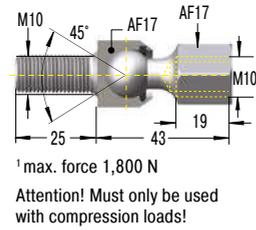
¹ Attention! Max. static load in Newtons. Beware force increase during compression (progression) and observe max. force limit.

M10x1.5 (for GS-28, GZ-28, HBD-50)

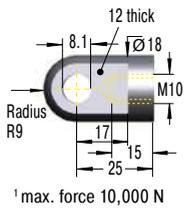
C10
Angle Ball Joint
DIN 71802



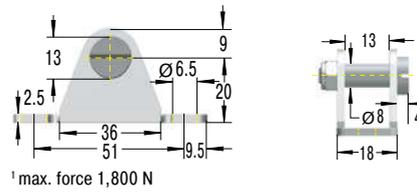
F10
Inline Ball Joint



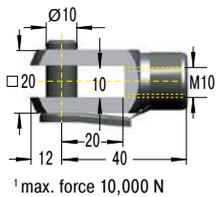
A10
Eye



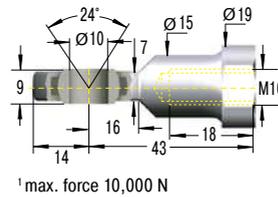
MA10
Bearing Shoe



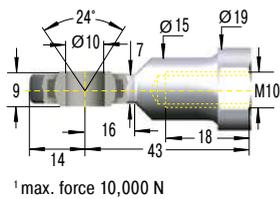
D10
Clevis Fork
DIN 71752



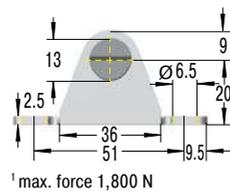
E10
Swivel Eye
DIN 648



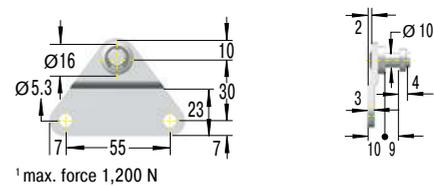
E10
Swivel Eye
DIN 648



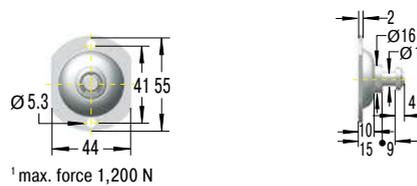
ME10
Bearing Shoe



OE10
Side Bracket

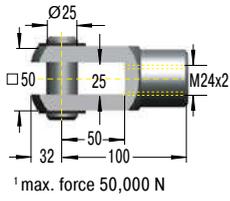


PE10
Round Bracket

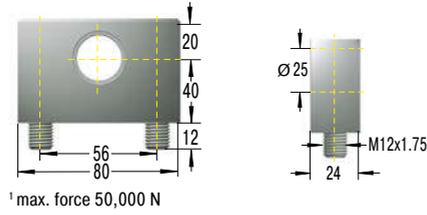


M24x2 (for GS-70, HB-70)

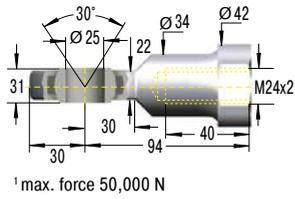
D24
Clevis Fork
DIN 71752



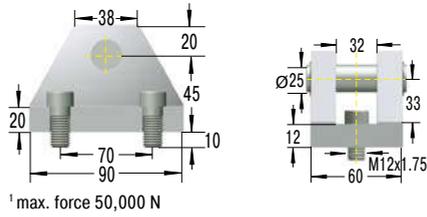
ND24
Mounting Flange



E24
Swivel Eye
DIN 648



ME24
Bearing Shoe



¹Attention! Max. static load in Newtons. Beware force increase during compression (progression) and observe max. force limit.

Mounting Accessories

for stainless steel gas springs and hydraulic dampers

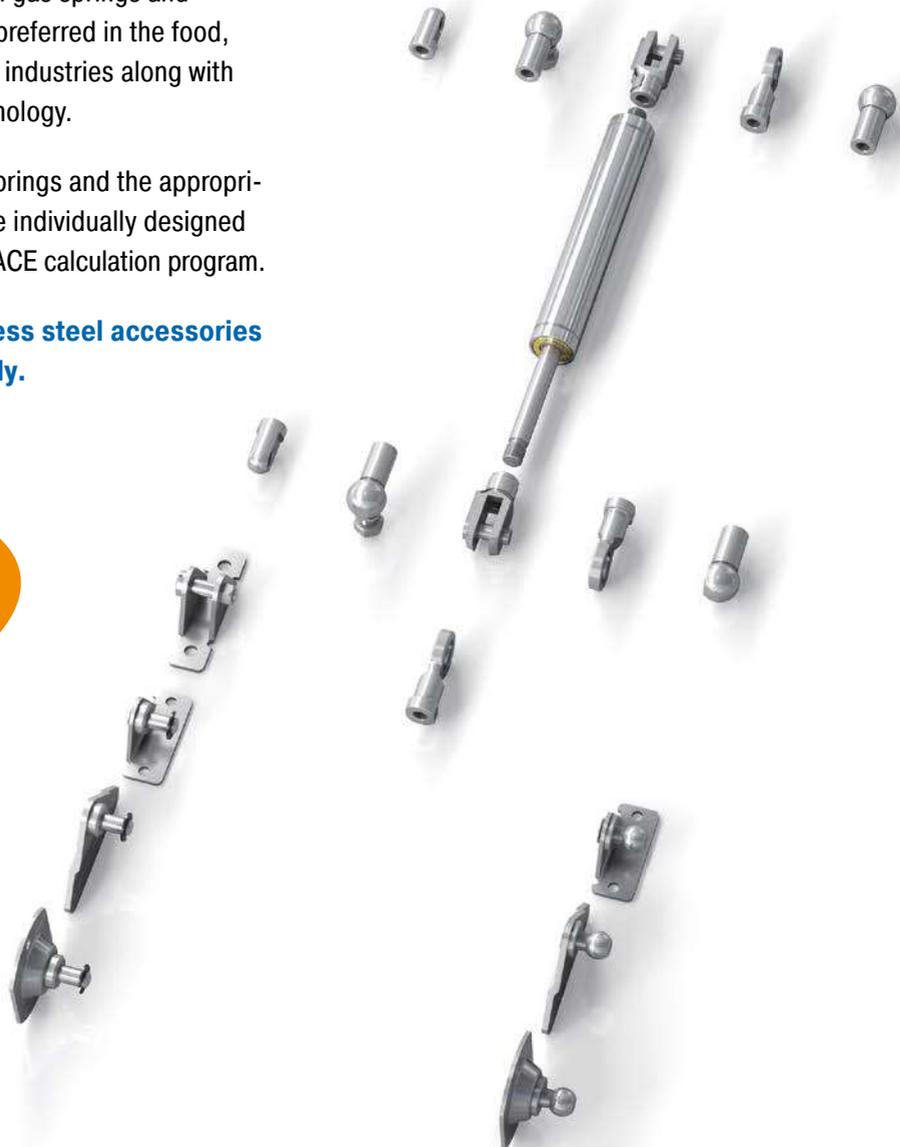
For our gas springs and hydraulic dampers made of stainless steel we also offer a flexible product range of DIN standardized end fittings and mounting brackets. These eyes, swivel eyes, clevis forks, angle ball joints, ball sockets, inline ball joints and mounting brackets are also made of sturdy stainless steel and can be easily combined.

The high-quality stainless steel accessories are rustproof and weakly magnetic. Just as with the corresponding stainless steel gas springs and hydraulic dampers, they are preferred in the food, electronics and ship building industries along with medical and cleanroom technology.

All ACE stainless steel gas springs and the appropriate mounting accessories are individually designed for each application with the ACE calculation program.

The entire range of stainless steel accessories is also available separately.

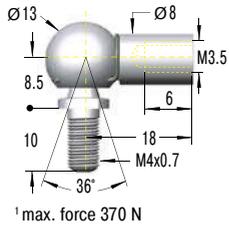
**Infinite
Combinations!**



M3.5x0.6

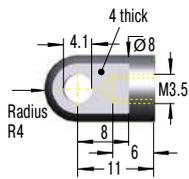
(for GS-8-V4A, GS-10-V4A, GS-12-V4A, GZ-15-V4A)

C3.5-V4A Angle Ball Joint



¹ max. force 370 N

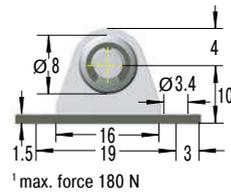
A3.5-V4A Eye



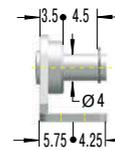
¹ max. force 370 N



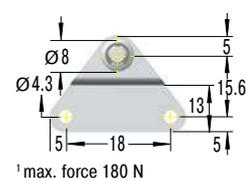
NA3.5-V4A Angle Bracket



¹ max. force 180 N



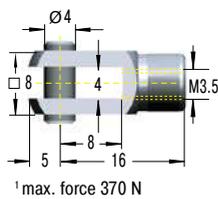
OA3.5-V4A Side Bracket



¹ max. force 180 N



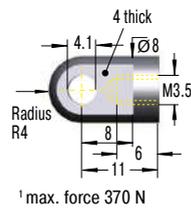
D3.5-V4A Clevis Fork



¹ max. force 370 N

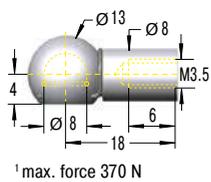


A3.5-V4A Eye



¹ max. force 370 N

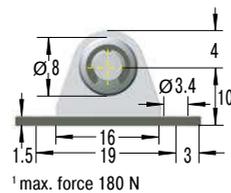
G3.5-V4A Ball Socket



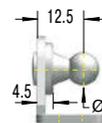
¹ max. force 370 N



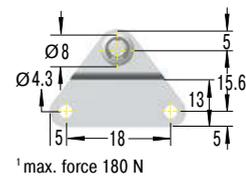
NG3.5-V4A Angle Bracket



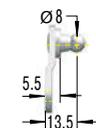
¹ max. force 180 N



OG3.5-V4A Side Bracket



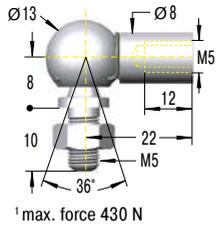
¹ max. force 180 N



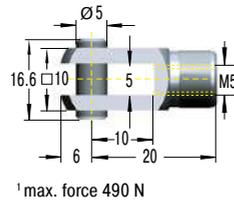
¹ Attention! Max. static load in Newtons. Beware force increase during compression (progression) and observe max. force limit.

M5x0.8 (for GS-15-VA)

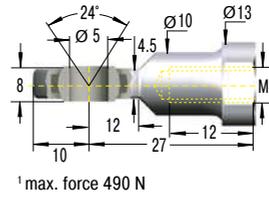
C5-VA
Angle Ball Joint



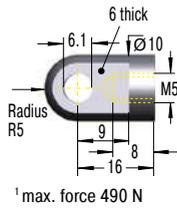
D5-VA
Clevis Fork



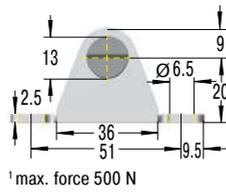
E5-VA
Swivel Eye



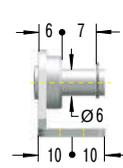
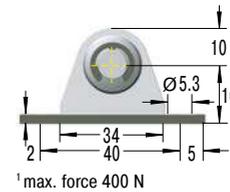
A5-VA
Eye



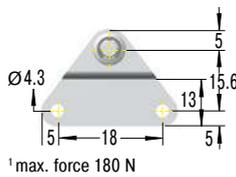
MA5-V4A
Bearing Shoe



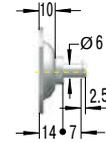
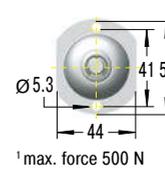
NA5-V4A
Angle Bracket



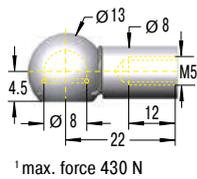
OA5-V4A
Side Bracket



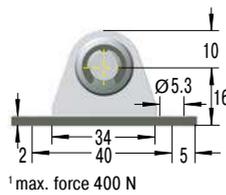
PA5-V4A
Round Bracket



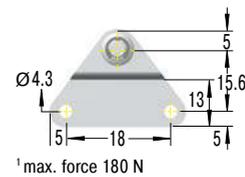
G5-VA
Ball Socket



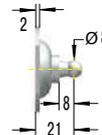
NG5-V4A
Angle Bracket



OG5-V4A
Side Bracket



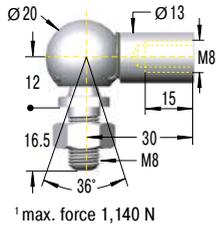
PG5-V4A
Round Bracket



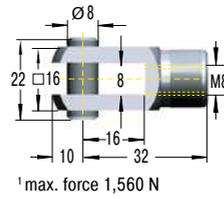
¹Attention! Max. static load in Newtons. Beware force increase during compression (progression) and observe max. force limit.

M8x1.25 (for GS-19-VA, GS-22-VA, GZ-19-VA)

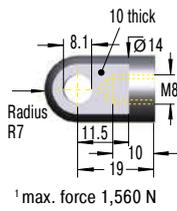
C8-VA
Angle Ball Joint



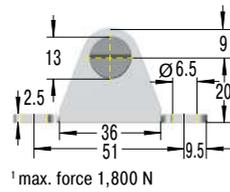
D8-VA
Clevis Fork



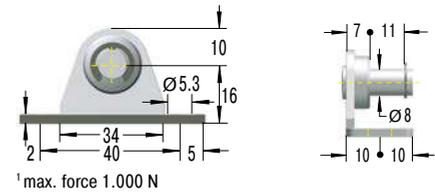
A8-VA
Eye



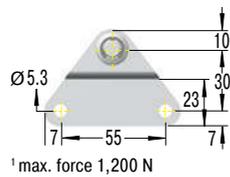
MA8-V4A
Bearing Shoe



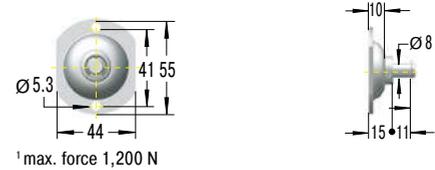
NA8-V4A
Angle Bracket



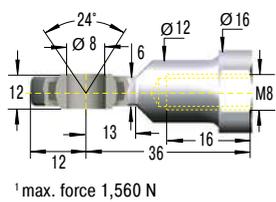
OA8-V4A
Side Bracket



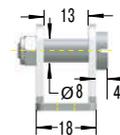
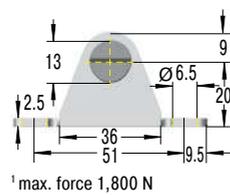
PA8-V4A
Round Bracket



E8-VA
Swivel Eye



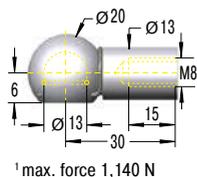
MA8-V4A
Bearing Shoe



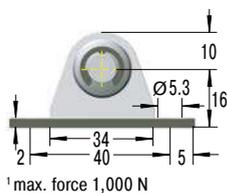
¹Attention! Max. static load in Newtons. Beware force increase during compression (progression) and observe max. force limit.

M8x1.25 (for GS-19-VA, GS-22-VA, GZ-19-VA)

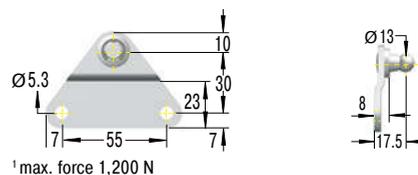
G8-VA
Ball Socket



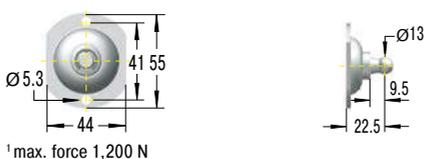
NG8-V4A
Angle Bracket



OG8-V4A
Side Bracket

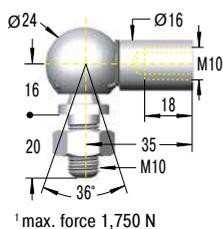


PG8-V4A
Round Bracket

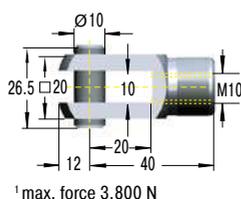


M10x1.5 (for GS-28-VA, GZ-28-VA)

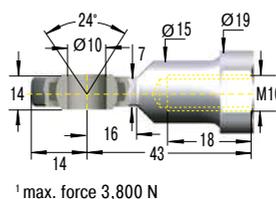
C10-VA
Angle Ball Joint



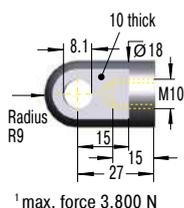
D10-VA
Clevis Fork



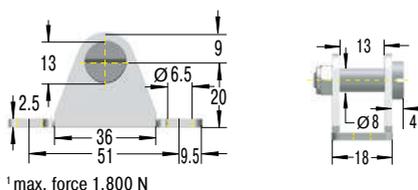
E10-VA
Swivel Eye



A10-VA
Eye



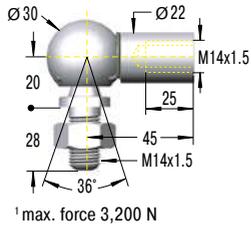
MA10-V4A
Bearing Shoe



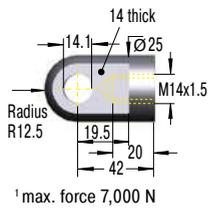
¹ Attention! Max. static load in Newtons. Beware force increase during compression (progression) and observe max. force limit.

M14x1.5 (for GS-40-VA, GZ-40-VA)

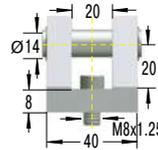
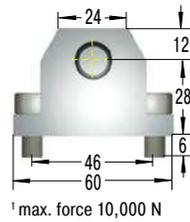
C14-VA Angle Ball Joint



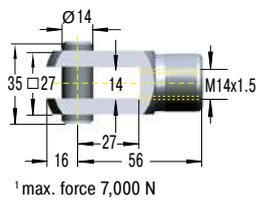
A14-VA Eye



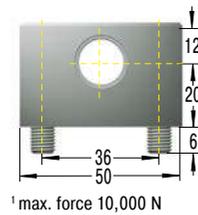
ME14-VA Bearing Shoe



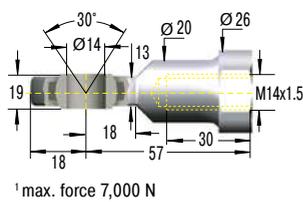
D14-VA Clevis Fork



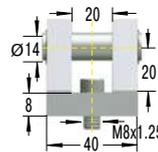
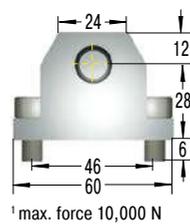
ND14-VA Mounting Flange



E14-VA Swivel Eye



ME14-VA Bearing Shoe



¹ Attention! Max. static load in Newtons. Beware force increase during compression (progression) and observe max. force limit.

Hydraulic Feed Controls

Regulate feed rates in the best way

ACE Hydraulic feed controls are recommended as the perfect solution when sawing, cutting, drilling and in order to prevent the stick-slip effect on pneumatic cylinders. They can be precisely adjusted and provide speeds from 12 mm/min. (1/2"/min.) with a very low feed force or up to 38 m/min. (1.5"/min.) with a high feed rate.

These maintenance-free, ready-to-install hydraulic feed controls are self-contained hydraulic elements regulated by a precision throttle. The feed rate is set from the outside by turning the setting adjuster. The tried-and-tested rolling diaphragms used in many ACE shock absorbers also serve as a dynamic sealing element for a hermetic seal as well as volume compensation for the piston rod and provide the resetting of the piston when the force is removed.



Hydraulic Feed Controls



VC25

Page 228

Adjustable
For precision adjustment of feed rates
 Handling modules, Linear slides, Automatic machinery,
 Conveyor equipment



MA, MVC

Page 230

Adjustable
Designed for applications with low precision requirements
 Handling modules, Linear slides, Automatic machinery,
 Conveyor equipment

Shorter processing times

Different feed rates

Adjustment segment at the lower end of the feed control

Most accurate calibrations

Available immediately

Easy to mount



VC25

For precision adjustment of feed rates

Adjustable

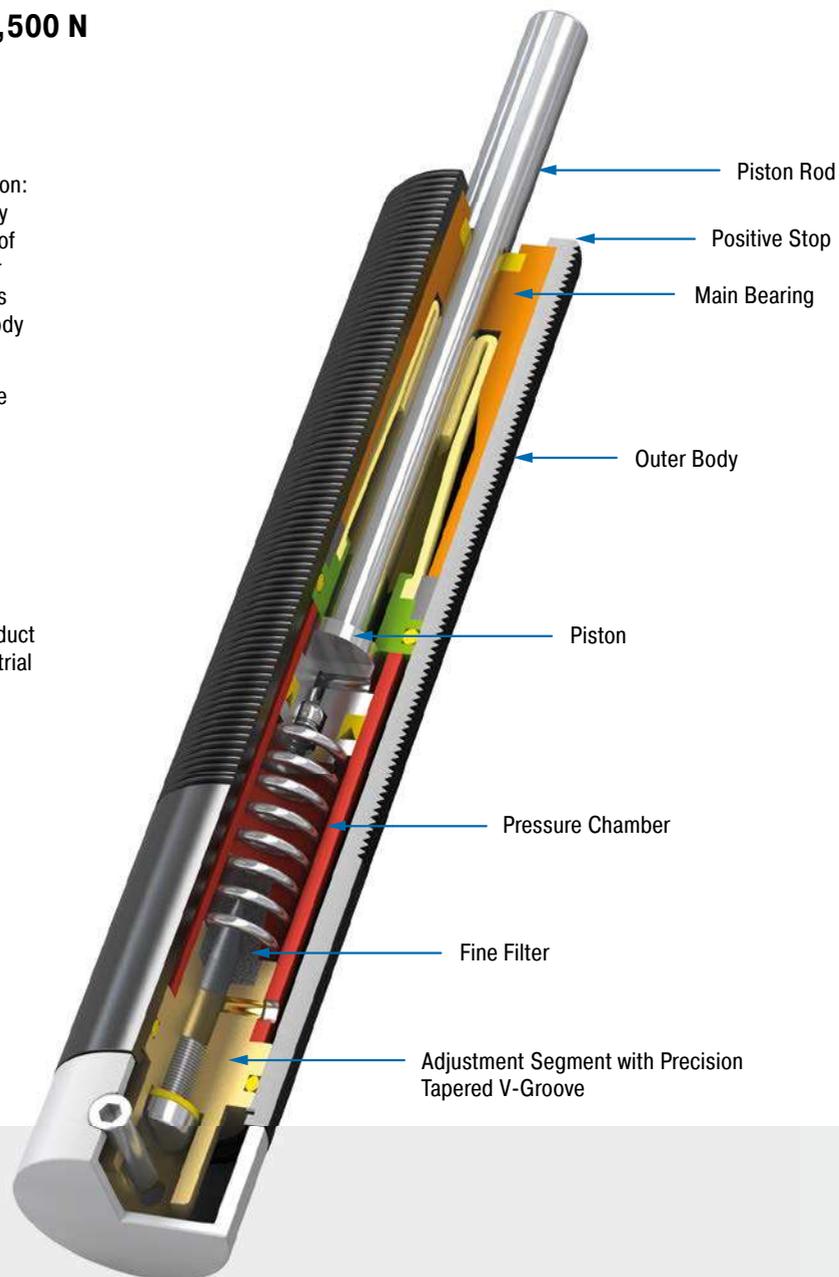
Compression force 30 N to 3,500 N

Stroke 15 mm to 125 mm

Precise adjustment for any type of application: Hydraulic feed controls of the product family VC are ideally suited for the precise tuning of constant feed rates. The thread of the outer body of this closed hydraulic element allows simple assembly. Designs with a smooth body can also be supplied.

As the hydraulic oil is forced out through the throttle opening, a constant feed rate is achieved on the stroke. In the models up to 55 mm (2.17") stroke, the tried and tested rolling diaphragm, known from ACE shock absorbers, serves as a dynamic seal, as volume compensation of the piston rod and as a reset element.

Precision hydraulic feed controls of the product family VC are used in automotive and industrial applications as well as in mechanical engineering and the electronics industry.



Technical Data

Compression force: 30 N to 3,500 N

Execution: F = Ø 23.8 mm without thread
FT = M25x1.5 threaded body

Piston rod diameter: Ø 8 mm

Feed rate/Compression force:
Min. 0.013 m/min. at 400 N; Max. 38 m/min.
at 3,500 N

Impact velocity range: At speeds of 0.3 m/s the maximum allowed energy is approx. 1 Nm for units up to 55 mm stroke and approx. 2 Nm for units 75 mm to 125 mm stroke. Where higher energies occur use a shock absorber for the initial impact. Avoid high impact velocities.

Adjustment: Infinitely adjustable

Positive stop: External positive stops 1 mm to 1.5 mm before the end of stroke provided by the customer.

Damping medium: Oil, temperature stable

Material: Outer body: Black anodized aluminium; Piston rod: Hard chrome plated steel; Accessories: Steel with black oxide finish or nitride hardened

Mounting: In any position

Operating temperature range: 0 °C to 60 °C

Application field: Handling modules, Linear slides, Automatic machinery, Conveyor equipment, Absorption control

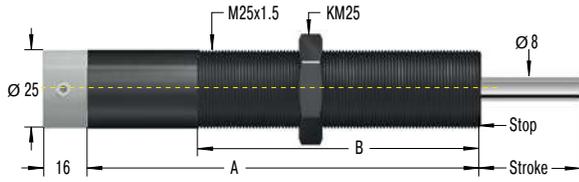
Note: Nylon button can be fitted onto piston rod. Unit may be mounted in any position.

Safety information: Do not rotate piston rod, if excessive rotation force is applied rolling seal may rupture. External materials in the surrounding area can attack the seal components and lead to a shorter service life. Please contact ACE for appropriate solution suggestions.

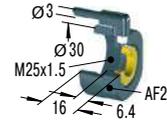
On request: Special oil and other special options available on request.

Adjustable

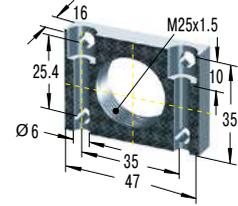
VC25FT



SP25 Air Bleed Collar

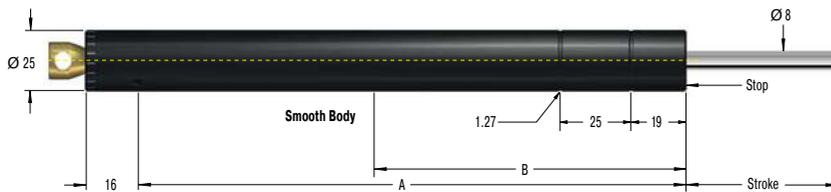


250-0044 Mounting Block

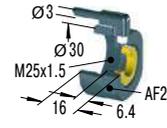


For VC2515FT to VC2555FT
reduction of the stroke 6.4 mm

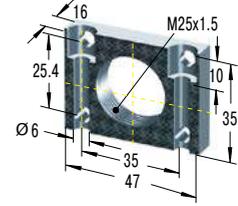
VC25F



SP25 Air Bleed Collar



250-0044 Mounting Block



For VC2515FT to VC2555FT
reduction of the stroke 6.4 mm

Additional accessories, mounting, installation ... see from page 47.

Complete details required when ordering

- Load to be decelerated: m (kg)
- Impact velocity: v (m/s)
- Propelling force: F (N)
- Operating cycles per hour: c (/hr)
- Number of absorbers in parallel: n
- Ambient temperature: °C

Ordering Example

Type (Feed Control) _____
 25 for Thread Size M25 _____
 Stroke 2.16" (55 mm) _____
 FT = with thread M25x1.5 _____
 F = without thread, plain body (Ø 0.94" / 23.8 mm) _____

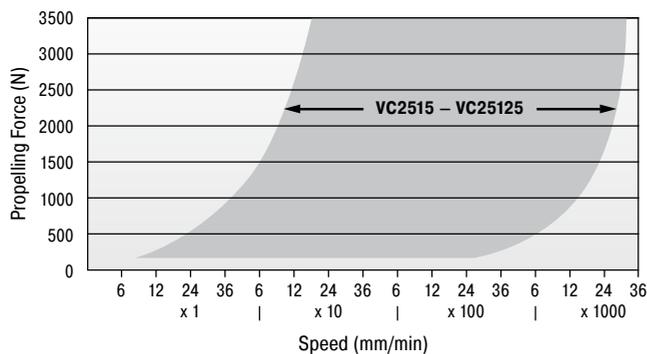
VC2555FT

Performance and Dimensions

TYPES	Stroke mm	A mm	B mm	Compression force		Return Force		Return Time s	Side Load Angle		Weight kg
				min. N	max. N	min. N	max. N		max. °		
VC2515FT	15	128	80	30	3,500	15	30	0.2	3	0.240	
VC2530FT	30	161	110	30	3,500	5	30	0.4	2	0.280	
VC2555FT	55	209	130	35	3,500	5	40	1.2	2	0.420	
VC2575FT	75	283	150	50	3,500	10	50	1.7	2	0.480	
VC25100FT	100	308	150	60	3,500	10	50	2.3	1	0.500	
VC25125FT	125	333.5	150	70	3,500	10	60	2.8	1	0.540	
VC2515F	15	128	80	30	3,500	15	30	0.2	3	0.240	
VC2530F	30	161	110	30	3,500	5	30	0.2	2	0.280	
VC2555F	55	209	130	35	3,500	5	40	1.2	2	0.420	
VC2575F	75	283	150	50	3,500	10	50	1.7	2	0.480	
VC25100F	100	308	150	60	3,500	10	50	2.3	1	0.500	
VC25125F	125	333.5	150	70	3,500	10	60	2.8	1	0.540	

Suffix FT: M25x1.5 threaded body.
 Suffix F: plain body 23.8 mm dia. (without thread), with optional clamp type mounting block.

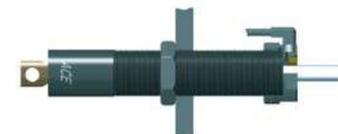
Operating range VC



Accessories with Mounting Example



Mounting with clamp mount

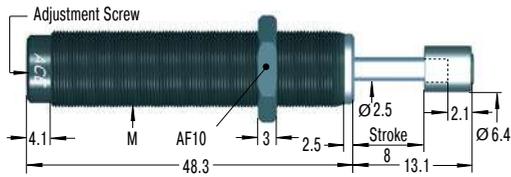


Installed with air bleed collar SP25 (part no. 10783-000)

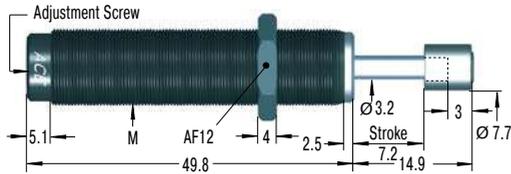
Products for
UNF and metric thread
available

Adjustable

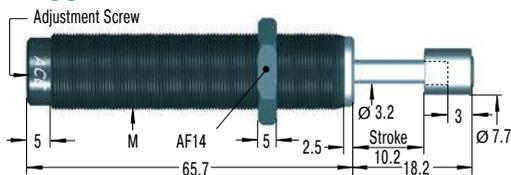
MA30M



MA50M

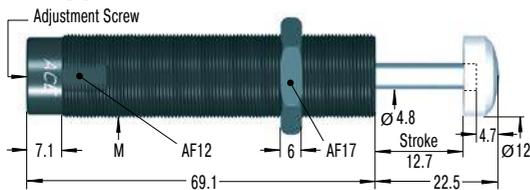


MA35



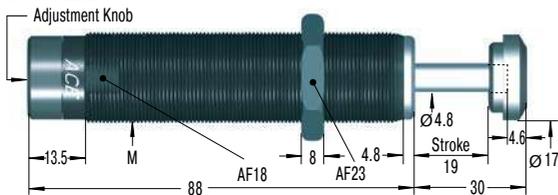
Product available for UNF and metric thread (for metric add suffix -M from part number)

MA150



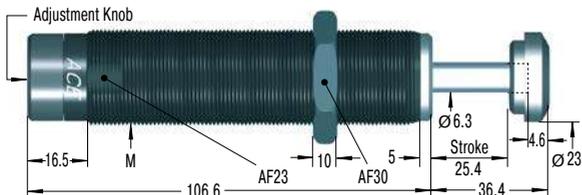
Product available for UNF and metric thread (for metric add suffix -M from part number)

MVC225



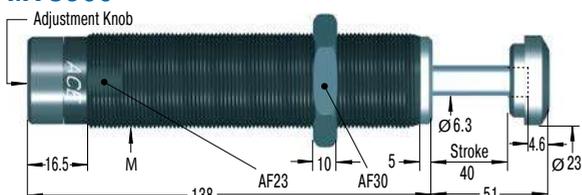
Product available for UNF and metric thread (for metric add suffix -M from part number)

MVC600



Product available for UNF and metric thread (for metric add suffix -M from part number)

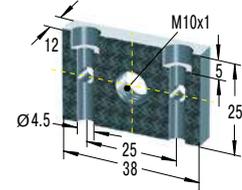
MVC900



Product available for UNF and metric thread (for metric add suffix -M from part number)

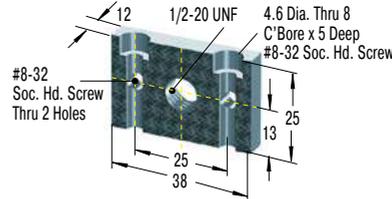
250-0307

Mounting Block



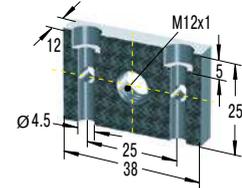
250-0308

Mounting Block



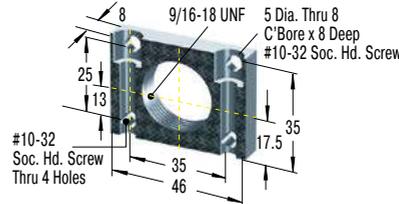
250-0309

Mounting Block



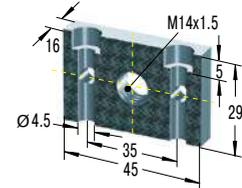
250-0318

Mounting Block



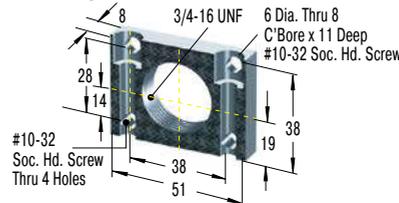
250-0352

Mounting Block



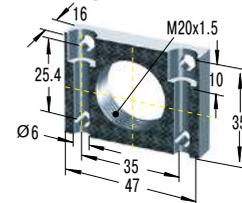
250-0401

Mounting Block



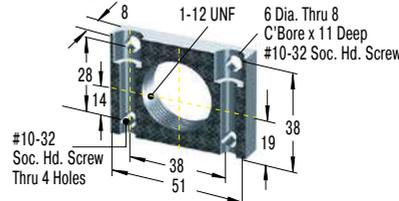
250-0353

Mounting Block



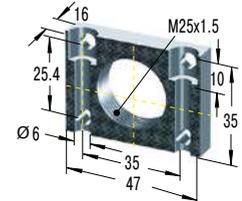
250-0402

Mounting Block



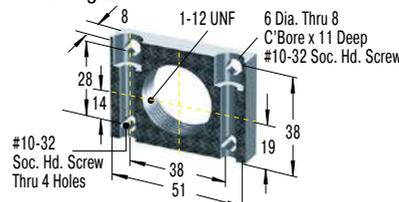
250-0044

Mounting Block



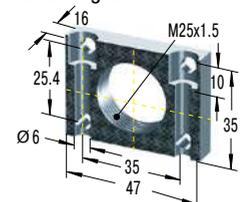
250-0402

Mounting Block



250-0044

Mounting Block



Additional accessories, mounting, installation ... see from page 44.

Rotary Dampers

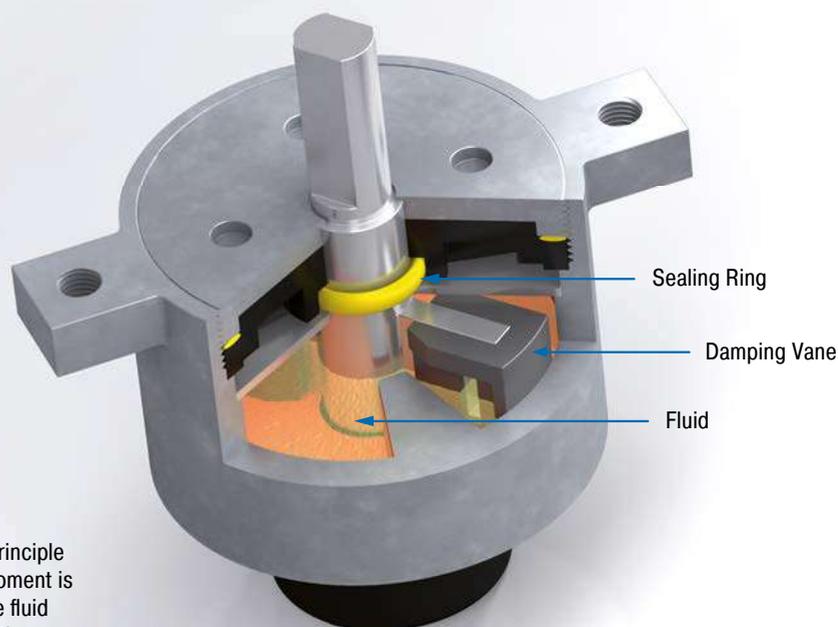
Small dampers refine your design

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

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

Partial Rotation Angle, Adjustable

e.g. FYT-H1 and FYN-H1



General Function

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



Rotary Dampers with Continuous Rotation

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

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



Rotary Dampers with Partial Rotation Angle

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

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

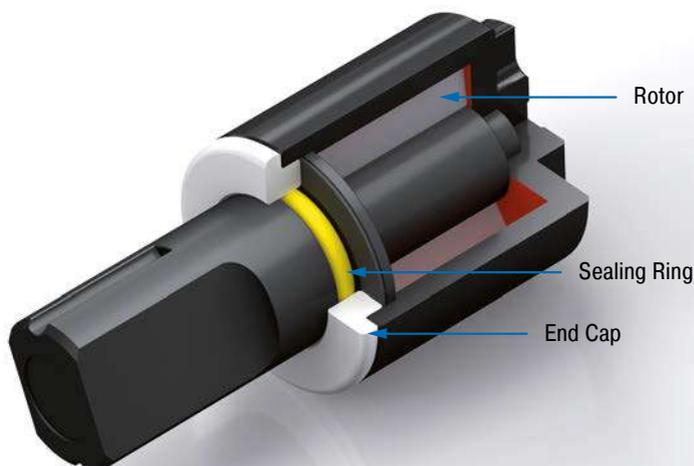
High protection of sensitive components

Various designs for every application

Maintenance-free and ready-to-install

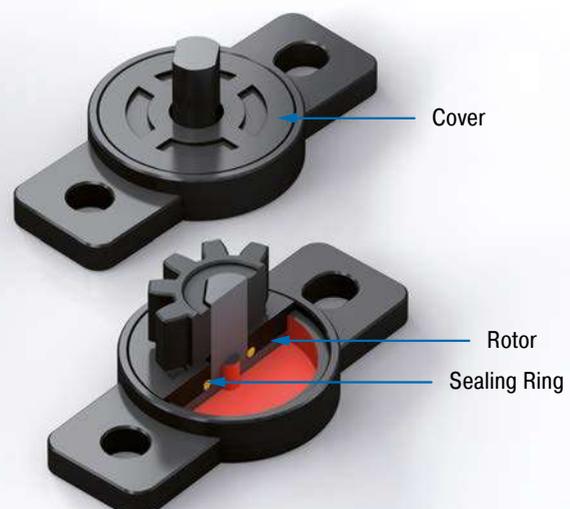
Partial Rotation Angle

e.g. FYN-N1



Continuous Rotation

e.g. FRT-E2



Rotary Dampers



Continuous rotation



FRT-E2

Page 236

Continuous Rotation
Small and lightweight for finest braking



FRT-G2

Page 237

Continuous Rotation
Small and lightweight for finest braking



FRT-C2 and FRN-C2

Page 238

Continuous Rotation
Flexible and cost efficient use



FRT-D2 and FRN-D2

Page 239

Continuous Rotation
Flexible and cost efficient use



FRT-F2/K2 and FRN-F2/K2

Page 240

Continuous Rotation
For a long service life



FFD

Page 241

Continuous Rotation
Precise braking without oil



FDT

Page 242

Continuous Rotation
The flat disc brake for two-sided damping



FDN

Page 243

Continuous Rotation
The flat disc brake for one direction of rotation

Rotary Dampers



Partial rotation angle



FYN-P1

Page 244

Partial Rotation Angle
Small diameter, large damping torques



FYN-N1

Page 245

Partial Rotation Angle
Small diameter, large damping torques



FYN-U1

Page 246

Partial Rotation Angle
Small, strong and very robust



FYN-S1

Page 247

Partial Rotation Angle
The flat damper for constant component protection



Partial rotation angle, adjustable



FYT-H1 and FYN-H1

Page 248

Partial Rotation Angle, Adjustable
Specifically adjustable, strong braking force



FYT-LA3 and FYN-LA3

Page 249

Partial Rotation Angle, Adjustable
Adjustable high performance

FRT-E2

Small and lightweight for finest braking

Continuous Rotation

Damping torque 0.1 Ncm to 0.4 Ncm

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



Technical Data

Construction size: Ø 10 mm

Rotational speed max.: 50 rpm

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

Operating temperature range: 0 °C to 50 °C

Pressure angle: 20°

Material: Outer body, Shaft, Gear: Plastic

Mounting: In any position

Tooth: Involute gearing

P.C.D.: 6 mm

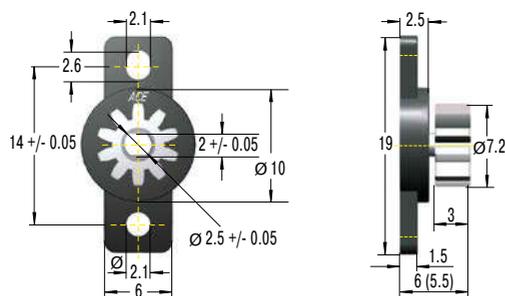
No. of teeth: 10

Module: 0.6

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

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

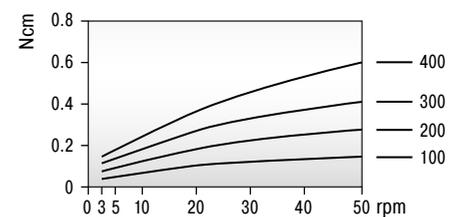
On request: Special designs available on request. Toothed plastic racks (modules 0.5 to 1.0) are available for the rotary dampers with pinions.



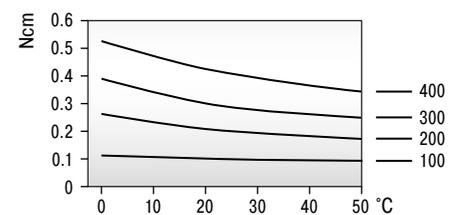
Dims. in () without gear

Characteristics

At 23 °C ambient temperature



At 20 rpm rotational speed



Performance

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

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

FRT-G2

Small and lightweight for finest braking

Continuous Rotation

Damping torque 0.2 Ncm to 1 Ncm

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



Technical Data

Construction size: Ø 15 mm

Rotational speed max.: 50 rpm

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

Operating temperature range: 0 °C to 50 °C

Pressure angle: 20°

Material: Outer body, Shaft, Gear: Plastic

Mounting: In any position

Tooth: Involute gearing

P.C.D.: 7 mm

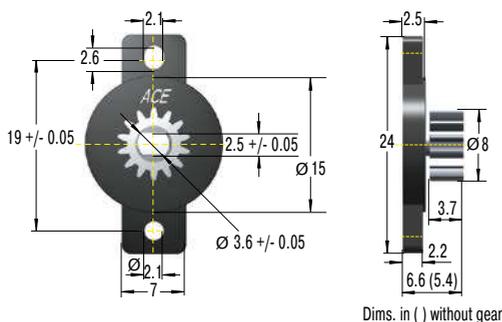
No. of teeth: 14

Module: 0.5

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

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

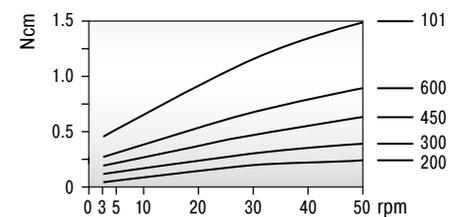
On request: Special designs available on request. Toothed plastic racks (modules 0.5 to 1.0) are available for the rotary dampers with pinions.



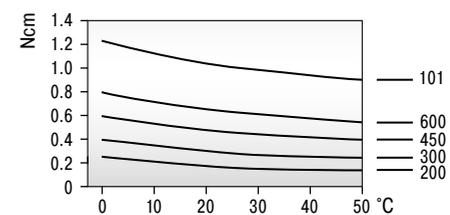
Dims. in () without gear

Characteristics

At 23 °C ambient temperature



At 20 rpm rotational speed



Performance

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

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

FRT-C2 and FRN-C2

Flexible and cost efficient use

Continuous Rotation

Damping torque 2 Ncm to 3 Ncm

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



Technical Data

Construction size: Ø 15 mm

Rotational speed max.: 50 rpm

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

Operating temperature range: 0 °C to 50 °C

Pressure angle: 20°

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

Mounting: In any position

Tooth: Involute gearing

P.C.D.: 8.8 mm

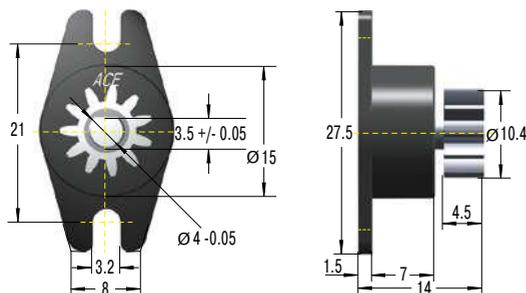
No. of teeth: 11

Module: 0.8

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

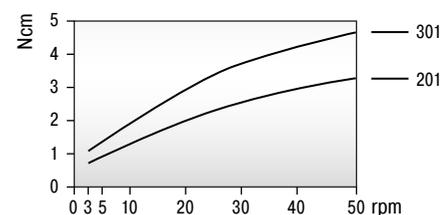
Safety information: Do not use rotary dampers as supports. Provide an external guide or support.

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

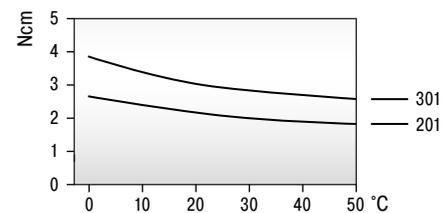


Characteristics

At 23 °C ambient temperature



At 20 rpm rotational speed



Performance

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

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

FRT-D2 and FRN-D2

Flexible and cost efficient use

Continuous Rotation

Damping torque 5 Ncm to 15 Ncm

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



Technical Data

Construction size: Ø 25 mm

Rotational speed max.: 50 rpm

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

Operating temperature range: 0 °C to 50 °C

Pressure angle: 20°

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

Mounting: In any position

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

P.C.D.: 12 mm

No. of teeth: 12

Module: 1

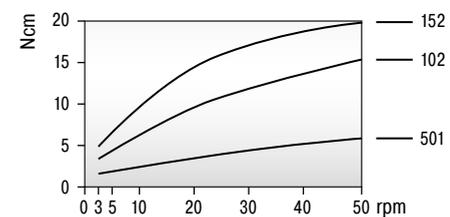
Mounting information: No axial or radial forces may be induced via the shaft.

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

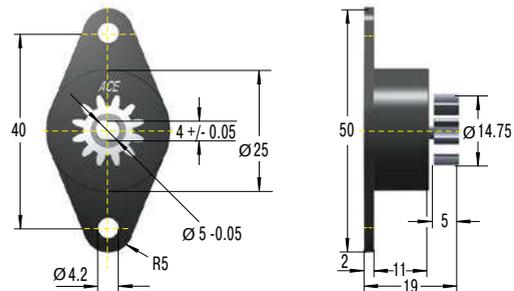
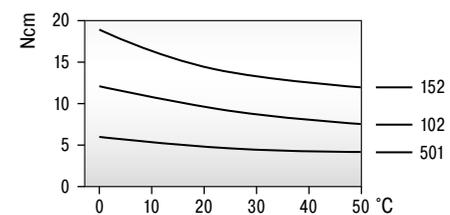
On request: Special designs available on request. Toothed plastic racks (modules 0.5 to 1.0) are available for the rotary dampers with pinions.

Characteristics

At 23 °C ambient temperature



At 20 rpm rotational speed



Performance

TYPES	¹ Damping torque Ncm	Damping direction	Gear	Weight kg
FRT-D2-102	10 +/- 2	bidirectional	without	0.008
FRT-D2-152	15 +/- 3	bidirectional	without	0.008
FRT-D2-501	5 +/- 1	bidirectional	without	0.008
FRT-D2-102-G1	10 +/- 2	bidirectional	with	0.009
FRT-D2-152-G1	15 +/- 3	bidirectional	with	0.009
FRT-D2-501-G1	5 +/- 1	bidirectional	with	0.009
FRN-D2-R102	10 +/- 2	right	without	0.012
FRN-D2-R152	15 +/- 3	right	without	0.012
FRN-D2-R501	5 +/- 1	right	without	0.012
FRN-D2-R102-G1	10 +/- 2	right	with	0.013
FRN-D2-R152-G1	15 +/- 3	right	with	0.013
FRN-D2-R501-G1	5 +/- 1	right	with	0.013
FRN-D2-L102	10 +/- 2	left	without	0.012
FRN-D2-L152	15 +/- 3	left	without	0.012
FRN-D2-L501	5 +/- 1	left	without	0.012
FRN-D2-L102-G1	10 +/- 2	left	with	0.013
FRN-D2-L152-G1	15 +/- 3	left	with	0.013
FRN-D2-L501-G1	5 +/- 1	left	with	0.013

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

FRT-F2/K2 and FRN-F2/K2

For a long service life

Continuous Rotation

Damping torque 200 Ncm to 400 Ncm

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



Technical Data

Construction size: Ø 40 mm

Rotational speed max.: 50 rpm

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

Operating temperature range: 30 °C to 50 °C

Material: Outer body: Plastic; Shaft: Steel

Mounting: In any position

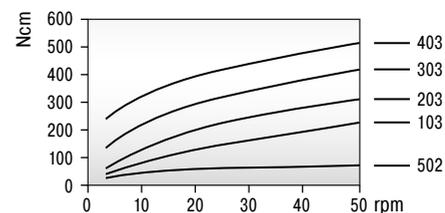
Mounting information: No axial or radial forces may be induced via the shaft.

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

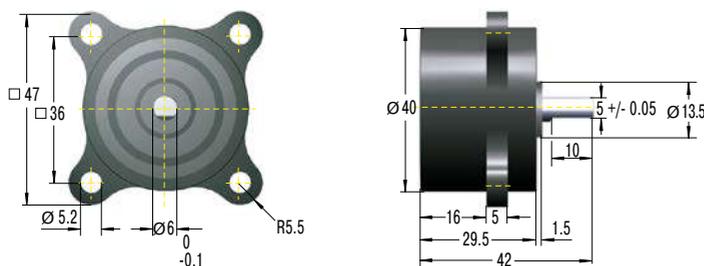
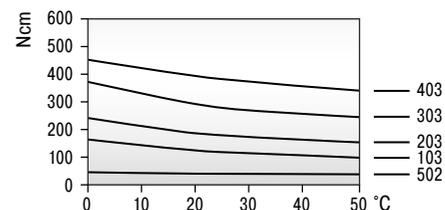
On request: Special designs available on request.

Characteristics

At 23 °C ambient temperature



At 20 rpm rotational speed



Performance

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

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

FFD

Precise braking without oil

Continuous Rotation

Damping torque 0.1 Nm to 3 Nm

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



Technical Data

Construction size: Ø 25 mm to 30 mm

Rotational speed max.: 30 rpm

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

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

Material: Outer body: Plastic

Mounting: In any position

Information to the shaft: Ø +0 / -0.03
Hardness > HRC55, surface smoothness R_z < 1µm

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

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

On request: Special designs available on request.

Ordering Example

Friction Damper _____ ↑
 Body Ø _____ ↑
 Mounting Style (flange = F, standard = S) _____ ↑
 Model (standard = S, high = W) _____ ↑
 Damping Direction (right = R, left = L) _____ ↑
 Damping Torque see chart _____ ↑

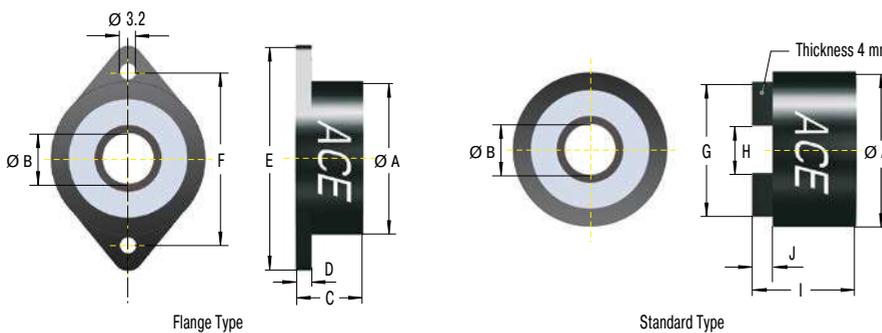
FFD-25-FS-L-102

Complete details required when ordering

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

Model Type Prefix

FS = Mounting Style with Flange, Model standard
 FW = Mounting Style with Flange, Model high
 SS = Mounting Style Standard, Model standard
 SW = Mounting Style Standard, Model high
 Combinations with W for higher damping torque.



Performance and Dimensions

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

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

FDT

The flat disc brake for two-sided damping

Continuous Rotation

Damping torque 2 Nm to 8.7 Nm

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



Technical Data

Construction size: Ø 47 mm to 70 mm

Rotational speed max.: 50 rpm

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

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

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

Mounting: In any position

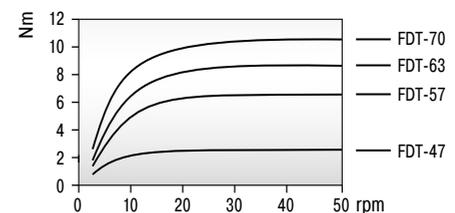
Mounting information: No axial or radial forces may be induced via the shaft.

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

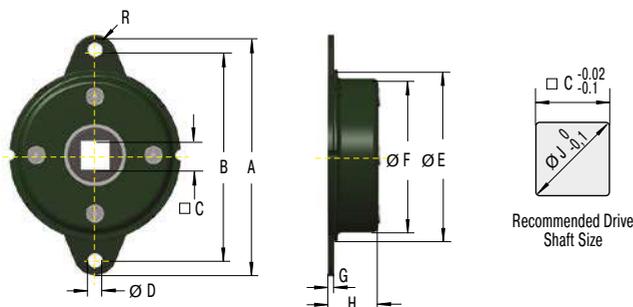
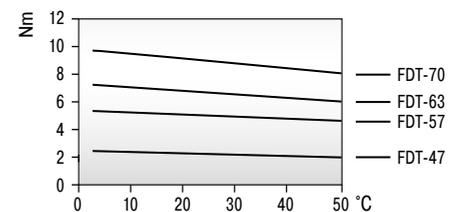
On request: Special designs available on request.

Characteristics

At 23 °C ambient temperature



At 20 rpm rotational speed



Performance and Dimensions

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

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

FDN

The flat disc brake for one direction of rotation

Continuous Rotation

Damping torque 2 Nm to 11 Nm

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



Technical Data

Construction size: Ø 47 mm to 70 mm

Rotational speed max.: 50 rpm

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

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

Material: Outer body: Steel; Output shaft sleeve: nylon with metal freewheel

Mounting: In any position

Information to the shaft:

FDN-47: Ø 6 +0 / -0.03

FDN-57 to FDN-70: Ø 10 +0 / -0.03

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

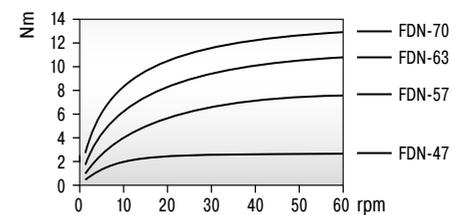
Mounting information: Turn the shaft in the opposite direction to the brake direction to avoid damaging the freewheel mount. No axial or radial forces may be induced via the shaft.

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

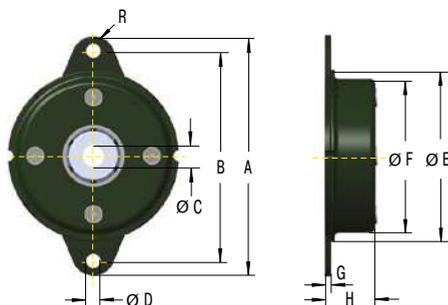
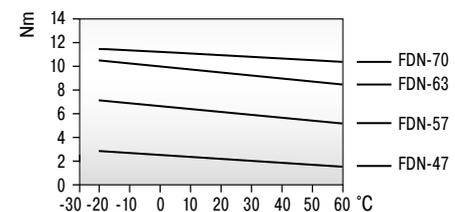
On request: Special designs available on request.

Characteristics

At 23 °C ambient temperature



At 20 rpm rotational speed



Performance and Dimensions

TYPES	¹ Damping torque		Damping direction	A mm	B mm	C mm	D mm	E mm	F mm	G mm	H mm	R mm	Weight kg
	Nm												
FDN-47-R	2.0 +/- 0.3		right	65	56	6	4.5	47	42.8	1.6	10.3	4.5	0.054
FDN-57-R	5.5 +/- 0.3		right	79	68	10	5.5	57	52.4	1.6	14	5.5	0.095
FDN-63-R	8.5 +/- 0.8		right	89	76	10	6.5	63	58.6	1.6	13.9	6.5	0.115
FDN-70-R	11.0 +/- 1.0		right	95	82	10	6.5	70	65.4	1.6	13	6.5	0.135
FDN-47-L	2.0 +/- 0.3		left	65	56	6	4.5	47	42.8	1.6	10.3	4.5	0.054
FDN-57-L	5.5 +/- 0.3		left	79	68	10	5.5	57	52.4	1.6	14	5.5	0.095
FDN-63-L	8.5 +/- 0.8		left	89	76	10	6.5	63	58.6	1.6	13.9	6.5	0.115
FDN-70-L	11.0 +/- 1.0		left	95	82	10	6.5	70	65.4	1.6	13	6.5	0.135

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

FYN-P1

Small diameter, large damping torques

Partial Rotation Angle

Damping torque 100 Ncm to 180 Ncm

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



Technical Data

Construction size: Ø 18.5 mm

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

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

Material: Outer body, Shaft: Plastic

Mounting: In any position

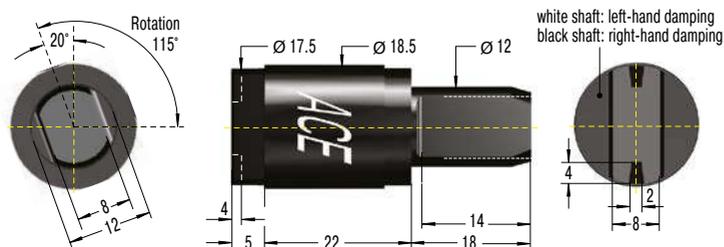
Rotation angle max.: 115°

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

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

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

On request: Special designs available on request.



Performance

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

FYN-N1

Small diameter, large damping torques

Partial Rotation Angle

Damping torque 100 Ncm to 300 Ncm

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



Technical Data

Construction size: Ø 20 mm

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

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

Material: Outer body, Shaft: Plastic

Mounting: In any position

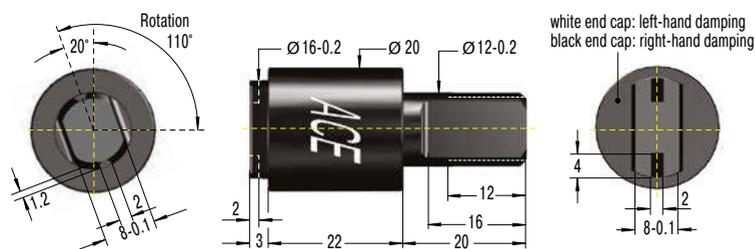
Rotation angle max.: 110°

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

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

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

On request: Special designs available on request.



Performance

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

FYN-U1

Small, strong and very robust

Partial Rotation Angle

Damping torque 200 Ncm to 300 Ncm

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



Technical Data

Construction size: Ø 16 mm

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

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

Material: Outer body, Shaft: Zinc die-cast

Mounting: In any position

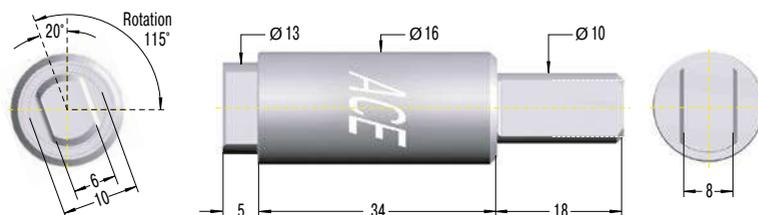
Rotation angle max.: 115°

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

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

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

On request: Special designs available on request.



Performance

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

FYN-S1

The flat damper for constant component protection

Partial Rotation Angle

Damping torque 5 Nm to 10 Nm

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



Technical Data

Construction size: Ø 60 mm

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

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

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

Mounting: In any position

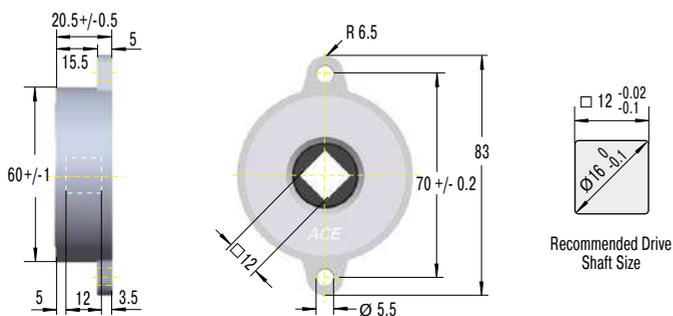
Rotation angle max.: 130°

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

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

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

On request: Special designs available on request.



Performance

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

FYT-H1 and FYN-H1

Specifically adjustable, strong braking force

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

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



Technical Data

Construction size: Ø 45 mm

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

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

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

Mounting: In any position

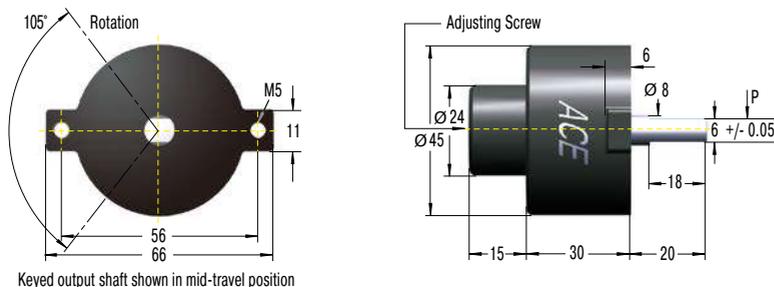
Rotation angle max.: 105°

Maximum side load: 50 N

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

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

On request: Special designs available on request.



Performance

TYPES	Damping torque Nm	Return Damping Torque Nm	Damping direction	Weight kg
FYT-H1	2 - 10	0.5	bidirectional	0.234
FYN-H1-R	2 - 10	0.5	right	0.234
FYN-H1-L	2 - 10	0.5	left	0.234

FYT-LA3 and FYN-LA3

Adjustable high performance

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

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



Technical Data

Construction size: Ø 80 mm

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

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

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

Mounting: In any position

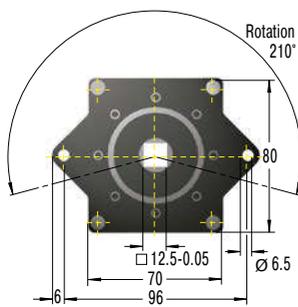
Rotation angle max.: 210°

Maximum side load: 200 N

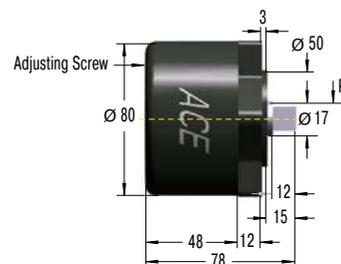
Note: Damping direction: Right hand damping = damping action in clockwise direction (when looking onto the output shaft or output shaft sleeve, depending on the damper type). A play of approx. 5° can occur at the beginning of movement.

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

On request: Special designs available on request.



Keyed output shaft shown in mid-travel position



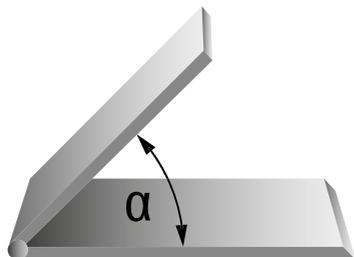
Performance

TYPES	Damping torque Nm	Return Damping Torque Nm	Damping direction	Weight kg
FYT-LA3	4 - 40	4	bidirectional	1.720
FYN-LA3-R	4 - 40	4	right	1.728
FYN-LA3-L	4 - 40	4	left	1.728

Calculation Example

Damping of a Lid

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



Calculation Steps

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

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

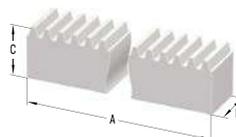
m Mass of a lid [kg] (1 kg = 9.81 N)
L Length of lid from pivot [cm]
n Rotation speed [r.p.m.]

Special Accessories

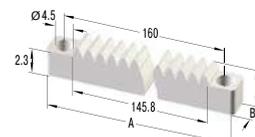
Toothed Racks for Rotary Dampers with Gear

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

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



M0.8P
Toothed Rack



Delivery Notes

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

On request: Toothed metal racks

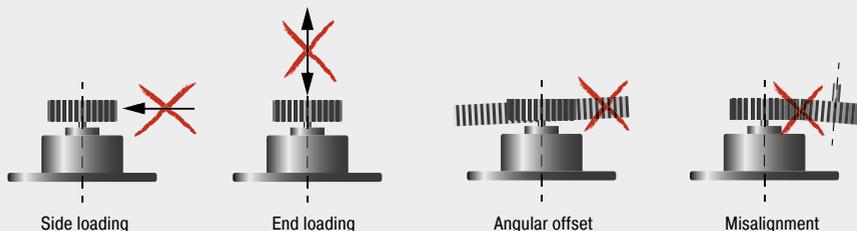
Dimensions				
TYPES	A mm	B mm	C mm	Model
M0.5	250	4	4.5	rigid, milled
M0.6	250	4	6	rigid, milled
M0.8	250	6	8	rigid, milled
M0.8P	170	8	4.1	flexible, milled
M1.0	250	9	9	rigid, milled
M1.0	500	10	10	rigid, milled

Damping Direction

right hand damping = damping action in clockwise direction
 (when looking onto the output shaft)

Mounting Information

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

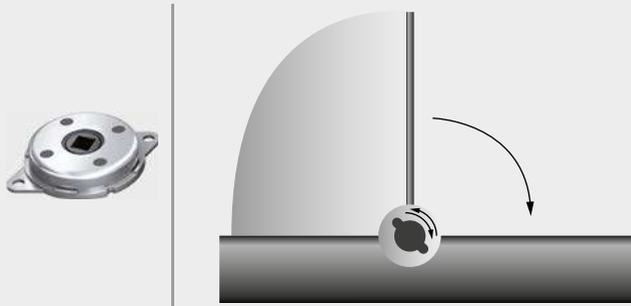


Application Examples

FDT

Finger protection when cutting bread

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



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

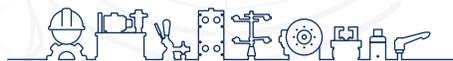
FDN-R

Invisible protection for cooker hoods

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



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



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