

Motion Control

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



Perfect Support for Muscle Power

Customised to suit your applications

The various products from ACE in this segment give a new quality to any type of movement. Anyone who wants to raise or lower loads, regulate the feed of an object to the precise millimetre or gently decelerate rotating or linear movements will find the right helper here.

ACE also convinces with industry quality in this area. And the innovative solutions also correspond with the maximum requirements of ergonomics and individuality, including with customised, fillable gas springs.



Industrial Gas Springs – Push Type

Lifting and lowering for smart people

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

Available with body diameters of 8 to 70 mm and forces from 10 to 13,000 N, ACE gas push type springs are characterised by 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 also make a particularly good impression visually in every branch.

Ready-to-install and universally applicable

Modular end fittings and mounting brackets

Calculation program for individual design

No own construction costs

Maintenance-free

Available with valve ex stock



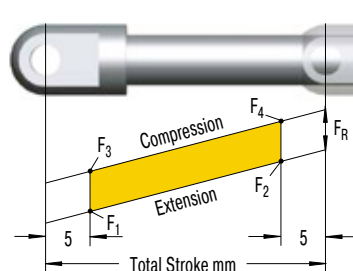
Function of a Gas Spring – Push Type

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)



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)

Type	Progression approx. %	¹ Friction F_R approx. in N
GS-8	28	10
GS-10	20	10
GS-12	25	20
GS-15	27	20
GS-19	26 - 39 ²	30
GS-22	30 - 40 ²	30
GS-28	58 - 67 ²	40
GS-40	37 - 49 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.

Free calculation service see page 168!

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 130



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 140



GST-40 Tandem

Valve Technology

Optimised dual force for heavy flaps and wide angle applications

Hoods, Shutters, Machine housing, Conveyor systems

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GS-8 to GS-70

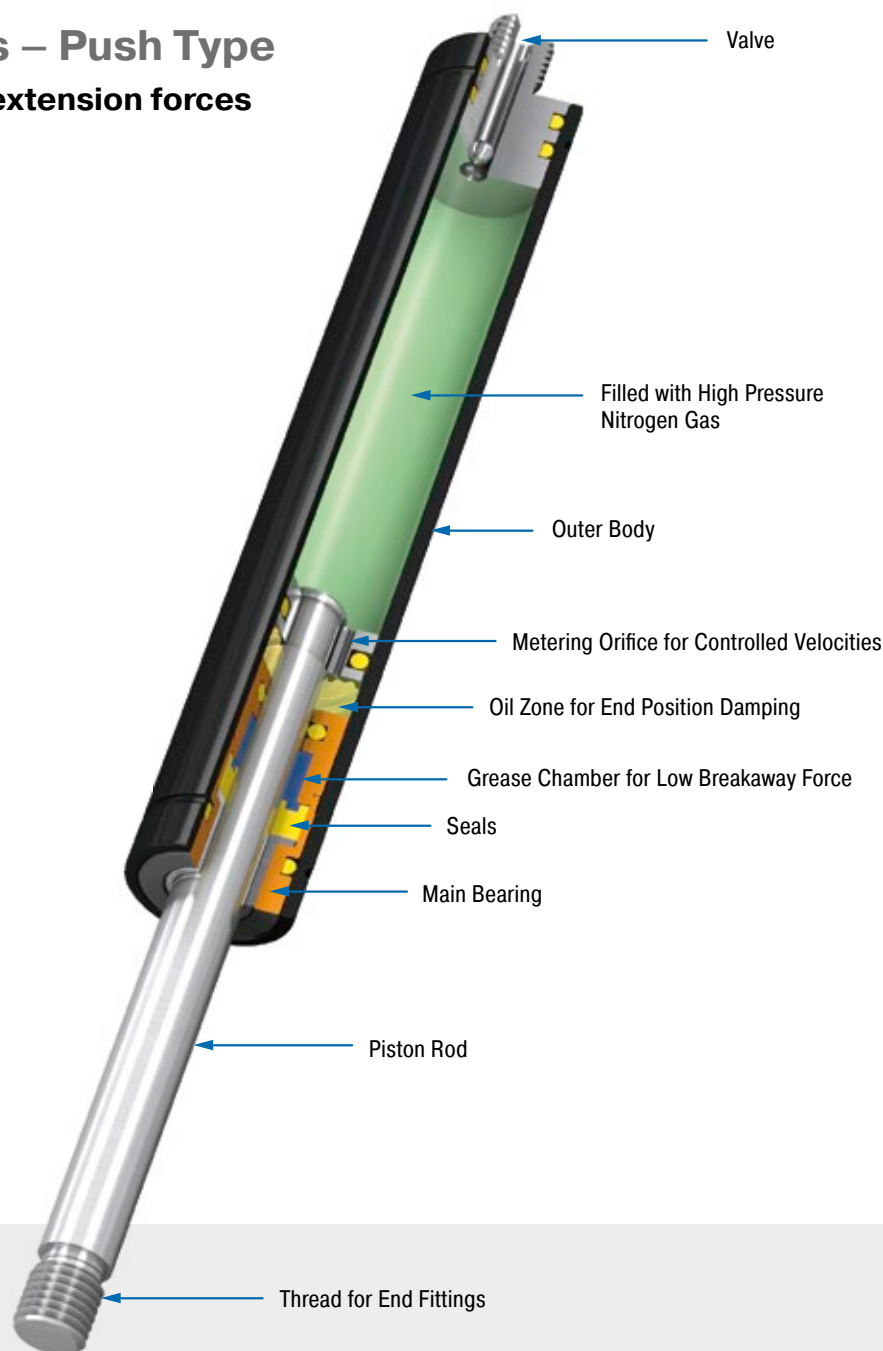
Industrial Gas Springs – Push Type

Individual stroke length and extension forces

Universal and tailor made: ACE industrial gas push type springs of the NEWTONLINE family offer perfect support of muscle power with forces from 10 to 13,000 N with body diameter of 8 to 70 mm. With their high quality features the NEWTONLINE gas springs form the industry standard. These durable and sealed systems are ready for installation, maintenance-free and filled with pressurised nitrogen gas.

They are supplied filled according to individual customer pressure requirements and maybe adjusted later by use of the inbuilt valve. The free of charge ACE calculation service designs the gas springs with mounting points specifically for the particular application. A variety of additional components makes assembly even easier and allows universal application of the gas springs.

ACE industrial gas push type springs are used in industrial applications, mechanical engineering and medical technology as well as in the electronics, automobile and furniture industries.



Technical Data

Force range: 10 N to 13,000 N

Piston rod diameter: Ø 3 mm to Ø 30 mm

Progression: Approx. 20 % to 67 %
(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

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

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

Safety instructions: 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.

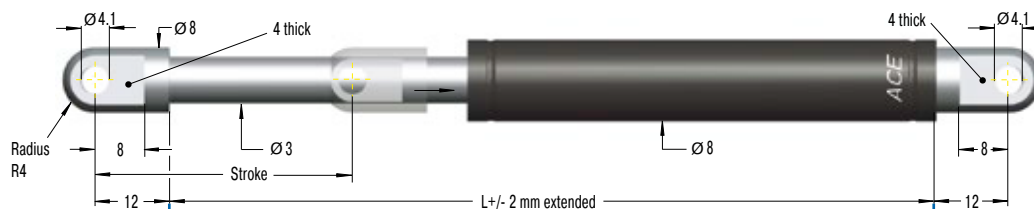
Valve Technology, Force range 10 N to 100 N (compressed up to 130 N)

End Fitting

Standard Dimensions

End Fitting

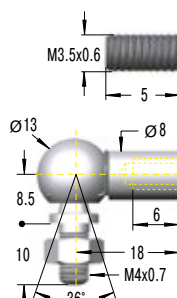
A3,5



Eye A3,5
max. force 370 N

B3,5

C3,5



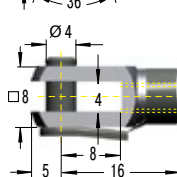
Performance and Dimensions

TYPES	Stroke mm	L extended mm	Force Range 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

Angle Ball Joint C3,5
max. force 370 N

D3,5

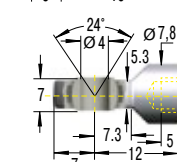


Ordering Example

Type (Push Type) _____
Body Ø (8 mm) _____
Stroke (30 mm) _____
Piston Rod End Fitting A3,5 _____
Body End Fitting C3,5 _____
Nominal Force F₁ 30 N _____

GS-8-30-AC-30

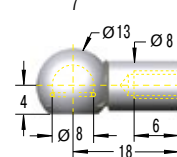
E3,5



Clevis Fork D3,5
max. force 370 N

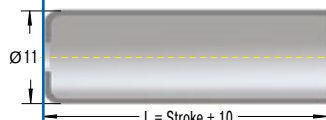
Swivel Eye E3,5
max. force 370 N

G3,5



Ball Socket G3,5
max. force 370 N

Rod Shroud W3,5-8



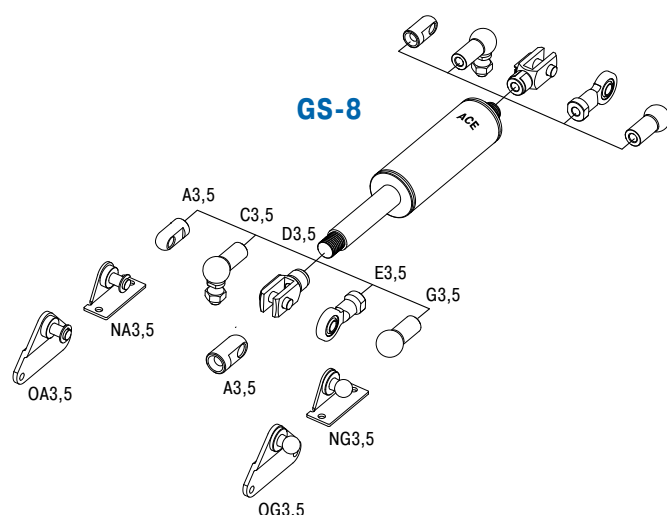
Mounting accessories see from
page 194.

Adjuster Knob

DE-GAS-3,5

See page 171.

GS-8



Technical Data

Force range: 10 N to 100 N (compressed up to 130 N)

Progression: Approx. 28 %

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 must be positively secured by the customer to prevent unscrewing.

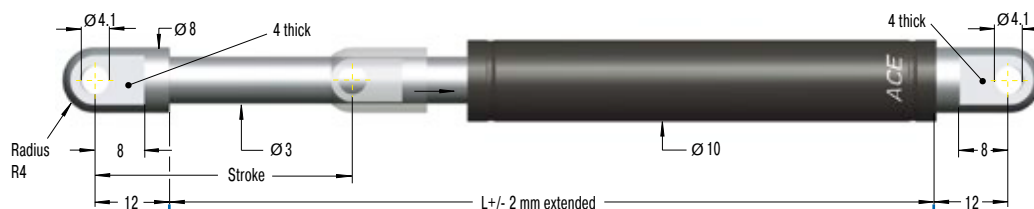
Safety instructions: Gas springs (push type) should not be installed under pre-tension.

End Fitting

Standard Dimensions

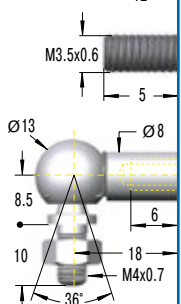
End Fitting

A3,5

Eye A3,5
max. force 370 N

B3,5

C3,5



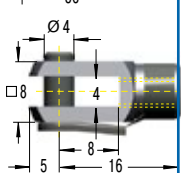
Performance and Dimensions

TYPES	Stroke mm	L extended mm	Force Range 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

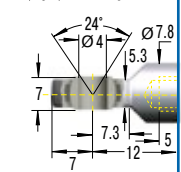
Stud Thread B3,5

Angle Ball Joint C3,5
max. force 370 N

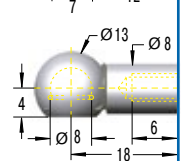
D3,5

Clevis Fork D3,5
max. force 370 N

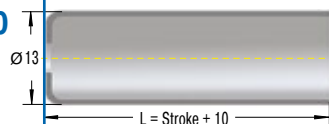
E3,5

Swivel Eye E3,5
max. force 370 N

G3,5

Ball Socket G3,5
max. force 370 N

Rod Shroud W3,5-10



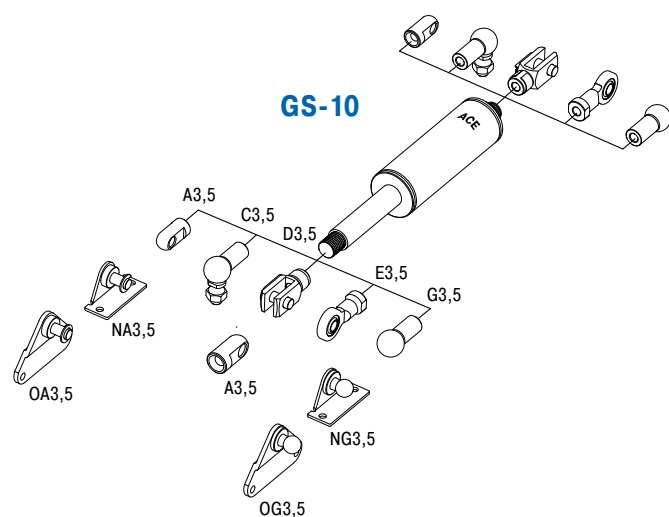
Ordering Example

Type (Push Type) _____
 Body Ø (10 mm) _____
 Stroke (80 mm) _____
 Piston Rod End Fitting A3,5 _____
 Body End Fitting C3,5 _____
 Nominal Force F_1 60 N _____

GS-10-80-AC-60

Mounting accessories see from
page 194.

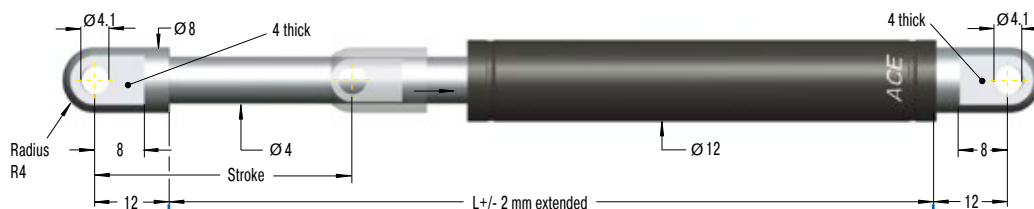
Technical Data

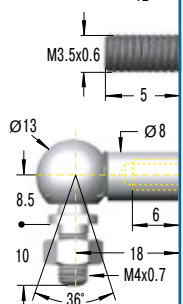
Force range: 10 N to 100 N (compressed up to 120 N)**Progression:** Approx. 28 %**Operating temperature range:** -20 °C to +80 °C**Material:** Outer body: Coated steel; Piston rod: Stainless steel (1.4301/1.4305, AISI 304/303); End fittings: Zinc plated steel**Mounting:** We recommend mounting with piston 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 must be positively secured by the customer to prevent unscrewing.**Safety instructions:** Gas springs (push type) should not be installed under pre-tension.

End Fitting

Standard Dimensions

End Fitting

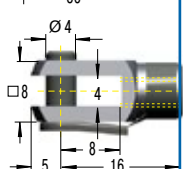
A3,5

Eye A3,5
max. force 370 N

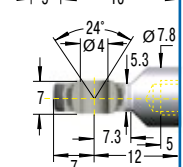
B3,5
C3,5


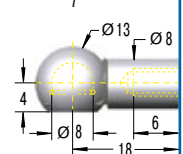
Performance and Dimensions

TYPES	Stroke mm	L extended mm	Force Range 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
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

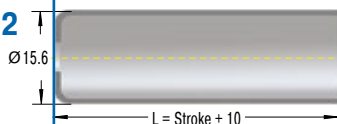
G3,5

Ball Socket G3,5
max. force 370 N

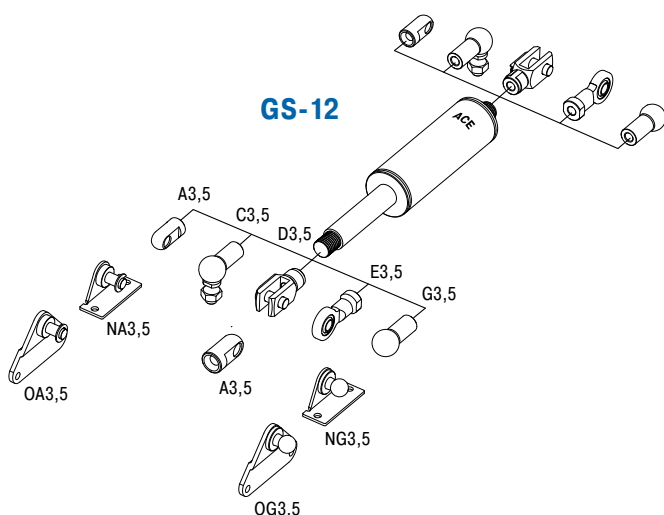
Ordering Example

GS-12-100-AA-30

Type (Push Type) _____
 Body Ø (12 mm) _____
 Stroke (100 mm) _____
 Piston Rod End Fitting A3,5 _____
 Body End Fitting A3,5 _____
 Nominal Force F₁ 30 N _____

Mounting accessories see from
page 194.

Rod Shroud W3,5-12

**Adjuster Knob
DE-GAS-3,5**
See page 171.

GS-12


Technical Data

Force range: 15 N to 180 N (compressed up to 225 N)

Progression: Approx. 25 %

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 must be positively secured by the customer to prevent unscrewing.

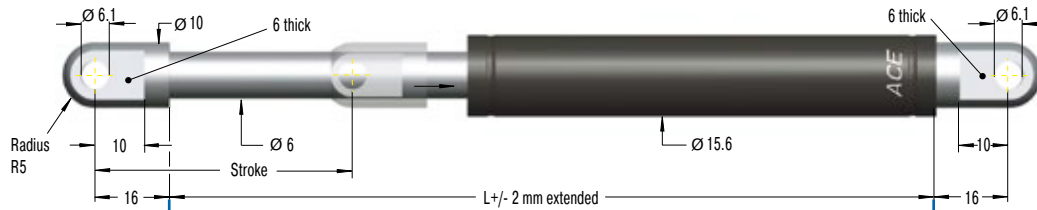
Safety instructions: Gas springs (push type) should not be installed under pre-tension.

End Fitting

Standard Dimensions

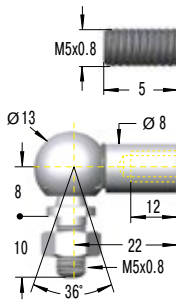
End Fitting

A5


Eye A5
max. force 800 N

B5

C5

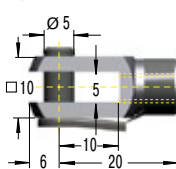


Performance and Dimensions

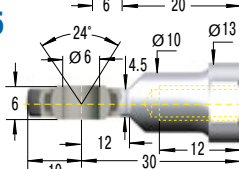
TYPES	Stroke mm	L extended mm	Force Range max. N
GS-15-20	20	67	400
GS-15-40	40	107	400
GS-15-50	50	127	400
GS-15-60	60	147	400
GS-15-80	80	187	400
GS-15-100	100	227	400
GS-15-120	120	267	400
GS-15-150	150	327	400
GS-15-200	200	427	400

Stud Thread B5
Angle Ball Joint C5
max. force 500 N

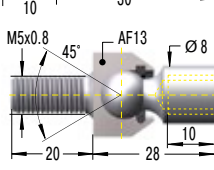
D5


Clevis Fork D5
max. force 800 N

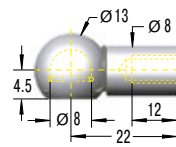
E5

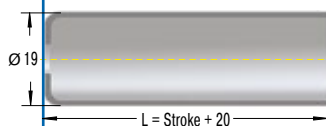

Swivel Eye E5
max. force 800 N

F5


Inline Ball Joint F5
max. force 500 N

G5


Ball Socket G5
max. force 500 N

Rod Shroud W5-15

GS-15-150-AC-150

Ordering Example

Type (Push Type) _____
 Body Ø (15.6 mm) _____
 Stroke (150 mm) _____
 Piston Rod End Fitting A5 _____
 Body End Fitting C5 _____
 Nominal Force F_1 150 N _____

 Mounting accessories see from
page 194.

**Adjuster Knob
DE-GAS-5**
See page 171.

Technical Data

Force range: 40 N to 400 N (compressed up to 500 N)

Progression: Approx. 27 %

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

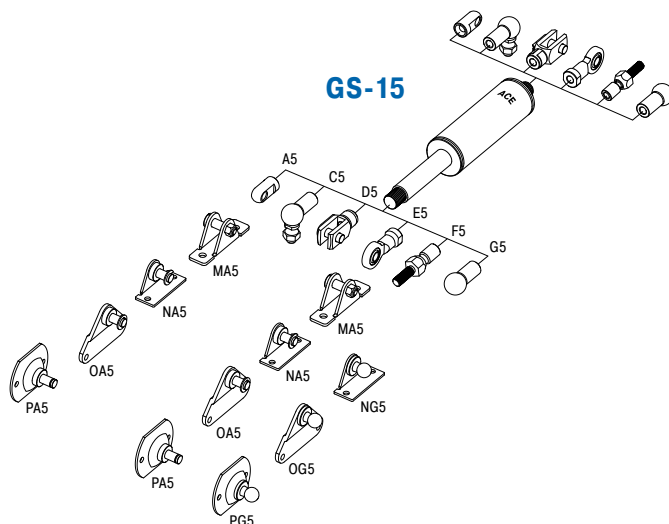
Mounting: We recommend mounting with piston rod downwards to take advantage of the built-in end position damping.

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.

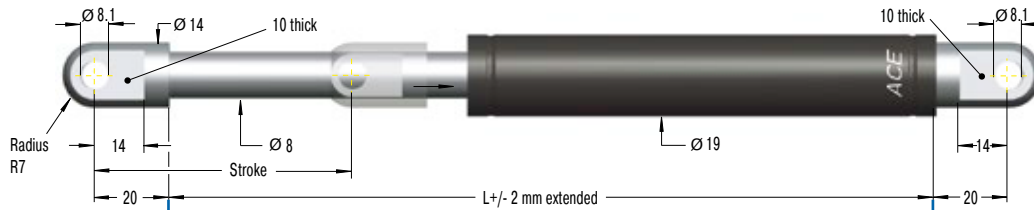
End fittings: They are interchangeable and must be positively secured by the customer to prevent unscrewing.

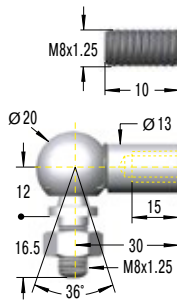
Safety instructions: Gas springs (push type) should not be installed under pre-tension.


End Fitting

Standard Dimensions

End Fitting

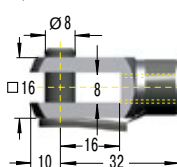
A8

Eye A8
max. force 3,000 N

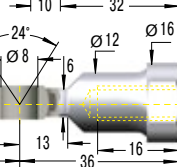
B8
C8


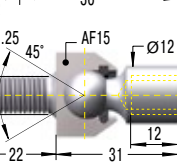
Performance and Dimensions

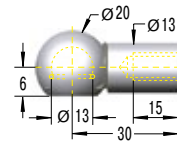
TYPES	Stroke mm	L extended mm	Force Range max. N
GS-19-50	50	164	700
GS-19-100	100	264	700
GS-19-150	150	364	700
GS-19-200	200	464	700
GS-19-250	250	564	700
GS-19-300	300	664	700

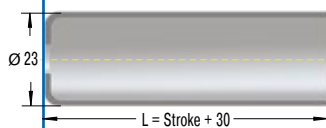
Stud Thread B8
Angle Ball Joint C8
max. force 1,200 N

D8

Clevis Fork D8
max. force 3,000 N

E8

Swivel Eye E8
max. force 3,000 N

F8

Inline Ball Joint F8
max. force 1,200 N

G8

Ball Socket G8
max. force 1,200 N

Rod Shroud W8-19

GS-19-150-AC-600

Ordering Example

Type (Push Type) _____
Body Ø (19 mm) _____
Stroke (150 mm) _____
Piston Rod End Fitting A8 _____
Body End Fitting C8 _____
Nominal Force F_1 600 N _____

Mounting accessories see from
page 194.

**Adjuster Knob
DE-GAS-8**

See page 171.

Technical Data

Force range: 50 N to 700 N (compressed up to 970 N)

Progression: Approx. 26 % to 39 %

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.

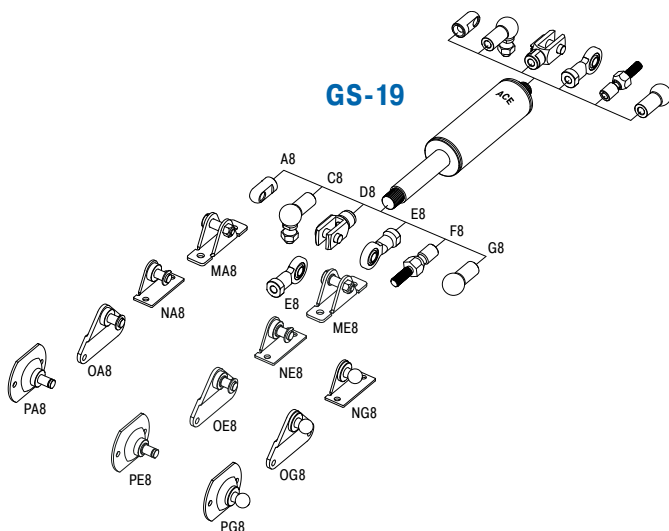
End position damping length: Approx. 20 mm to 60 mm (depending on the stroke)

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

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

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

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



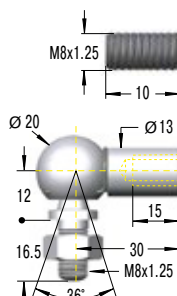
End Fitting

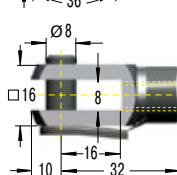
Standard Dimensions

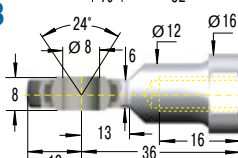
End Fitting

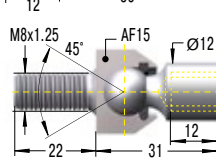
A8

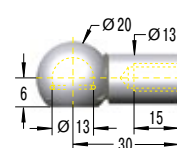
Eye A8
max. force 3,000 N

B8
C8

Stud Thread B8
Angle Ball Joint C8
max. force 1,200 N

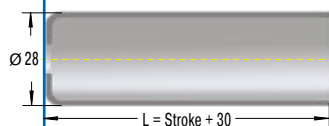
D8

Clevis Fork D8
max. force 3,000 N

E8

Swivel Eye E8
max. force 3,000 N

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	Force Range 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	1,300
GS-22-350	350	764	1,300
GS-22-400	400	864	1,300
GS-22-450	450	964	1,300
GS-22-500	500	1,064	1,300
GS-22-550	550	1,164	1,300
GS-22-600	600	1,264	1,300
GS-22-650	650	1,364	1,300
GS-22-700	700	1,464	1,300

Ordering Example

Type (Push Type) _____
 Body Ø (23 mm) _____
 Stroke (150 mm) _____
 Piston Rod End Fitting A8 _____
 Body End Fitting E8 _____
 Nominal Force F₁ 800 N _____

GS-22-150-AE-800

Mounting accessories see from
page 194.

Adjuster Knob
DE-GAS-8

See page 171.

Technical Data

Force range: 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.

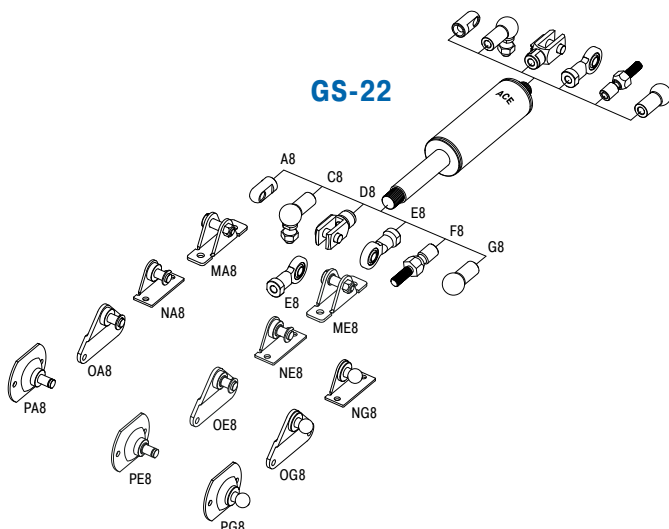
End position damping length: Approx. 20 mm to 70 mm (depending on the stroke)

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

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

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

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

GS-22


Valve Technology, Force range 150 N to 2,500 N (compressed up to 4,175 N)

End Fitting

Standard Dimensions

End Fitting

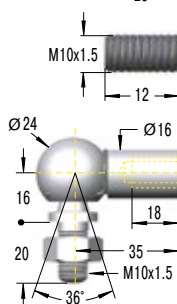
A10



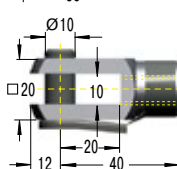
Eye A10
max. force 10,000 N

B10

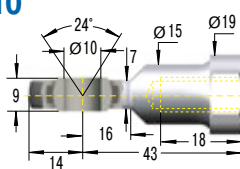
C10



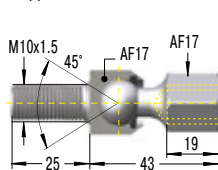
D10



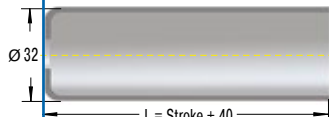
E10



F10



Rod Shroud W10-28



Performance and Dimensions

TYPES	Stroke mm	L extended mm	Force Range 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	2,500
GS-28-450	450	962	2,500
GS-28-500	500	1,062	2,500
GS-28-550	550	1,162	2,500
GS-28-600	600	1,262	2,500
GS-28-650	650	1,362	2,500
GS-28-700	700	1,462	2,500
GS-28-750	750	1,562	2,500

Ordering Example

Type (Push Type) _____
 Body Ø (28 mm) _____
 Stroke (150 mm) _____
 Piston Rod End Fitting E10 _____
 Body End Fitting E10 _____
 Nominal Force F_1 1200 N _____

GS-28-150-EE-1200

Mounting accessories see from
page 194.

Stud Thread B10

Angle Ball Joint C10
max. force 1,800 N

Clevis Fork D10
max. force 10,000 N

Swivel Eye E10
max. force 10,000 N

Inline Ball Joint F10
max. force 1,800 N

**Adjuster Knob
DE-GAS-10**

See page 171.

Technical Data

Force range: 150 N to 2,500 N (compressed up to 4,175 N)

Progression: Approx. 58 % to 67 %

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)

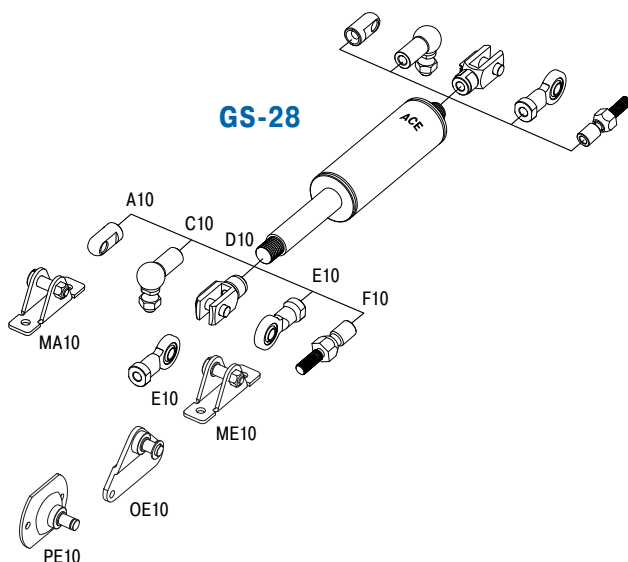
Positive stop: External positive stop at the end of stroke provided by the customer.

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

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

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

GS-28

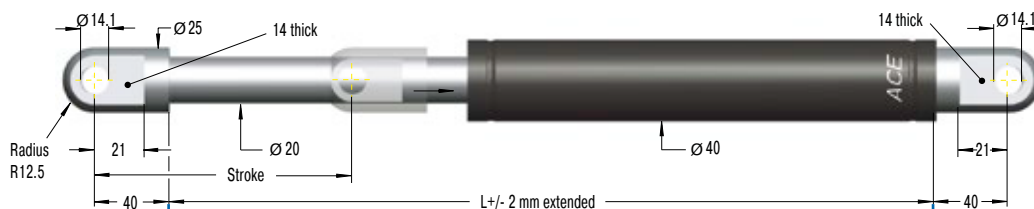


End Fitting

Standard Dimensions

End Fitting

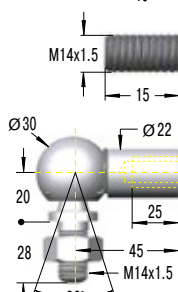
A14



Eye A14
max. force 10,000 N

B14

C14



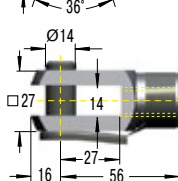
Performance and Dimensions

TYPES	Stroke mm	L extended mm	Force Range 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	5,000
GS-40-800	800	1,717	5,000
GS-40-1000	1,000	2,117	5,000

Stud Thread B14

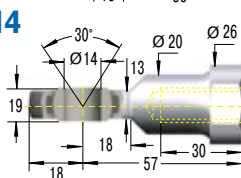
Angle Ball Joint C14
max. force 3,200 N

D14



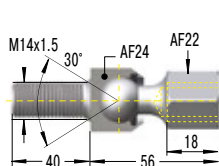
Clevis Fork D14
max. force 10,000 N

E14



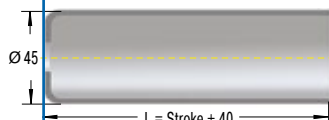
Swivel Eye E14
max. force 10,000 N

F14



Inline Ball Joint F14
max. force 3,200 N

Rod Shroud W14-40



Mounting accessories see from
page 194.

Ordering Example

GS-40-150-DD-3500

Type (Push Type) _____
Body Ø (40 mm) _____
Stroke (150 mm) _____
Piston Rod End Fitting D14 _____
Body End Fitting D14 _____
Nominal Force F_1 3500 N _____

Technical Data

Force range: 500 N to 5,000 N (compressed up to 7,450 N)

Progression: Approx. 37 % to 49 %

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.

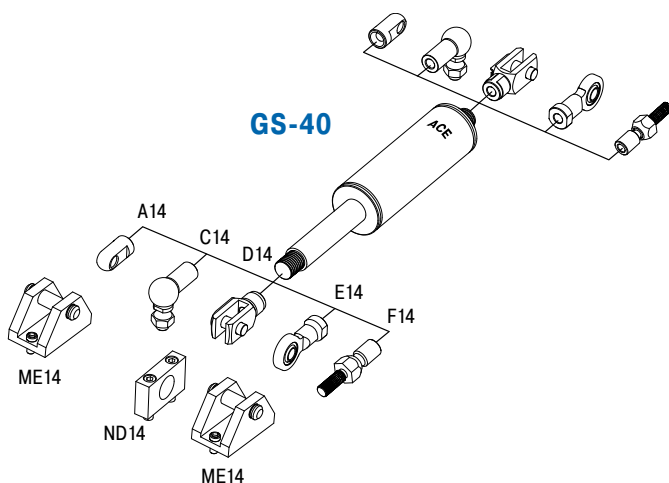
End position damping length: Approx. 30 mm to 70 mm (depending on the stroke)

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

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

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

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



Adjuster Knob
DE-GAS-14

See page 171.

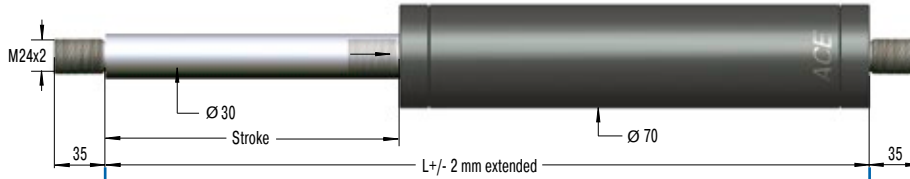
Valve Technology, Force range 2,000 N to 13,000 N (compressed up to 16,250 N)

End Fitting

Standard Dimensions

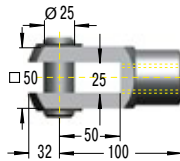
End Fitting

B24



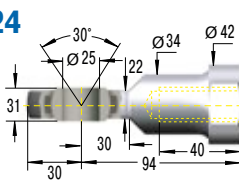
Stud Thread B24

D24



Clevis Fork D24
max. force 50,000 N

E24



Swivel Eye E24
max. force 50,000 N

Performance and Dimensions

TYPES	Stroke mm	L extended mm	Force Range 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	13,000

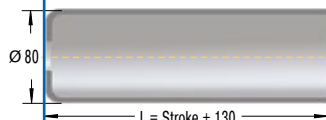
Ordering Example

GS-70-200-EE-8000

Type (Push Type) _____
 Body Ø (70 mm) _____
 Stroke (200 mm) _____
 Piston Rod End Fitting E24 _____
 Body End Fitting E24 _____
 Nominal Force F_1 8000 N _____

Mounting accessories see from page 194.

Rod Shroud W24-70



Technical Data

Force range: 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)

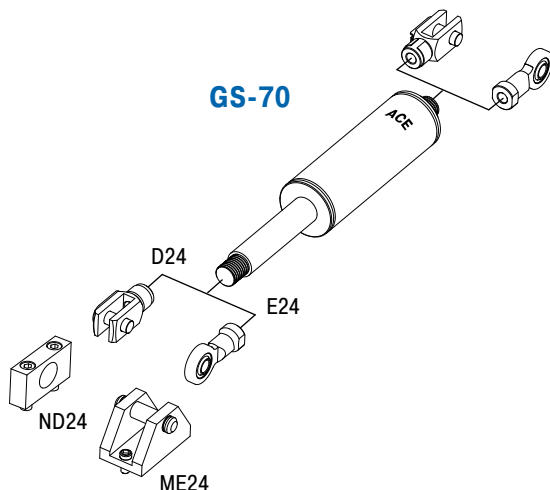
Positive stop: External positive stop at the end of stroke provided by the customer.

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

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

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

GS-70



GS-8-V4A to GS-40-VA

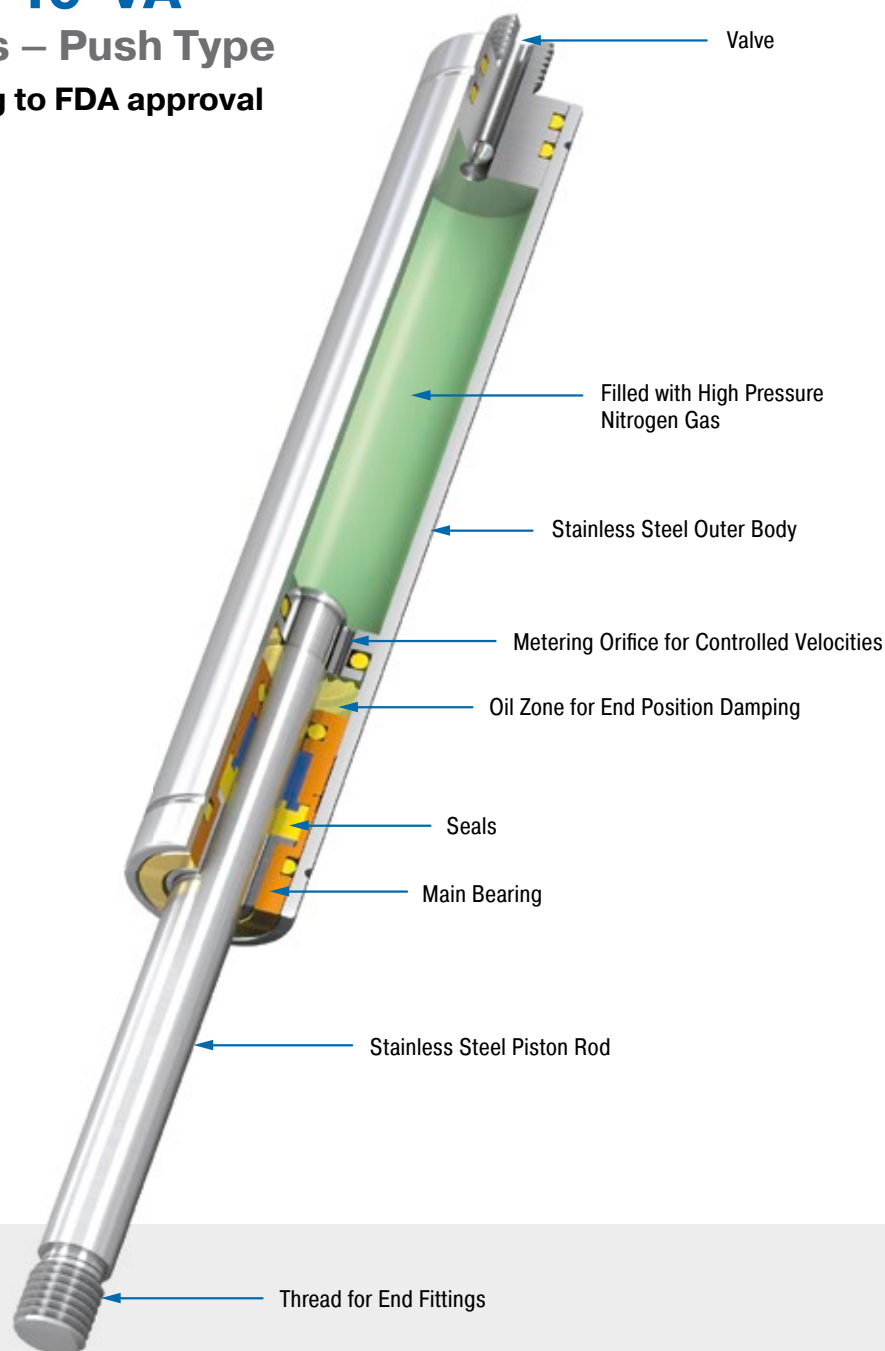
Industrial Gas Springs – Push Type

With food grade oil according to FDA approval

Protection against corrosion and superior optics for even more sophisticated requirements: Based on ACE's industrial gas push type 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 push type springs do not only look good, they also are available in various stroke lengths and possible extension forces. A comprehensive range of accessories in stainless steel guarantees easy assembly and a broad range of uses.

ACE industrial gas pressure springs made of stainless steel are used in the automotive sector, in industrial applications, mechanical engineering and medical cleanroom technology as well as in the food, electronics and shipbuilding industries.



Technical Data

Force range: 10 N to 5,000 N

Piston rod diameter: Ø 3 mm to Ø 20 mm

Progression: Approx. 12 % to 40 %
(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

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

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

Safety instructions: 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, Force range 10 N to 100 N (compressed up to 130 N)

End Fitting

Standard Dimensions

End Fitting

B3,5

A3,5-V4A

C3,5-V4A

D3,5-V4A

G3,5-V4A

TYPES	Stroke mm	L extended mm	Force Range 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

Type (Push Type) **GS-8-30-AC-30-V4A**

Body Ø (8 mm)

Stroke (30 mm)

Piston Rod End Fitting A3,5-V4A

Body End Fitting C3,5-V4A

Nominal Force F₁ 30 N

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

Mounting accessories see from page 202.

Adjuster Knob DE-GAS-3,5
See page 171.

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

Technical Data

Force range: 10 N to 100 N (compressed up to 130 N)

Progression: Approx. 27 %

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)

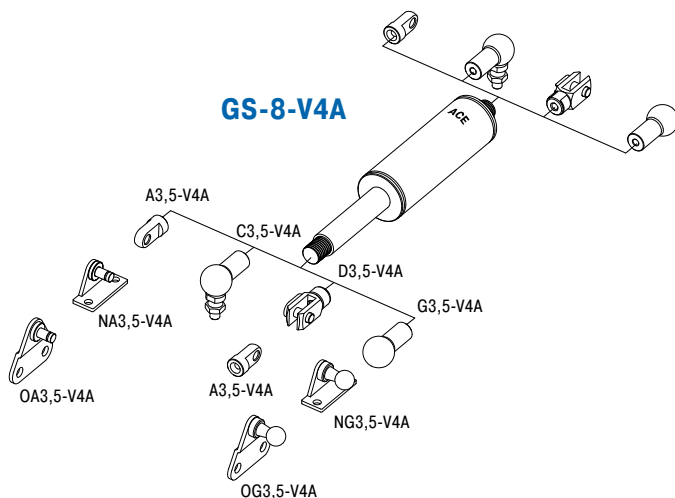
Positive stop: External positive stop at the end of stroke provided by the customer.

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

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

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

GS-8-V4A



End Fitting

Standard Dimensions

End Fitting

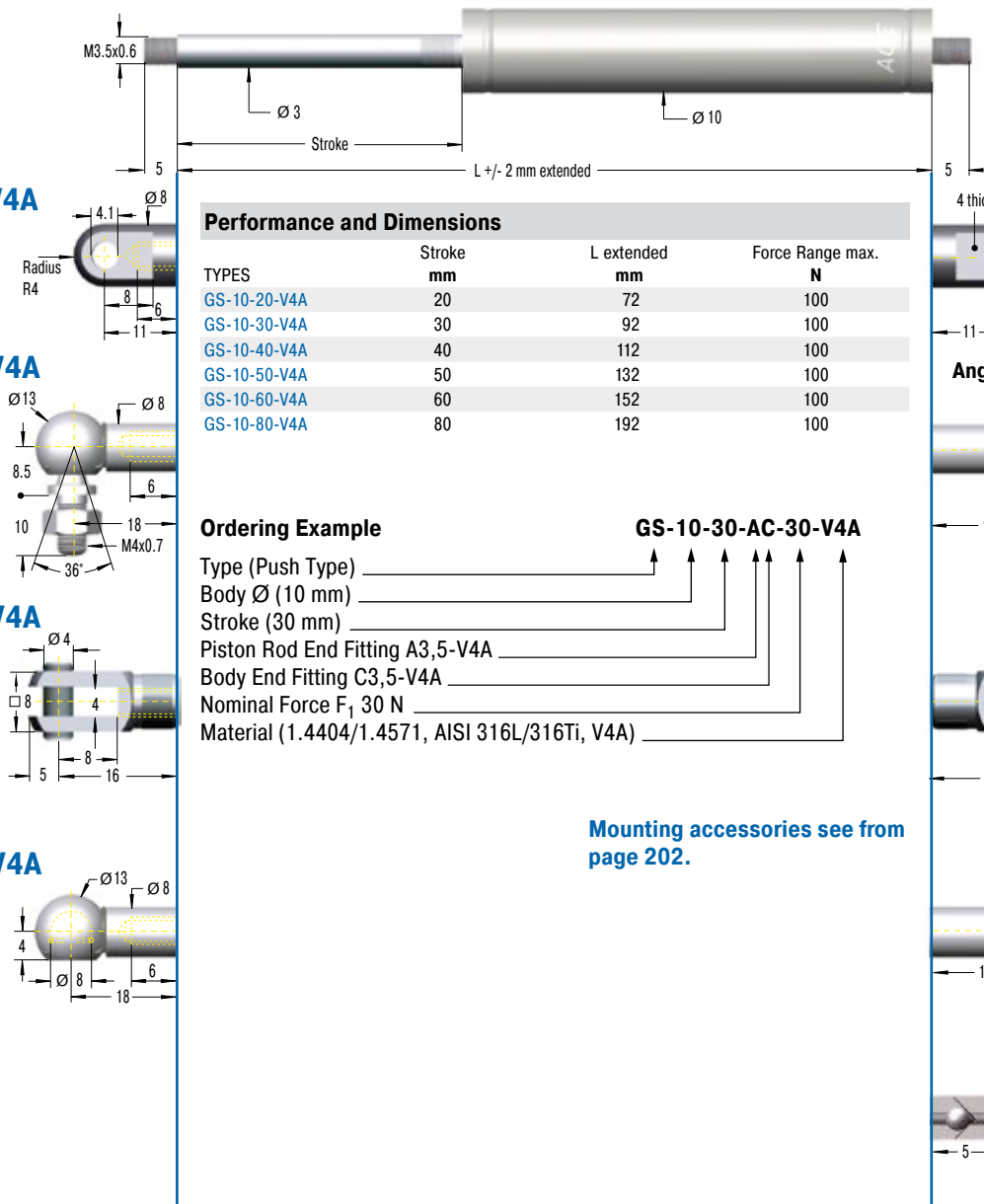
B3,5

A3,5-V4A

C3,5-V4A

D3,5-V4A

G3,5-V4A



Performance and Dimensions

TYPES	Stroke mm	L extended mm	Force Range 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

Type (Push Type) _____
 Body Ø (10 mm) _____
 Stroke (30 mm) _____
 Piston Rod End Fitting A3,5-V4A _____
 Body End Fitting C3,5-V4A _____
 Nominal Force F_1 30 N _____
 Material (1.4404/1.4571, AISI 316L/316Ti, V4A) _____

GS-10-30-AC-30-V4A

Mounting accessories see from
page 202.

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 171.

Technical Data

Force range: 10 N to 100 N (compressed up to 115 N)

Progression: Approx. 12 %

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.

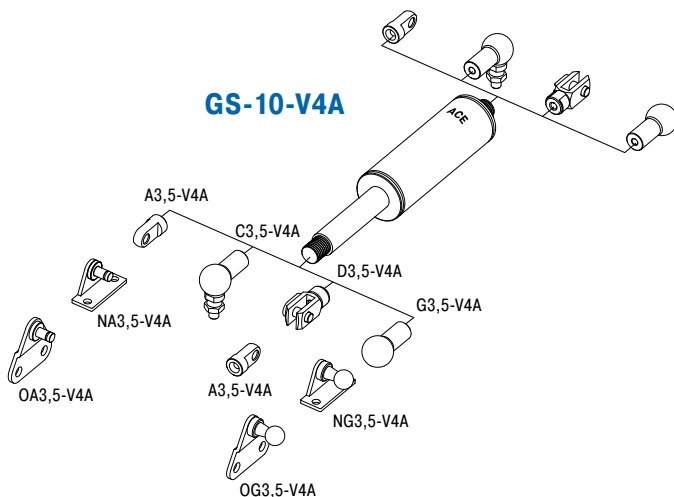
End position damping length: Approx. 5 mm
(depending on the stroke)

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 must be positively secured by the customer to prevent unscrewing.

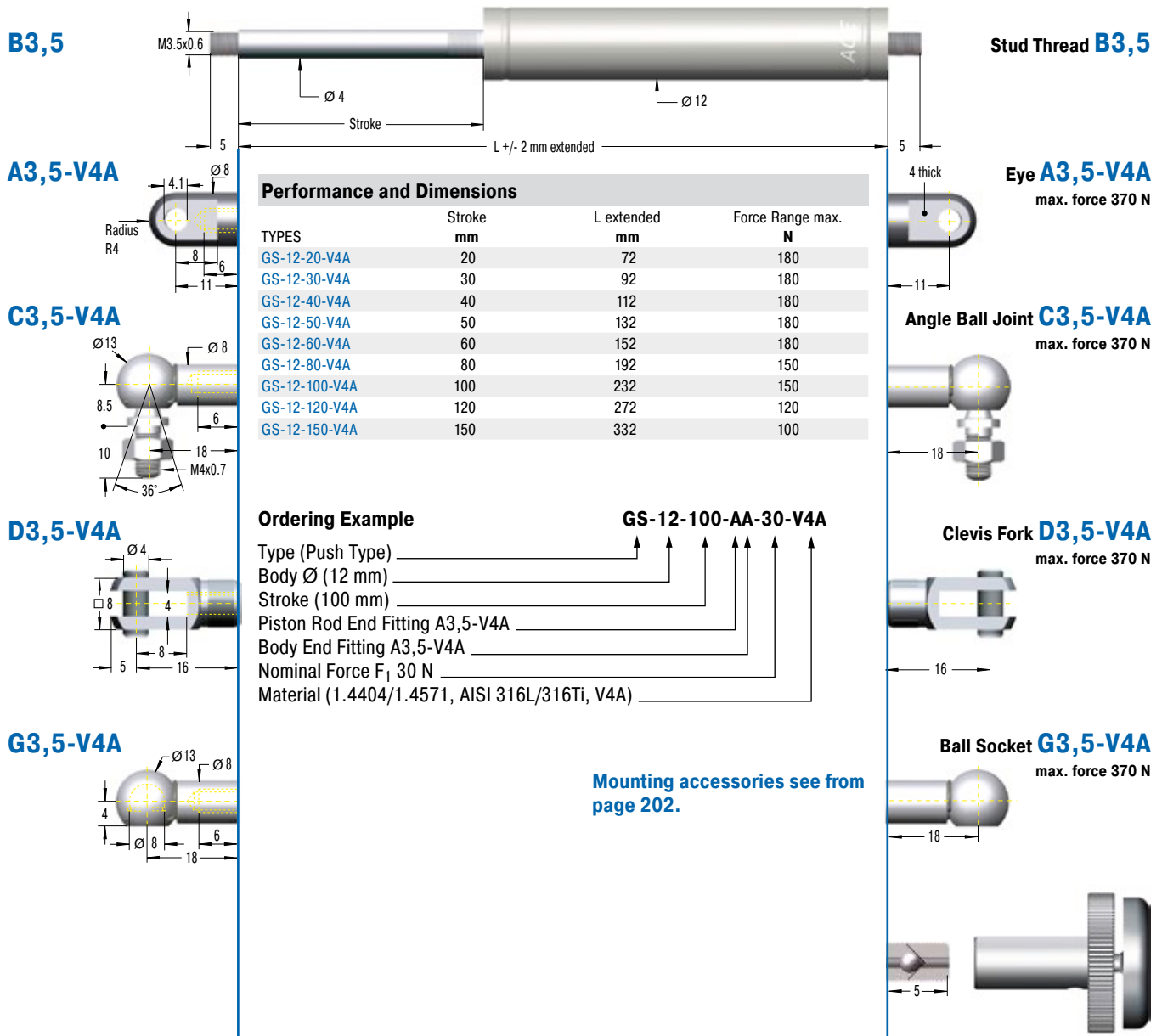
Safety instructions: Gas pressure springs should not be installed under pre-tension.

GS-10-V4A


End Fitting

Standard Dimensions

End Fitting



Technical Data

Force range: 15 N to 180 N (compressed up to 212 N)

Progression: Approx. 18 %

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)

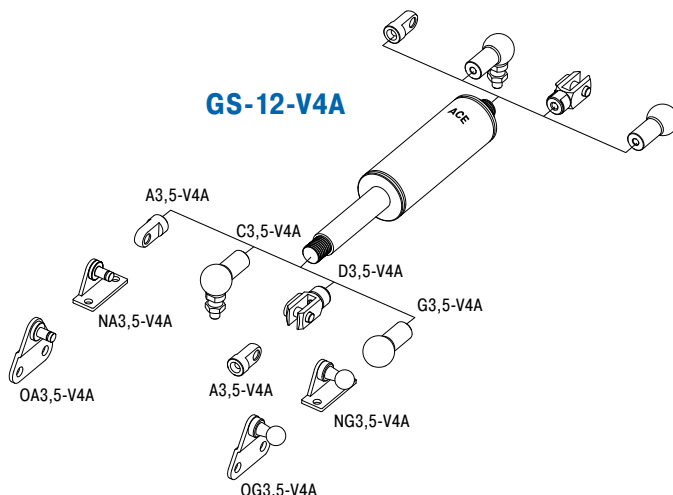
Positive stop: External positive stop at the end of stroke provided by the customer.

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

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

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

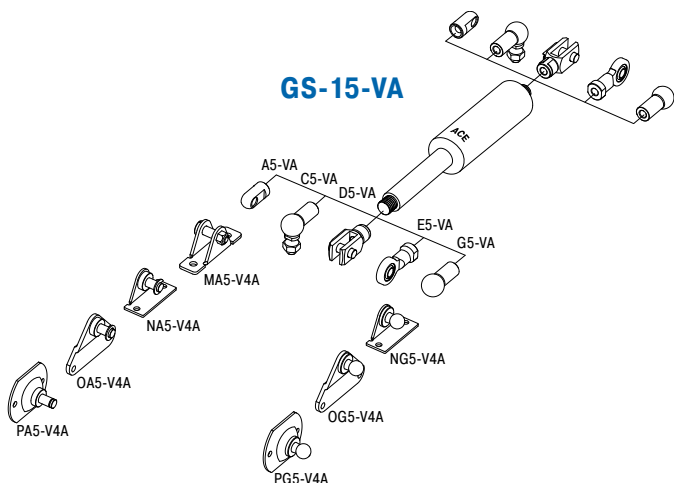
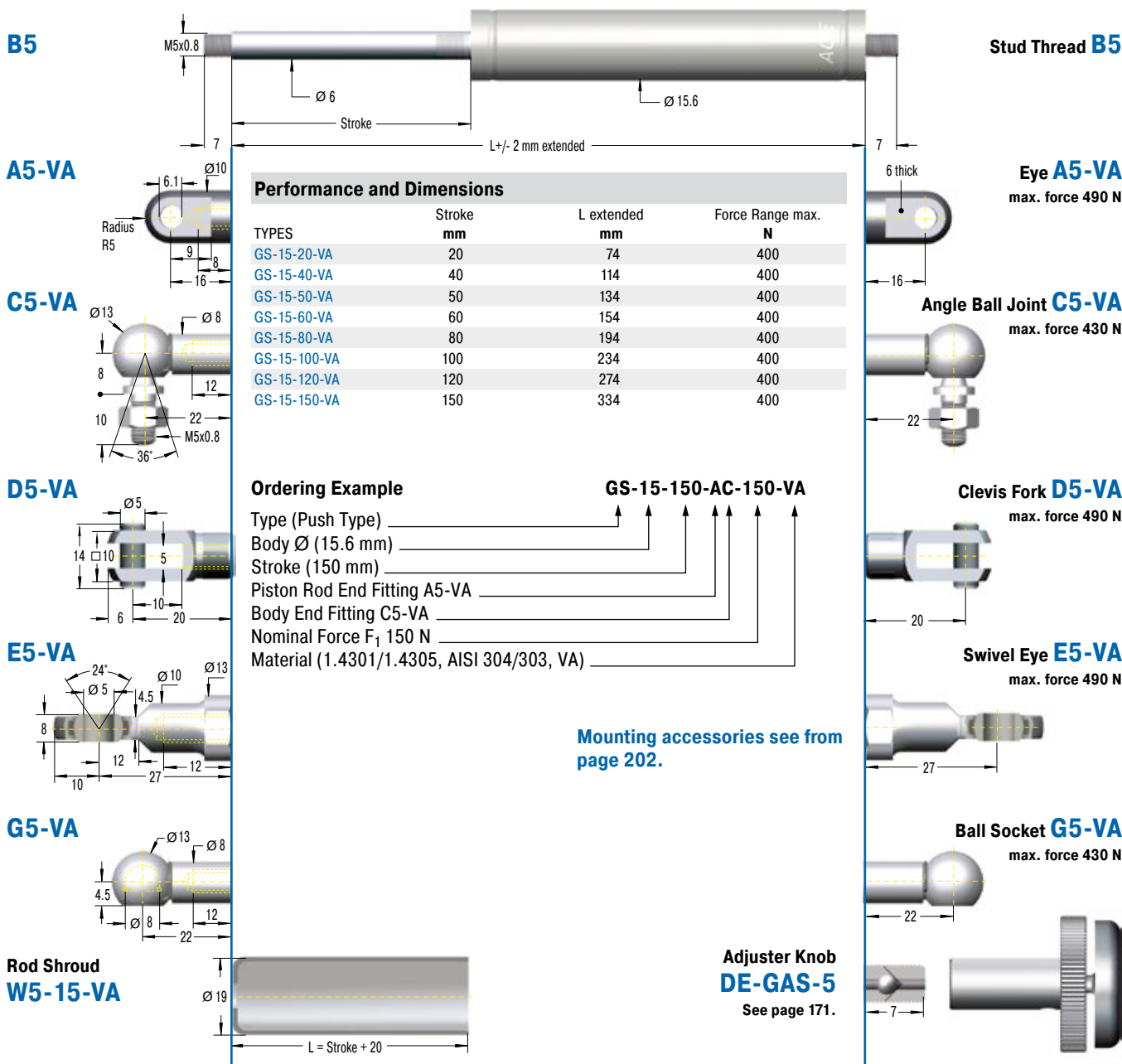
GS-12-V4A



End Fitting

Standard Dimensions

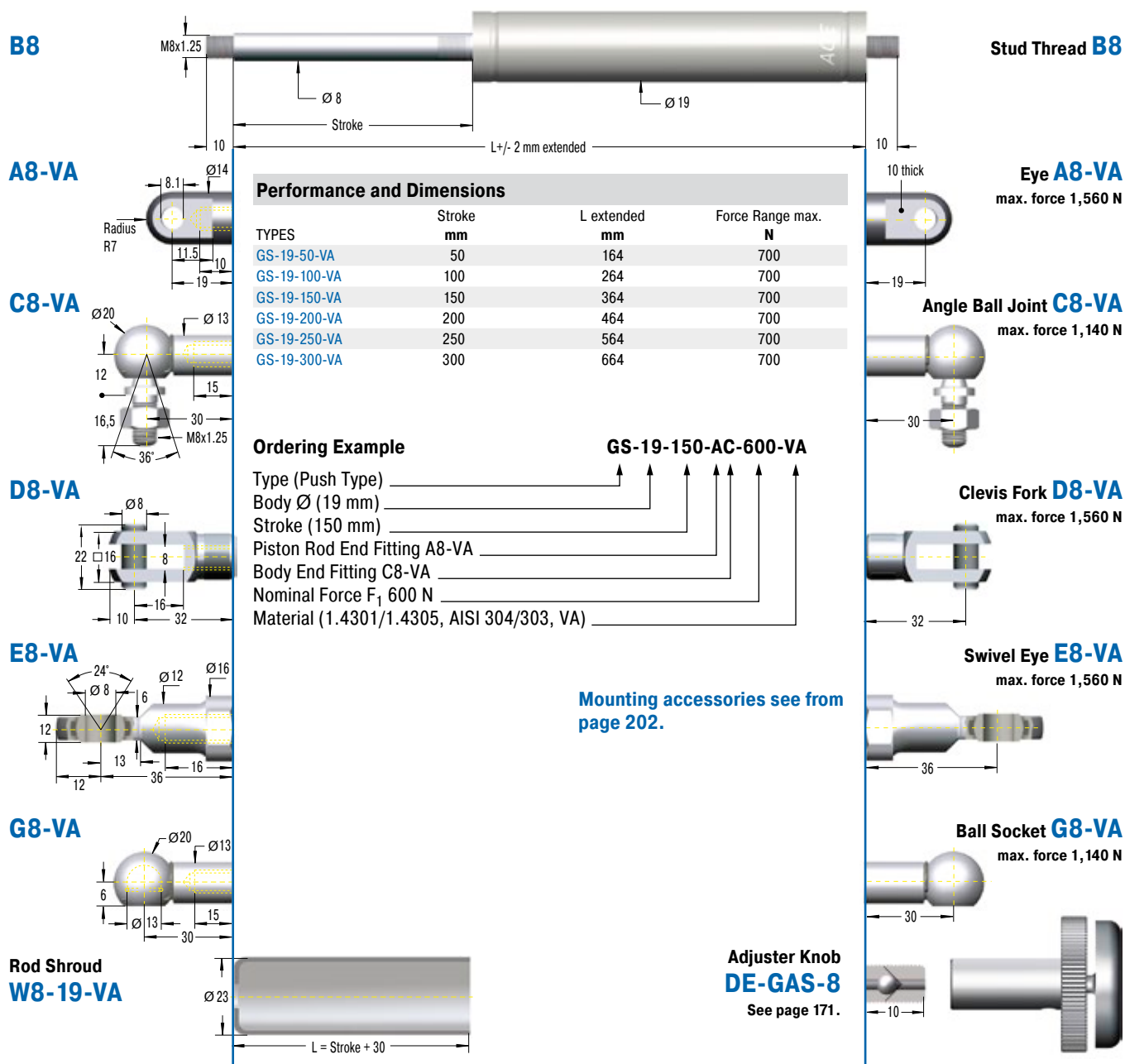
End Fitting



End Fitting

Standard Dimensions

End Fitting



Technical Data

Force range: 50 N to 700 N (compressed up to 930 N)

Progression: Approx. 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.

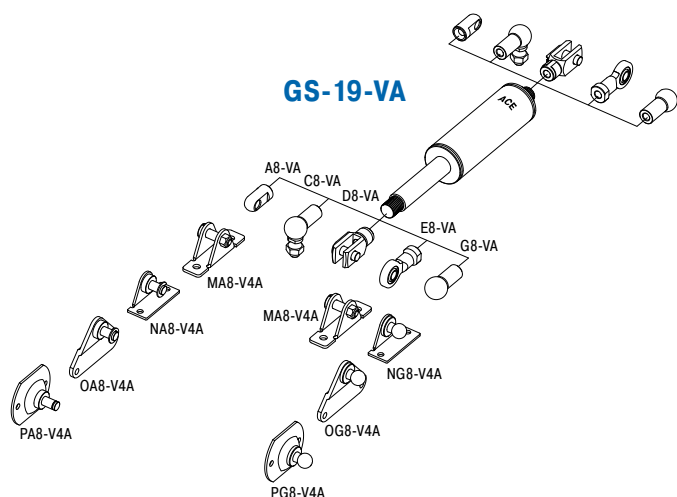
End position damping length: Approx. 20 mm
(depending on the stroke)

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 must be positively secured by the customer to prevent unscrewing.

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



Valve Technology, Stainless Steel, Force range 150 N to 2,500 N (compressed up to 3,800 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 extended mm	Force Range 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	2,500
GS-28-450-VA	450	962	2,500
GS-28-500-VA	500	1,062	2,500
GS-28-550-VA	550	1,162	2,500
GS-28-600-VA	600	1,262	2,500
GS-28-650-VA	650	1,362	2,500

Ordering Example

GS-28-150-EE-1200-VA

Type (Push Type) _____

Body Ø (28 mm) _____

Stroke (150 mm) _____

Piston Rod End Fitting E10-VA _____

Body End Fitting E10-VA _____

Nominal Force F_1 1200 N _____

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

Mounting accessories see from page 202.

Adjuster Knob DE-GAS-10
See page 171.

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

Technical Data

Force range: 150 N to 2,500 N (compressed up to 3,800 N)

Progression: Approx. 52 %

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.

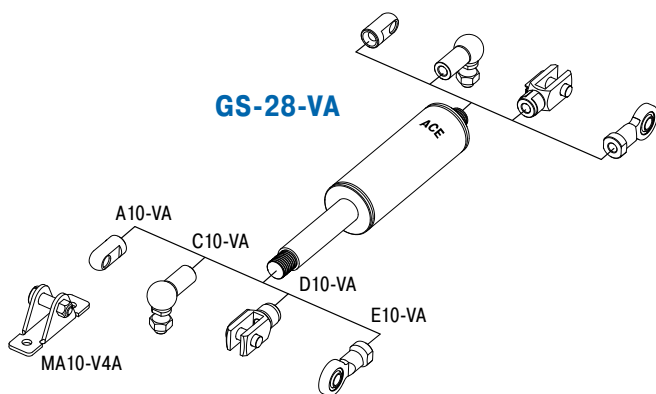
End position damping length: Approx. 20 mm (depending on the stroke)

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 must be positively secured by the customer to prevent unscrewing.

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



Further Stainless Steel Gas Springs (Push Type), V4A

Performance			
TYPES	Stroke mm	L extended mm	Dimensions see Page
GS-15-20-V4A	20	74	144
GS-15-40-V4A	40	114	144
GS-15-50-V4A	50	134	144
GS-15-60-V4A	60	154	144
GS-15-80-V4A	80	194	144
GS-15-100-V4A	100	234	144
GS-15-120-V4A	120	274	144
GS-15-150-V4A	150	334	144
GS-19-50-V4A	50	164	145
GS-19-100-V4A	100	264	145
GS-19-150-V4A	150	364	145
GS-19-200-V4A	200	464	145
GS-19-250-V4A	250	564	145
GS-19-300-V4A	300	664	145
GS-22-50-V4A	50	164	146
GS-22-100-V4A	100	264	146
GS-22-150-V4A	150	364	146
GS-22-200-V4A	200	464	146
GS-22-250-V4A	250	564	146
GS-22-300-V4A	300	664	146
GS-22-350-V4A	350	764	146
GS-22-400-V4A	400	864	146
GS-22-450-V4A	450	964	146
GS-22-500-V4A	500	1,064	146
GS-22-550-V4A	550	1,164	146
GS-22-600-V4A	600	1,264	146
GS-22-650-V4A	650	1,364	146
GS-22-700-V4A	700	1,464	146
GS-28-100-V4A	100	262	147
GS-28-150-V4A	150	362	147
GS-28-200-V4A	200	462	147
GS-28-250-V4A	250	562	147
GS-28-300-V4A	300	662	147
GS-28-350-V4A	350	762	147
GS-28-400-V4A	400	862	147
GS-28-450-V4A	450	962	147
GS-28-500-V4A	500	1,062	147
GS-28-550-V4A	550	1,162	147
GS-28-600-V4A	600	1,262	147
GS-28-650-V4A	650	1,362	147
GS-40-100-V4A	100	317	148
GS-40-150-V4A	150	417	148
GS-40-200-V4A	200	517	148
GS-40-300-V4A	300	717	148
GS-40-400-V4A	400	917	148
GS-40-500-V4A	500	1,117	148
GS-40-600-V4A	600	1,317	148

Further Stainless Steel Accessories, V4A

End Fittings		End Fittings	
TYPES	Dimensions see Page	TYPES	Dimensions see Page
A5-V4A	204	A10-V4A	206
C5-V4A	204	C10-V4A	206
D5-V4A	204	D10-V4A	206
E5-V4A	204	E10-V4A	206
G5-V4A	204	A14-V4A	206
A8-V4A	205	C14-V4A	206
C8-V4A	205	D14-V4A	206
D8-V4A	205	E14-V4A	206
E8-V4A	205		
G8-V4A	206		

GST-40 Tandem

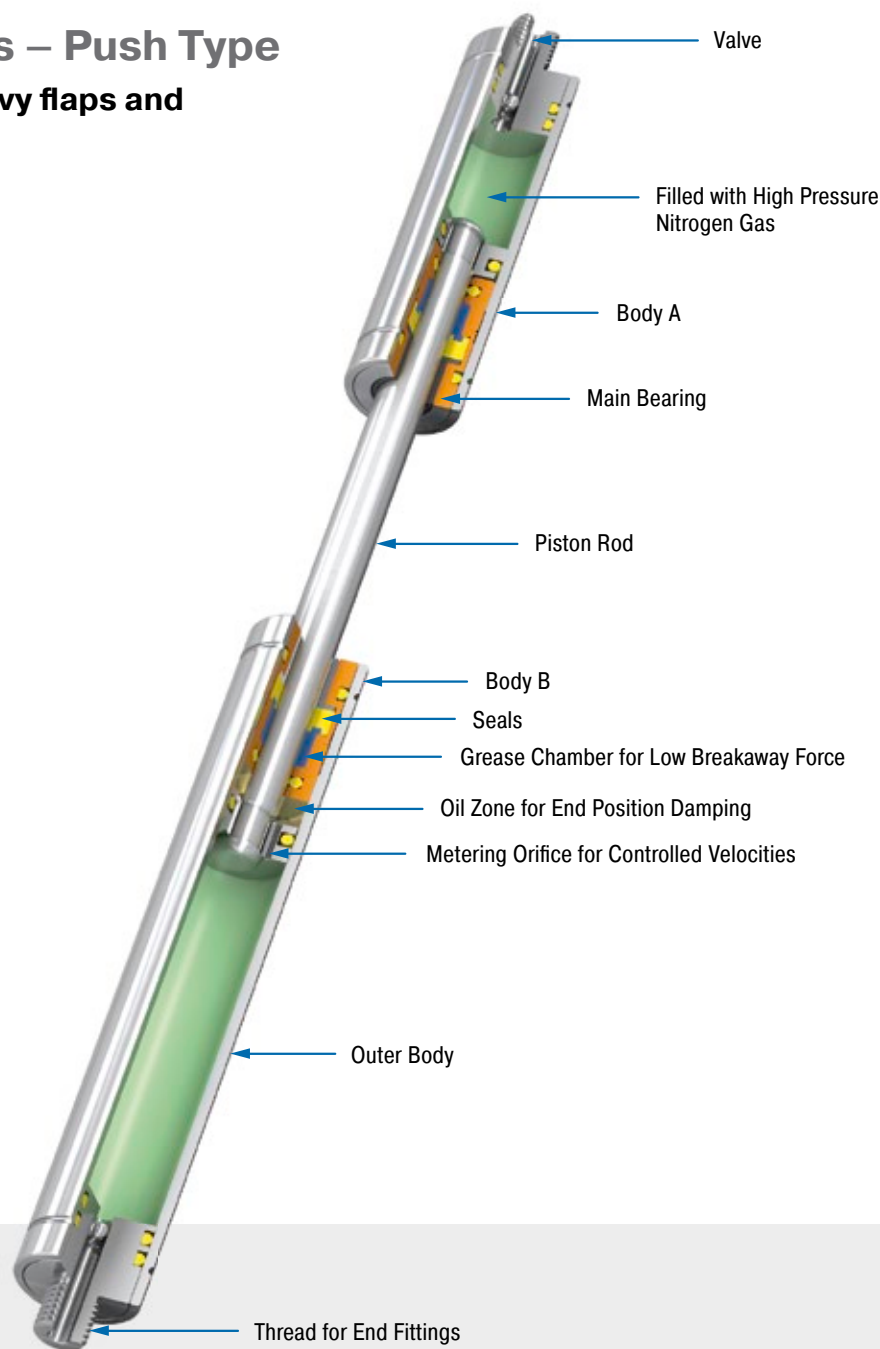
Industrial Gas Springs – Push Type

Optimised dual force for heavy flaps and wide angle applications

Cover two differing force ranges: Tandem push type gas springs by ACE are maintenance-free and ready-to-install with two pressure tubes with 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. These force ranges are adjusted and compliment each other, designed individually for the relevant application by the free of charge ACE calculation service, then are specifically manufactured adjusted precisely to the required dynamics of the application.

The customer specific systems, for which there are many fitting parts, are specifically suitable for heavy loads with large opening angle and can also be delivered in stainless steel versions.

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



Technical Data

Force range: 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

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

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

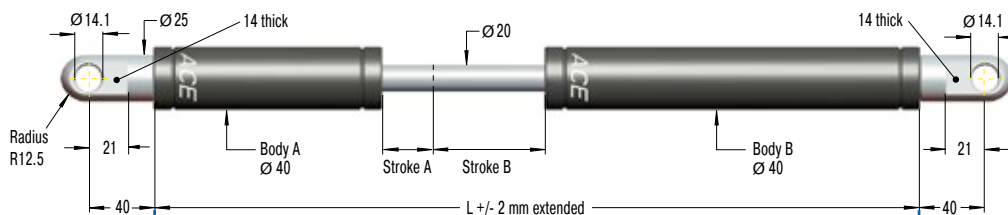
On request: Special oils and other special options. Alternative accessories. Material 1.4301/1.4305, AISI 304/303 (V2A) and 1.4404/1.4571, AISI 316L/316Ti (V4A).

End Fitting

Standard Dimensions

End Fitting

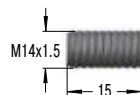
A14



Eye A14

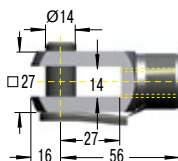
max. force 10,000 N

B14



Stud Thread B14

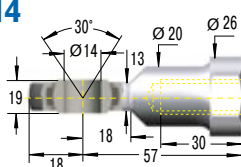
D14



Clevis Fork D14

max. force 10,000 N

E14



Swivel Eye E14

max. force 10,000 N

Performance and Dimensions

TYPES	Stroke A mm	Stroke B mm	L extended mm	Force Range 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

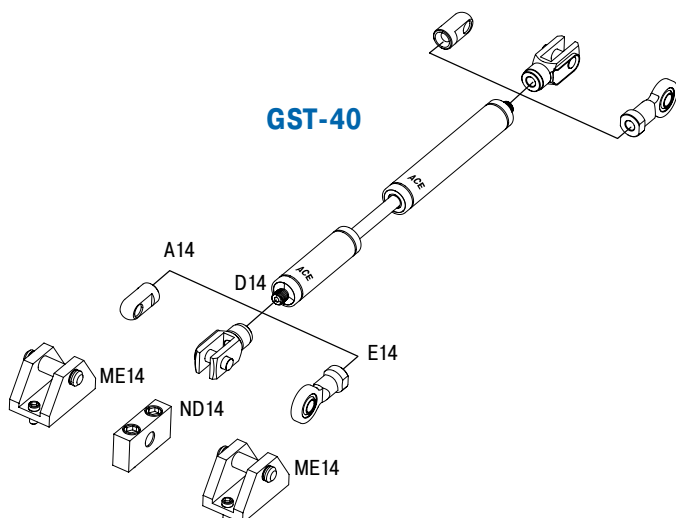
Ordering Example

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

Type (Tandem Gas Spring) _____
 Body Ø (40 mm) _____
 Stroke A (50 mm) _____
 Stroke B (150 mm) _____
 Body A End Fitting, A14 _____
 Body B End Fitting, D14 _____
 Nominal Force Body A, 900 N _____
 Nominal Force Body B, 2500 N _____

Mounting accessories see from
page 194.

GST-40



Technical Data

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 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



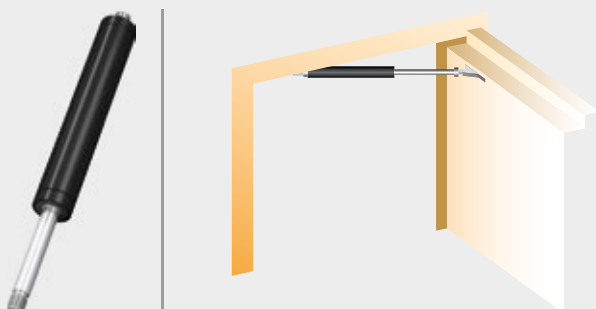
GS-19

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.



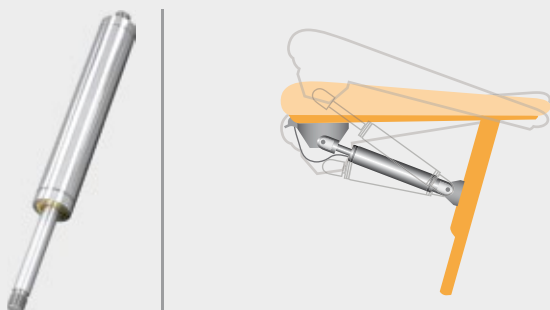
Industrial gas springs: For safe entry and exit



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.

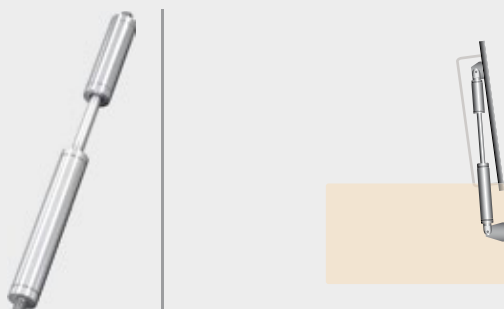


With inclination angles of 15 degrees to the front and rear, the ACE stainless steel gas springs facilitate the work of nurses
Rifton Equipment, Rifton, New York 12471, USA

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

Industrial Gas Springs – Pull Type

Takes over when things get too tight for gas pressure springs

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. The compact assistants with body diameters of 15 to 40 mm 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 with the pressure springs. 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. Any installation position, extensive DIN standardised accessories and various models enable universal use.

Compact design

Individual filling valve technology

Calculation program for specific design

Universally applicable

Delivery time within 24 hours



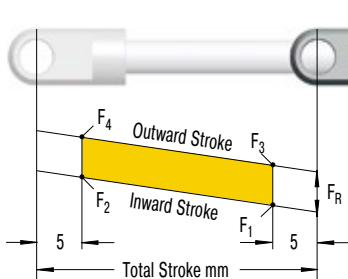
Function of a Gas Spring – Pull Type

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 extension 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.

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)

Type	Progression approx. %	¹ Friction F_R approx. in N
GZ-15	23	55 - 140
GZ-19	10	20 - 40
GZ-28	20	100 - 200
GZ-40	40	

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.

Free calculation service see page 168!

Industrial Gas Springs – Pull Type



GZ-15 to GZ-40

Valve Technology

Very low progression rate

Hoods, Shutters, Machine housing, Conveyor systems

Page 156



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 162

GZ-15 to GZ-40

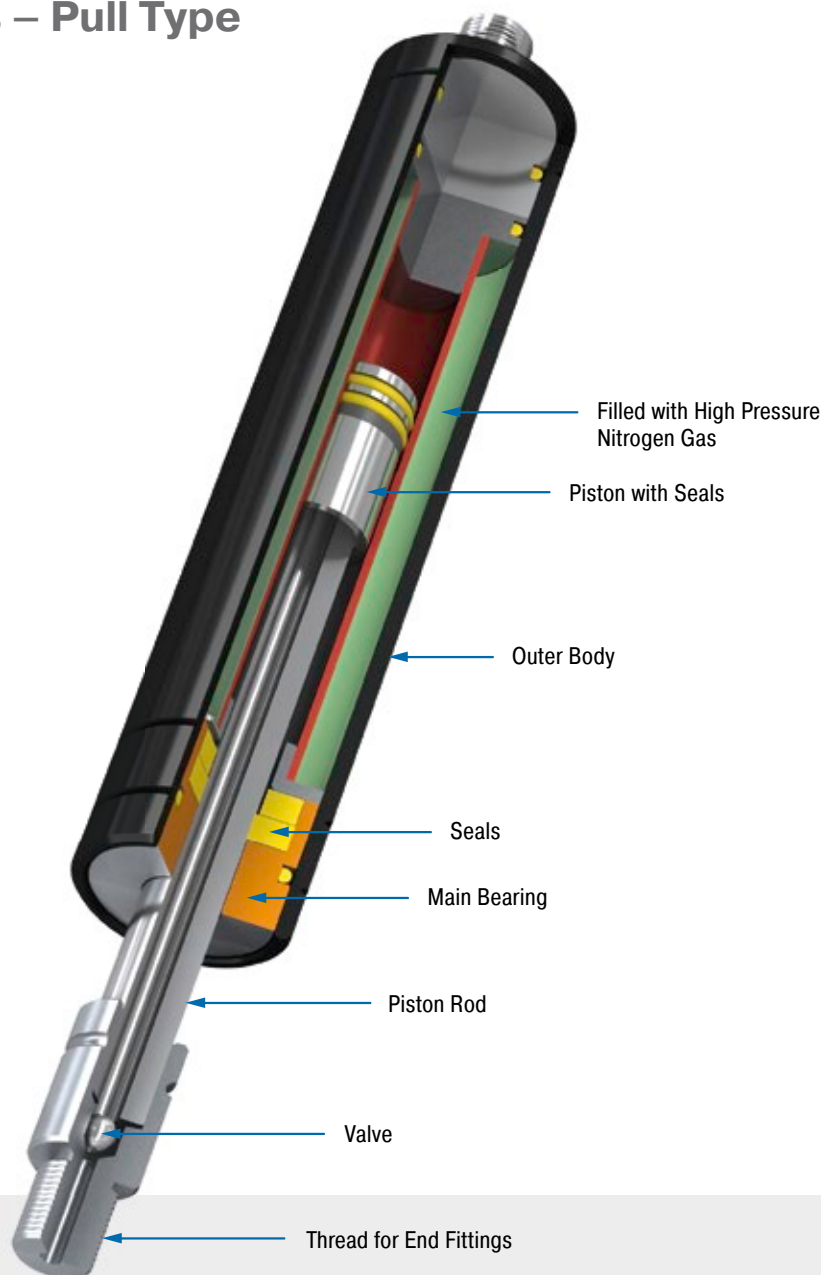
Industrial Gas Springs – Pull Type

Very low progression rate

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 come into their own. They work in the opposite way to 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 to 40 mm as well as forces from 40 to 5,000 N and are available from stock with valve and large selection of accessories. The traction force can be subsequently adjusted using the 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 range: 40 N to 5,000 N

Piston rod diameter: Ø 4 mm bis Ø 28 mm

Progression: Approx. 20 % bis 40 %

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

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

On request: Special oils and other special options. Alternative accessories. Traction gas

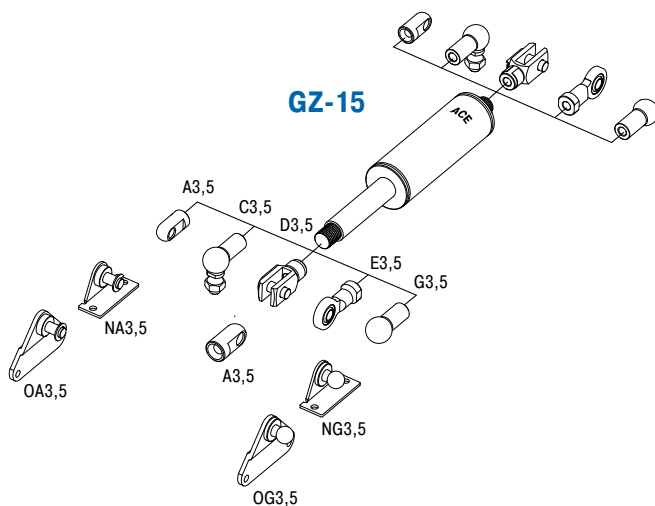
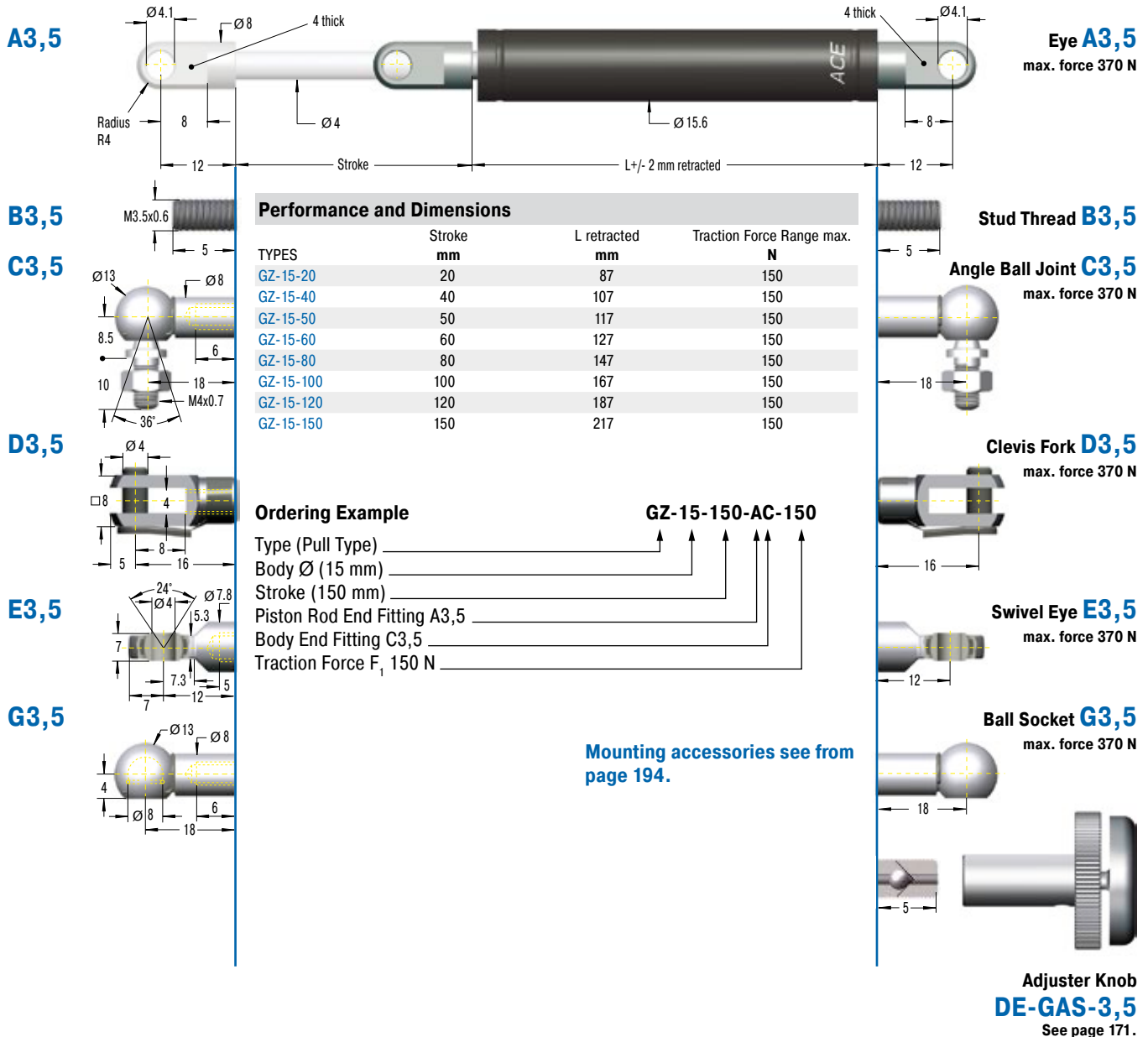
springs with end position damping also available on request.

Valve Technology, Traction force range 50 N to 150 N (extended up to 185 N)

End Fitting

Standard Dimensions

End Fitting



Technical Data

Traction force range: 50 N to 150 N (extended up to 185 N)

Progression: Approx. 23 %

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.

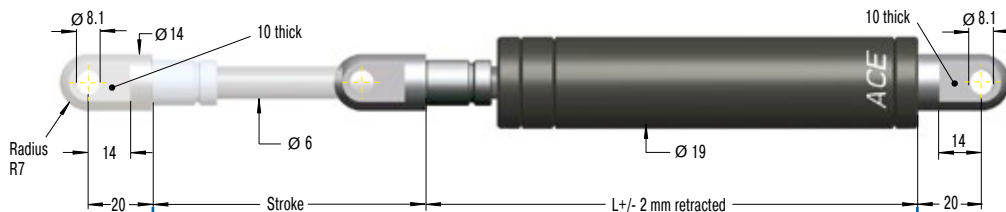
End fittings: They are interchangeable and must be positively secured by the customer to prevent unscrewing.

End Fitting

Standard Dimensions

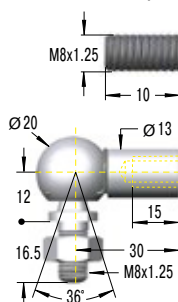
End Fitting

A8

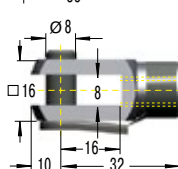

Eye A8
max. force 3,000 N

B8

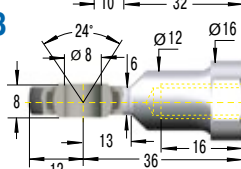
C8


Stud Thread B8
Angle Ball Joint C8
max. force 1,200 N

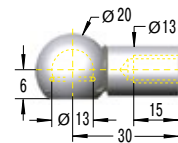
D8


Clevis Fork D8
max. force 3,000 N

E8


Swivel Eye E8
max. force 3,000 N

G8


Ball Socket G8
max. force 1,200 N

Performance and Dimensions

TYPES	Stroke mm	L retracted mm	Traction Force Range max. N
GZ-19-30	30	112	300
GZ-19-50	50	132	300
GZ-19-100	100	182	300
GZ-19-150	150	232	300
GZ-19-200	200	282	300
GZ-19-250	250	332	300

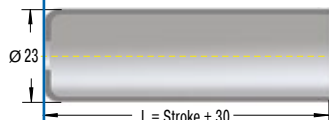
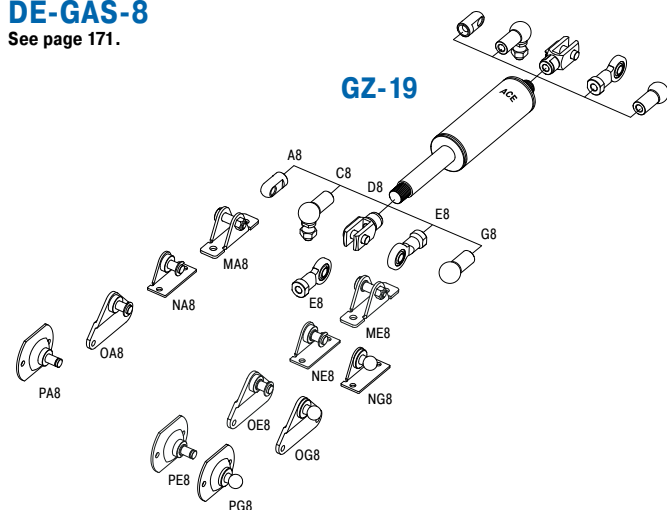
Ordering Example

GZ-19-150-AC-250

Type (Pull Type) _____
 Body Ø (19 mm) _____
 Stroke (150 mm) _____
 Piston Rod End Fitting A8 _____
 Body End Fitting C8 _____
 Traction Force F_1 250 N _____

 Mounting accessories see from
page 194.

Rod Shroud W8-19


Adjuster Knob
DE-GAS-8
See page 171.


Technical Data

Traction force range: 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 must be positively secured by the customer to prevent unscrewing.

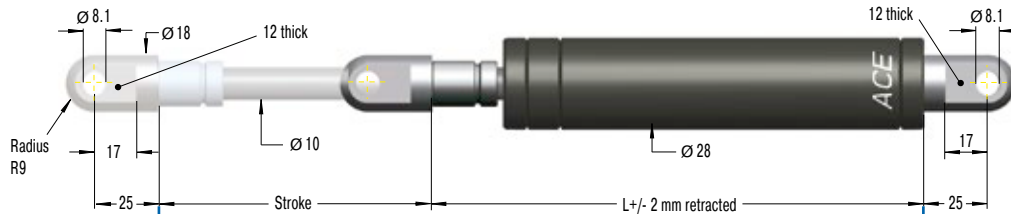
Valve Technology, Traction force range 150 N to 1,200 N (extended up to 1,440 N)

End Fitting

Standard Dimensions

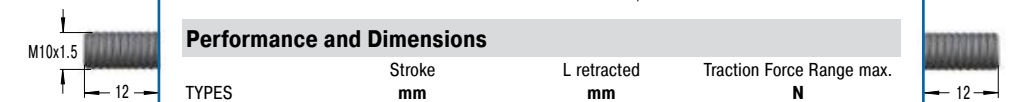
End Fitting

A10



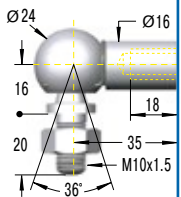
Eye A10
max. force 10,000 N

B10



Stud Thread B10

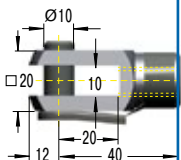
C10



Angle Ball Joint C10

max. force 1,800 N

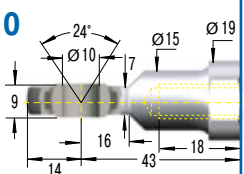
D10



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 Range 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

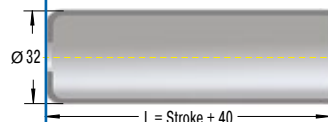
Ordering Example

GZ-28-150-EE-800

Type (Pull Type) _____
Body Ø (28 mm) _____
Stroke (150 mm) _____
Piston Rod End Fitting E10 _____
Body End Fitting E10 _____
Traction Force F₁ 800 N _____

Mounting accessories see from page 194.

Rod Shroud W10-28



Adjuster Knob
DE-GAS-10
See page 171.

GZ-28

Technical Data

Traction force range: 150 N to 1,200 N (extended up to 1,440 N)

Progression: Approx. 20 %

Lifetime: Approx. 2,000 m

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

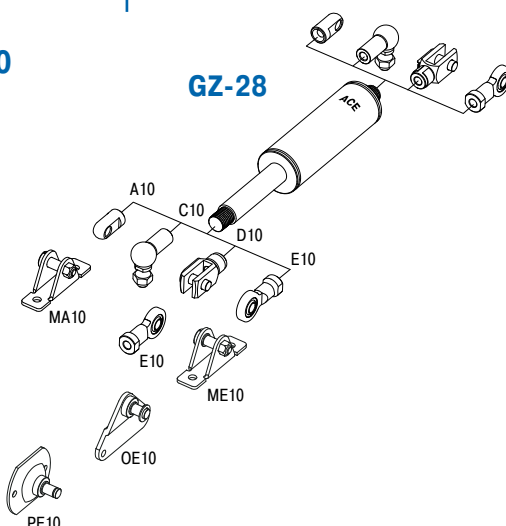
Material: Outer body, End fittings: Zinc plated steel; Piston rod: Steel with wear-resistant coating

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 must be positively secured by the customer to prevent unscrewing.



End Fitting

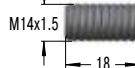
Standard Dimensions

End Fitting

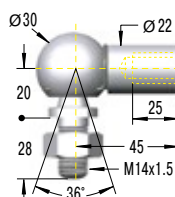
A14


Eye A14
 max. force 10,000 N

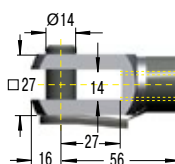
B14


Stud Thread B14

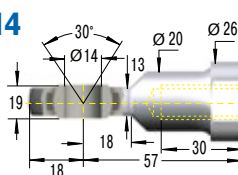
C14


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 Range 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

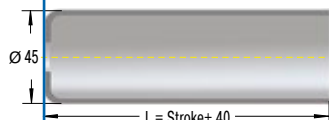
Ordering Example

Type (Pull Type) _____
 Body Ø (40 mm) _____
 Stroke (150 mm) _____
 Piston Rod End Fitting E14 _____
 Body End Fitting E14 _____
 Traction Force F_1 800 N _____

GZ-40-150-EE-800

 Mounting accessories see from
 page 194.

Rod Shroud W14-40


Adjuster Knob
DE-GAS-14
 See page 171.

GZ-40

Technical Data

Traction force range: 500 N to 5,000 N (extended up to 7,000 N)

Progression: Approx. 40 %

Lifetime: Approx. 2,000 m

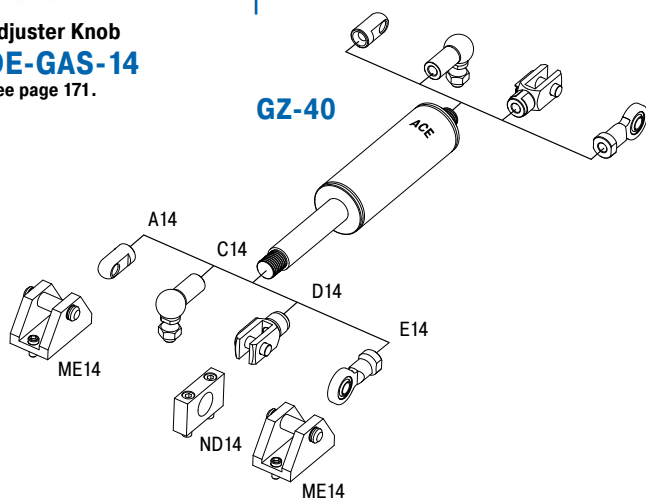
Operating temperature range: -20 °C to +80 °C

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

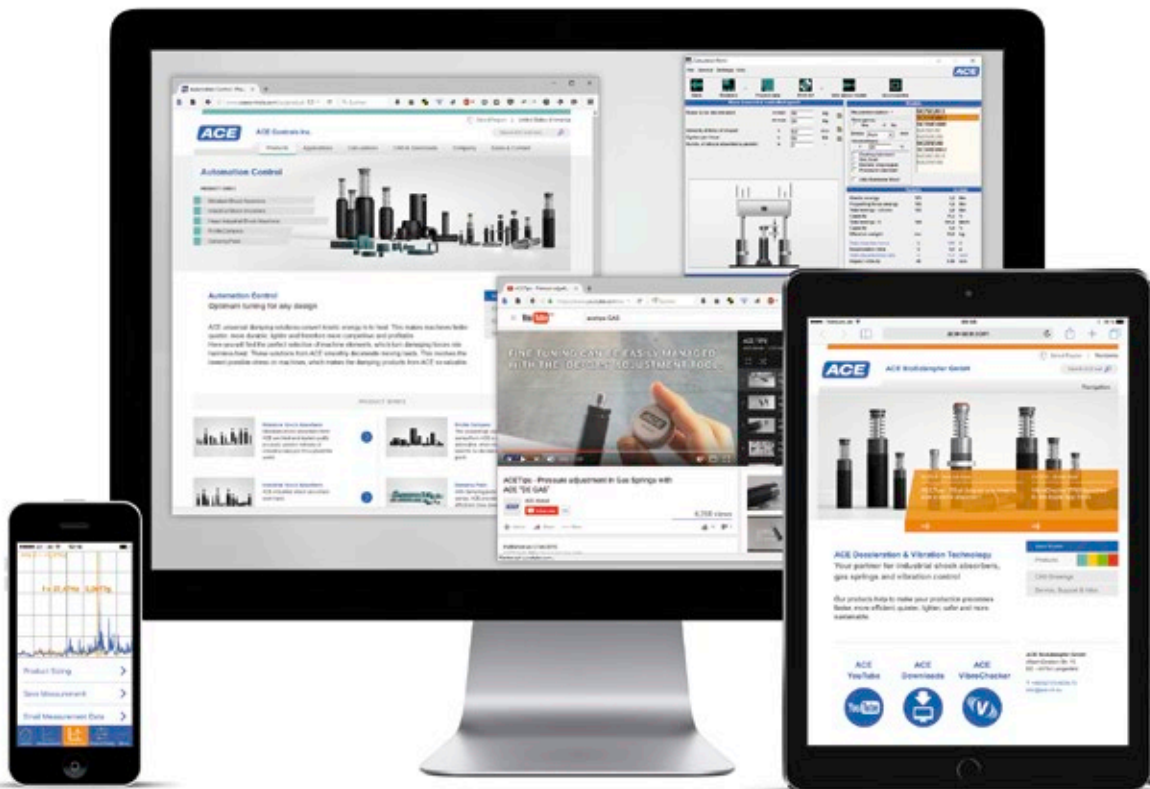
Mounting: With piston rod upwards.

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 must be positively secured by the customer to prevent unscrewing.


ACE Digital Tools



For more information
about the calculation
service see page 168!

Print catalogue? Everyone can.

ACE offers more:

- ▶ Downloads: Product information in many languages
- ▶ PC calculation software & online calculation service
- ▶ Extensive CAD component libraries
- ▶ ACE-YouTube-Channel with video tips
- ▶ VibroChecker – awarded free iPhone App

All information on our website: www.ace-ace.com

GZ-15-V4A to GZ-40-VA

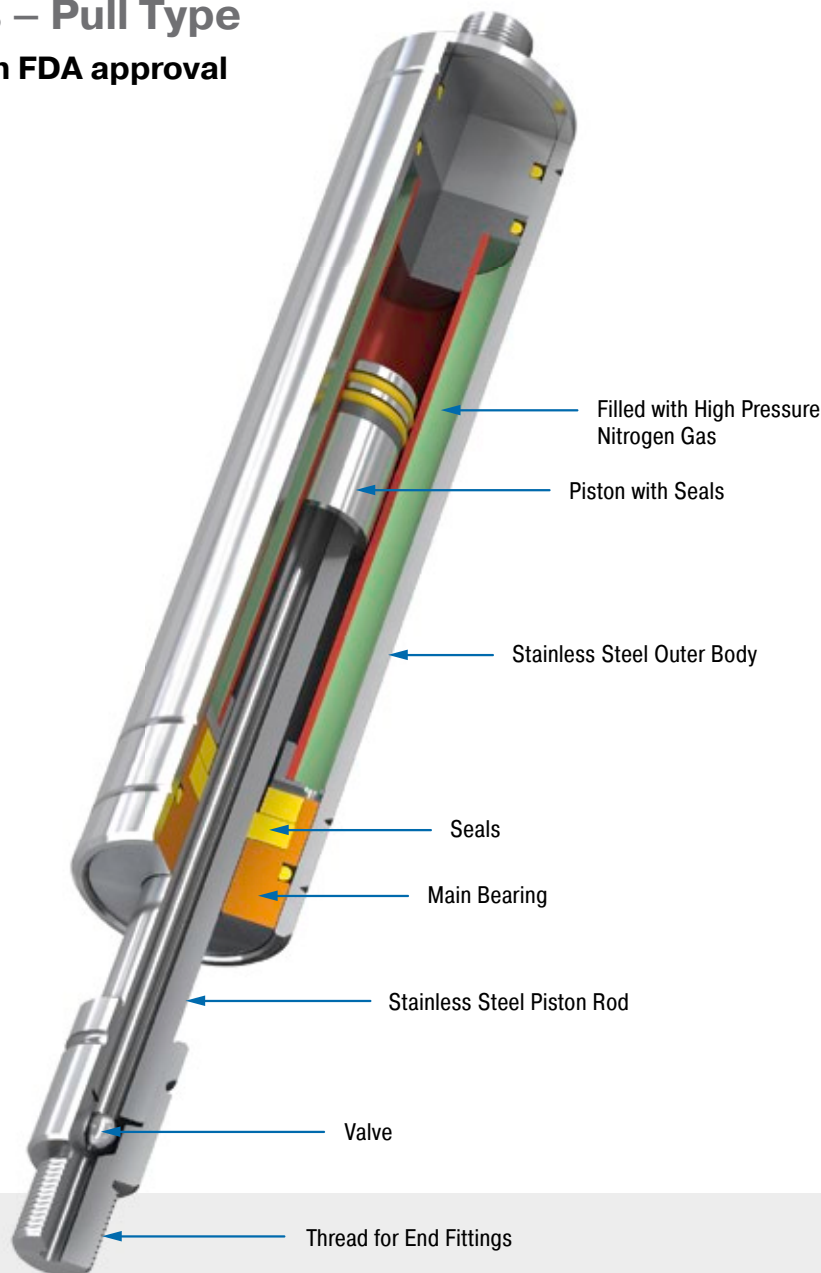
Industrial Gas Springs – Pull Type

Very low progression rate with FDA approval

Brilliant performance when things become tight: For specific use e.g. in tough surroundings or small spaces, the broad spectrum of ACE industrial pull type gas springs made of stainless steel with body diameters from 15 to 40 mm supplements the comprehensive programme 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 optically appealing, very durable and available, upon request, in many stroke lengths and are also possible in many extension forces in combination with the suitable stainless steel accessories.

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 range: 40 N to 5,000 N

Piston rod diameter: Ø 4 mm to Ø 28 mm

Progression: Approx. 11 % to 40 %

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

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

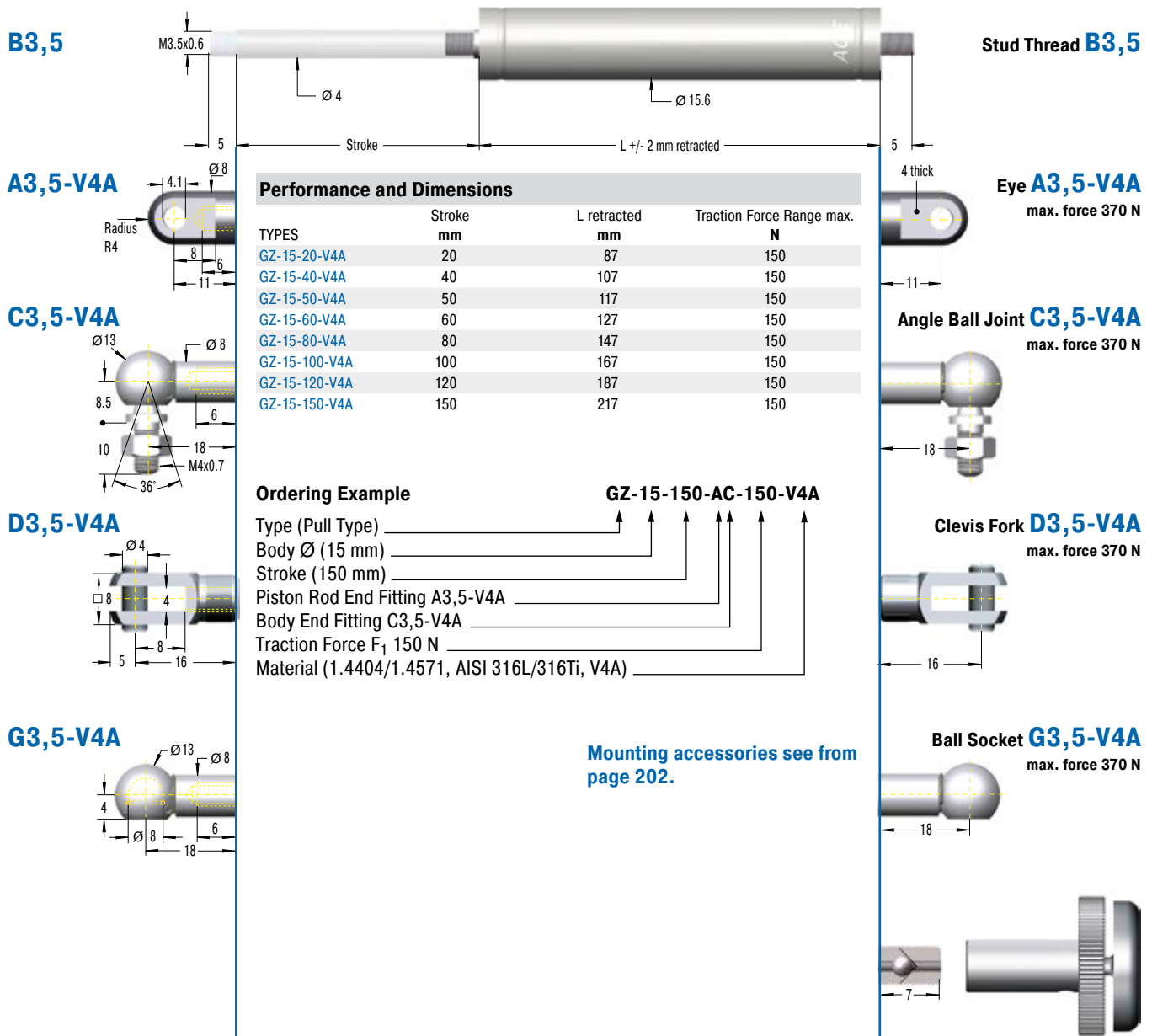
On request: Special oils and other special options. Alternative accessories. Traction gas

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.

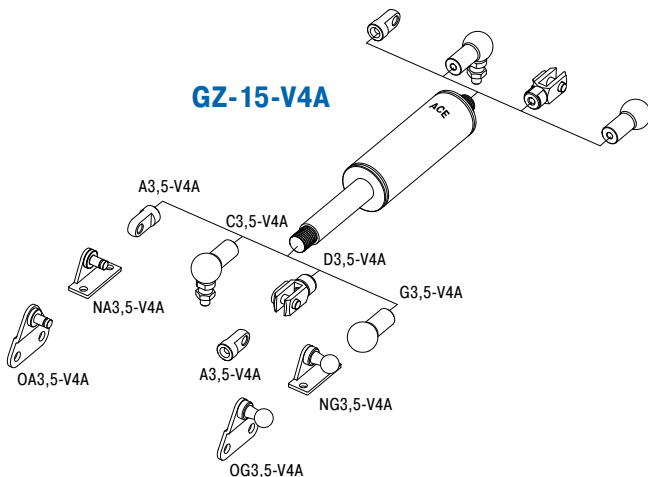
End Fitting

Standard Dimensions

End Fitting



GZ-15-V4A



Technical Data

Traction force range: 50 N to 150 N (extended up to 185 N)

Progression: Approx. 23 %

Lifetime: Approx. 2,000 m

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: 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.

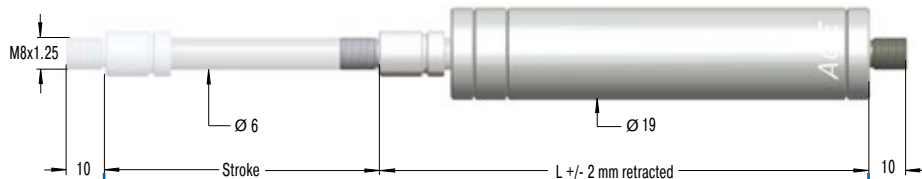
End fittings: They are interchangeable and must be positively secured by the customer to prevent unscrewing.

End Fitting

Standard Dimensions

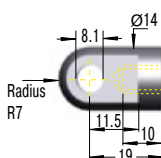
End Fitting

B8

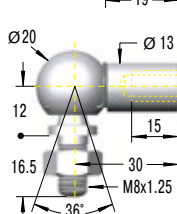


Stud Thread B8

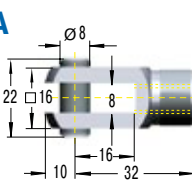
A8-VA


Eye A8-VA
max. force 1,560 N

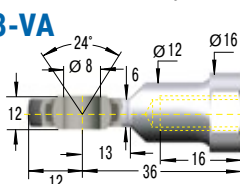
C8-VA


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

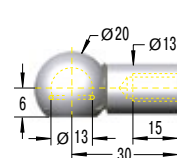
D8-VA


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

Performance and Dimensions

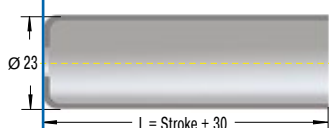
TYPES	Stroke mm	L retracted mm	Traction Force Range max. N
GZ-19-30-VA	30	130	300
GZ-19-50-VA	50	150	300
GZ-19-100-VA	100	200	300
GZ-19-150-VA	150	250	300
GZ-19-200-VA	200	300	300
GZ-19-250-VA	250	350	300

Ordering Example

Type (Pull Type) _____
 Body Ø (19 mm) _____
 Stroke (150 mm) _____
 Piston Rod End Fitting A8-VA _____
 Body End Fitting C8-VA _____
 Traction Force F₁ 150 N _____
 Material (1.4301/1.4305, AISI 304/303, VA) _____

GZ-19-150-AC-150-VA

Mounting accessories see from
page 202.

Rod Shroud
W8-19-VA

Adjuster Knob
DE-GAS-8
See page 171.


GZ-19-VA

Technical Data

Traction force range: 40 N to 350 N (extended up to 448 N)

Progression: Approx. 21 % to 28 %

Lifetime: Approx. 2,000 m

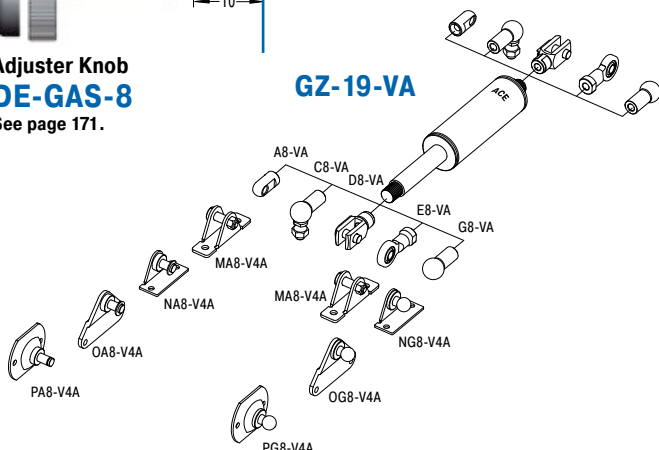
Operating temperature range: -20 °C to +80 °C

Material: Outer body, 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 must be positively secured
by the customer to prevent unscrewing.


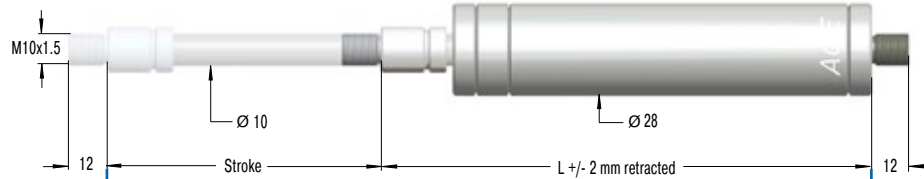
Valve Technology, Stainless Steel, Traction force range 150 N to 1,200 N (ext. up to 1,460 N)

End Fitting

Standard Dimensions

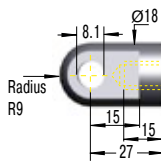
End Fitting

B10



Stud Thread B10

A10-VA

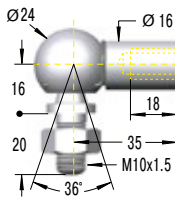


Performance and Dimensions

TYPES	Stroke mm	L retracted mm	Traction Force Range 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

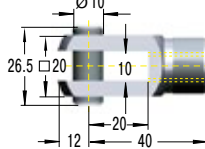
Eye A10-VA max. force 3,800 N

C10-VA



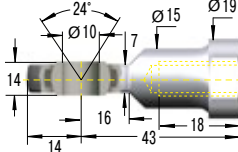
Angle Ball Joint C10-VA max. force 1,750 N

D10-VA



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

E10-VA



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

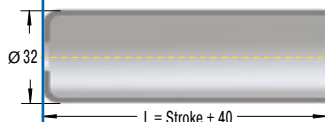
Ordering Example

Type (Pull Type) _____
 Body Ø (28 mm) _____
 Stroke (150 mm) _____
 Piston Rod End Fitting E10-VA _____
 Body End Fitting E10-VA _____
 Traction Force F₁ 800 N _____
 Material (1.4301/1.4305, AISI 304/303, VA) _____

GZ-28-150-EE-800-VA

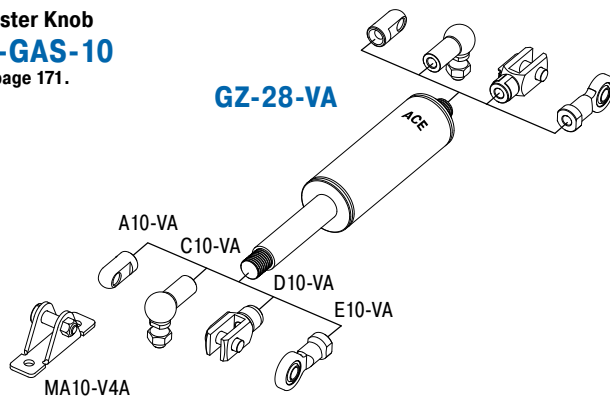
Mounting accessories see from
page 202.

Rod Shroud W10-28-VA



Adjuster Knob DE-GAS-10 See page 171.

GZ-28-VA



Technical Data

Traction force range: 150 N to 1,200 N (extended up to 1,460 N)

Progression: Approx. 22 %

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.

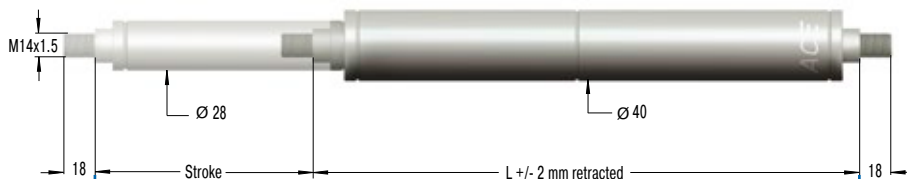
End fittings: They are interchangeable and must be positively secured by the customer to prevent unscrewing.

End Fitting

Standard Dimensions

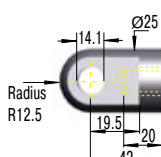
End Fitting

B14



Stud Thread B14

A14-VA

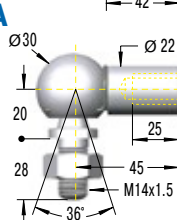


Performance and Dimensions

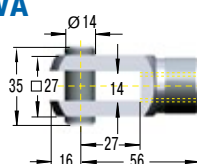
TYPES	Stroke mm	L retracted mm	Traction Force Range max. N
GZ-40-100-VA	100	250	5,000
GZ-40-150-VA	150	325	5,000
GZ-40-200-VA	200	400	5,000
GZ-40-250-VA	250	475	5,000
GZ-40-300-VA	300	550	5,000
GZ-40-400-VA	400	700	5,000
GZ-40-500-VA	500	850	5,000
GZ-40-600-VA	600	1,000	5,000

Eye A14-VA
max. force 7,000 N

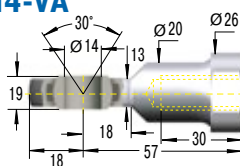
C14-VA


Angle Ball Joint
C14-VA
max. force 3,200 N

D14-VA


Clevis Fork D14-VA
max. force 7,000 N

E14-VA

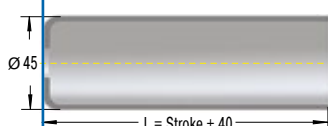

Swivel Eye E14-VA
max. force 7,000 N

Ordering Example

Type (Pull Type) _____
 Body Ø (40 mm) _____
 Stroke (150 mm) _____
 Piston Rod End Fitting E14-VA _____
 Body End Fitting E14-VA _____
 Traction Force F_1 800 N _____
 Material (1.4301/1.4305, AISI 304/303, VA) _____

GZ-40-150-EE-800-VA

Mounting accessories see from page 202.

Rod Shroud
W14-40-VA

Adjuster Knob
DE-GAS-14
See page 171.

GZ-40-VA

Technical Data

Traction force range: 500 N to 5,000 N (extended up to 7,000 N)

Progression: Approx. 40 %

Lifetime: Approx. 2,000 m

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

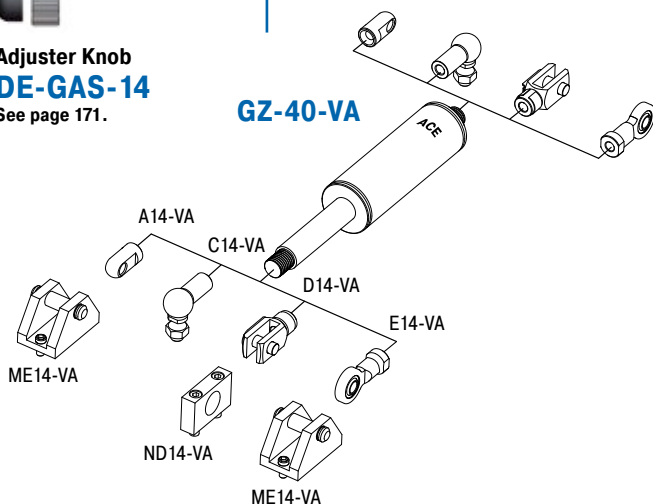
Material: Outer body, Piston rod, End fittings: Stainless steel (1.4301/1.4305, AISI 304/303)

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 must be positively secured by the customer to prevent unscrewing.



Further Stainless Steel Gas Springs (Pull Type), V4A

Performance			
TYPES	Stroke mm	L retracted mm	Dimensions see Page
GZ-19-30-V4A	30	130	164
GZ-19-50-V4A	50	150	164
GZ-19-150-V4A	150	250	164
GZ-19-200-V4A	200	300	164
GZ-19-250-V4A	250	350	164
GZ-28-50-V4A	50	165	165
GZ-28-100-V4A	100	215	165
GZ-28-150-V4A	150	265	165
GZ-28-200-V4A	200	315	165
GZ-28-250-V4A	250	365	165
GZ-28-300-V4A	300	415	165
GZ-28-350-V4A	350	465	165
GZ-28-400-V4A	400	515	165
GZ-28-450-V4A	450	565	165
GZ-28-500-V4A	500	615	165
GZ-28-550-V4A	550	665	165
GZ-28-600-V4A	600	715	165
GZ-40-100-V4A	100	250	166
GZ-40-150-V4A	150	325	166
GZ-40-200-V4A	200	400	166
GZ-40-250-V4A	250	475	166
GZ-40-300-V4A	300	550	166
GZ-40-400-V4A	400	700	166
GZ-40-500-V4A	500	850	166
GZ-40-600-V4A	600	1,000	166

Further Stainless Steel Accessories, V4A

End Fittings		End Fittings	
TYPES	Dimensions see Page	TYPES	Dimensions see Page
A5-V4A	204	A10-V4A	206
C5-V4A	204	C10-V4A	206
D5-V4A	204	D10-V4A	206
E5-V4A	204	E10-V4A	206
G5-V4A	204	A14-V4A	207
A8-V4A	205	C14-V4A	207
C8-V4A	205	D14-V4A	207
D8-V4A	205	E14-V4A	207
E8-V4A	205		
G8-V4A	206		

Free Calculation Offer for Industrial Gas Springs

With all necessary information for installation

To obtain the optimum operation with minimal hand force, the 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.

NEW!
Also try our
Online Calculation Service:
www.ace-ace.com

Example of a Calculation Offer

Input data		Identification data	
Start angle	α_{st} : 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 hand force	RMH: 820 mm		

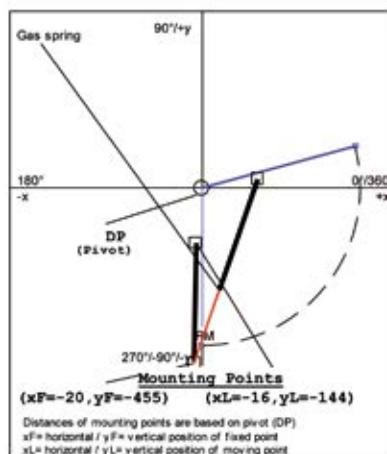
Required user hand forces

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.

Therefore please attach a sketch of your application!

(A few lines with their 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 centre of gravity R_M _____ mm
 Radius of hand force R_H _____ mm
 Starting angle α_M _____ °
 Opening angle α _____ °

* Compulsory information

Desired Mounting Fittings

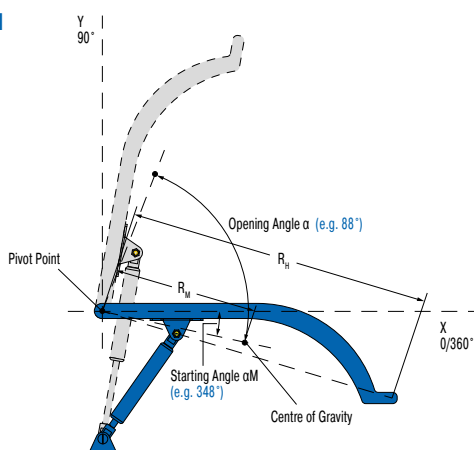
End Fitting

☐ A		☐ A
☐ B	B Stud Thread	☐ B
☐ C		☐ C
☐ D		☐ D
☐ E		☐ E
☐ F		☐ F
☐ G		☐ G

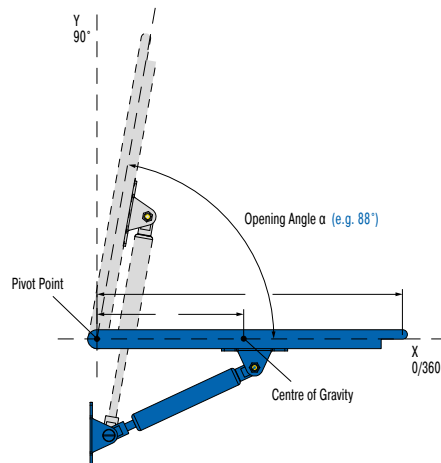
The end fittings are interchangeable

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

Address

ZIP / City

Internet

Dept.

Name

Telephone

E-Mail

Please copy, complete and fax with attached sketch to: +49 (0)2173 - 9226-89

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. Do not attempt to open or modify them!

Gas springs are maintenance-free!

ACE gas springs will operate in surrounding 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 values, 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" (German standard). 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 and 40,000 N. These maintenance-free, ready-to-install products are available in body diameters of 12 to 70 mm and in stroke lengths up to 800 mm.



Hydraulic Dampers



DVC-32

Page 174

Adjustable, Without Free Travel

Individual speed adjustment in both directions

Cylinder speed controls, Absorption control, Finishing and processing centres



HBD-50 to HBD-85

Page 176

Adjustable, Without Free Travel

Regulation at the highest level

Sports equipment, Rehabilitation technology, Conveyor technology



HBS-28 to HBS-70

Page 180

Adjustable, Without Free Travel

Direction change backlash free linear motion regulation

Oscillation insulation, Chairlift impact control, Fairground rides, Cylinder speed controls



HB-12 to HB-70

Page 184

Adjustable

Linear motion control

Conveyor systems, Transport systems, Furniture industry, Locking systems

Door Dampers



TD, TDE

Page 191

Adjustable

The safe way to close doors

Lift doors, Automatic doors, Doors



Constant speed rates

Sensitive adjustment

High quality and long lifetime

Easy to mount

DVC-32

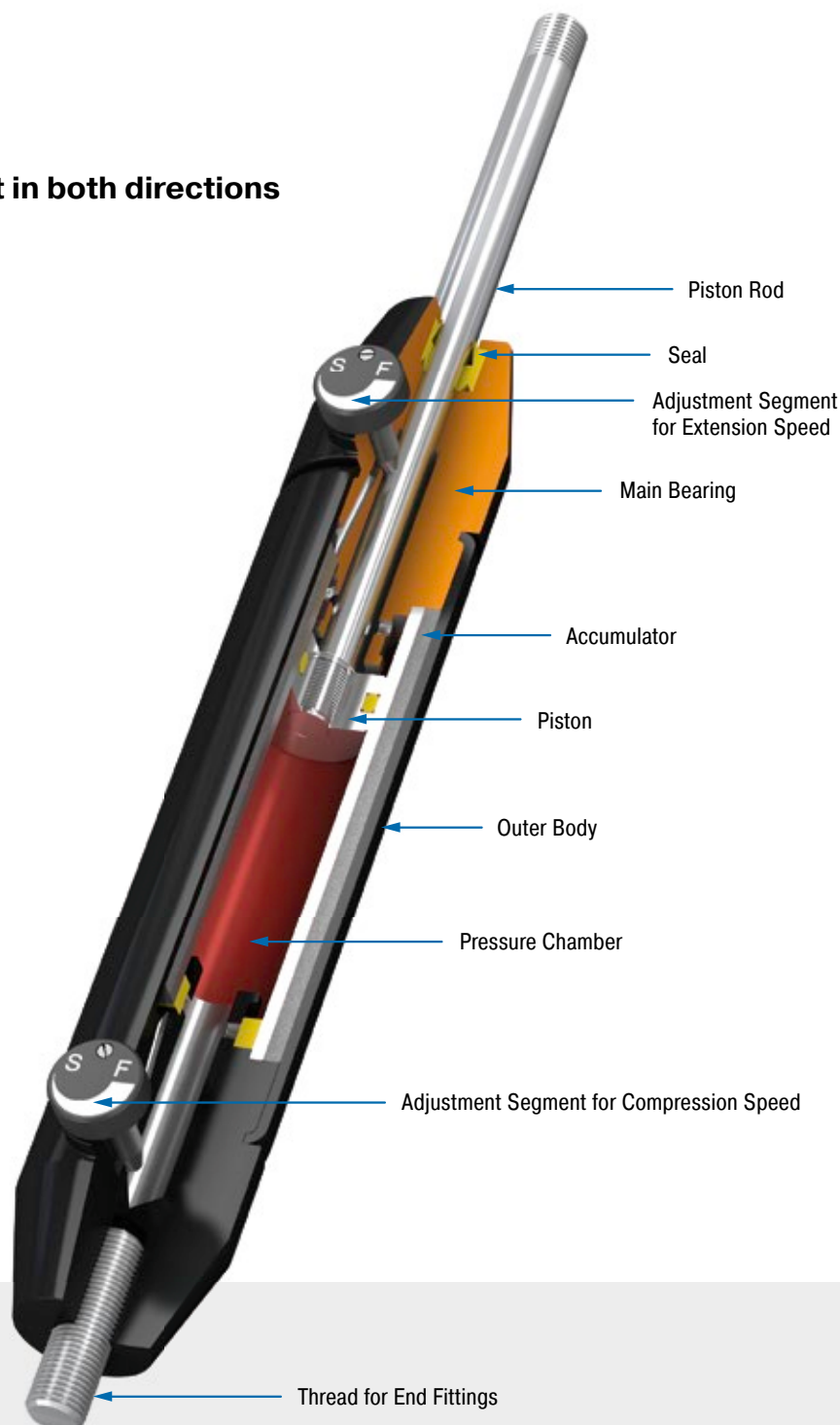
Hydraulic Dampers

Individual speed adjustment in both directions

Can be regulated separately in any stroke position: The hydraulic dampers in the DVC-32 model are the first model to have the ability to have the in and out speeds adjusted independently from the outside and therefore more precisely. With their individual adjustment segments for the push and pull direction as well as the double-sided action, these are suitable as safety or control elements.

The great number of mounting accessories makes assembly of these hydraulic dampers by ACE 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 machine elements are used, for one, in the automotive sector and industrial applications as well as in mechanical engineering and 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: Black anodized aluminium; 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 must be positively secured by the customer to prevent unscrewing.

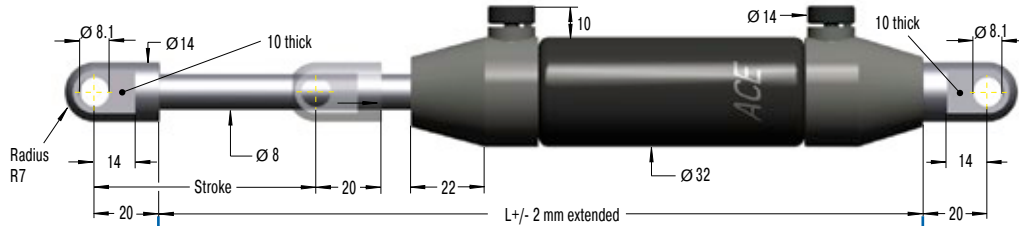
On request: Special oils and other special options. Alternative accessories available on request.

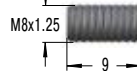
Adjustable, Without Free Travel, Compression and extension force 42 N to 2,000 N

End Fitting

Standard Dimensions

End Fitting

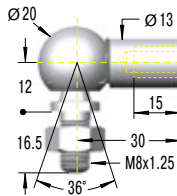
A8

Eye A8
max. force 3,000 N

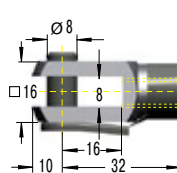
B8


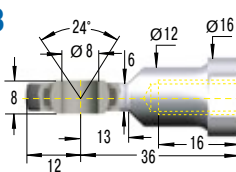
Performance and Dimensions

TYPES	Stroke mm	L extended mm	¹ Compression Force max. N
DVC-32-50EU	50	240	2,000
DVC-32-100EU	100	340	1,670
DVC-32-150EU	150	440	1,335

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

Type (Hydraulic Damper) _____
 Body Ø (32 mm) _____
 Stroke (50 mm) _____
 EU Compliant _____
 Piston Rod End Fitting D8 _____
 Body End Fitting D8 _____
 Damping Direction (P = both directions) _____

DVC-32-50EU-DD-P

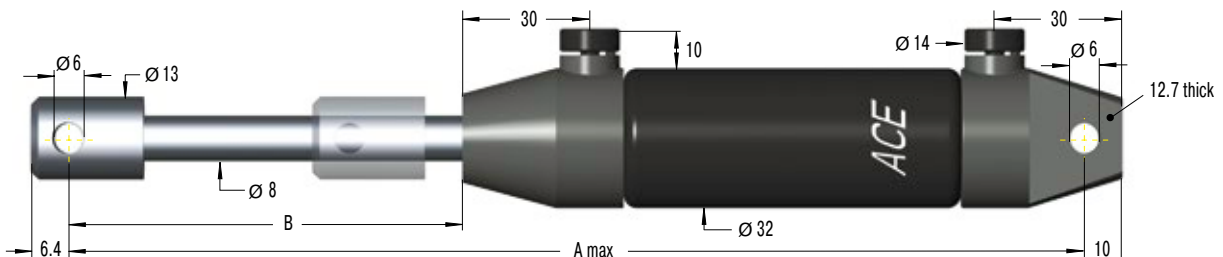
Model Type Prefix

P: Damping in both directions (standard model)
 M: Damping on out stroke only (adjustment knob at "rear end" free flow)
 N: Damping on in stroke only (adjustment knob at "piston rod end" free flow)

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

Mounting accessories see from page 194.

DVC-32EU-xx



Performance and Dimensions

TYPES	Stroke mm	A max. mm	B mm	Compression Force max. N	Traction Force Range max. N
DVC-32-50EU-XX	50	250	75.2	2,000	2,000
DVC-32-100EU-XX	100	350	124.4	1,670	2,000
DVC-32-150EU-XX	150	450	173.6	1,335	2,000

HBD-50 to HBD-85

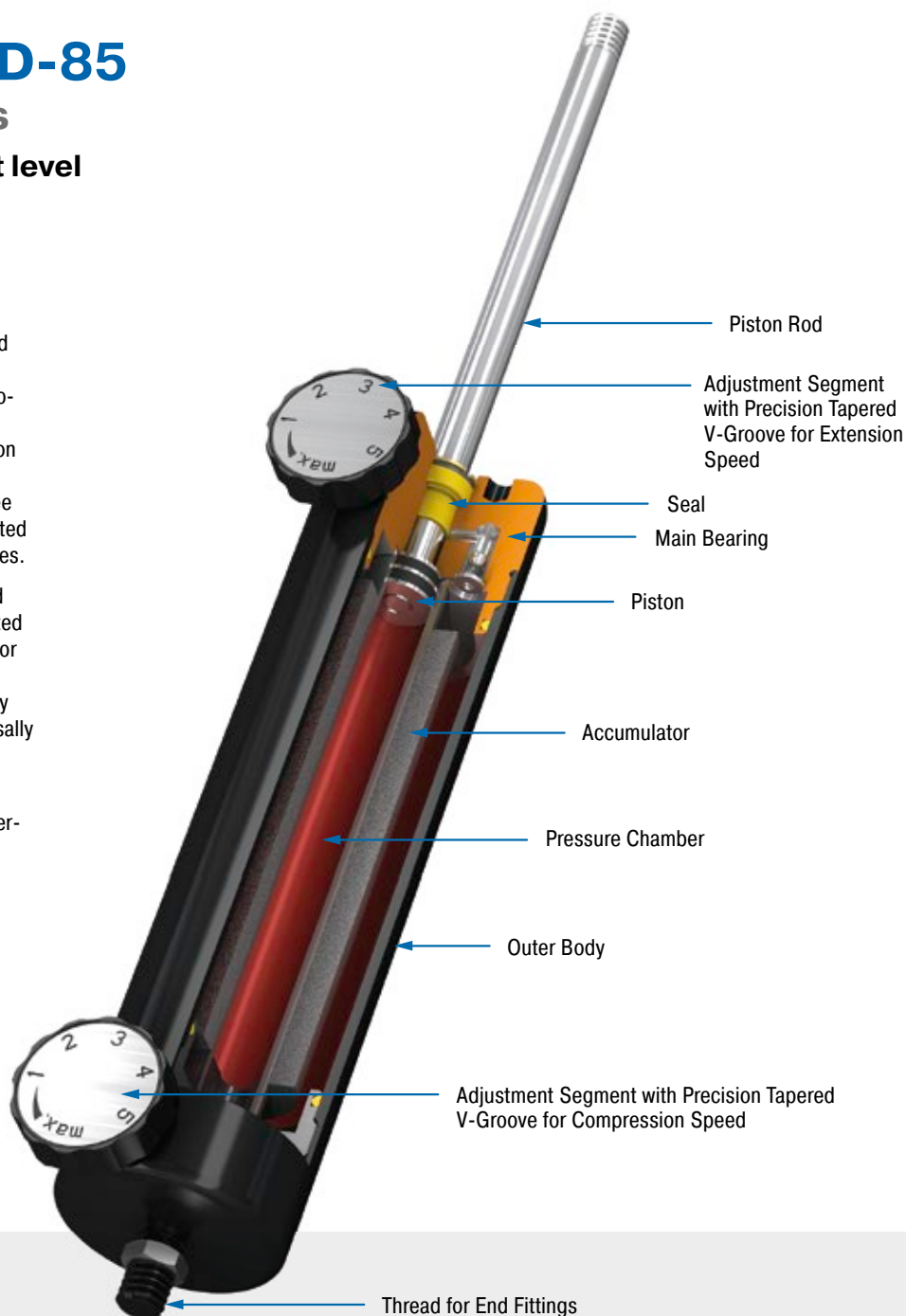
Hydraulic Dampers

Regulation at the highest level

Motion control in both directions: The HBD model of hydraulic dampers can be adjusted independently in both the push and pull direction. These maintenance-free, ready-to-install and closed systems leave no prayers unanswered as far as the setting of retraction and extension speeds are concerned. In addition each damper works without any free travel therefore the flow of oil can be regulated exactly via the two precision metering orifices.

Adjustment can be made once installed and even when moving through stroke. The coated body and hard-chromed piston rods stand for quality and long service life. The variety of mounting accessories makes assembly easy and the high-end hydraulic dampers universally usable.

HBD hydraulic dampers are used in the automotive, in industry, mechanical engineering and medical technology.



Technical Data

Compression and extension force:

150 N to 50,000 N

Outer body diameter: Ø 50 mm to Ø 85 mm

Piston rod diameter: Ø 10 mm to Ø 20 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 3 mm before the end of stroke provided by the customer.

Damping medium: Hydraulic oil

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

Mounting: In any position

Application field: Sports equipment, Rehabilitation technology, Conveyor technology

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

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

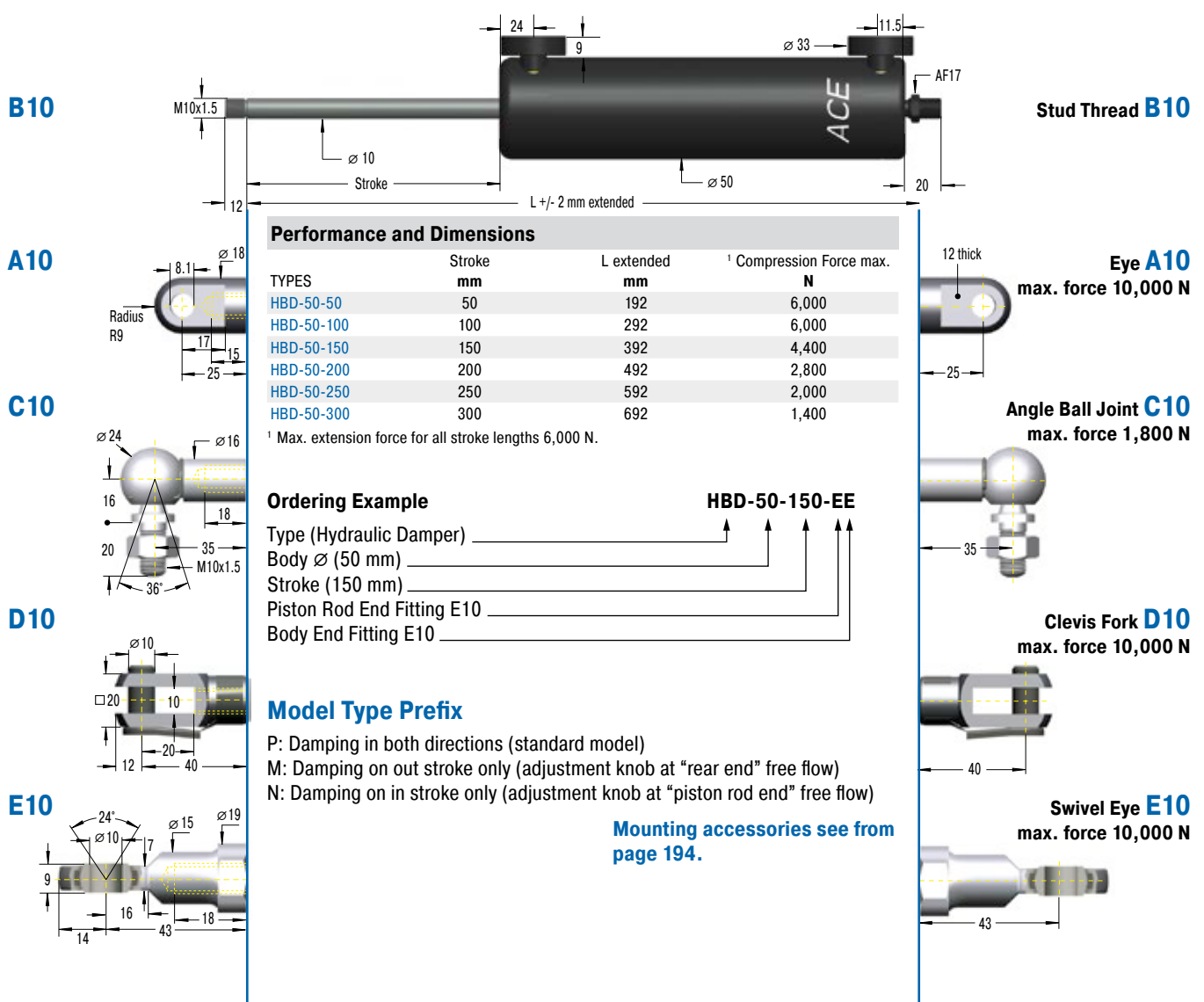
On request: Special oils and other special options. Alternative accessories available on request.

Adjustable, Without Free Travel, Compression and extension force 100 N to 6,000 N

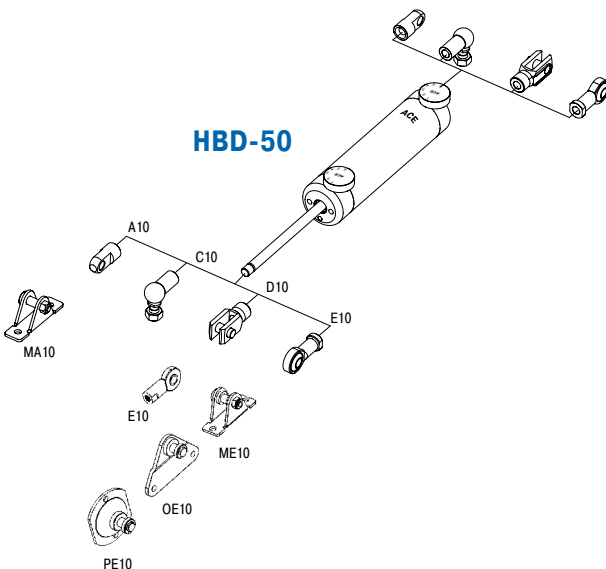
End Fitting

Standard Dimensions

End Fitting



HBD-50



Technical Data

Compression and extension force: 100 N to 6,000 N

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.

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. One locknut included.

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

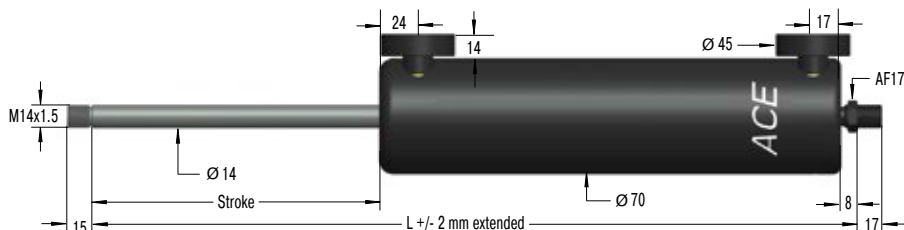
Adjustable, Without Free Travel, Compression and extension force 150 N to 10,000 N

End Fitting

Standard Dimensions

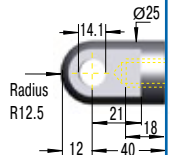
End Fitting

B14



Stud Thread B14

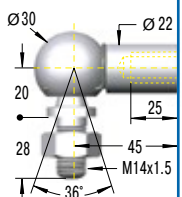
A14



Eye A14

max. force 10,000 N

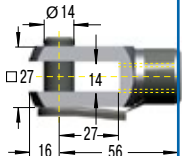
C14



Angle Ball Joint C14

max. force 3,200 N

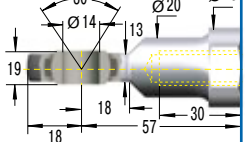
D14



Clevis Fork D14

max. force 10,000 N

E14



Swivel Eye E14

max. force 10,000 N

Performance and Dimensions

TYPES	Stroke mm	L extended mm	¹ Compression Force max. N
HBD-70-100	100	314	10,000
HBD-70-150	150	414	10,000
HBD-70-200	200	514	10,000
HBD-70-300	300	714	10,000
HBD-70-400	400	914	8,000
HBD-70-500	500	1,114	6,000

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

Ordering Example

Type (Hydraulic Damper) _____
 Body Ø (70 mm) _____
 Stroke (300 mm) _____
 Piston Rod End Fitting E14 _____
 Body End Fitting E14 _____

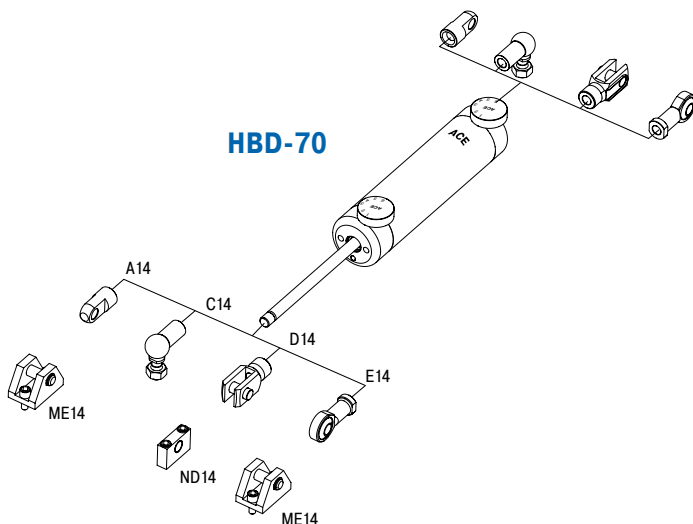
HBD-70-300-EE

Model Type Prefix

P: Damping in both directions (standard model)
 M: Damping on out stroke only (adjustment knob at "rear end" free flow)
 N: Damping on in stroke only (adjustment knob at "piston rod end" free flow)

Mounting accessories see from
page 194.

HBD-70



Technical Data

Compression and extension force: 150 N to 10,000 N

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.

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. One locknut included.

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

Adjustable, Without Free Travel, Compression and extension force 150 N to 50,000 N

End Fitting

Standard Dimensions

End Fitting

B24

D24

E24

Performance and Dimensions

TYPES	Stroke mm	L extended mm	¹ Compression Force max. N
HBD-85-100	100	313	50,000
HBD-85-150	150	413	30,000
HBD-85-200	200	513	20,000
HBD-85-300	300	713	10,000
HBD-85-400	400	913	6,500
HBD-85-500	500	1,113	4,000
HBD-85-600	600	1,313	3,000
HBD-85-700	700	1,513	2,000

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

Ordering Example

Type (Hydraulic Damper) **HBD-85-300-EE**

Body Ø (85 mm)

Stroke (300 mm)

Piston Rod End Fitting E24

Body End Fitting E24

Model Type Prefix

P: Damping in both directions (standard model)
M: Damping on out stroke only (adjustment knob at "rear end" free flow)
N: Damping on in stroke only (adjustment knob at "piston rod end" free flow)

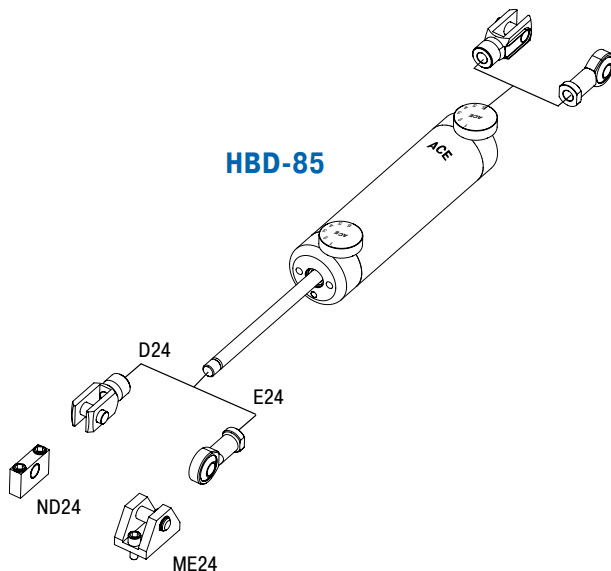
Mounting accessories see from page 194.

Stud Thread B24

Clevis Fork D24
max. force 50,000 N

Swivel Eye E24
max. force 50,000 N

HBD-85



Technical Data

Compression and extension force: 150 N to 50,000 N

Operating temperature range: 0 °C to 65 °C

Adjustment: Steplessly adjustable

Positive stop: External positive stops 2 mm to 3 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. Thread adaptor for piston rod from M16 to M24 included.

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

HBS-28 to HBS-70

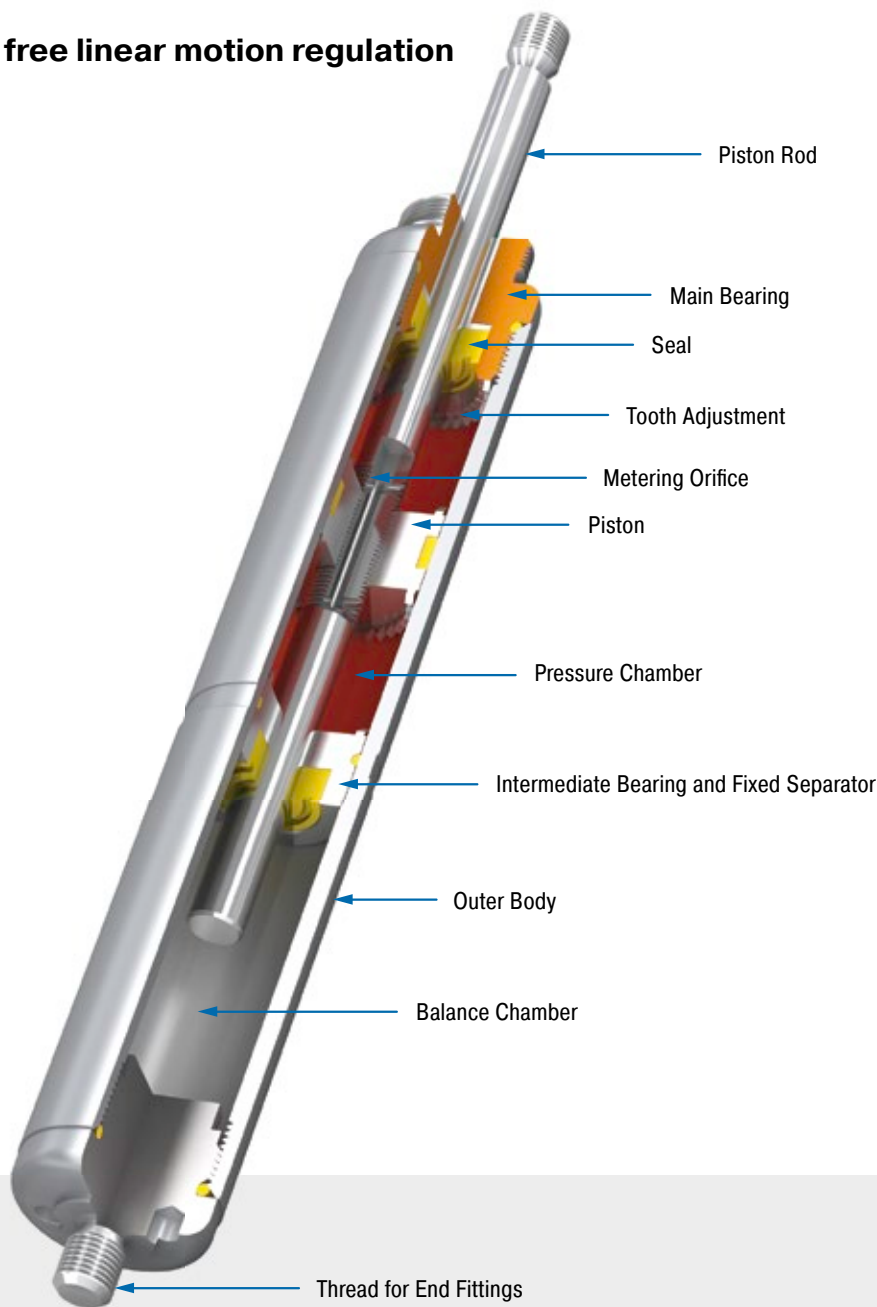
Hydraulic Dampers

Direction change backlash free linear motion regulation

Damping either in one or both directions: The HBS models of hydraulic dampers are made in a slim gas spring design and are compact and high in performance. Maintenance-free and ready-to-install they allow precise setting of retraction and extension speeds without any free travel when changing direction.

These hydraulic dampers offer constant feeding rates and can be finely tuned via the screw adjustment. A control segment on the piston makes the adjustment at the end position child's play. Thanks to many add-on components the assembly is easy to mount, so that the damper can be universally deployed for damping back and forth swinging masses, such as in power or free conveyors.

In addition to the automotive sector, the application areas are industrial applications, classic mechanical engineering, the electronics and furniture industry and medical technology.



Technical Data

Compression and extension force:

30 N to 40,000 N

Outer body diameter: Ø 28 mm to Ø 70 mm

Piston rod diameter: Ø 8 mm to Ø 30 mm

Lifetime: Approx. 10,000 m

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

Adjustment: Achieved by turning the piston rod in its fully extended or 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: Zinc plated or coated steel; Piston rod: Hard chrome plated steel; End fittings: Zinc plated steel

Mounting: In any position

Application field: Oscillation insulation, Chairlift impact control, Fairground rides, Cylinder speed controls

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

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

Safety instructions: For long strokes with high forces use swivel mounting block MBS.

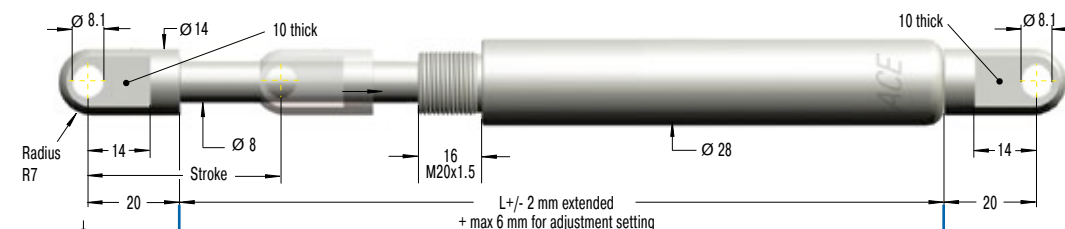
On request: Special oils and other special options. Alternative accessories available on request.

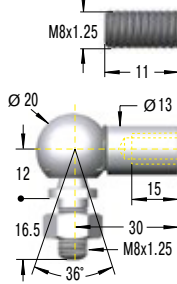
Adjustable, Without Free Travel, Compression and extension force 30 N to 3,000 N

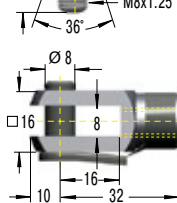
End Fitting

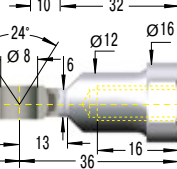
Standard Dimensions

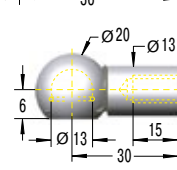
End Fitting

A8

Eye A8
max. force 3,000 N

B8
C8

Stud Thread B8
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

G8

Ball Socket G8
max. force 1,200 N

Rod Shroud
no retrofit
Ø 32, L = Stroke + 50

Performance and Dimensions

TYPES	Stroke mm	L extended mm	¹ Compression Force max. N	¹ Compression Force with MBS max. N
HBS-28-50	50	295	3,000	3,000
HBS-28-100	100	445	1,550	3,000
HBS-28-150	150	595	900	3,000
HBS-28-200	200	745	600	3,000
HBS-28-250	250	895	440	3,000
HBS-28-300	300	1,045	330	3,000
HBS-28-350	350	1,195	260	2,500
HBS-28-400	400	1,345	200	2,000

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

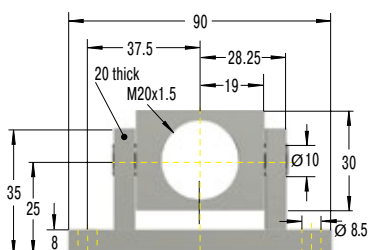
Ordering Example

Type (Hydraulic Damper) **HBS-28-150-DD-M**
 Body Ø (28 mm)
 Stroke (150 mm)
 Piston Rod End Fitting D8
 Body End Fitting D8
 Damping Direction (M = out stroke only)

Model Type Prefix

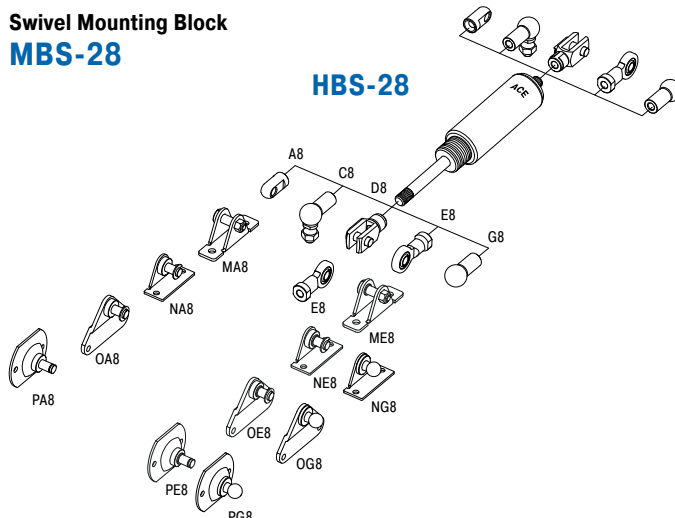
P: Damping in both directions
 N: Damping on in stroke only
 M: Damping on out stroke only
 X: Special model suffix

Mounting accessories see from
page 194.



Swivel Mounting Block MBS-28

HBS-28


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

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 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: Zinc plated or 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 must be positively secured by the customer to prevent unscrewing.

Safety instructions: For long strokes with high forces use swivel mounting block MBS.

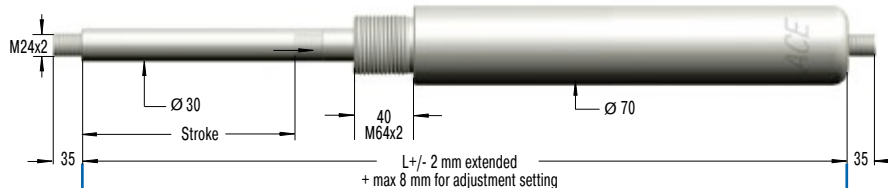
Adjustable, Without Free Travel, Compression and extension force 2,000 N to 40,000 N

End Fitting

Standard Dimensions

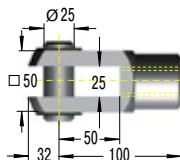
End Fitting

B24

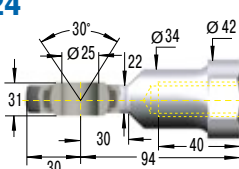


Stud Thread B24

D24


Clevis Fork D24
max. force 50,000 N

E24


Swivel Eye E24
max. force 50,000 N

Performance and Dimensions

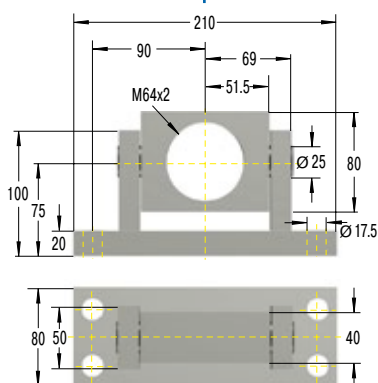
TYPES	Stroke mm	L extended mm	¹ Compression Force max. N	¹ Compression Force with MBS max. N
HBS-70-100	100	561	40,000	40,000
HBS-70-200	200	861	40,000	40,000
HBS-70-300	300	1,161	40,000	40,000
HBS-70-400	400	1,461	30,300	40,000
HBS-70-500	500	1,761	21,600	40,000
HBS-70-600	600	2,061	16,200	40,000
HBS-70-700	700	2,361	12,600	40,000
HBS-70-800	800	2,661	10,100	40,000

¹ Max. extension force for all stroke lengths 40,000 N.

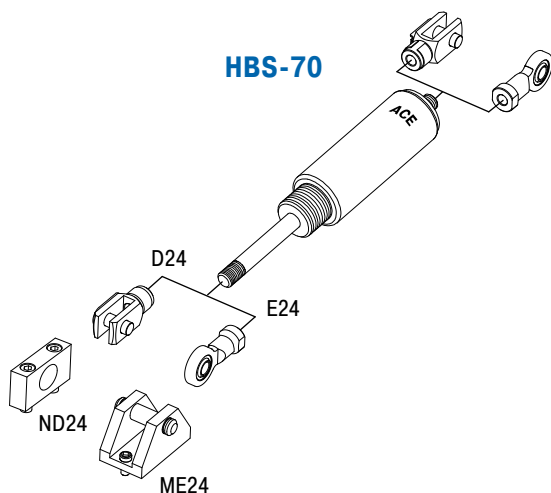
Ordering Example

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

HBS-70-300-EE-N



Swivel Mounting Block MBS-70



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 194.

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

Technical Data

Compression and extension force: 2,000 N to 40,000 N

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 8 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: Zinc plated or 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 must be positively secured by the customer to prevent unscrewing.

Safety instructions: For long strokes with high forces use swivel mounting block MBS.

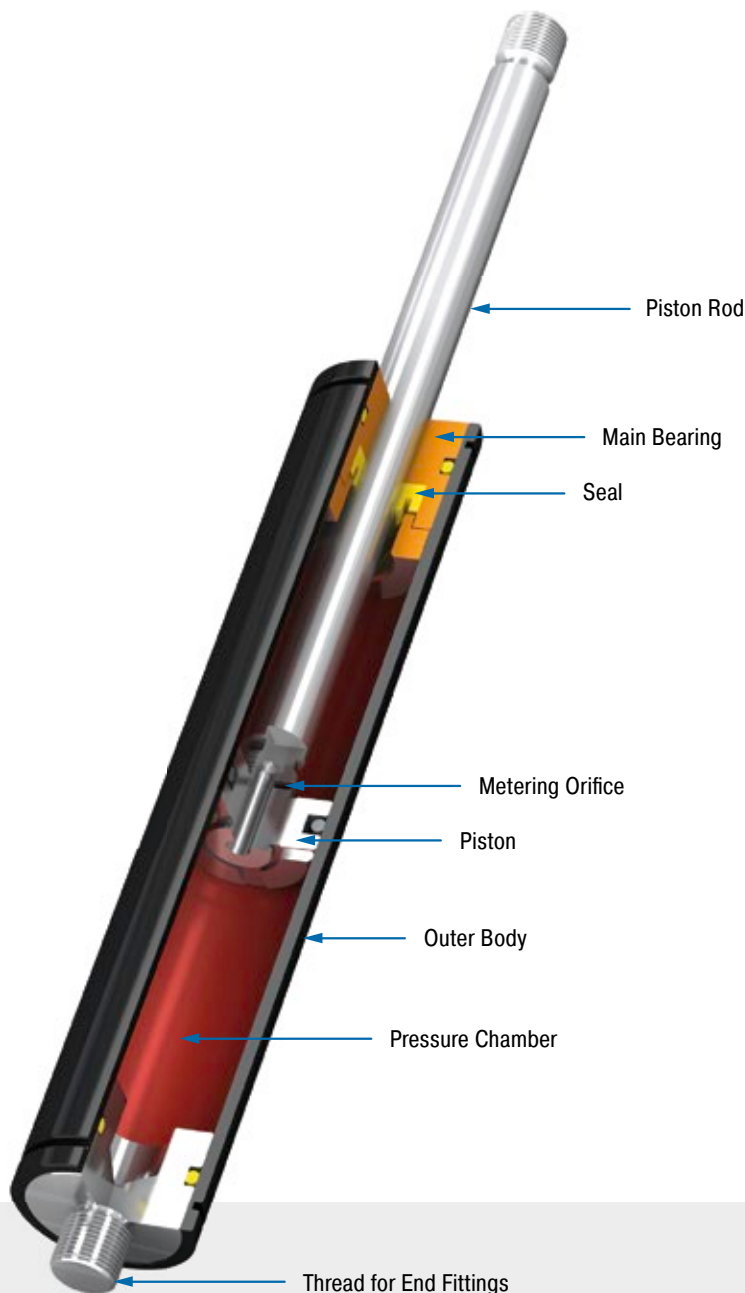
HB-12 to HB-70 Hydraulic Dampers

Linear motion control

High quality and long service life: The HB model of hydraulic damper can also be used as single or double acting brake. Its coated body in a slim gas spring design and the piston rods with wear-resistant surface coating 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, and the control segment on the piston makes adjustment at the end position child's play. Thanks to many add-on components the assembly is easy to mount, so that the damper can be universally deployed for damping back and forth swinging masses, such as in power or free conveyors.

On automotive or industrial applications, mechanical engineering, 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

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

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

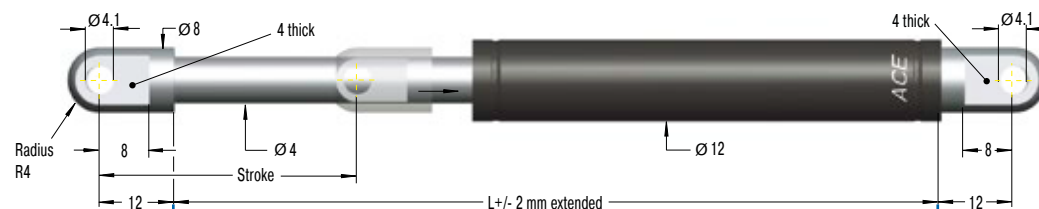
On request: Special oils and other special options. Alternative accessories available on request.

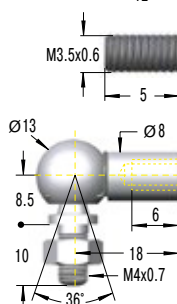
Adjustable, Compression and extension force 20 N to 180 N

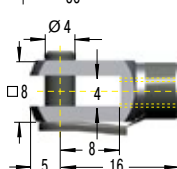
End Fitting

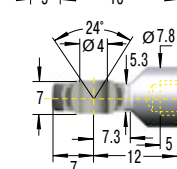
Standard Dimensions

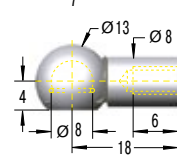
End Fitting

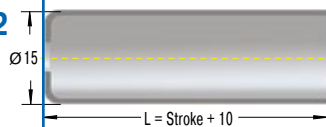
A3,5

Eye A3,5
max. force 370 N

B3,5
C3,5

Stud Thread B3,5
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 W3,5-12


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.

Ordering Example

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

HB-12-30-AC-M

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 194.

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: -

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.

The adjustment can add a max. of 6 mm to the L dimension.

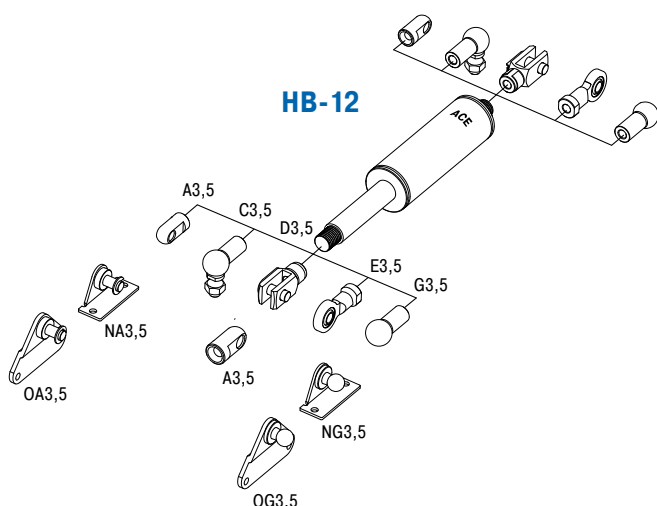
Positive stop: External positive stops 1 mm to 1.5 mm before the end of stroke provided by the customer.

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 must be positively secured by the customer to prevent unscrewing.

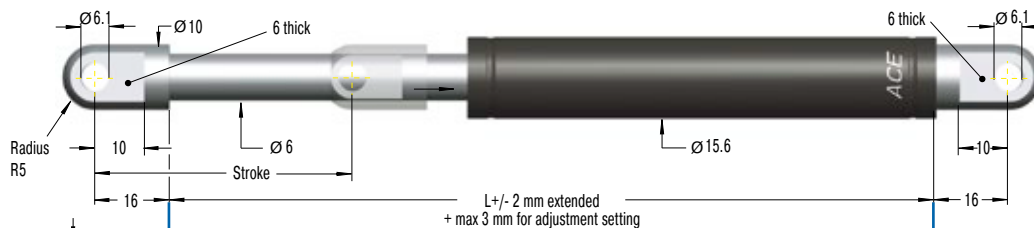
HB-12


End Fitting

Standard Dimensions

End Fitting

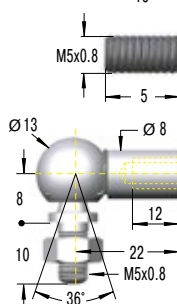
A5


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

G5

Ball Socket G5
max. force 500 N

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-CC-M

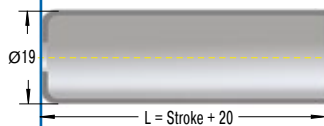
Type (Hydraulic Damper) _____
 Body Ø (15.6 mm) _____
 Stroke (150 mm) _____
 Piston Rod End Fitting C5 _____
 Body End Fitting C5 _____
 Damping Direction (M = out stroke only) _____

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 194.

Rod Shroud W5-15



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: Extension force 40 N; dimension L = 2.45 x stroke + 49 mm. Part number: add suffix -T.

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.

The adjustment can add a max. of 6 mm to the L dimension.

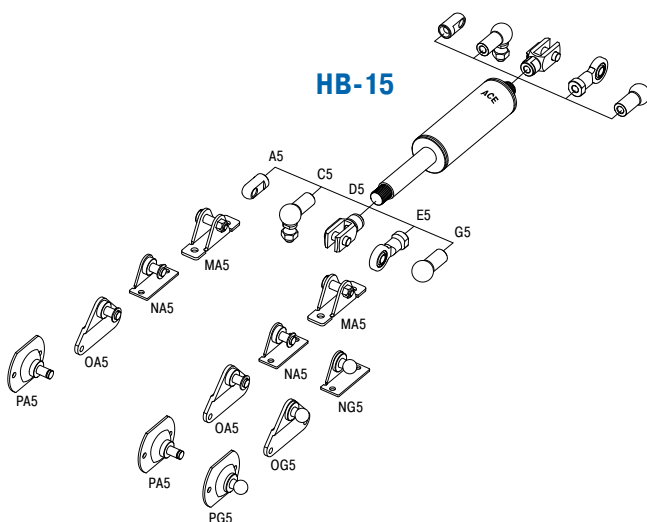
Positive stop: External positive stops 1 mm to 1.5 mm before the end of stroke provided by the customer.

Material: Outer body: Coated steel; Piston rod: 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 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

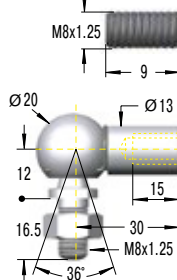
End Fitting

A8


Eye **A8**
max. force 3,000 N

B8

C8

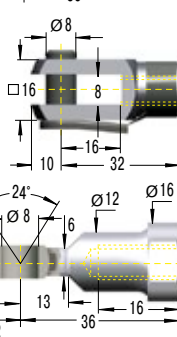

Stud Thread **B8**

Angle Ball Joint **C8**
max. force 1,200 N

D8

E8

G8


Clevis Fork **D8**
max. force 3,000 N

Swivel Eye **E8**
max. force 3,000 N

Ball Socket **G8**
max. force 1,200 N

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

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

Ordering Example

HB-22-150-DD-M

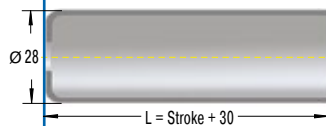
Type (Hydraulic Damper) _____
 Body Ø (23 mm) _____
 Stroke (150 mm) _____
 Piston Rod End Fitting D8 _____
 Body End Fitting D8 _____
 Damping Direction (M = out stroke only) _____

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 194.

Rod Shroud W8-22



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: Extension force 50 N; dimension L = 2.38 x stroke + 55 mm. Part number: add suffix -T.

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

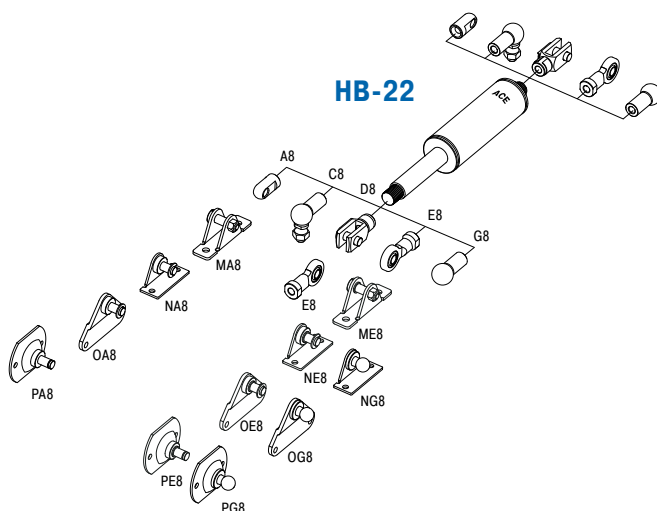
The adjustment can add a max. of 6 mm to the L dimension.

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: 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 must be positively secured by the customer to prevent unscrewing.


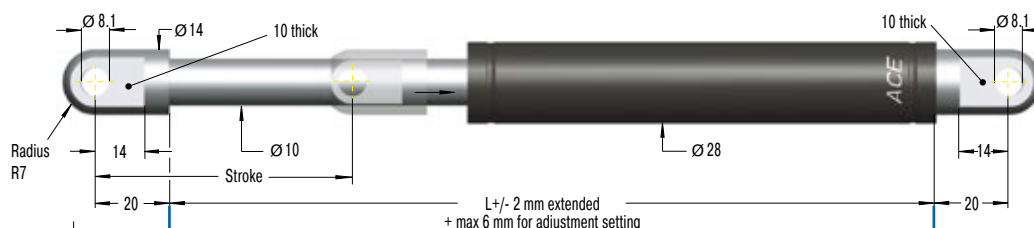
Adjustable, Compression and extension force 30 N to 3,000 N

End Fitting

Standard Dimensions

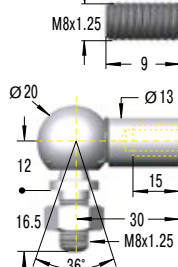
End Fitting

A8

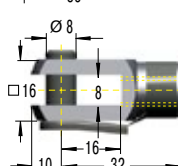

Eye A8
max. force 3,000 N

B8

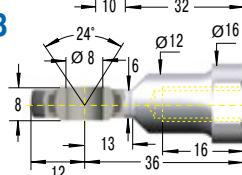
C8


Stud Thread B8
Angle Ball Joint C8
max. force 1,200 N

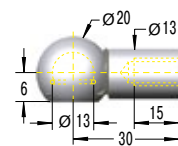
D8


Clevis Fork D8
max. force 3,000 N

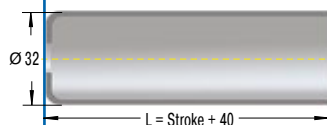
E8


Swivel Eye E8
max. force 3,000 N

G8


Ball Socket G8
max. force 1,200 N

Rod Shroud W8-28



Performance and Dimensions

TYPES	Stroke mm	L extended mm	¹ Compression Force max. N
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

Type (Hydraulic Damper) _____
 Body Ø (28 mm) _____
 Stroke (150 mm) _____
 Piston Rod End Fitting D8 _____
 Body End Fitting D8 _____
 Damping Direction (M = out stroke only) _____

HB-28-150-DD-M

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 194.

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: Extension force 80 N; dimension L = 2.35 x stroke + 60 mm. Part number: add suffix -T.

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

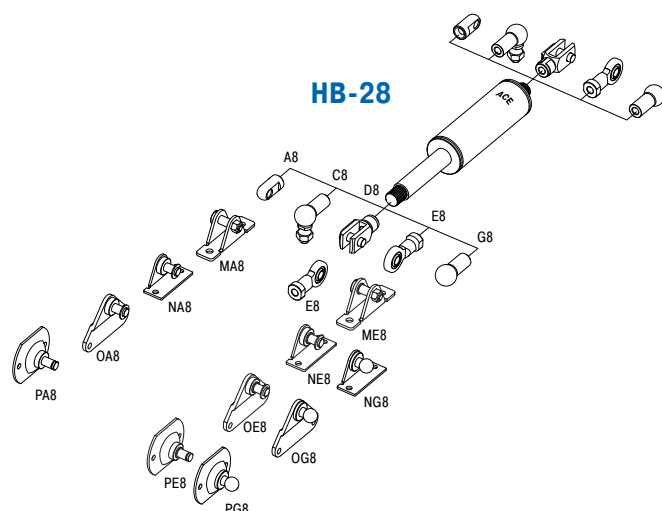
The adjustment can add a max. of 6 mm to the L dimension.

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: 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.

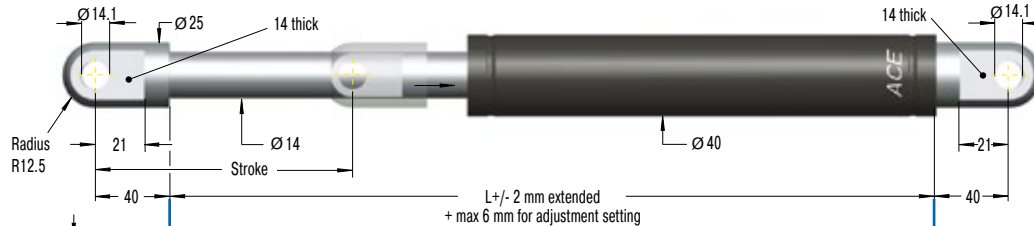
End fittings: They are interchangeable and must be positively secured by the customer to prevent unscrewing.


End Fitting

Standard Dimensions

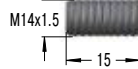
End Fitting

A14



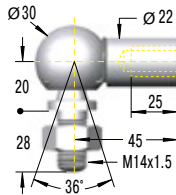
Eye A14
max. force 10,000 N

B14



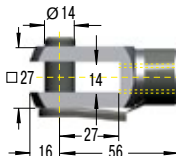
Stud Thread B14

C14



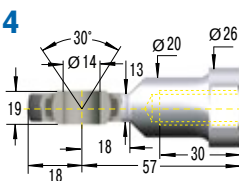
Angle Ball Joint C14
max. force 3,200 N

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 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

Type (Hydraulic Damper) _____
Body Ø (40 mm) _____
Stroke (300 mm) _____
Piston Rod End Fitting E14 _____
Body End Fitting E14 _____
Damping Direction (N = in stroke only) _____

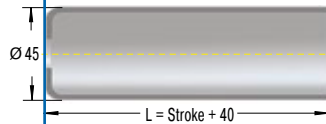
HB-40-300-EE-N

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 194.

Rod Shroud W14-40



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: Extension force 150 N; dimension L = 2.32 x stroke + 82 mm. Part number: add suffix -T.

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

The adjustment can add a max. of 6 mm to the L dimension.

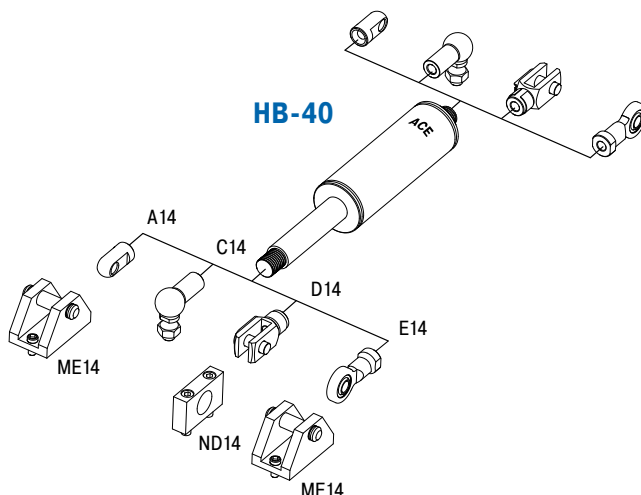
Positive stop: External positive stops 1 mm to 1.5 mm before the end of stroke provided by the customer.

Material: Outer body: Coated steel; Piston rod: 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 must be positively secured by the customer to prevent unscrewing.



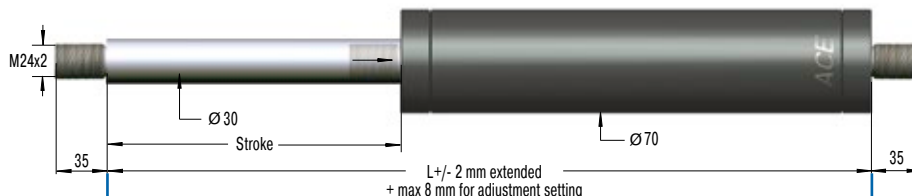
Adjustable, Compression and extension force 2,000 N to 50,000 N

End Fitting

Standard Dimensions

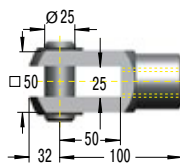
End Fitting

B24

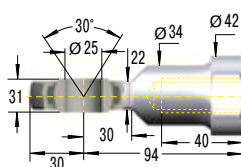


Stud Thread B24

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	100	320	50,000
HB-70-200	200	520	50,000
HB-70-300	300	720	50,000
HB-70-400	400	920	30,300
HB-70-500	500	1,120	21,600
HB-70-600	600	1,320	16,200
HB-70-700	700	1,520	12,600
HB-70-800	800	1,720	10,100

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

Ordering Example

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

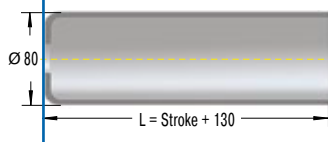
HB-70-300-EE-N

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 194.

Rod Shroud W24-70



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: Extension force min. 250 N; dimension L + 150 mm. Part number: add suffix -T.

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

The adjustment can add a max. of 8 mm to the L dimension.

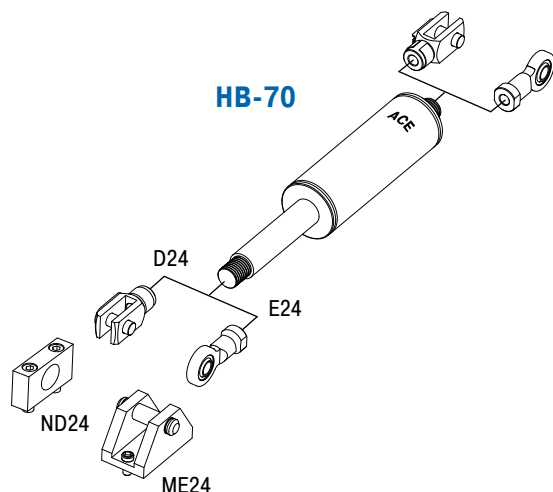
Positive stop: External positive stops 5 mm to 6 mm before the end of stroke provided by the customer.

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

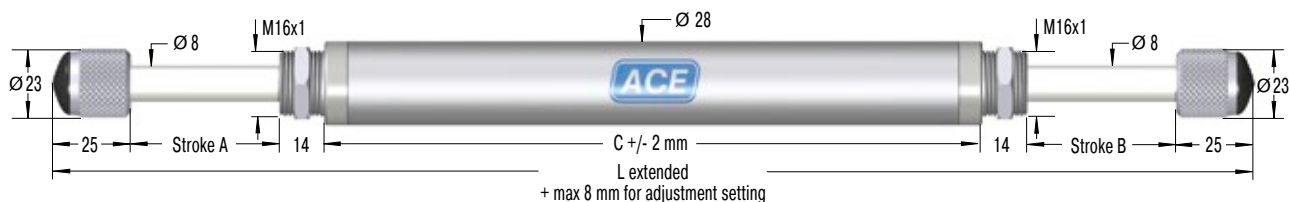
Mounting: In any position

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

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



TD-28



Model Type Prefix

F: Automatic return with return spring

D: Without return spring. When one piston is pushed in, the piston rod at the other end is pushed out (thus the damper must be impacted from alternate ends to sequence correctly).

Ordering Example

Type (Door Damper) _____
 Body Ø (28 mm) _____
 Stroke A (50 mm) _____
 Stroke B (50 mm) _____

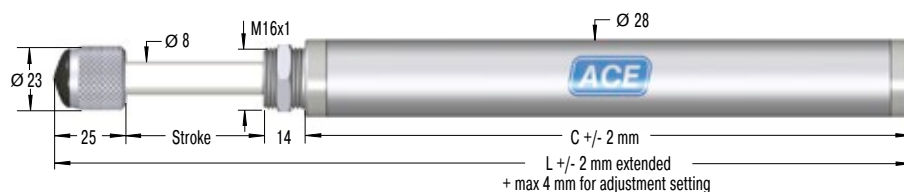
TD-28-50-50

Performance and Dimensions

TYPES	Energy Capacity Nm/cycle	Reacting Force N	Impact Mass max. kg	Stroke A mm	Stroke B mm	C mm	L extended mm	Return Force max. N	¹ Return Type
TD-28-50-50-F	75	1,550	150	50	50	220	402	30	F
TD-28-70-70-F	70	1,500	200	70	70	260	482	30	F
TD-28-100-100-F	80	1,500	250	100	100	220	502	40	F
TD-28-120-120-D	165	3,800	250	120	120	208	410	-	D

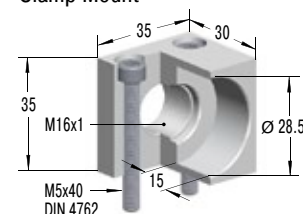
¹ Standard model. Other models available on request.

TDE-28



MB-16

Clamp Mount



Ordering Example

Type (Door Damper) _____
 Body Ø (28 mm) _____
 Stroke (50 mm) _____

TDE-28-50

Performance and Dimensions

TYPES	Energy Capacity Nm/cycle	Reacting Force N	Impact Mass max. kg	Stroke mm	C mm	L extended mm	Return Force max. N
TDE-28-50	80	2,400	4,000	50	130	221	30
TDE-28-70	112	2,400	5,600	70	158	269	30
TDE-28-100	160	2,400	8,000	100	193	333	30
TDE-28-120	190	2,400	7,000	120	214	373	40

Technical Data

Outer body diameter: Ø 28 mm

Piston rod diameter: Ø 8 mm

Free travel: TDE: Marginal

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

Adjustment: Pull the piston rod fully out and turn the knurled rod end button. The internal toothed adjustment allows the damping to be

separately adjusted for each side. As a result of the adjustment mechanism the overall length L can be increased by up to 4 mm.

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

Impact velocity range: 0.1 m/s to 2 m/s

Strokes per minute: Max. 10

Application field: Lift doors, Automatic doors, Doors

Note: ACE door dampers are single ended or double ended adjustable hydraulic shock absorbers.

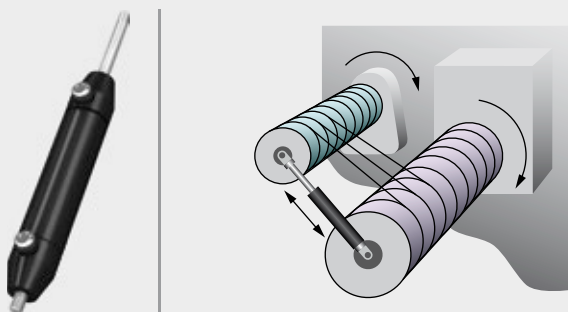
On request: Special oils, other special options and special accessories are available on request.

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-32-100EU. 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.

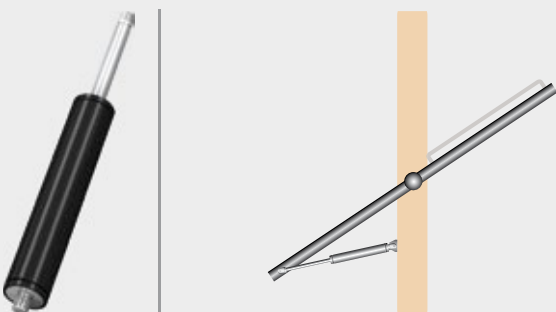


Textile machine unreels threads even better

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

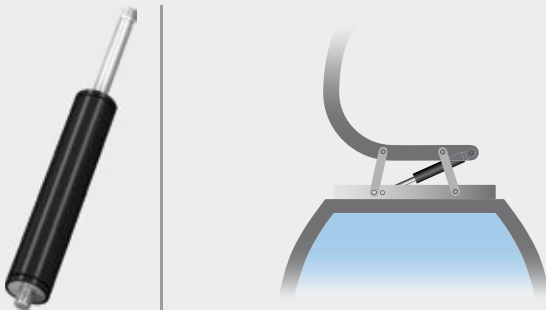
HB-40

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 gas springs and hydraulic dampers
made of steel

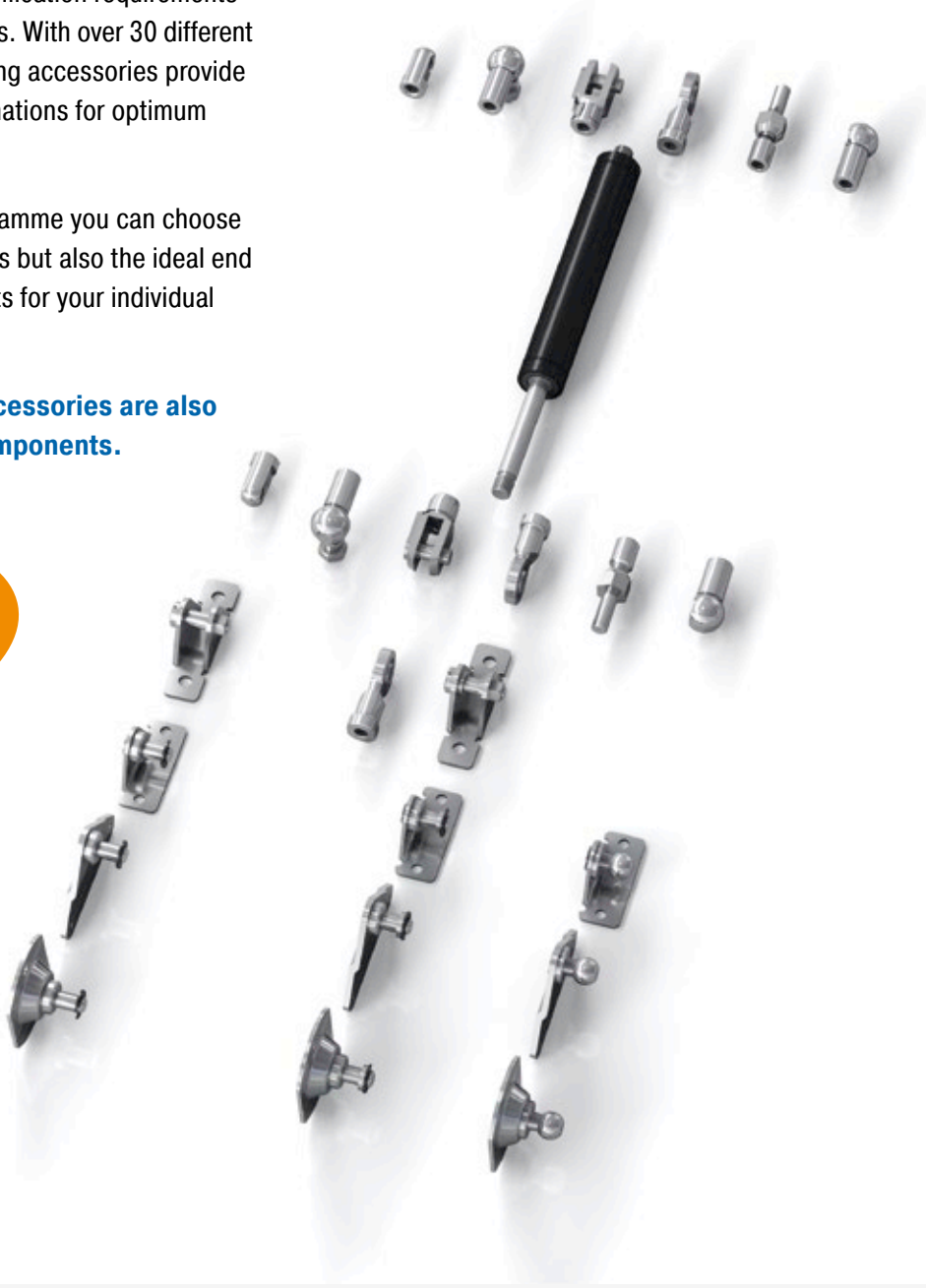
By taking advantage of the very extensive range of ACE end fittings and mounting brackets you can easily and simply install our gas springs and hydraulic dampers. You profit from the variety of DIN Standard end fittings such as swivel eyes, clevis forks, angle ball joints, inline ball joints, and complementary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

**Individual
Combinations!**

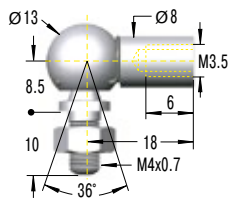


M3.5x0.6

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

C3,5

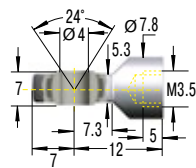
Angle Ball Joint
DIN 71802



¹ max. force 370 N

E3,5

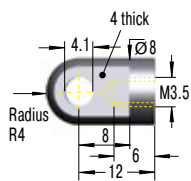
Swivel Eye
DIN 648



¹ max. force 370 N

A3,5

Eye

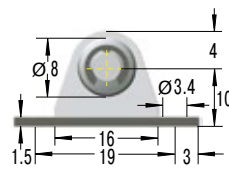


¹ max. force 370 N

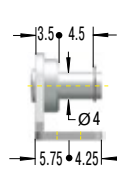


NA3,5

Angle Bracket with Ball

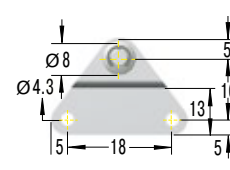


¹ max. force 180 N

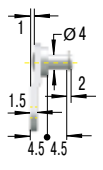


OA3,5

Side Bracket with Ball

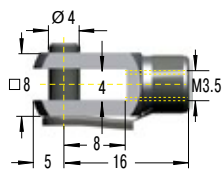


¹ max. force 180 N



D3,5

Clevis Fork
DIN 71752

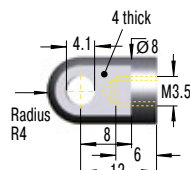


¹ max. force 370 N



A3,5

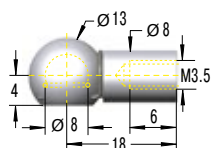
Eye



¹ max. force 370 N

G3,5

Ball Socket
DIN 71805

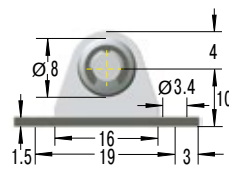


¹ max. force 370 N

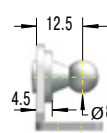


NG3,5

Angle Bracket with Ball

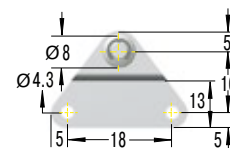


¹ max. force 180 N

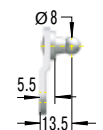


OG3,5

Side Bracket with Ball



¹ max. force 180 N



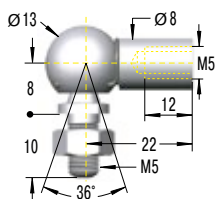
¹ Attention! Max. static load in Newtons. Beware force increase during compression (progression) and observe max. force limit.

Overview

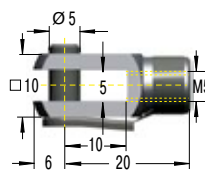
M5x0.8

(for GS-15, HB-15)

C5

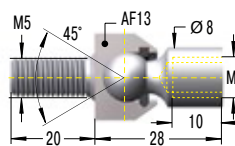
Angle Ball Joint
DIN 71802¹ max. force 500 N

D5

Clevis Fork
DIN 71752¹ max. force 800 N

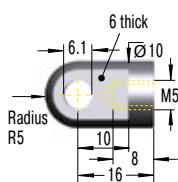
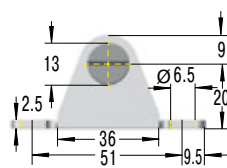
F5

Inline Ball Joint


¹ max. force 500 N
 Attention! Must only be used with compression loads!

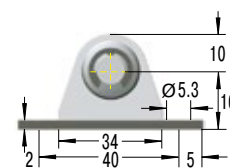
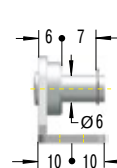
A5

Eye

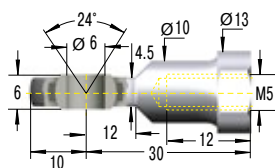
¹ max. force 800 NMA5
Bearing Shoe¹ max. force 500 N

NA5

Angle Bracket with Ball

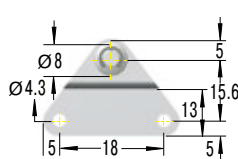
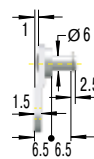
¹ max. force 400 N

E5

Swivel Eye
DIN 648¹ max. force 800 N

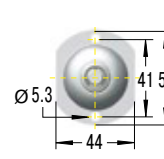
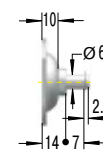
OA5

Side Bracket with Ball

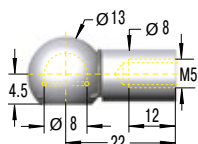
¹ max. force 180 N

PA5

Round Bracket with Ball

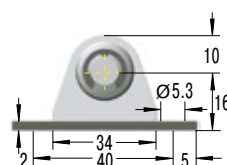
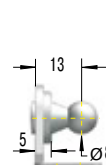
¹ max. force 500 N

G5

Ball Socket
DIN 71805¹ max. force 500 N

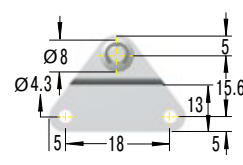
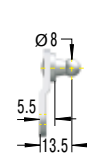
NG5

Angle Bracket with Ball

¹ max. force 400 N

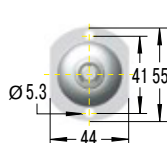
OG5

Side Bracket with Ball

¹ max. force 180 N

PG5

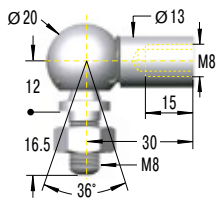
Round Bracket with Ball

¹ max. force 500 N¹ Attention! Max. static load in Newtons. Beware force increase during compression (progression) and observe max. force limit.

M8x1.25

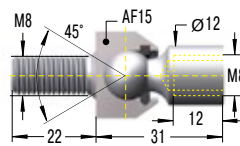
(for GS-19, GS-22, GZ-19, HB-22, HB-28, HBS-28, DVC-32)

C8 Angle Ball Joint DIN 71802



¹ max. force 1,200 N

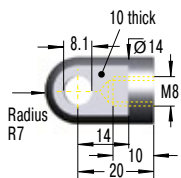
F8 Inline Ball Joint



¹ max. force 1,200 N

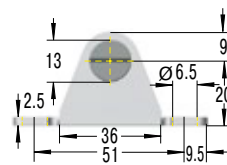
Attention! Must only be used with compression loads!

A8 Eye

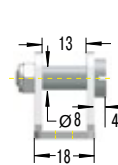


¹ max. force 3,000 N

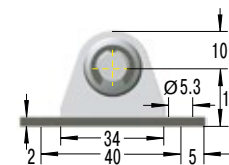
MA8 Bearing Shoe



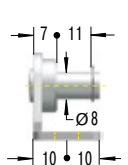
¹ max. force 1,800 N



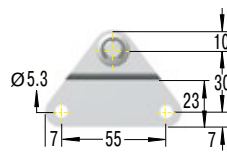
NA8 Angle Bracket with Ball



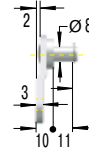
¹ max. force 1,000 N



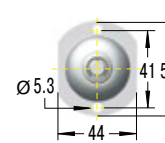
OA8 Side Bracket with Ball



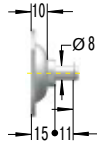
¹ max. force 1,200 N



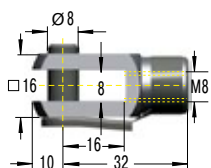
PA8 Round Bracket with Ball



¹ max. force 1,200 N

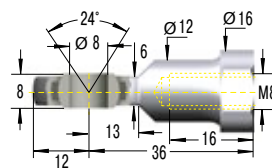


D8 Clevis Fork DIN 71752



¹ max. force 3,000 N

E8 Swivel Eye DIN 648



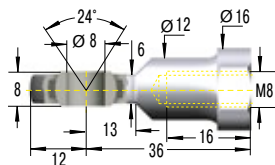
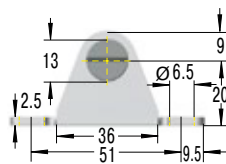
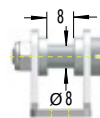
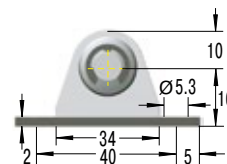
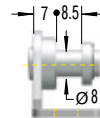
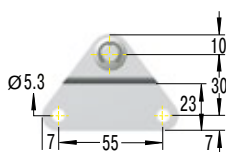
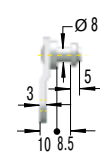
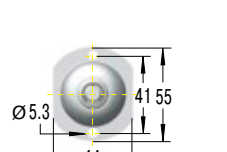
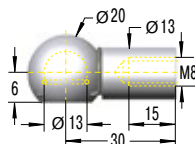
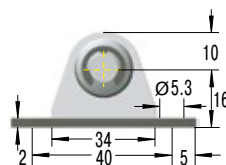
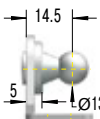
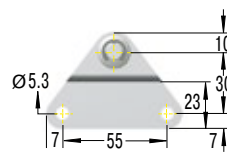
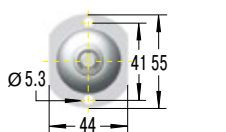
¹ max. force 3,000 N

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

Overview

M8x1.25

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

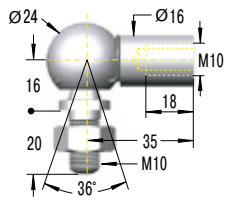
E8
Swivel Eye
DIN 648
¹ max. force 3,000 N
ME8
Bearing Shoe
¹ max. force 1,800 N
NE8
Angle Bracket with Ball
¹ max. force 1,000 N
OE8
Side Bracket with Ball
¹ max. force 1,200 N
PE8
Round Bracket with Ball
¹ max. force 1,200 N
G8
Ball Socket
DIN 71805
¹ max. force 1,200 N
NG8
Angle Bracket with Ball
¹ max. force 1,000 N
OG8
Side Bracket with Ball
¹ max. force 1,200 N
PG8
Round Bracket with Ball
¹ max. force 1,200 N¹ Attention! Max. static load in Newtons. Beware force increase during compression (progression) and observe max. force limit.

M10x1.5

(for GS-28, GZ-28, HBS-35)

C10

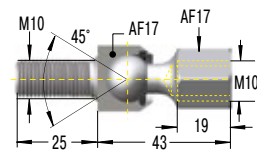
Angle Ball Joint
DIN 71802



¹ max. force 1,800 N

F10

Inline Ball Joint

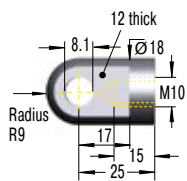


¹ max. force 1,800 N

Attention! Must only be used with compression loads!

A10

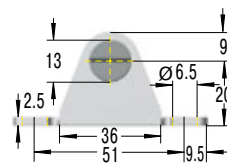
Eye



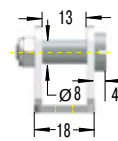
¹ max. force 10,000 N

MA10

Bearing Shoe

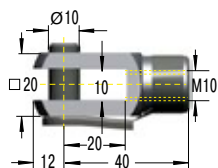


¹ max. force 1,800 N



D10

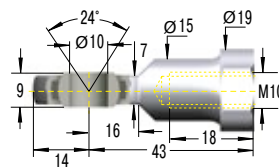
Clevis Fork
DIN 71752



¹ max. force 10,000 N

E10

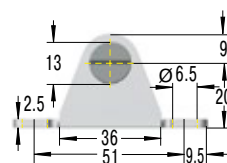
Swivel Eye
DIN 648



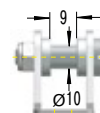
¹ max. force 10,000 N

ME10

Bearing Shoe

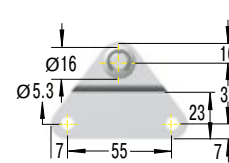


¹ max. force 1,800 N

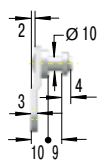


OE10

Side Bracket with Ball

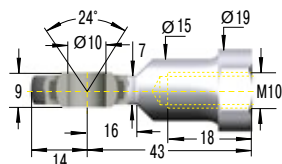


¹ max. force 1,200 N



E10

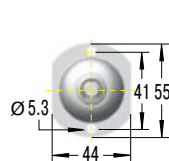
Swivel Eye
DIN 648



¹ max. force 10,000 N

PE10

Round Bracket with Ball



¹ max. force 1,200 N

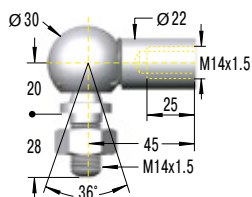


Overview

M14x1.5

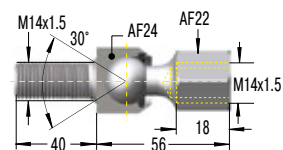
(for GS-40, GST-40, GZ-40, HB-40, HBD-70)

C14

Angle Ball Joint
DIN 71802¹ max. force 3,200 N

F14

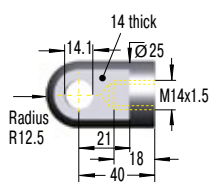
Inline Ball Joint

¹ max. force 3,200 N

Attention! Must only be used with compression loads!

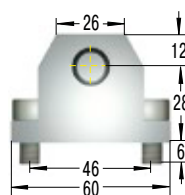
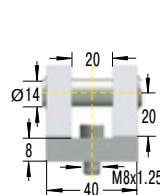
A14

Eye

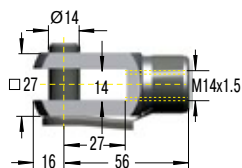
¹ max. force 10,000 N

ME14

Bearing Shoe

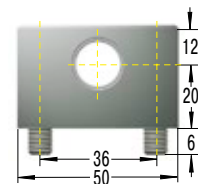
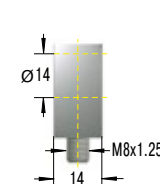
¹ max. force 10,000 N

D14

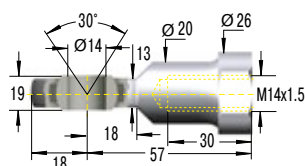
Clevis Fork
DIN 71752¹ max. force 10,000 N

ND14

Mounting Flange

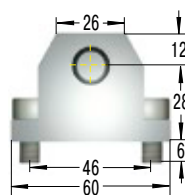
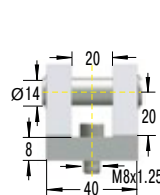
¹ max. force 10,000 N

E14

Swivel Eye
DIN 648¹ max. force 10,000 N

ME14

Bearing Shoe

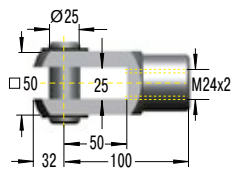
¹ max. force 10,000 N¹ Attention! Max. static load in Newtons. Beware force increase during compression (progression) and observe max. force limit.

M24x2

(for GS-70, HB-70, HBS-70)

D24

Clevis Fork
DIN 71752

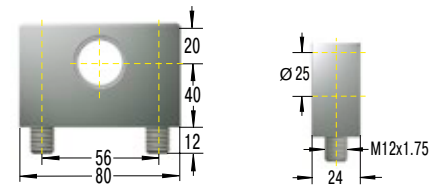


¹ max. force 50,000 N



ND24

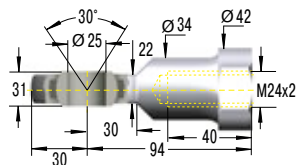
Mounting Flange



¹ max. force 50,000 N

E24

Swivel Eye
DIN 648

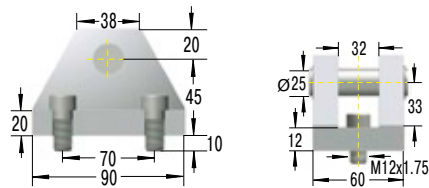


¹ max. force 50,000 N



ME24

Bearing Shoe



¹ max. force 50,000 N

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

Mounting Accessories

for gas springs and hydraulic dampers
made of stainless steel

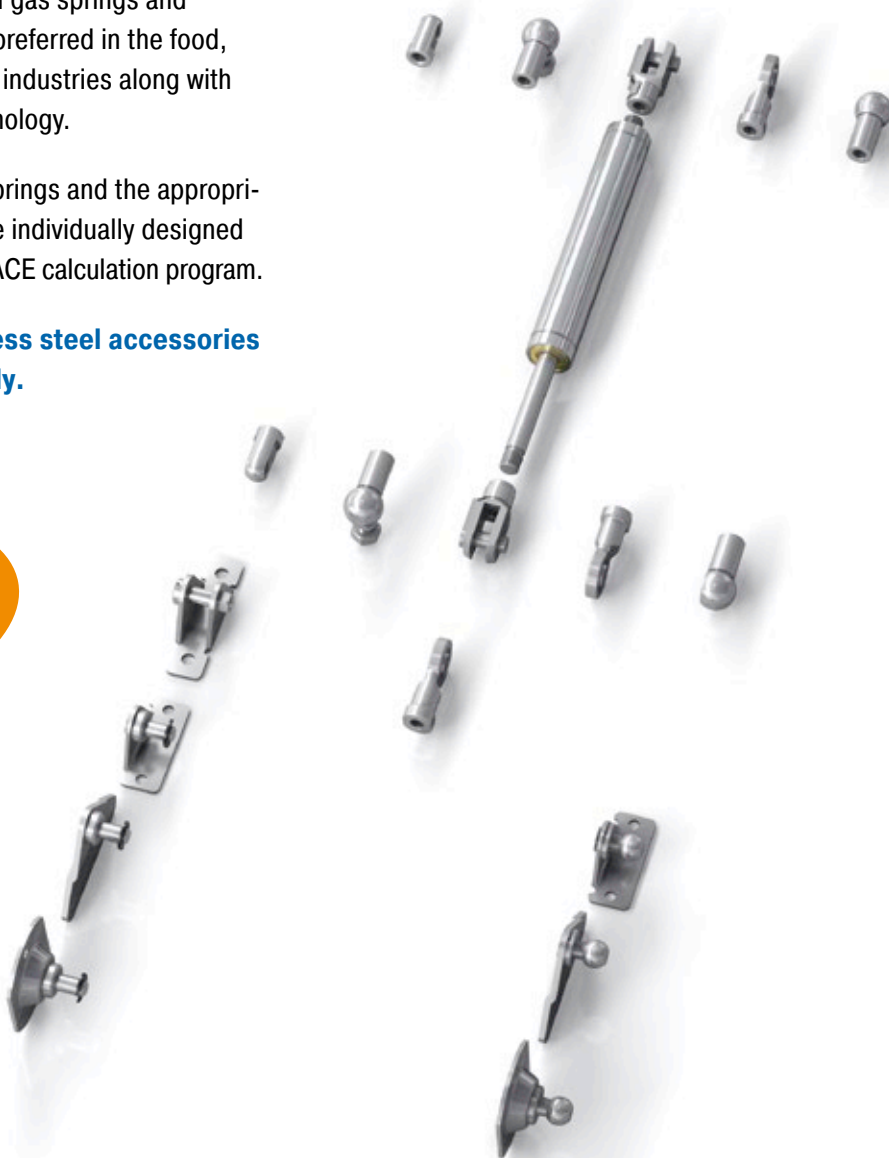
For our gas springs and hydraulic dampers made of stainless steel we also offer a flexible product range of DIN standardised end fittings and mounting brackets. These eyes, swivel eyes, clevis forks, angle ball joints, ball sockets, inline ball joints and mounting brackets are also made of sturdy stainless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

**Individual
Combinations!**

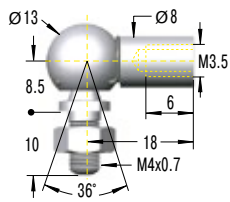


M3.5x0.6

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

C3,5-V4A

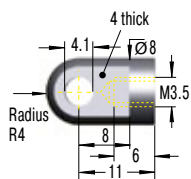
Angle Ball Joint



¹ max. force 370 N

A3,5-V4A

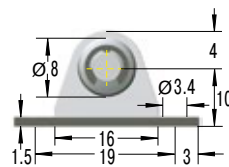
Eye



¹ max. force 370 N

NA3,5-V4A

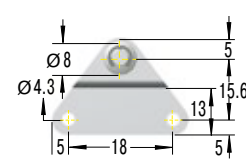
Angle Bracket with Ball



¹ max. force 180 N

OA3,5-V4A

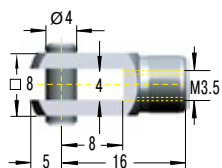
Side Bracket with Ball



¹ max. force 180 N

D3,5-V4A

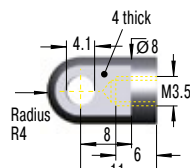
Clevis Fork



¹ max. force 370 N

A3,5-V4A

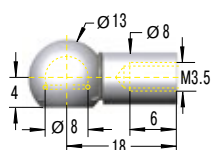
Eye



¹ max. force 370 N

G3,5-V4A

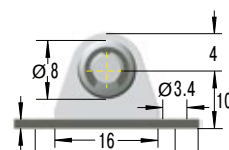
Ball Socket



¹ max. force 370 N

NG3,5-V4A

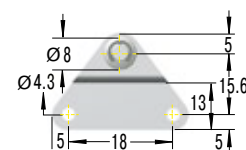
Angle Bracket with Ball



¹ max. force 180 N

OG3,5-V4A

Side Bracket with Ball



¹ max. force 180 N

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

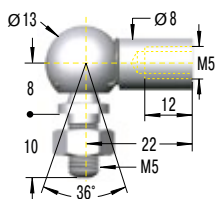
Overview

M5x0.8

(for GS-15-VA)

C5-VA

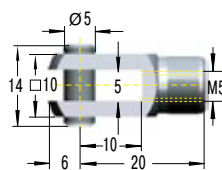
Angle Ball Joint



¹ max. force 430 N

D5-VA

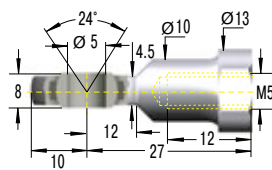
Clevis Fork



¹ max. force 490 N

E5-VA

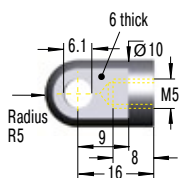
Swivel Eye



¹ max. force 490 N

A5-VA

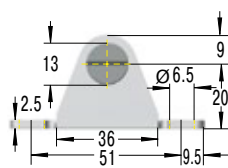
Eye



¹ max. force 490 N

MA5-V4A

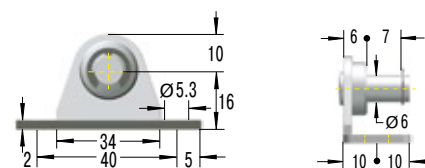
Bearing Shoe



¹ max. force 500 N

NA5-V4A

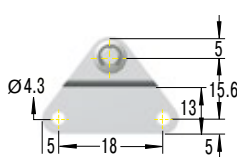
Angle Bracket with Ball



¹ max. force 400 N

OA5-V4A

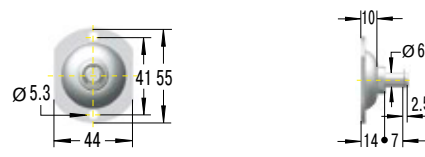
Side Bracket with Ball



¹ max. force 180 N

PA5-V4A

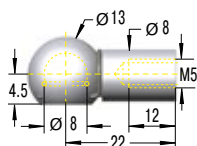
Round Bracket with Ball



¹ max. force 500 N

G5-VA

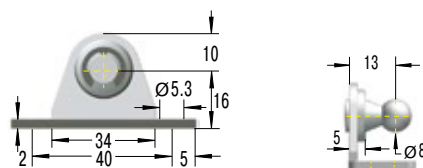
Ball Socket



¹ max. force 430 N

NG5-V4A

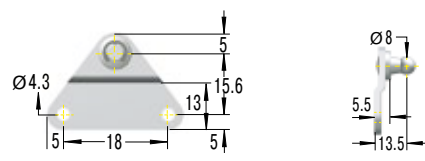
Angle Bracket with Ball



¹ max. force 400 N

OG5-V4A

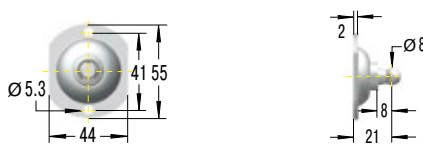
Side Bracket with Ball



¹ max. force 180 N

PG5-V4A

Round Bracket with Ball



¹ max. force 500 N

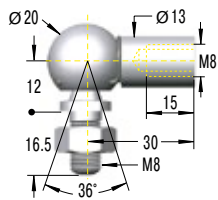
¹ Attention! Max. static load in Newtons. Beware force increase during compression (progression) and observe max. force limit.

M8x1.25

(for GS-19-VA, GS-22-VA, GZ-19-VA)

C8-VA

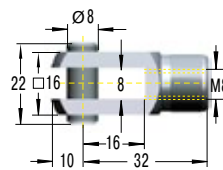
Angle Ball Joint



¹ max. force 1,140 N

D8-VA

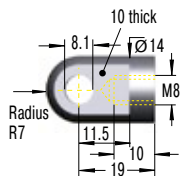
Clevis Fork



¹ max. force 1,560 N

A8-VA

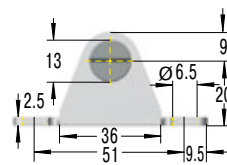
Eye



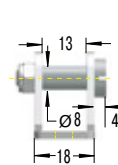
¹ max. force 1,560 N

MA8-V4A

Bearing Shoe

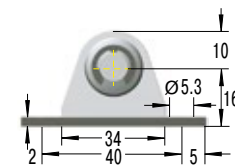


¹ max. force 1,800 N

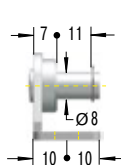


NA8-V4A

Angle Bracket with Ball

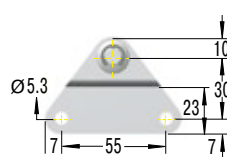


¹ max. force 1,000 N

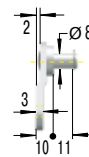


OA8-V4A

Side Bracket with Ball

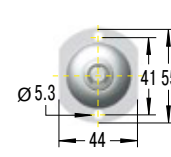


¹ max. force 1,200 N



PA8-V4A

Round Bracket with Ball

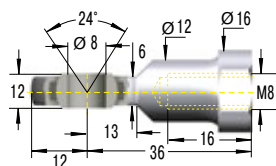


¹ max. force 1,200 N



E8-VA

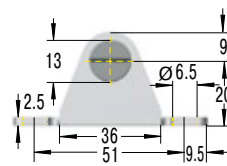
Swivel Eye



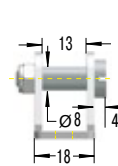
¹ max. force 1,560 N

MA8-V4A

Bearing Shoe



¹ max. force 1,800 N



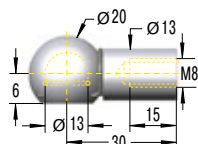
¹ Attention! Max. static load in Newtons. Beware force increase during compression (progression) and observe max. force limit.

Overview

M8x1.25

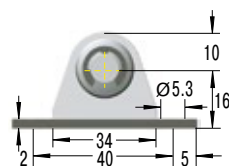
(for GS-19-VA, GS-22-VA, GZ-19-VA)

G8-VA Ball Socket

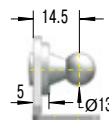


¹ max. force 1,140 N

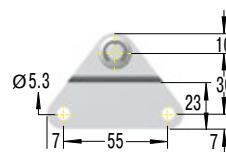
NG8-V4A Angle Bracket with Ball



¹ max. force 1,000 N



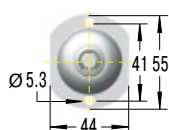
OG8-V4A Side Bracket with Ball



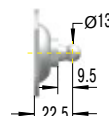
¹ max. force 1,200 N



PG8-V4A Round Bracket with Ball



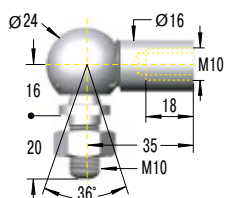
¹ max. force 1,200 N



M10x1.5

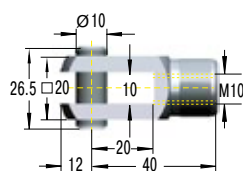
(for GS-28-VA, GZ-28-VA)

C10-VA Angle Ball Joint



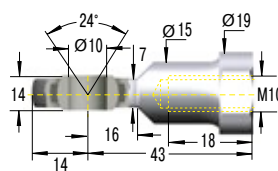
¹ max. force 1,750 N

D10-VA Clevis Fork



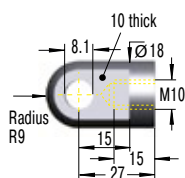
¹ max. force 3,800 N

E10-VA Swivel Eye



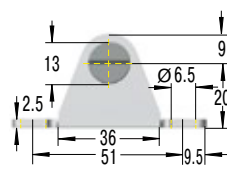
¹ max. force 3,800 N

A10-VA Eye

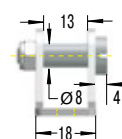


¹ max. force 3,800 N

MA10-V4A Bearing Shoe



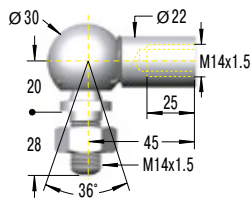
¹ max. force 1,800 N



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

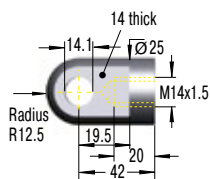
M14x1.5 (for GS-40-VA, GZ-40-VA)

C14-VA Angle Ball Joint



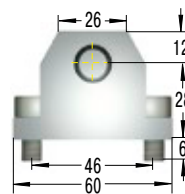
¹ max. force 3,200 N

A14-VA Eye

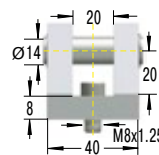


¹ max. force 7,000 N

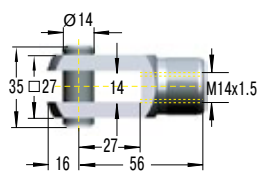
ME14-VA Bearing Shoe



¹ max. force 10,000 N

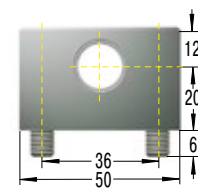


D14-VA Clevis Fork

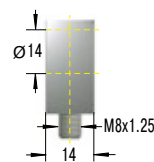


¹ max. force 7,000 N

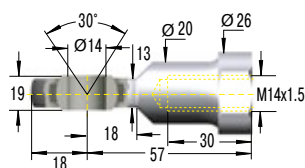
ND14-VA Mounting Flange



¹ max. force 10,000 N

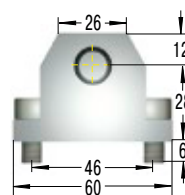


E14-VA Swivel Eye

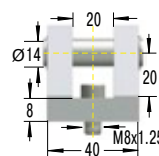


¹ max. force 7,000 N

ME14-VA Bearing Shoe



¹ max. force 10,000 N



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

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

The 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 resetting element.



Hydraulic Feed Controls



VC25

Adjustable

For precision adjustment of feed rates

Handling modules, Linear slides, Automatic machinery, Conveyor equipment

Page 210



MA, MVC

Adjustable

Designed for applications with low precision requirements

Handling modules, Linear slides, Automatic machinery, Conveyor equipment

Page 212

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

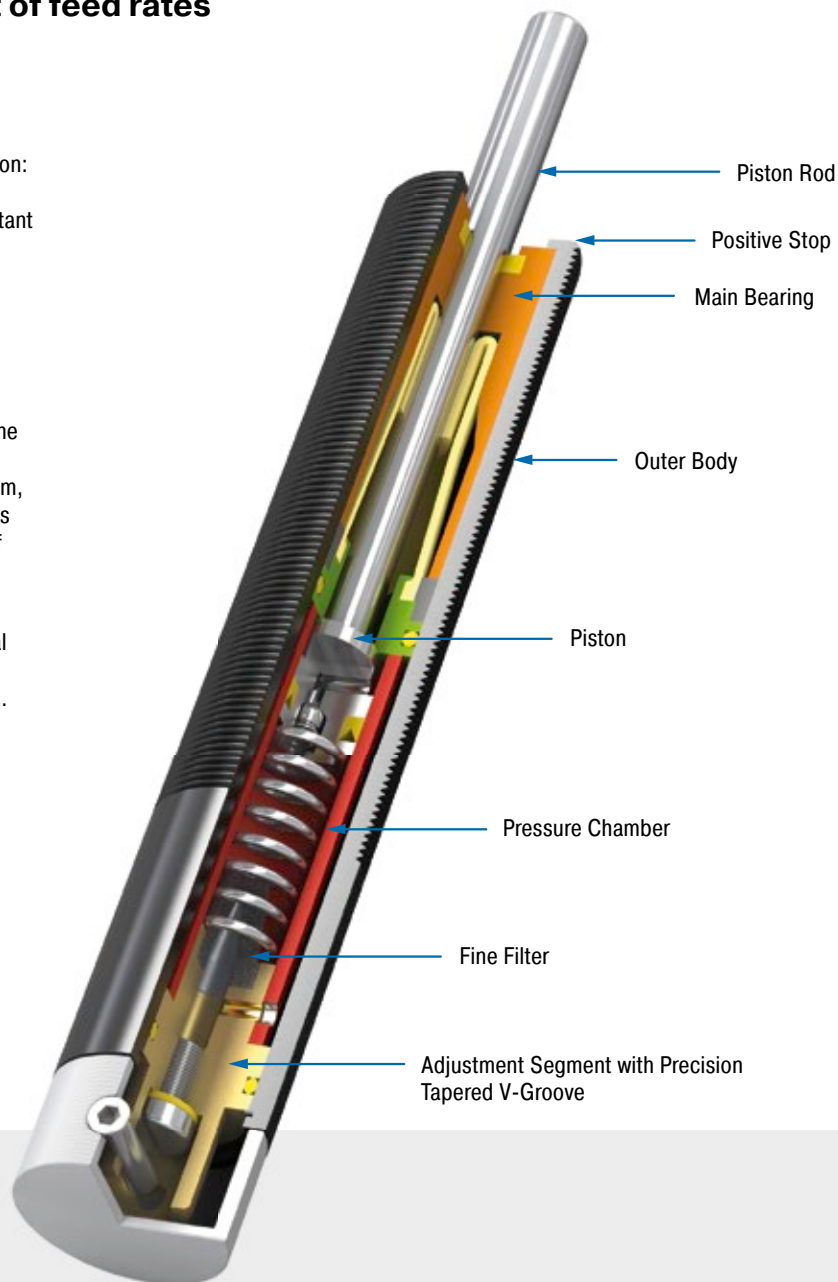
Hydraulic Feed Controls

For precision adjustment of feed rates

Precise adjustment for any type of application: The VC model of hydraulic feed controls is 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, which also avoids the stick-slip effect. In the models up to 55 mm 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.

The VC model of precision hydraulic feed controls is used in automotive and industrial applications as well as in automation and machine building and electronics industries.



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

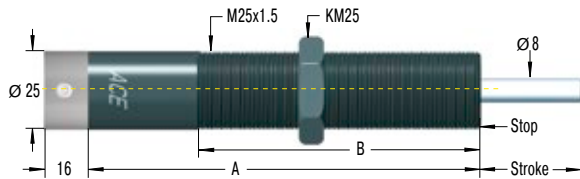
Application field: Handling modules, Linear slides, Automatic machinery, Conveyor equipment

Note: Nylon button PP600 can be fitted onto piston rod. Unit may be mounted in any position.

Safety instructions: 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.

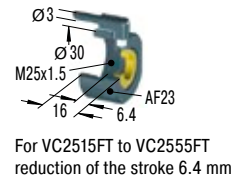
On request: Special oil and other special options available on request.

VC25EUFT



SP25

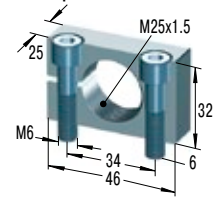
Air Bleed Collar



For VC2515FT to VC2555FT
reduction of the stroke 6.4 mm

MB25

Clamp Mount



Additional accessories, mounting, installation ... see from page 42.

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: $^{\circ}\text{C}$

Ordering Example

Type (Feed Control) _____
Thread Size M25 _____
Stroke (55 mm) _____
EU Compliant _____
FT = mit Gewinde M25x1,5 _____
F = without thread, plain body ($\varnothing$ 23.8 mm)

VC 2555 EUFT

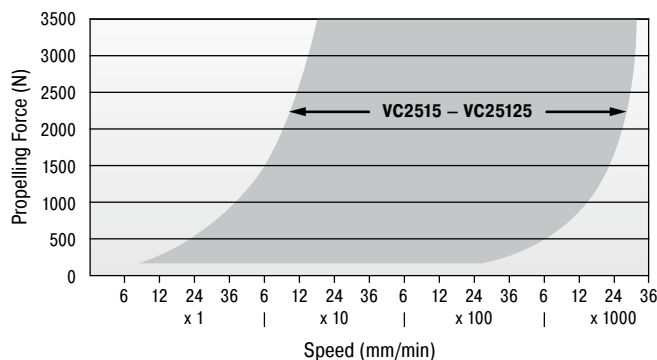
Performance and Dimensions

TYPES	Stroke mm	A mm	B mm	Compression Force min. N	Compression Force max. N	Return force min. N	Return force max. N	Return time s	Side Load Angle max. $^{\circ}$	Weight kg
VC2515EUFT	15	128	80	30	3,500	15	30	0.2	3	0.350
VC2530EUFT	30	161	110	30	3,500	5	30	0.4	2	0.450
VC2555EUFT	55	209	130	35	3,500	5	40	1.2	2	0.423
VC2575EUFT	75	283	150	50	3,500	10	50	1.7	2	0.681
VC25100EUFT	100	308	150	60	3,500	10	50	2.3	1	0.794
VC25125EUFT	125	333.5	150	70	3,500	10	60	2.8	1	0.908

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 MB25

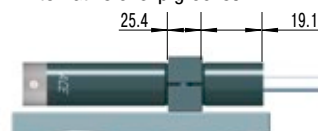


Installed with air bleed collar SP25



Installed with switch stop collar inc. proximity
switch and steel button AS25 plus PS25

Alternative circlip grooves



Bulkhead mounting for VC25...F with mounting
block KB... (23.8 mm plain body option)

Hydraulic Feed Controls

Designed for applications with low precision requirements

Hydraulic feed controls with the designations MA and MVC are especially used in handling modules or linear carriages and also for applications with changing usage data.

The graph illustrates the relationship between propelling force and speed for three different models. The y-axis represents Propelling Force in Newtons (N), ranging from 0 to 4000. The x-axis represents Speed in mm/min, with a logarithmic scale showing values from 12 to 3600. MVC600 and MVC900 have a maximum force of approximately 3500 N, while MVC225 has a maximum force of approximately 1700 N. All models show a significant increase in force as speed increases, particularly above 100 mm/min.

Speed (mm/min)	MVC600 Force (N)	MVC900 Force (N)	MVC225 Force (N)
12	~100	~100	~100
24	~200	~200	~200
36	~300	~300	~300
60	~500	~500	~500
120	~1000	~1000	~1000
240	~2000	~2000	~1500
360	~3000	~3000	~1700
600	~3500	~3500	~1700
1200	~3500	~3500	~1700
2400	~3500	~3500	~1700
3600	~3500	~3500	~1700

TYPES	Stroke mm	Compression Force	Compression Force	Return force min. N	Return force max. N	Return time s	¹ Side Load Angle	Weight kg
		min. N	max. N				max. °	
MA30EUM	8	8	80	1.7	5.3	0.3	2.0	0.013
MA50EUM	7.2	40	160	3.0	6.0	0.3	2.0	0.025
MA35EUM	10.2	15	200	5.0	11.0	0.2	2.0	0.043
MA150EUM	12.7	20	300	3.0	5.0	0.4	2.0	0.060
MVC225EUM	19	25	1,750	5.0	10.0	0.65	2.0	0.150
MVC600EUM	25	65	3,500	10.0	30.0	0.85	2.0	0.300
MVC900EUM	40	70	3,500	10.0	35.0	0.95	2.0	0.400

¹ For applications with higher side load angles consider using the side load adaptor (BV) pages 38 to 45.

On request: Nickel-plated, weartec finish (seawater resistant) or other special options available on request.

Rotary Dampers

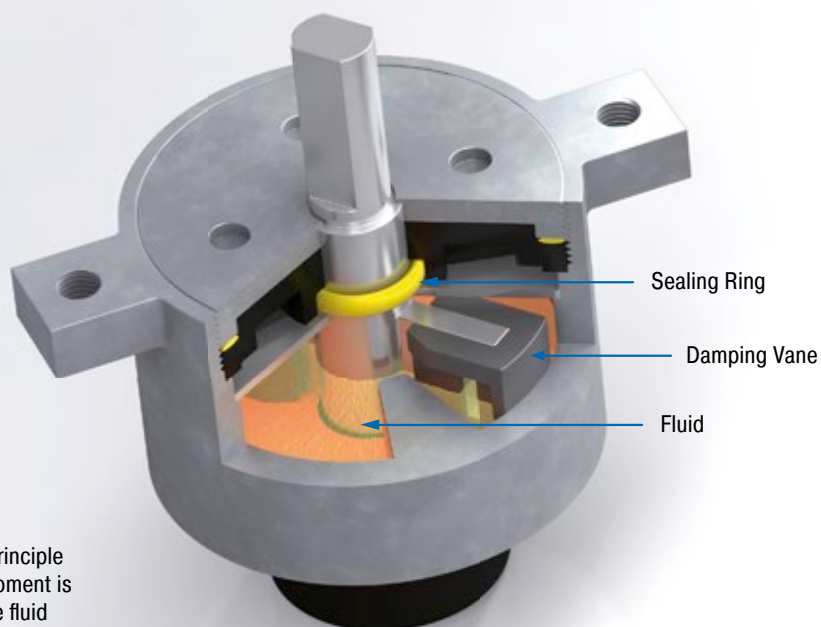
Small dampers refine end product

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

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

Partial Rotation Angle, Adjustable

e.g. FYT-H1 and FYN-H1



General Function

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



Rotary Dampers with Continuous Rotation

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

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



Rotary Dampers with Partial Rotation Angle

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

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

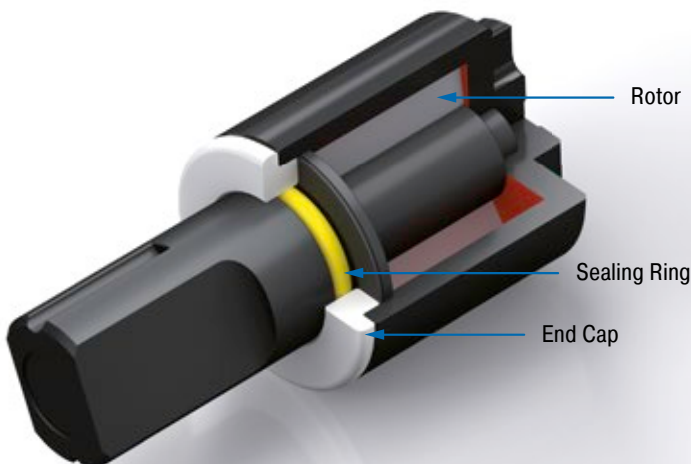
High protection of sensitive components

Various designs for every application

Maintenance-free and ready-to-install

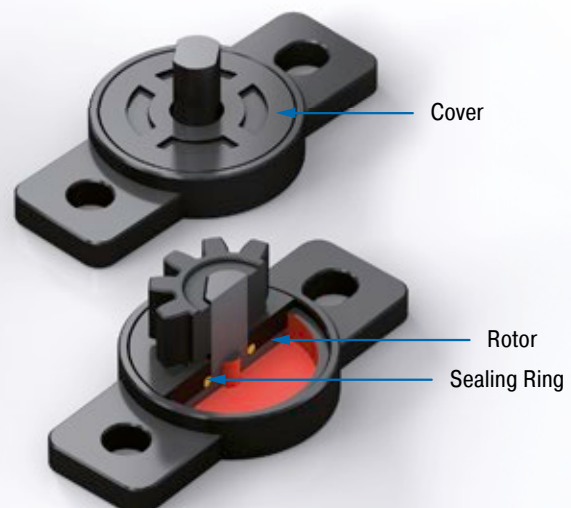
Partial Rotation Angle

e.g. FYN-N1



Continuous Rotation

e.g. FRT-E2





Rotary Dampers

Continuous rotation



FRT-E2

Continuous Rotation

Small and lightweight for finest braking

Page 218



FRT-G2

Continuous Rotation

Small and lightweight for finest braking

Page 219



FRT-C2 and FRN-C2

Continuous Rotation

Flexible and cost efficient use

Page 220



FRT-D2 and FRN-D2

Continuous Rotation

Flexible and cost efficient use

Page 221



FRT-F2/K2 and FRN-F2/K2

Continuous Rotation

For very long service life extension

Page 222



FFD

Continuous Rotation

Precise braking without oil

Page 223



FDT

Continuous Rotation

The flat disc brake for two-sided damping

Page 224



FDN

Continuous Rotation

The flat disc brake for one direction of rotation

Page 225

Rotary Dampers



FYN-P1

Partial Rotation Angle
Small diameter, large damping torques

Page 226



FYN-N1

Partial Rotation Angle
Small diameter, large braking torques

Page 227



FYN-U1

Partial Rotation Angle
Small, strong and very robust

Page 228



FYN-S1

Partial Rotation Angle
The flat damper for constant component protection

Page 229



Partial rotation angle, adjustable



FYT-H1 and FYN-H1

Partial Rotation Angle, Adjustable
Specific adjustable, strong braking force

Page 230



FYT-LA3 and FYN-LA3

Partial Rotation Angle, Adjustable
Adjustable High Performance

Page 231

FRT-E2

Rotary Dampers

Small and lightweight for finest braking

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



Technical Data

Construction size: Ø 10 mm

Rotational speed max.: 50 rpm

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

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

Pressure angle: 20°

Material: Outer body, Shaft, Gear: Plastic

Mounting: In any position

Tooth: Involute gearing

P.C.D.: 6 mm

No. of teeth: 10

Module: 0.6

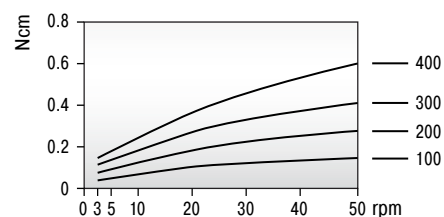
Mounting information: No axial or radial forces may be induced via the shaft.

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

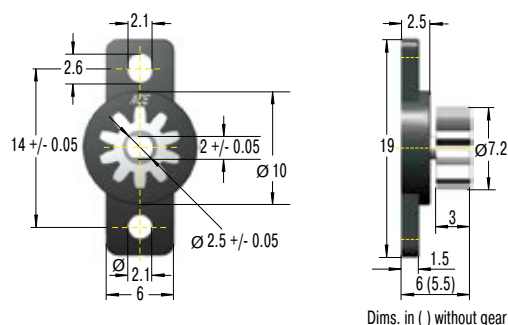
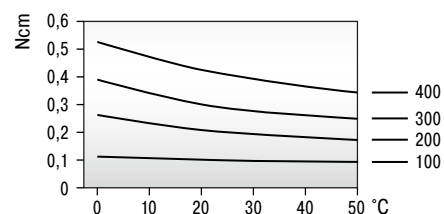
On request: Special designs available on request. Toothed plastic racks (modules 0.5 to 1.0) are available for the rotary dampers with pinions.

Characteristics

At 23 °C ambient temperature



At 20 rpm rotational speed



Performance

TYPES	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

Rotary Dampers

Small and lightweight for finest braking

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



Technical Data

Construction size: Ø 15 mm

Rotational speed max.: 50 rpm

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

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

Pressure angle: 20°

Material: Outer body, Shaft, Gear: Plastic

Mounting: In any position

Tooth: Involute gearing

P.C.D.: 7 mm

No. of teeth: 14

Module: 0.5

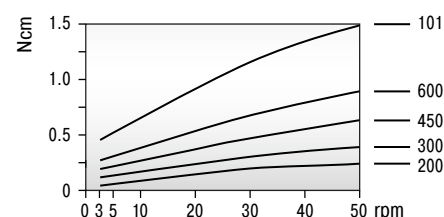
Mounting information: No axial or radial forces may be induced via the shaft.

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

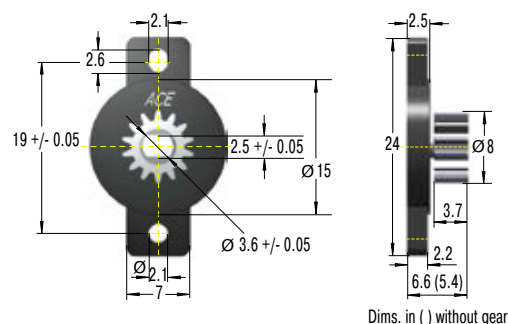
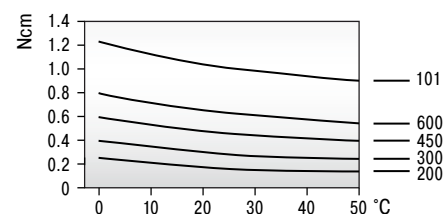
On request: Special designs available on request. Toothed plastic racks (modules 0.5 to 1.0) are available for the rotary dampers with pinions.

Characteristics

At 23 °C ambient temperature



At 20 rpm rotational speed



Dims. in () without gear

Performance

TYPES	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 Rotary Dampers

Flexible and cost efficient use

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



Technical Data

Construction size: Ø 15 mm

Rotational speed max.: 50 rpm

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

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

Pressure angle: 20°

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

Mounting: In any position

Tooth: Involute gearing

P.C.D.: 8.8 mm

No. of teeth: 11

Module: 0.8

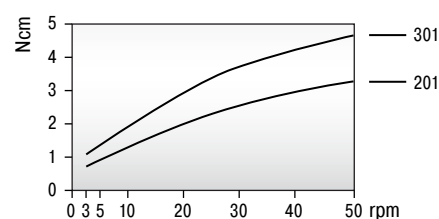
Mounting information: No axial or radial forces may be induced via the shaft.

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

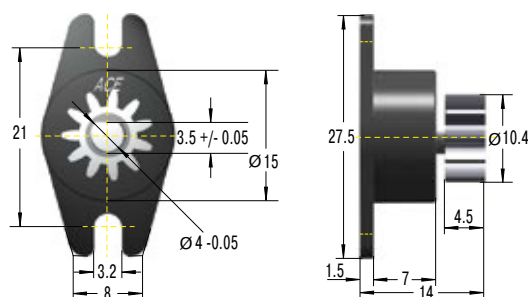
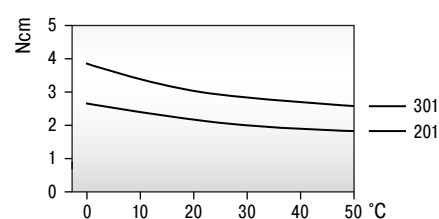
On request: Special designs available on request. Toothed plastic racks (modules 0.5 to 1.0) are available for the rotary dampers with pinions.

Characteristics

At 23 °C ambient temperature



At 20 rpm rotational speed



Performance

TYPES	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	0.003
FRN-C2-R201-G1	2 +/- 0.6	right	with	0.002
FRN-C2-R301-G1	3 +/- 0.8	right	with	0.004
FRN-C2-L201	2 +/- 0.6	left	without	0.002
FRN-C2-L301	3 +/- 0.8	left	without	0.003
FRN-C2-L201-G1	2 +/- 0.6	left	with	0.002
FRN-C2-L301-G1	3 +/- 0.8	left	with	0.003

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

Rotary Dampers

Flexible and cost efficient use

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



Technical Data

Construction size: Ø 25 mm

Rotational speed max.: 50 rpm

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

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

Pressure angle: 20°

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

Mounting: In any position

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

P.C.D.: 12 mm

No. of teeth: 12

Module: 1

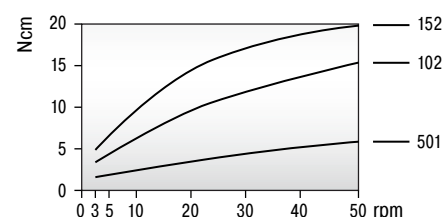
Mounting information: No axial or radial forces may be induced via the shaft.

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

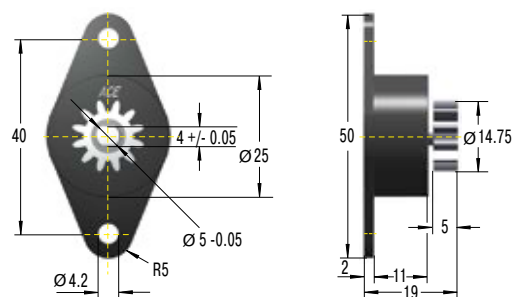
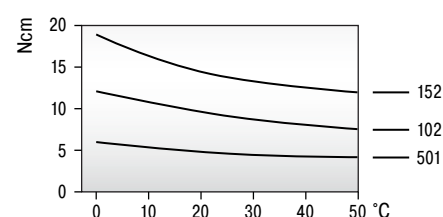
On request: Special designs available on request. Toothed plastic racks (modules 0.5 to 1.0) are available for the rotary dampers with pinions.

Characteristics

At 23 °C ambient temperature



At 20 rpm rotational speed



Performance

TYPES	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	0.012
FRN-D2-R152-G1	15 +/- 3	right	with	0.012
FRN-D2-R501-G1	5 +/- 1	right	with	0.012
FRN-D2-L102	10 +/- 2	left	without	0.012
FRN-D2-L152	15 +/- 3	left	without	0.012
FRN-D2-L501	5 +/- 1	left	without	0.012
FRN-D2-L102-G1	10 +/- 2	left	with	0.012
FRN-D2-L152-G1	15 +/- 3	left	with	0.012
FRN-D2-L501-G1	5 +/- 1	left	with	0.012

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 Rotary Dampers

For very long service life extension

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



Technical Data

Construction size: Ø 40 mm

Rotational speed max.: 50 rpm

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

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

Material: Outer body: Plastic; Shaft: Steel

Mounting: In any position

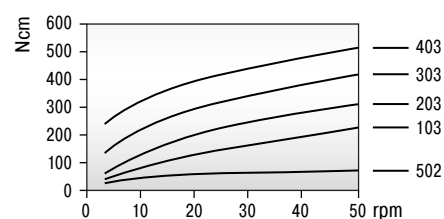
Mounting information: No axial or radial forces may be induced via the shaft.

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

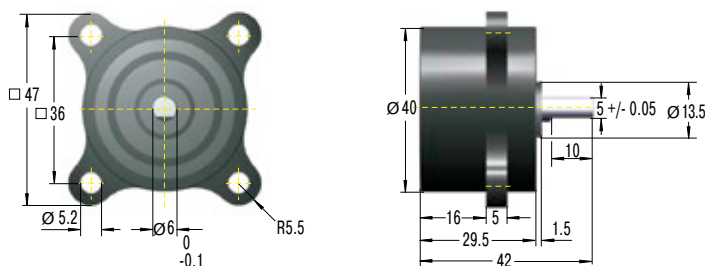
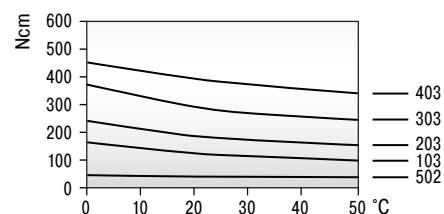
On request: Special designs available on request.

Characteristics

At 23 °C ambient temperature



At 20 rpm rotational speed



Performance

TYPES	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	0.110
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

Rotary Dampers

Precise braking without oil

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 to 30 mm

Rotational speed max.: 30 rpm

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

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

Material: Outer body: Plastic

Mounting: In any position

Information to the shaft: Ø +0 / -0.03

Hardness > HRC55, surface smoothness RZ<1µm

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

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

On request: Special designs available on request.

Ordering Example

FFD-25-FS-L-102

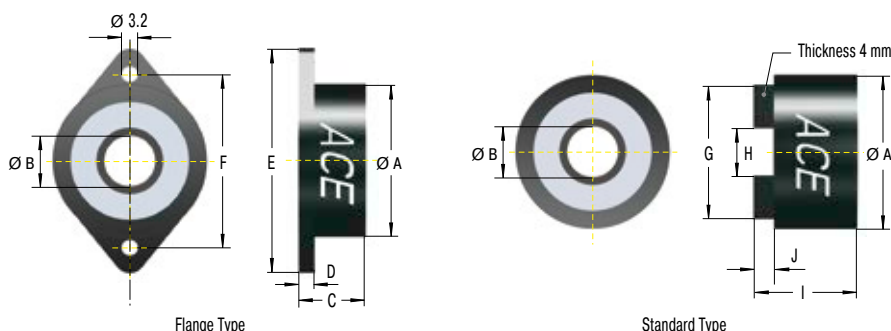
Friction Damper _____
Body Ø _____
Mounting Style (flange = F, standard = S) _____
Model (standard = S, high = W) _____
Damping Direction (right = R, left = L) _____
Damping Torque see chart _____

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	0.014
FFD-28SS	0.1/0.5/1.0	right or left	SS	28	8	13	3	44	36	24	8.2	16	4	0.013
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	0.019
FFD-25FS	0.1/0.5/1.0	right or left	FS	25	6	13	3	42	34	21	6.2	16	4	0.014
FFD-28FS	0.1/0.5/1.0	right or left	FS	28	8	13	3	44	36	24	8.2	16	4	0.013
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	0.014
FFD-28SW	1.0/1.5/2.0	right or left	SW	28	8	19	3	44	36	24	8.2	22	4	0.014
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	0.019
FFD-25FW	1.0/1.5/2.0	right or left	FW	25	6	19	3	42	34	21	6.2	22	4	0.014
FFD-28FW	1.0/1.5/2.0	right or left	FW	28	8	19	3	44	36	24	8.2	22	4	0.013
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

Rotary Dampers

The flat disc brake for two-sided damping

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 to 70 mm

Rotational speed max.: 50 rpm

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

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

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

Mounting: In any position

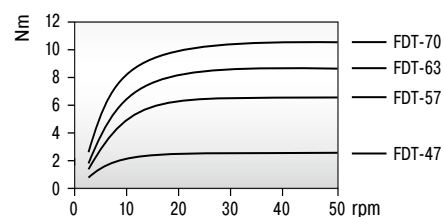
Mounting information: No axial or radial forces may be induced via the shaft.

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

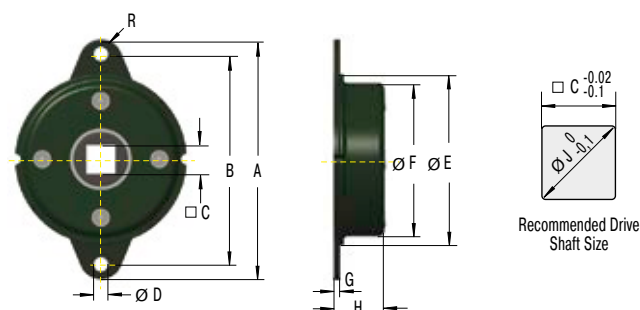
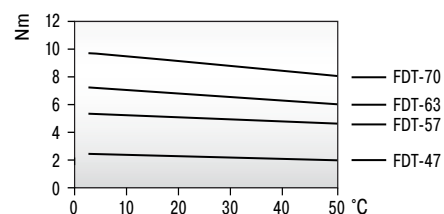
On request: Special designs available on request.

Characteristics

At 23 °C ambient temperature



At 20 rpm rotational speed



Performance and Dimensions

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

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

FDN

Rotary Dampers

The flat disc brake for one direction of rotation

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 to 70 mm

Rotational speed max.: 50 rpm

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

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

Material: Outer body: Steel

Mounting: In any position

Information to the shaft:

FDN-47: Ø 6 +0 / -0.03

FDN-57 to FDN-70: Ø 10 +0 / -0.03

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

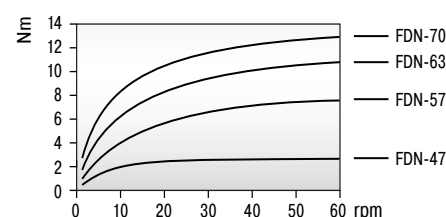
Mounting information: Turn the shaft in the opposite direction to the brake direction to avoid damaging the freewheel mount. No axial or radial forces may be induced via the shaft.

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

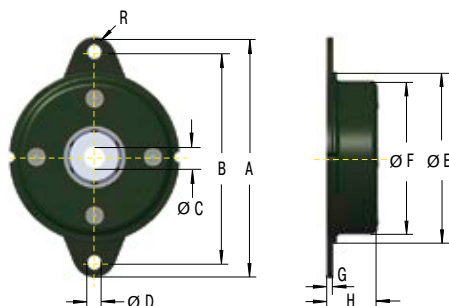
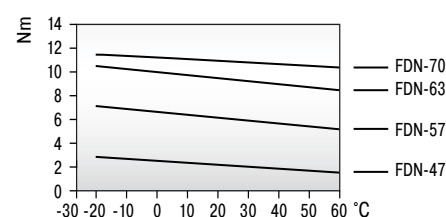
On request: Special designs available on request.

Characteristics

At 23 °C ambient temperature



At 20 rpm rotational speed



Performance and Dimensions

TYPES	¹ Damping torque Nm	Damping direction	A mm	B mm	C mm	D mm	E mm	F mm	G mm	H mm	R mm	Weight kg
FDN-47-R	2.0 +/- 0.3	right	65	56	6	4.5	47	42.8	1.6	10.3	4.5	0.055
FDN-57-R	5.5 +/- 0.3	right	79	68	10	5.5	57	52.4	1.6	14	5.5	0.095
FDN-63-R	8.5 +/- 0.8	right	89	76	10	6.5	63	58.6	1.6	13.9	6.5	0.115
FDN-70-R	11.0 +/- 1.0	right	95	82	10	6.5	70	65.4	1.6	13	6.5	0.135
FDN-47-L	2.0 +/- 0.3	left	65	56	6	4.5	47	42.8	1.6	10.3	4.5	0.055
FDN-57-L	5.5 +/- 0.3	left	79	68	10	5.5	57	52.4	1.6	14	5.5	0.095
FDN-63-L	8.5 +/- 0.8	left	89	76	10	6.5	63	58.6	1.6	13.9	6.5	0.115
FDN-70-L	11.0 +/- 1.0	left	95	82	10	6.5	70	65.4	1.6	13	6.5	0.135

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

FYN-P1

Rotary Dampers

Small diameter, large damping torques

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



Technical Data

Construction size: Ø 18.5 mm

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

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

Material: Outer body, Shaft: Plastic

Mounting: In any position

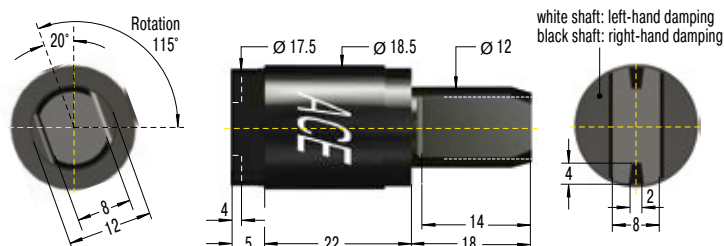
Rotation angle max.: 115°

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

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

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

On request: Special designs available on request.



Performance

TYPES	Damping torque Ncm	Return Damping Torque Ncm	Damping direction	Weight kg
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

Rotary Dampers

Small diameter, large damping torques

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



Technical Data

Construction size: Ø 20 mm

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

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

Material: Outer body, Shaft: Plastic

Mounting: In any position

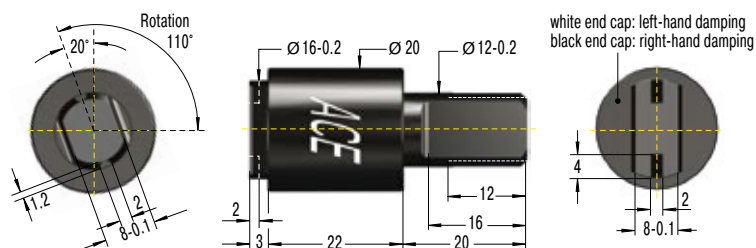
Rotation angle max.: 110°

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

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

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

On request: Special designs available on request.



Performance

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

Partial Rotation Angle

FYN-U1

Rotary Dampers

Small, strong and very robust

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



Technical Data

Construction size: Ø 16 mm

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

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

Material: Outer body, Shaft: Zinc die-cast

Mounting: In any position

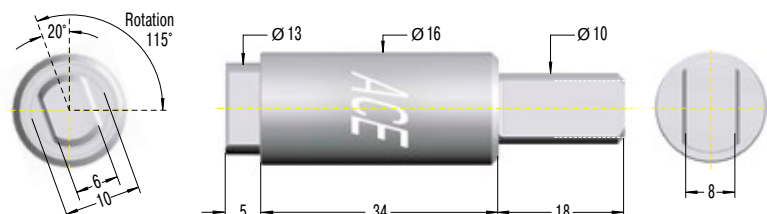
Rotation angle max.: 115°

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

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

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

On request: Special designs available on request.



Performance

TYPES	Damping torque Ncm	Return Damping Torque Ncm	Damping direction	Weight kg
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

Rotary Dampers

The flat damper for constant component protection

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



Technical Data

Construction size: Ø 60 mm

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

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

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

Mounting: In any position

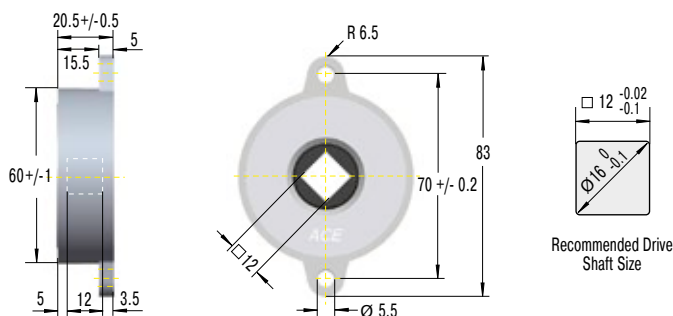
Rotation angle max.: 130°

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

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

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

On request: Special designs available on request.



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 Rotary Dampers

Specifically adjustable, strong braking force

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



Technical Data

Construction size: Ø 45 mm

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

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

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

Mounting: In any position

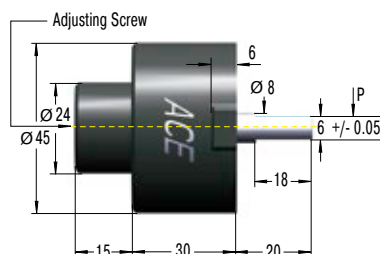
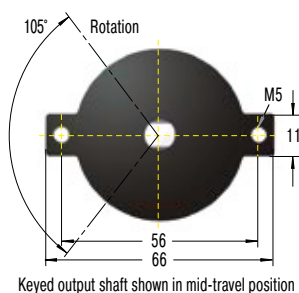
Rotation angle max.: 105°

Maximum side load: 50 N

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

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

On request: Special designs available on request.



Performance

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

FYT-LA3 and FYN-LA3

Rotary Dampers

Adjustable high performance

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



Technical Data

Construction size: Ø 80 mm

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

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

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

Mounting: In any position

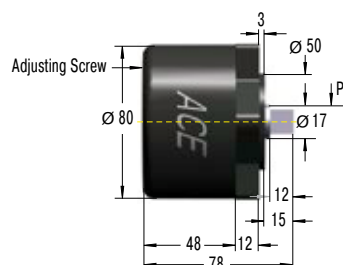
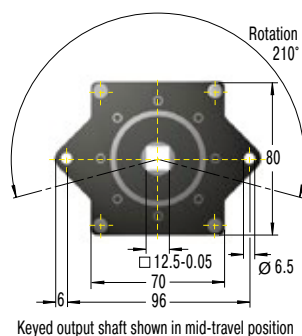
Rotation angle max.: 210°

Maximum side load: 200 N

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

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

On request: Special designs available on request.



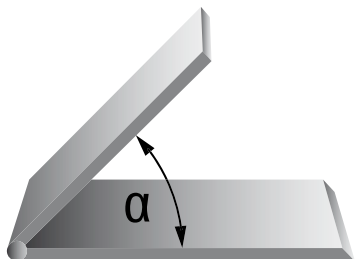
Performance

TYPES	Damping torque Nm	Return Damping Torque Nm	Damping direction	Weight kg
FYT-LA3	4 - 40	4	bidirectional	1.720
FYN-LA3-R	4 - 10	4	right	1.725
FYN-LA3-L	4 - 10	4	left	1.725

Calculation Example

Damping of a Lid

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



Calculation Steps

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

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

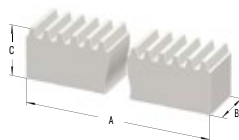
m Mass of a lid [kg] (1 kg = 9.81 N)
L Length of lid from pivot [cm]
n Rotation speed [r.p.m.]

Special Accessories

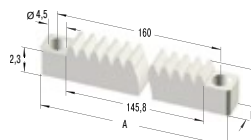
Toothed Racks for Rotary Dampers with Gear

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

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



M0.8P Toothed Rack



Delivery Notes

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

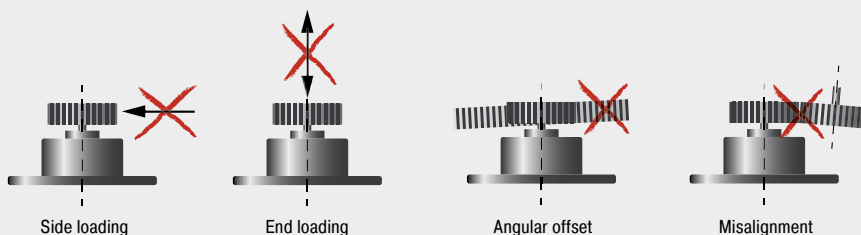
On request: Toothed metal racks

Dimensions

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

Mounting Information

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

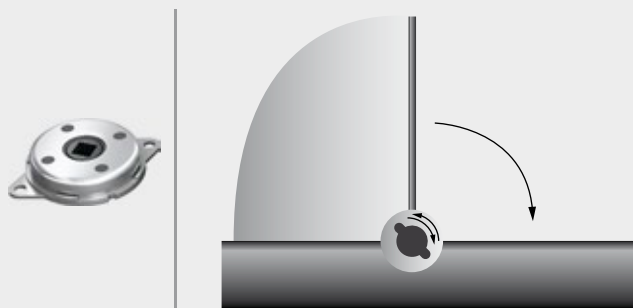


Application Examples

FDT

Finger protection when cutting bread

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



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

FDN-R

Invisible protection for cooker hoods

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



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