

Industrial Gas Springs – Pull Type

Alternatives for tight spaces and mounting requirements

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

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

Compact design

Individual filling valve technology

Calculation program for specific design

Universally applicable



Function of a Gas Spring – Pull Type

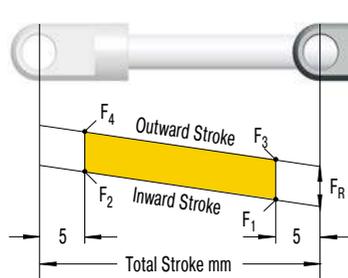
Gas pull type springs work based on the reverse principle of a gas push type spring. They are also individually filled according to customer request to a certain pressure (extension force F_1). However, the piston rod here is pulled inwards by the gas pressure in the cylinder. The higher the pressure,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

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

Free calculation service see page 188!

Calculation Principles

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



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

Gas Springs (Pull Type)

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

¹ Depending on the filling force
² Depending on the stroke

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

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

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

Industrial Gas Springs – Pull Type



GZ-15 to GZ-40

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

Page 176

GZ-15-V4A to GZ-40-VA

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

Page 182

GZ-15 to GZ-40

Very low progression rate

Valve Technology

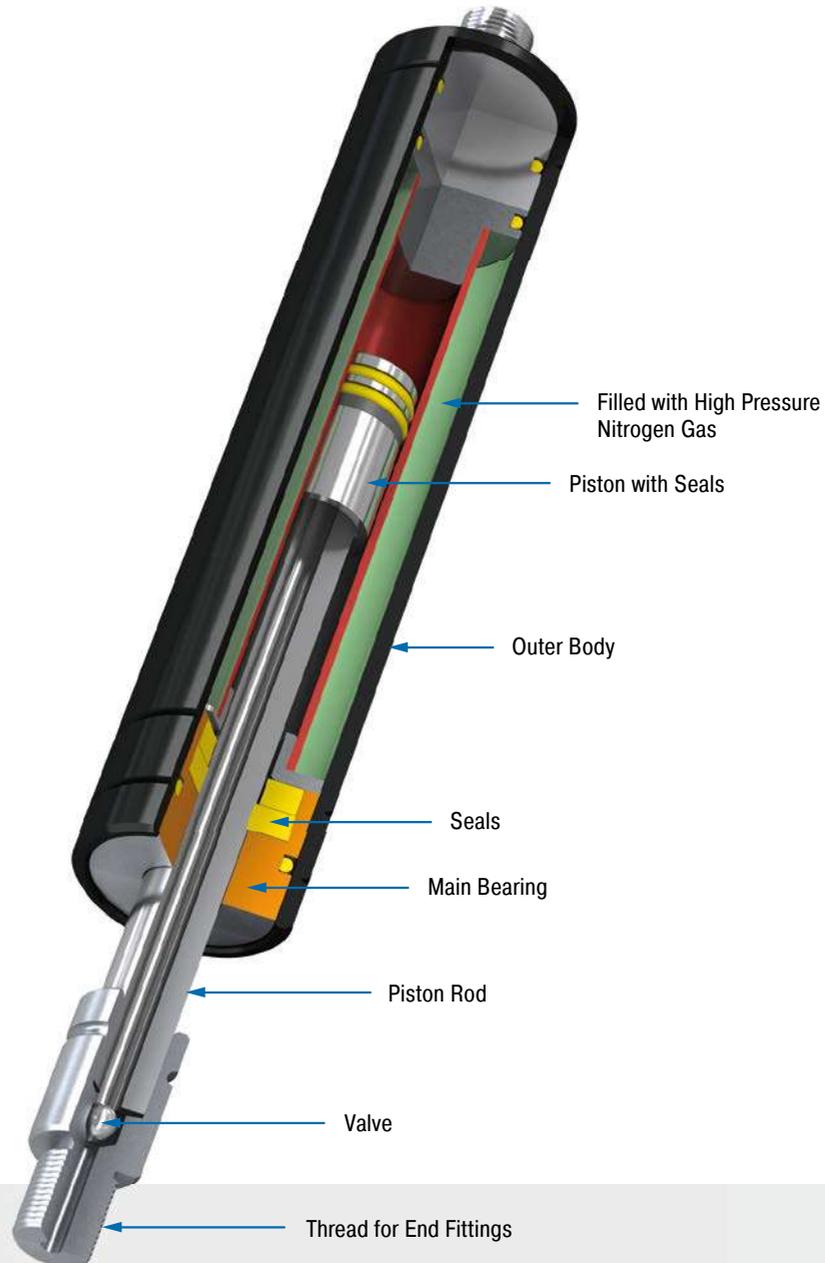
Traction force 40 N to 5,000 N

Stroke 20 mm to 650 mm

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

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

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



Technical Data

Traction force: 40 N to 5,000 N

Piston rod diameter: Ø 4 mm to Ø 28 mm

Progression: Approx. 12 % to 45 %

Lifetime: Approx. 2,000 m

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

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

Operating fluid: Nitrogen gas

Mounting: With piston rod upwards.

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

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

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

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

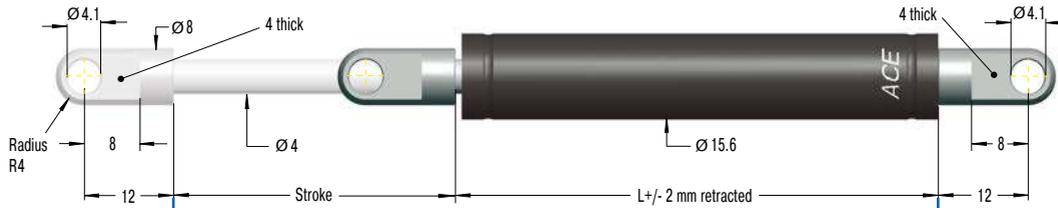
On request: Special oils and other special options. Alternative accessories. Traction gas springs with end position damping also available on request.

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

End Fitting

Standard Dimensions

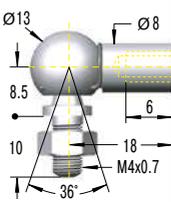
End Fitting

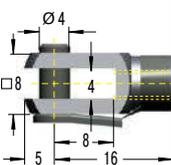
A3.5

Eye A3.5
max. force 370 N

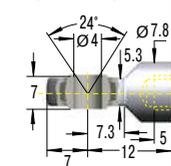
B3.5

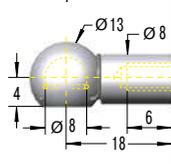

Performance and Dimensions

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

Stud Thread B3.5
C3.5

Angle Ball Joint C3.5
max. force 370 N

D3.5

Clevis Fork D3.5
max. force 370 N

E3.5

Swivel Eye E3.5
max. force 370 N

G3.5

Ball Socket G3.5
max. force 370 N

Ordering Example

GZ-15-150-AC-V-150

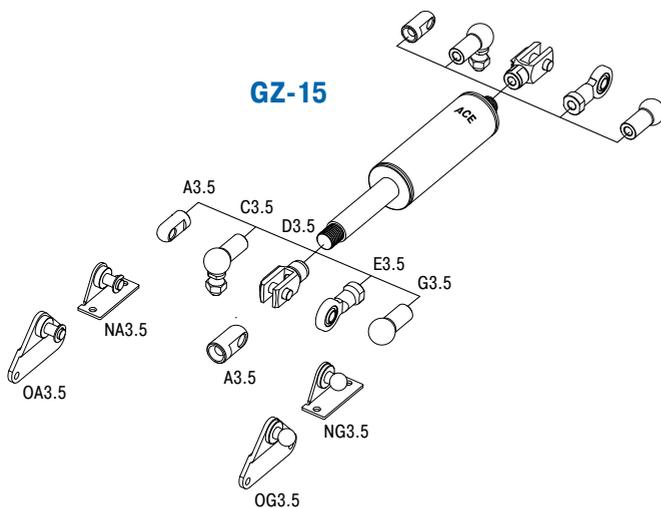
Type (Pull Type) _____
 Body 0.61" (15.6 mm) _____
 Stroke 5.91" (150 mm) _____
 Piston Rod End Fitting A3.5 _____
 Body End Fitting C3.5 _____
 Adjustable (V) _____
 Traction Force F₁ 34 lbs (150 N) _____

Mounting accessories see from page 212.

Adjuster Knob
DE-GAS-3.5

See page 191.

GZ-15



Technical Data

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

Progression: Approx. 12 % to 22 %

Lifetime: Approx. 2,000 m

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

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

Mounting: With piston rod upwards.

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

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

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

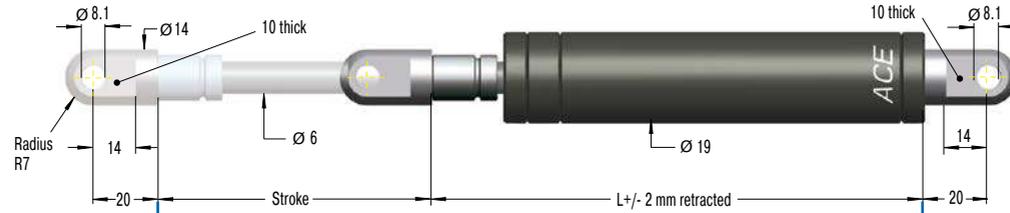
Valve Technology, Traction force 40 N to 350 N (extended up to 448 N)

End Fitting

Standard Dimensions

End Fitting

A8



Eye A8
max. force 3,000 N

B8

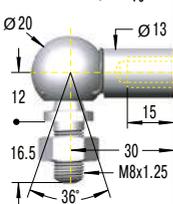


Performance and Dimensions

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

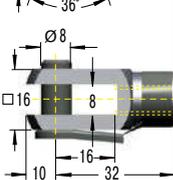
Stud Thread B8

C8



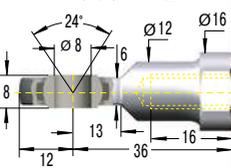
Angle Ball Joint C8
max. force 1,200 N
Also available with UNF thread 5/16-18. Order G5/16.

D8



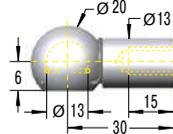
Clevis Fork D8
max. force 3,000 N

E8



Swivel Eye E8
max. force 3,000 N

G8



Ball Socket G8
max. force 1,200 N

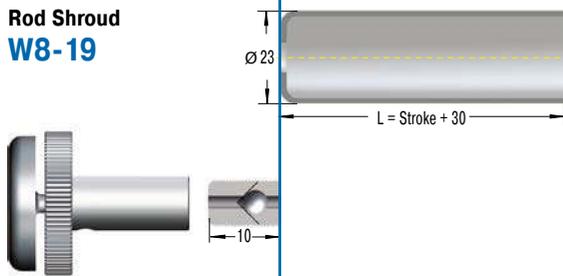
Ordering Example

GZ-19-150-AC-V-250

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

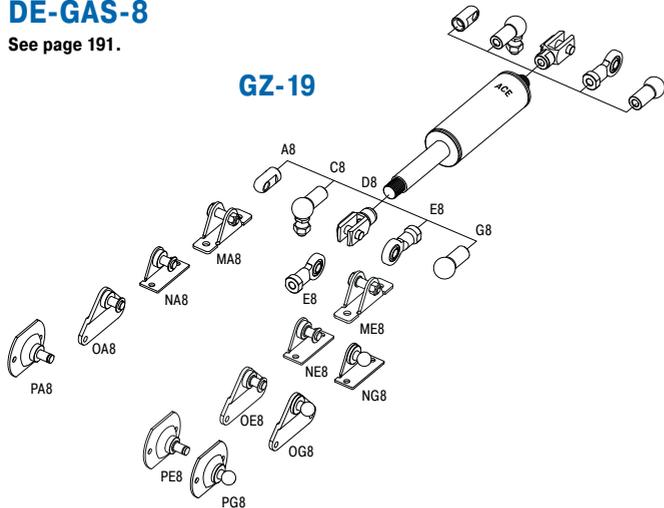
Mounting accessories see from page 212.

Rod Shroud W8-19



Adjuster Knob DE-GAS-8

See page 191.



Technical Data

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

Issue 04.2018 – Specifications subject to change

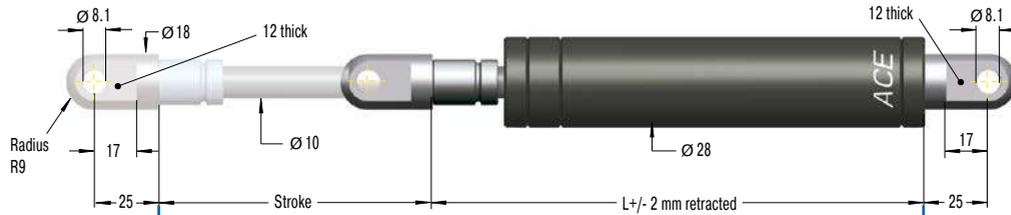
Valve Technology, Traction force 150 N to 1,200 N (extended up to 1,560 N)

End Fitting

Standard Dimensions

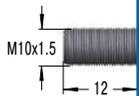
End Fitting

A10



Eye A10
max. force 10,000 N

B10

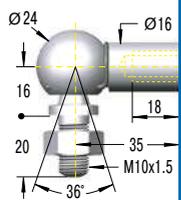


Performance and Dimensions

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

Stud Thread B10

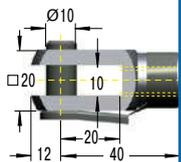
C10



Angle Ball Joint C10

max. force 1,800 N

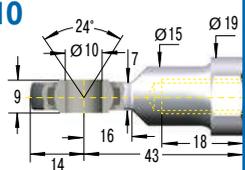
D10



Clevis Fork D10

max. force 10,000 N

E10



Swivel Eye E10

max. force 10,000 N

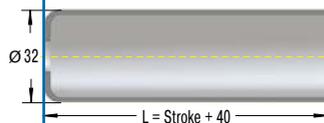
Ordering Example

GZ-28-150-EE-V-800

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

Mounting accessories see from page 212.

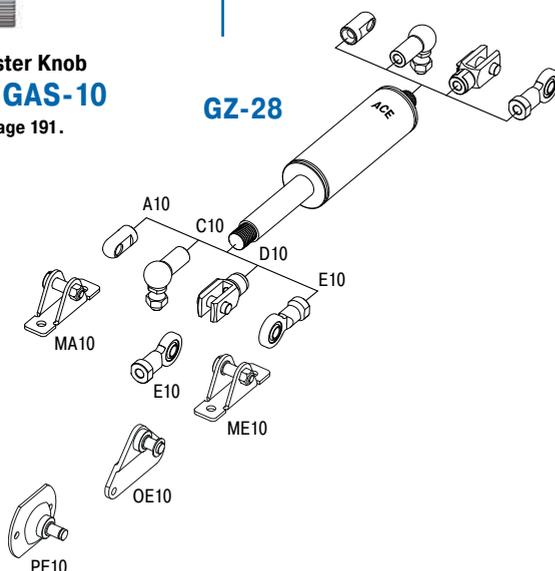
Rod Shroud W10-28



Adjuster Knob DE-GAS-10

See page 191.

GZ-28



Technical Data

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

Progression: Approx. 28 % to 30 %

Lifetime: Approx. 2,000 m

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

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

Mounting: With piston rod upwards.

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

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

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

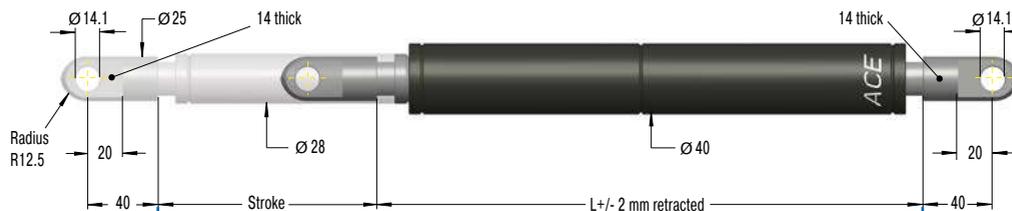
Valve Technology, Traction force 500 N to 5,000 N (extended up to 7,250 N)

End Fitting

Standard Dimensions

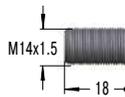
End Fitting

A14



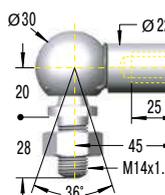
Eye A14
max. force 10,000 N

B14



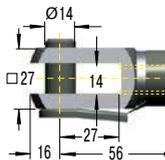
Stud Thread B14

C14



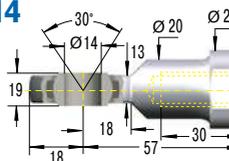
Angle Ball Joint C14
max. force 3,200 N

D14



Clevis Fork D14
max. force 10,000 N

E14



Swivel Eye E14
max. force 10,000 N

Performance and Dimensions

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

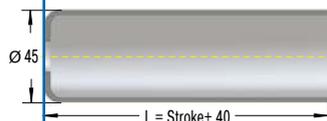
Ordering Example

GZ-40-150-EE-V-800

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

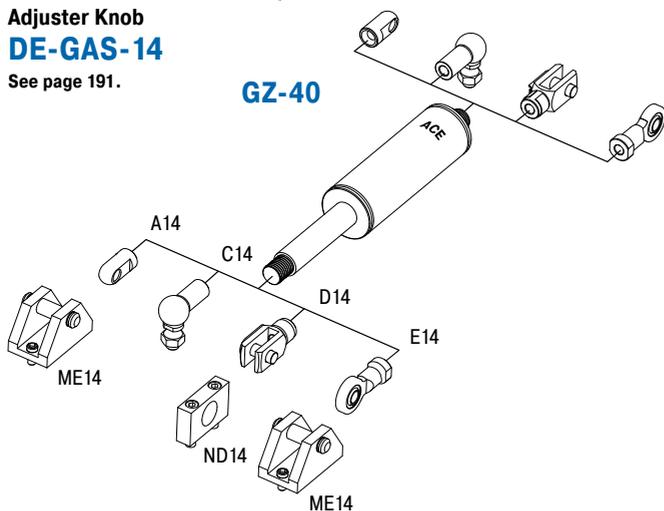
Mounting accessories see from page 212.

Rod Shroud W14-40



Adjuster Knob DE-GAS-14

See page 191.



Technical Data

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

Progression: Approx. 43 % to 45 %

Lifetime: Approx. 2,000 m

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

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

Mounting: With piston rod upwards.

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

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

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

ACE Easy Sizing

Just a few simple steps to your perfect ACE Gas Spring

NEW !

1

Select the position of flap and pivot point.

2

Specify your application within our 3D-simulator.

3

Calculate your ACE Gas Springs.

4

Add mounting accessories.

5

Send an order request.

Talk to us!

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

1-800-521-3320

The screenshot shows the ACE Easy Sizing web application interface. At the top, there's a navigation bar with 'ACE Controls Inc.' and a search bar. Below that, a main heading reads 'Just a few steps to your perfect fitting gas spring ACE Sizing Tools & Services'. The interface is divided into several sections: 'ACE Easy Sizing' (with sub-sections for 'Gas Springs (Push Type)' and 'GS-8 to GS-40'), 'Simulation' (featuring a 3D model of a gas spring mechanism and a 'Hand Force Trajectory' graph showing force in Newtons over an angle from 0° to 88°), and 'Configuration' (with dropdown menus for 'End fitting (piston rod)', 'Matching gas springs', 'End fitting (cylinder)', 'Mounting bracket (piston rod)', and 'Mounting bracket (cylinder)'. A 'Calculate Your Gas Spring(s)' button is prominent. At the bottom, there's an 'Amount' field set to '2' and a 'How to Order' button.

All available at
www.acecontrols.com

Calculations



GZ-15-V4A to GZ-40-VA

Very low progression rate with FDA approval

Valve Technology, Stainless Steel

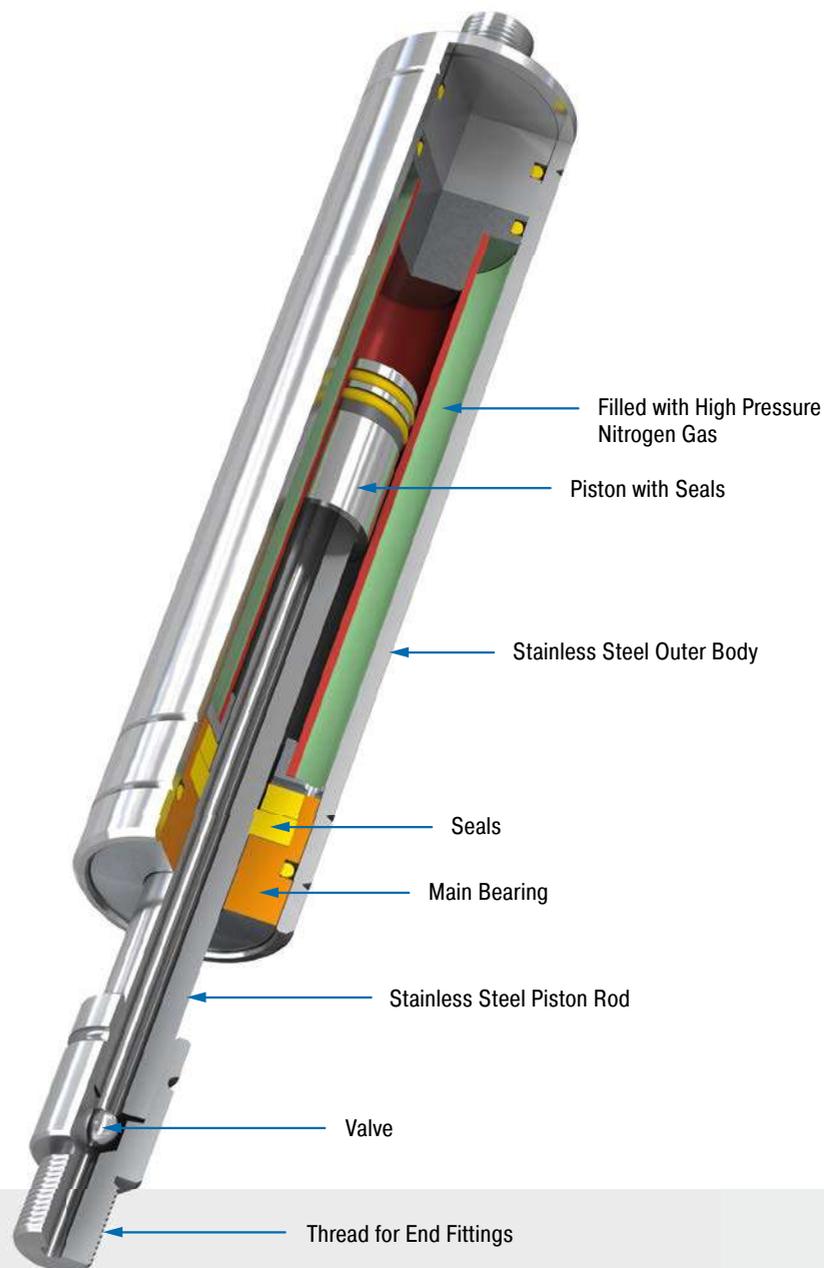
Traction force 40 N to 5,000 N

Stroke 20 mm to 600 mm

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

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

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



Technical Data

Traction force: 40 N to 5,000 N

Piston rod diameter: Ø 4 mm to Ø 28 mm

Progression: Approx. 11 % to 45 %

Lifetime: Approx. 2,000 m

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

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

Operating fluid: Nitrogen gas

Mounting: With piston rod upwards.

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

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

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

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

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

Valve Technology, Stainless Steel, Traction force 50 N to 150 N (extended up to 182 N)

End Fitting
Standard Dimensions
End Fitting

B3.5

A3.5-V4A

C3.5-V4A

D3.5-V4A

G3.5-V4A

Performance and Dimensions

TYPES	Stroke mm	L retracted mm	Traction force max. N
GZ-15-20-V4A	20	87	150
GZ-15-40-V4A	40	107	150
GZ-15-50-V4A	50	117	150
GZ-15-60-V4A	60	127	150
GZ-15-80-V4A	80	147	150
GZ-15-100-V4A	100	167	150
GZ-15-120-V4A	120	187	150
GZ-15-150-V4A	150	217	150

Ordering Example

Type (Pull Type) **GZ-15-150-AC-V-150-V4A**

Body 0.61" (15.6 mm)

Stroke 5.91" (150 mm)

Piston Rod End Fitting A3.5-V4A

Body End Fitting C3.5-V4A

Adjustable (V)

Traction Force F₁ 34 lbs (150 N)

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

Stud Thread B3.5

Eye A3.5-V4A
max. force 370 N

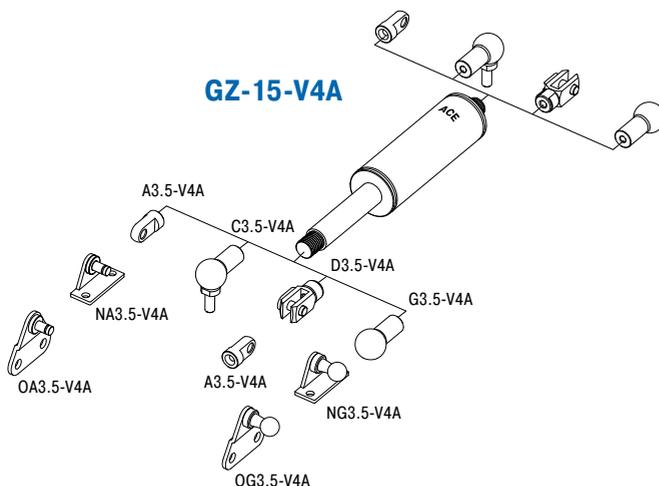
Angle Ball Joint C3.5-V4A
max. force 370 N

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

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

Adjuster Knob DE-GAS-3.5
See page 191.

Mounting accessories see from page 220.

GZ-15-V4A
Technical Data

Traction force: 50 N to 150 N (extended up to 182 N)

Progression: Approx. 11 % to 21 %

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.

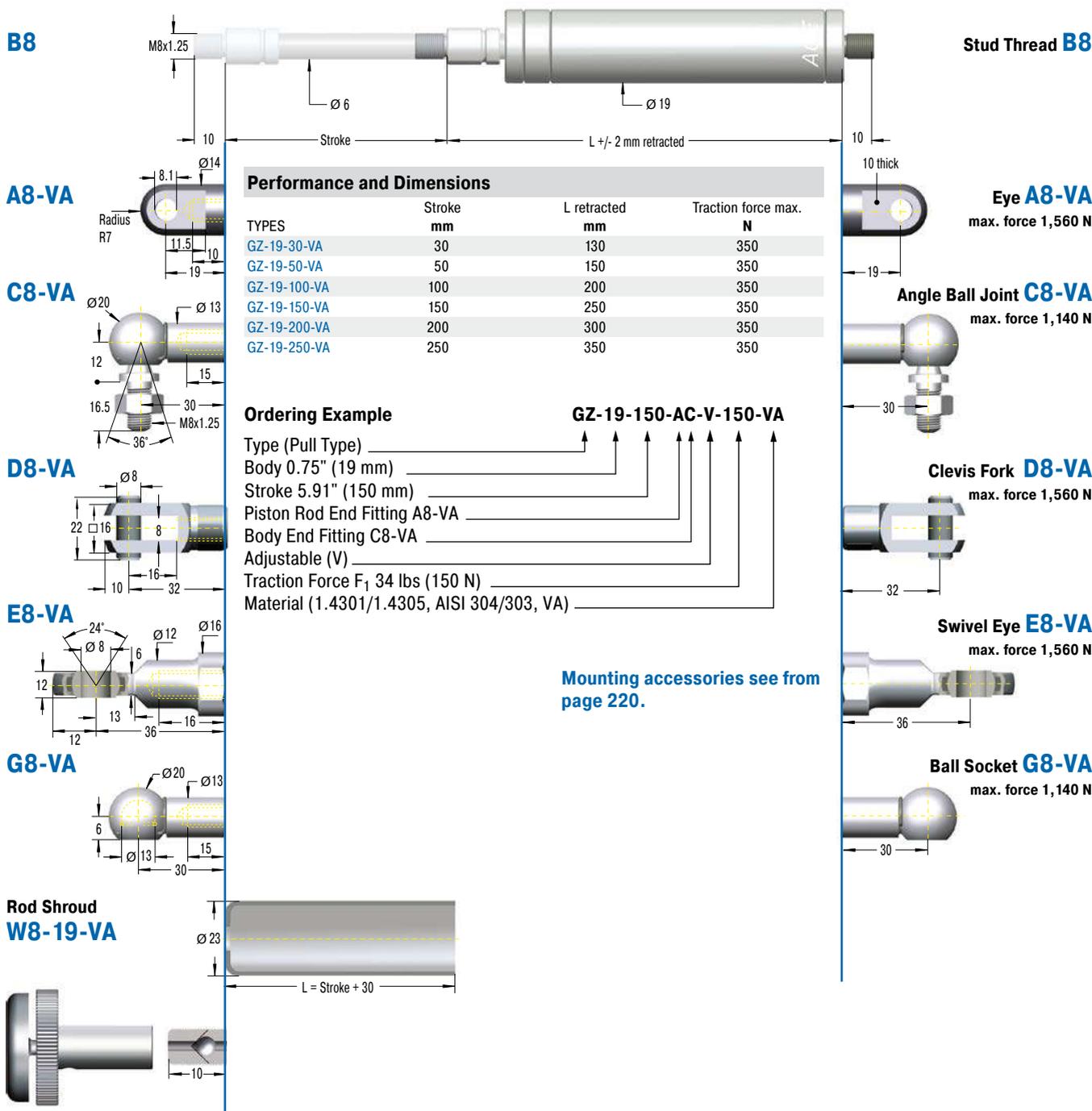
End fittings: They are interchangeable and if necessary must be positively secured by the customer to prevent unscrewing.

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

End Fitting

Standard Dimensions

End Fitting



Performance and Dimensions

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

Ordering Example **GZ-19-150-AC-V-150-VA**

Type (Pull Type) _____

Body 0.75" (19 mm) _____

Stroke 5.91" (150 mm) _____

Piston Rod End Fitting A8-VA _____

Body End Fitting C8-VA _____

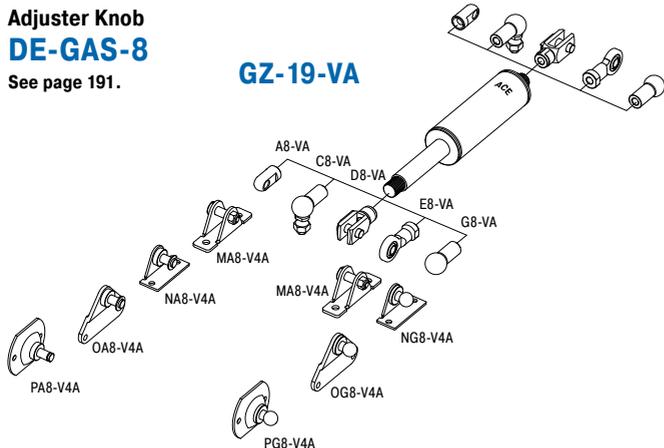
Adjustable (V) _____

Traction Force F₁ 34 lbs (150 N) _____

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

Mounting accessories see from page 220.

Adjuster Knob DE-GAS-8
See page 191.



Technical Data

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

Issue 04.2018 – Specifications subject to change

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

End Fitting

Standard Dimensions

End Fitting

B10

A10-VA

C10-VA

D10-VA

E10-VA

Rod Shroud W10-28-VA

Performance and Dimensions

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

Ordering Example

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

Type (Pull Type) _____

Body 1.10" (28 mm) _____

Stroke 5.91" (150 mm) _____

Piston Rod End Fitting E10-VA _____

Body End Fitting E10-VA _____

Adjustable (V) _____

Traction Force F₁ 180 lbs (800 N) _____

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

Stud Thread B10

Eye A10-VA
max. force 3,800 N

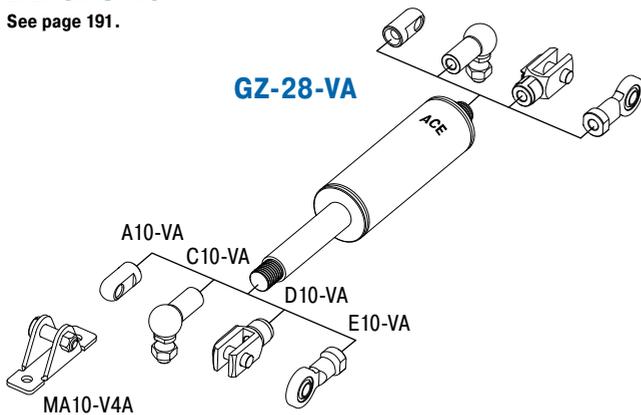
Angle Ball Joint C10-VA
max. force 1,750 N

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

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

Mounting accessories see from page 220.

Adjuster Knob DE-GAS-10
See page 191.



Technical Data

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

Progression: Approx. 29 % to 30 %

Lifetime: Approx. 2,000 m

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

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

Mounting: With piston rod upwards.

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

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

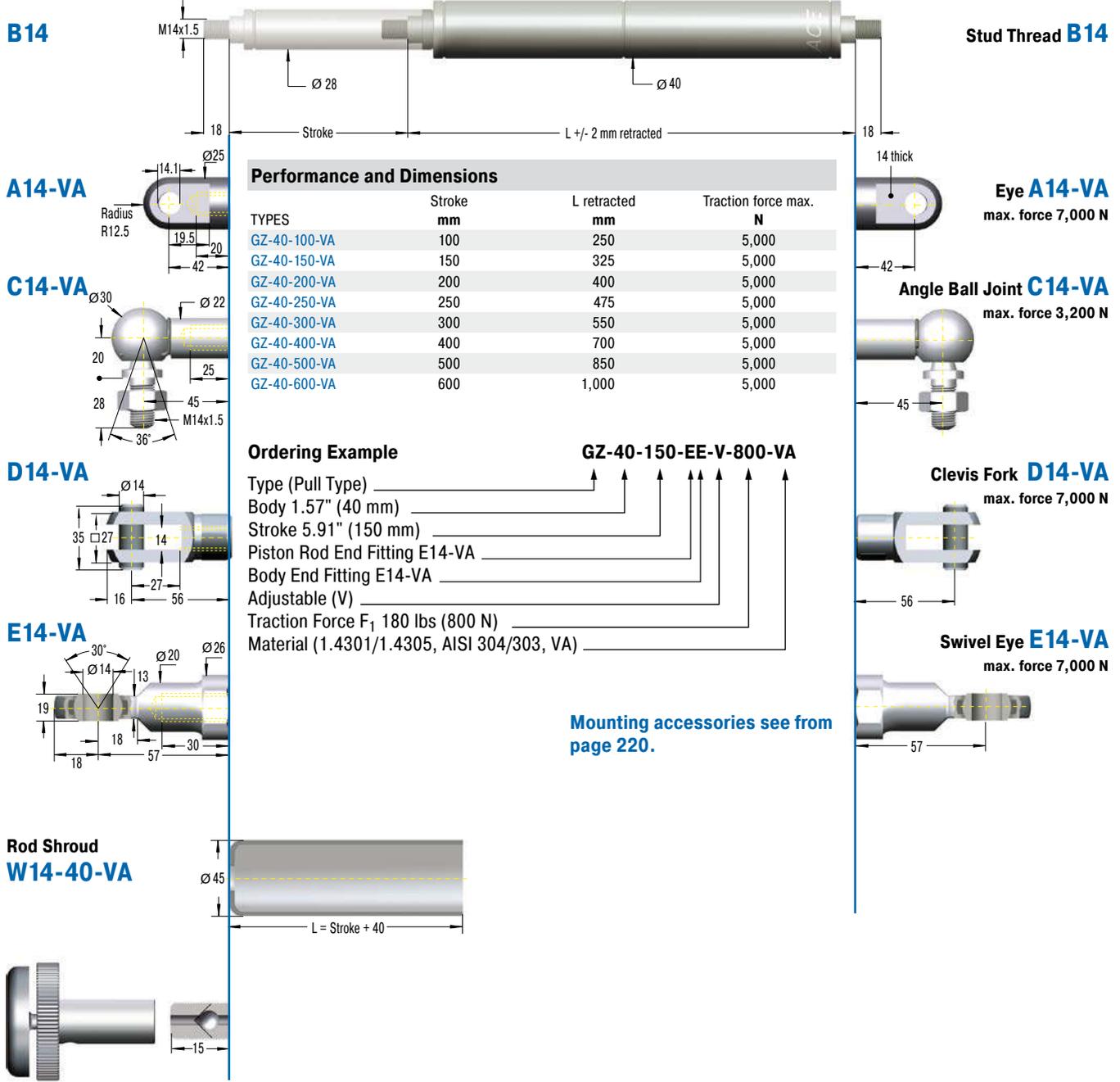
End fittings: They are interchangeable and if necessary must be positively secured by the customer to prevent unscrewing.

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

End Fitting

Standard Dimensions

End Fitting



Performance and Dimensions

TYPES	Stroke mm	L retracted mm	Traction force 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

Ordering Example

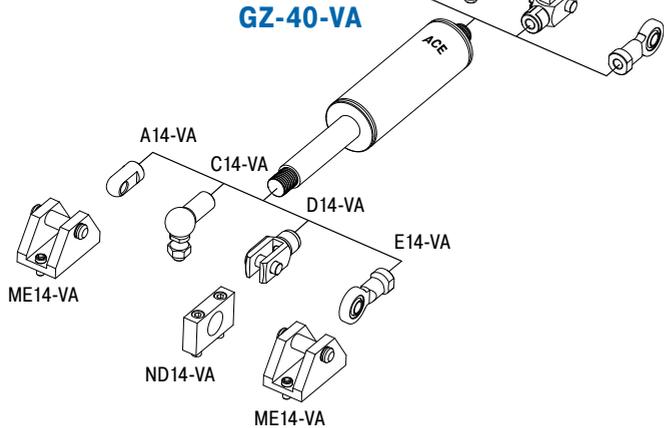
GZ-40-150-EE-V-800-VA

Type (Pull Type) _____
 Body 1.57" (40 mm) _____
 Stroke 5.91" (150 mm) _____
 Piston Rod End Fitting E14-VA _____
 Body End Fitting E14-VA _____
 Adjustable (V) _____
 Traction Force F₁ 180 lbs (800 N) _____
 Material (1.4301/1.4305, AISI 304/303, VA) _____

Mounting accessories see from page 220.

Adjuster Knob
DE-GAS-14

See page 191.



Technical Data

- Traction force:** 500 N to 5,000 N (extended up to 7,250 N)
- Progression:** Approx. 43 % to 45 %
- Lifetime:** Approx. 2,000 m
- Operating temperature range:** -20 °C to 80 °C
- Material:** Outer body, Piston rod, End fittings: Stainless steel (1.4301/1.4305, AISI 304/303)
- Mounting:** With piston rod upwards.
- End position damping length:** Without damping. For end position damping use damping material (e.g. TUBUS or SLAB).
- Positive stop:** External positive stop in the pulling direction provided by the customer.
- End fittings:** They are interchangeable and if necessary must be positively secured by the customer to prevent unscrewing.

Stainless Steel Gas Springs (Pull Type), V4A

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

Stainless Steel Accessories, V4A

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

We'll Size Industrial Gas Springs for You And we'll provide all necessary information for installation

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

It is important to identify the following points:

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

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

Example of a Calculation Offer

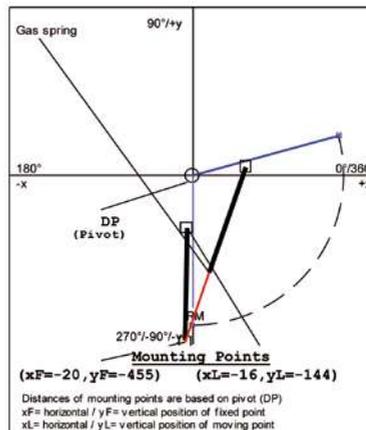
Input data		Identification data	
Start angle	αM: 270 °	Temperature	: 20 °C
Open angle	α: 105 °	Progression	: 42 %
Rd. ctr.grvty.	RM: 410 mm	Friction	: 30 N
Mass	m: 12 kg	Ext. length	: 504 mm
No. gas springs	n: 2		
Radius handforce	RRH: 820 mm		

Required user hand-forces

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

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

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



Input Data

Gas Spring Push type Gas Spring Pull type

Gas spring fixing points

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

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

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

If not shown by the sketch:

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

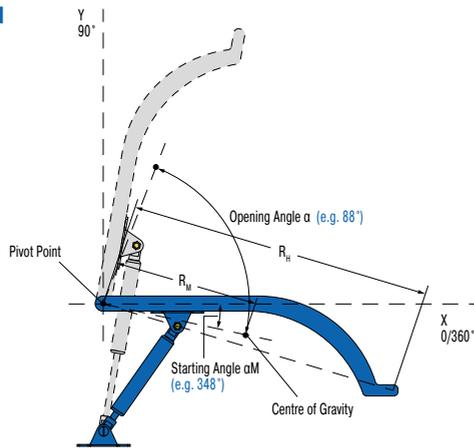
* Compulsory information

Desired Mounting Fittings

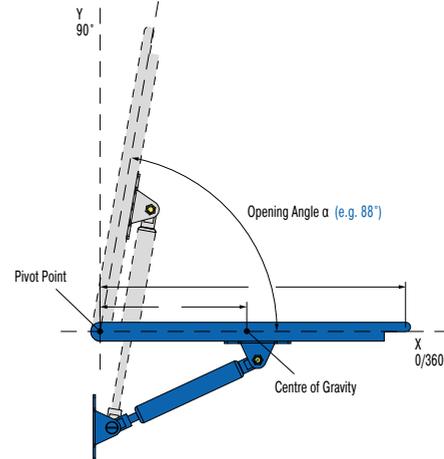
End Fitting		End Fitting
<input type="checkbox"/> A		A <input type="checkbox"/>
<input type="checkbox"/> B	B Stud Thread	B <input type="checkbox"/>
<input type="checkbox"/> C		C <input type="checkbox"/>
<input type="checkbox"/> D		D <input type="checkbox"/>
<input type="checkbox"/> E		E <input type="checkbox"/>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

The end fittings are interchangeable
 e.g. -CE: C = Angle Ball Joint, E = Swivel Eye

Hood



Flap



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

Comments	
Requirement per year	
Machine type / reference	

Sender

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

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

Mounting and Safety Instructions

Filling

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

Gas springs are maintenance-free!

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

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

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

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

Mounting

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

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

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

Life Time

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

Disposal/Recycling

Please ask for our disposal recommendations.

Warnings and Liability

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

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

Valve Actuation with ACE DE-GAS

Simple, safe and reliable

De-gassing for controlled force reduction on valve gas springs

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

Adjustment

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

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

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



DE-GAS

You can also visit our Youtube channel at www.youtube.com/user/acecontrolsglobal
Here, among other things you will find an ACETips video on the topic of DE-GAS!

Gas Spring Refilling Kit

Flexible and easy to use

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

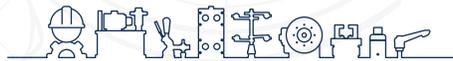


The refilling kit contains all filling bells and adjuster knobs for the current ACE gas spring range.

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

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

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



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