GS-8 to GS-70

Industrial gas springs – push type

Individual strokes and force ranges

Valve technology

Force range 10 N to 13,000 N

Stroke 20 mm to 1,000 mm

GS-8

GS-10

GS-12

GS-15

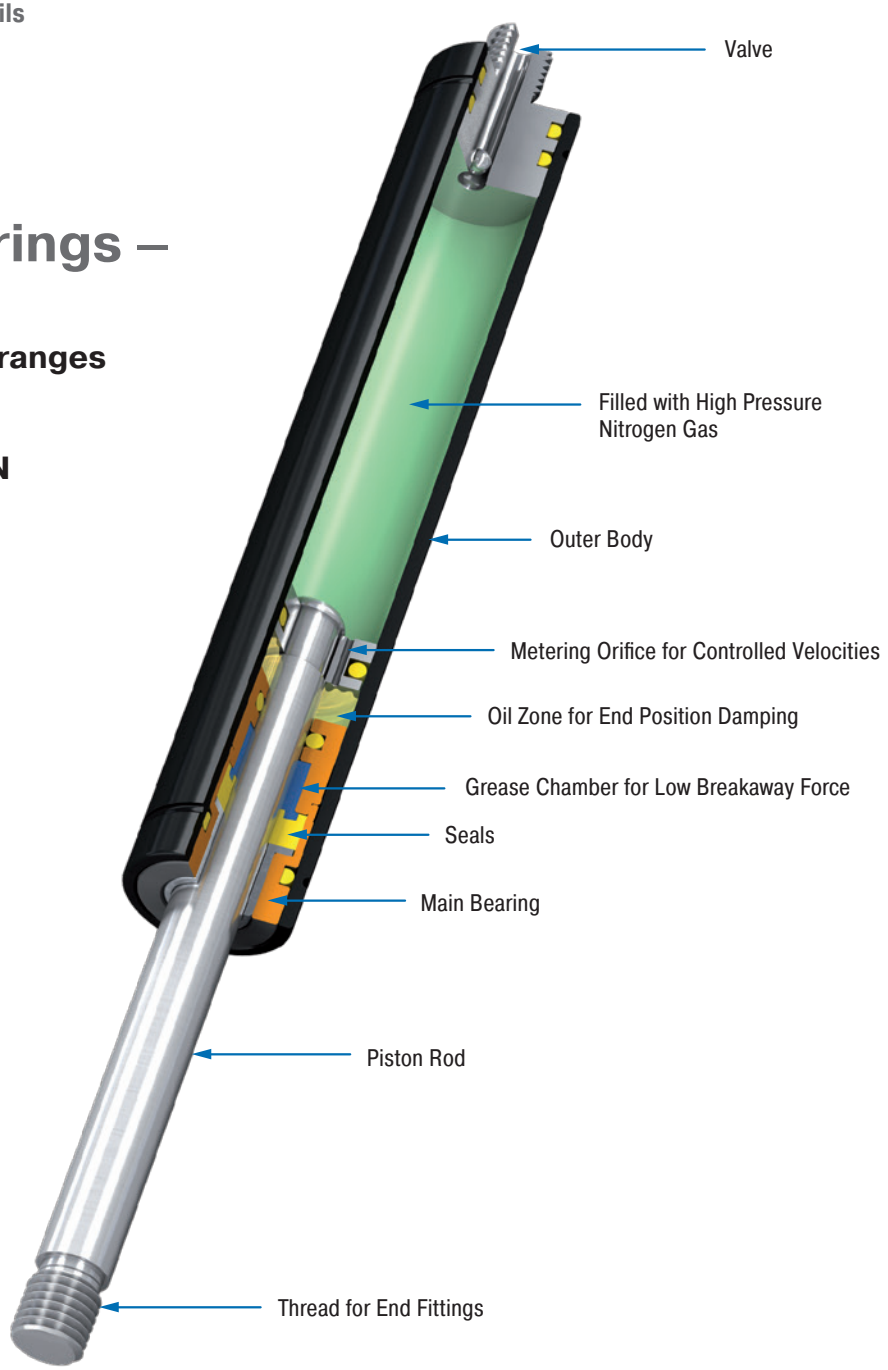
GS-19

GS-22

GS-28

GS-40

GS-70



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Industrial gas springs – push type GS-8 to GS-70 (with valve technology)

Manual

General instructions

This manual is for the disruption-free use of the product types listed on page 1; its compliance is a prerequisite for the fulfilment of any warranty claims.

Therefore, make sure to read this manual before use.

Always maintain the limits specified in the performance table. Take into account the predominant environmental conditions and restrictions. Note the regulations of the trade association, TÜV or corresponding national, international and European regulations. Installation and commissioning only according to mounting instructions.

Safety information

WARNING

If ACE gas springs are used where a failure of the product could lead to personal injuries and/or material damage, additional safety elements must be implemented.

The flap/mass can fall down during installation of the gas springs. Secure the flap/mass to be moved against falling down.
Always install:
Push type gas springs always in extended state. Pull type gas springs in retracted state.

Intended use

ACE industrial push type gas springs are used wherever flaps or components are to be pressed, pulled, lifted, positioned or lowered by hand with the support of gas springs and without external energy. ACE gas springs are individually filled with a certain pressure (force range F_1) according to customer requirements.

Description and function

Industrial push type gas springs are maintenance-free and ready-to-install. They are available off-the-shelf with a body diameter of 8 mm to 70 mm and forces of between 10 N and 13,000 N with a valve.

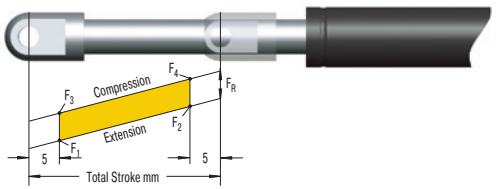
ACE push type gas springs are individually filled with a certain pressure (force range F_1) according to customer requirements. Taking into account the filling pressure, the cross-sectional area of the piston rod generates the force range F = p*A.

When inserting the piston rod, nitrogen flows through a metering orifice into the piston from the piston side to the piston rod side. The filling with nitrogen is sealed by the piston rod volume (compressed).

The increasing pressure causes the force increase (progression) of the gas springs. The force increase is dependent upon the ratio of the piston rod diameter to the outer body diameter and is approximately linear.

Calculation basis

Gas spring characteristic line in force-distance diagram



F_1 = nominal force at 20 °C (selected with orders and calculations)

F_2 = force in retracted state

Additional friction force is created by the contact pressure of the seals **during the retraction movement only**:

F_3 = force at the start of the insertion movement
F_4 = force at the end of the insertion movement

Gas springs (push type)

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

[1] Depending on stroke

[2] Depending on filling power

Progression: Linear force increase during retraction, measured by the nominal force over the entire stroke. The specified approximate values can be changed on request.

Temperature effect: Due to physical restrictions the force of the gas springs changes by 3.4% every 10 °C.

Filling tolerances: -20 N to +40 N or 5% to 7%. The tolerances may deviate depending on construction size and force range.

Instructions for the discharge process with valve gas springs

1. Hold gas spring with valve vertically upwards.
2. Screw DE-GAS adjustment tool onto the valve threaded pin.
3. Operate DE-GAS with light manual force until nitrogen escapes. Only press briefly so that not too much nitrogen can escape.
4. After the discharge, remove the DE-GAS, screw on the mounting element and try the gas springs in the application; if necessary, repeat the discharge process.

If 2 gas springs are installed in parallel, both gas springs should have the same force in order to avoid tilting. If necessary, send to ACE in order to have both gas springs filled to the same (averaged) force.

If too much nitrogen is discharged, this can be refilled at ACE.

DE-GAS

Calculation and design

In order to achieve an optimum force progression with minimal manual force, the gas spring must be correctly dimensioned and the suspension points optimally positioned (see figure). The following must be determined:

- Gas spring types
- Necessary gas spring stroke
- Fastening points on flap and frame
- Maximum installation length of the gas spring
- Necessary force ranges
- Manual force to be used for all flap positions

With the free ACE calculation service you can avoid these time-consuming calculations. Using the calculation form in the catalogue or on www.ace-ace.de you can fax or mail the necessary requirements to us. Please add a sketch in side view (simple hand-drawn sketch with dimensions is sufficient) to your application. Our technical advisers can use this to determine the optimum mounting points for you.

You will receive a calculation offer with manual forces required to open and close. The mounting points on the flap and the frame are selected in such a way that they can be easily mounted to (hooked in) the completely extended gas spring with an open flap.

Delivery and storage

- After delivery please check the gas springs for any damage.
- The tension gas springs can become damaged if they fall down; remove gas springs from packaging carefully.
- Push type gas springs can generally be stored in any position. (Recommendation: Store with piston rod pointing downwards.)
- Always store push type gas springs in a dry place in order to avoid oxidation.
- The recommended maximum storage time is 1 year.
- Any protective packaging must be removed before installation.

Maintenance and care

Industrial push type gas springs are maintenance-free and ready-to-install. Regularly check the gas springs for oil loss, function and external damage.

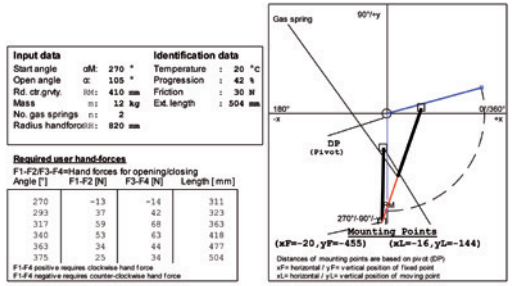
Push type gas springs are machine elements that are subject to continuous wear. Increased service life results in a reduced pushing (pulling) force. If this is no longer sufficient, the push type gas springs must be replaced or exchanged as appropriate.

Disassembly and disposal

Take account of environmental protection during disposal of the gas springs.

Push type gas springs can be given an oil filling depending on model. The corresponding data sheet is available on request. Gas springs cannot be repaired (with the exception of GS-70). The corresponding disposal instructions are available on request. You can return the gas springs to ACE for disposal that is free of charge.

Only remove push type gas springs in a completely extended state. This allows the gas spring to be easily unhooked.



Example: Calculation offer with mounting information

Industrial gas spring – push type GS-8 (with valve technology)

Mounting instructions and mounting accessories

Installation instructions

Gas springs are maintenance-free and ready to install. Before installation and use, check whether the identification number on the gas spring matches the respective designation on the delivery note.

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

Temperature effect: Due to physical restrictions the force of the gas springs changes by 3.4% every 10 °C.

Mounting: Install piston rod pointing downwards, then the end-position damping acts during opening and the piston rod of the gas spring is lubricated.

Filling tolerance: -20 N to +40 N or 5% to 7%

WARNING

The flap/mass can fall down during installation of the gas springs.
Secure the flap/mass to be moved against falling down. Always install push type gas springs in extended state, pull type gas springs in retracted state.

If the temperature exceeds or falls below the maximum or minimum temperature, the gas spring may fail.
Always maintain temperature range of -20 °C to +80 °C.

Fluids, gases and dirt particles in the environment can attack or destroy the seal system of the gas spring and cause it to fail.
Protect piston rod and seal system from external materials in the environment.

Damage to the piston rod surface can destroy the seal system.
Do not grease, oil, paint piston rod, etc.; protect against dirt particles.

Tilting and lateral forces can lead to leaks from the gas spring or blocking of the piston rod.
Check installation and ensure suitable end fittings and guides. There must be no tension on mounting parts; if necessary, allow a little free play.

The body tube can become deformed.
Do not allow any transverse or lateral forces on the gas spring. Do not clamp the body tube.

End fittings can come loose from the gas spring.
Always completely screw on the end fittings and, if necessary, secure with threadlocker (Loctite).

High forces may cause the gas spring to compress or overstretch.
Apply mechanical stops.

Danger of kinking.
Avoid long stroke lengths combined with a high force range.

Max. force.
The max. forces for the mounting parts and fittings relate to the compressed gas spring. If these are exceeded there is a risk of breakage.

Packaging disposal

Please dispose of the transportation packaging in an environmentally-friendly manner. Recycling packaging materials saves raw materials and reduces waste. The packaging materials do not contain any prohibited materials.

M3.5x0.6 mounting accessories

GS-8

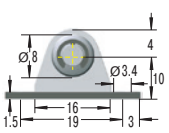
Before installation check whether the identification number on the packaging matches the respective designation on the delivery note.

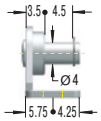
Note the dimensioning for mounting when using accessory parts. Bolts for fitting of accessories are not included.

If you have any questions, please phone +49 (0)2173 - 9226-20 for free advice.

[1] Up to max. 180 N

NA3.5

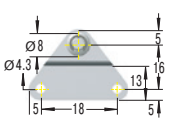


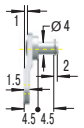


NG3.5

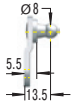
[1] Up to max. 180 N

OA3.5





OG3.5

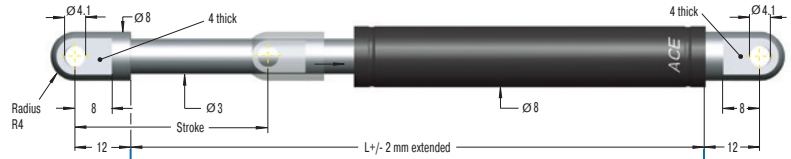


[1] Note! Max. static load in N; note force increase when pushing in (progression). Higher load possible on request.

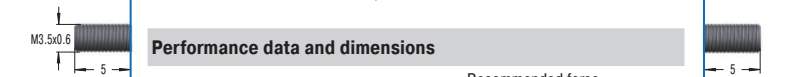
Valve technology, force range 10 N to 100 N (retracted to 133 N)

End Fitting | **Standard Dimensions** | **End Fitting**

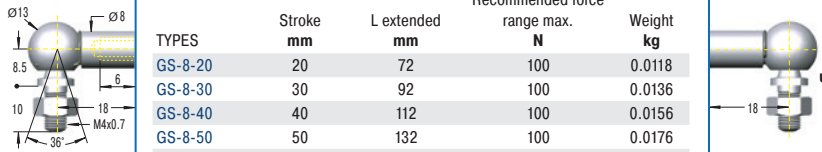
A3.5



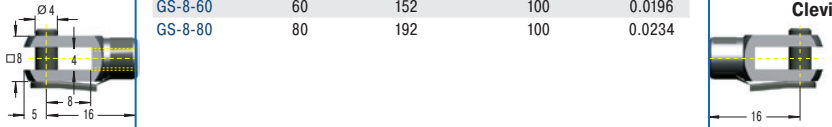
B3.5



C3.5



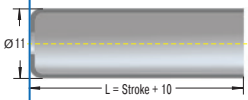
D3.5



E3.5

G3.5

Protective tube
W3.5-8



Performance data and dimensions

TYPES	Stroke mm	L extended mm	Recommended force range max. N	Weight kg
GS-8-20	20	72	100	0.0118
GS-8-30	30	92	100	0.0136
GS-8-40	40	112	100	0.0156
GS-8-50	50	132	100	0.0176
GS-8-60	60	152	100	0.0196
GS-8-80	80	192	100	0.0234

Eyelet
A3.5
up to max. 370 N

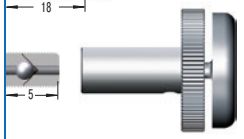
Threaded pin
B3.5

Hinge joint
C3.5
up to max. 370 N

Clevis fork D3.5
up to max. 370 N

Joint head E3.5
up to max. 370 N

Angle joint G3.5
up to max. 370 N



Discharge tool
DE-GAS-3.5

The end fittings can be combined in any manner and must be secured against twisting by the customer, if necessary. See mounting accessories.

Industrial gas spring – pull type GS-10 (with valve technology)

Mounting instructions and mounting accessories

Installation instructions

Gas springs are maintenance-free and ready to install. Before installation and use, check whether the identification number on the gas spring matches the respective designation on the delivery note.

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

Temperature effect: Due to physical restrictions the force of the gas springs changes by 3.4% every 10 °C.

Mounting: Install piston rod pointing downwards, then the end-position damping acts during opening and the piston rod of the gas spring is lubricated.

Filling tolerance: -20 N to +40 N or 5% to 7%

WARNING

The flap/mass can fall down during installation of the gas springs.
Secure the flap/mass to be moved against falling down. Always install push type gas springs in extended state, pull type gas springs in retracted state.

If the temperature exceeds or falls below the maximum or minimum temperature, the gas spring may fail.
Always maintain temperature range of -20 °C to +80 °C.

Fluids, gases and dirt particles in the environment can attack or destroy the seal system of the gas spring and cause it to fail.
Protect piston rod and seal system from external materials in the environment.

Damage to the piston rod surface can destroy the seal system.
Do not grease, oil, paint piston rod, etc.; protect against dirt particles.

Tilting and lateral forces can lead to leaks from the gas spring or blocking of the piston rod.
Check installation and ensure suitable end fittings and guides. There must be no tension on mounting parts; if necessary, allow a little free play.

The body tube can become deformed.
Do not allow any transverse or lateral forces on the gas spring. Do not clamp the body tube.

End fittings can come loose from the gas spring.
Always completely screw on the end fittings and, if necessary, secure with threadlocker (Loctite).

High forces may cause the gas spring to compress or overstretch.
Apply mechanical stops.

Danger of kinking.
Avoid long stroke lengths combined with a high force range.

Max. force.
The max. forces for the mounting parts and fittings relate to the compressed gas spring. If these are exceeded there is a risk of breakage.

Packaging disposal

Please dispose of the transportation packaging in an environmentally-friendly manner. Recycling packaging materials saves raw materials and reduces waste. The packaging materials do not contain any prohibited materials.

M3.5x0.6 mounting accessories

GS-10

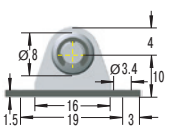
Before installation check whether the identification number on the packaging matches the respective designation on the delivery note.

Note the dimensioning for mounting when using accessory parts. Bolts for fitting of accessories are not included.

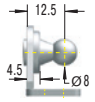
If you have any questions, please phone +49 (0)2173 - 9226-20 for free advice.

[1] Up to max. 180 N

NA3.5

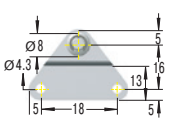


NG3.5

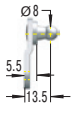


[1] Up to max. 180 N

OA3.5



OG3.5

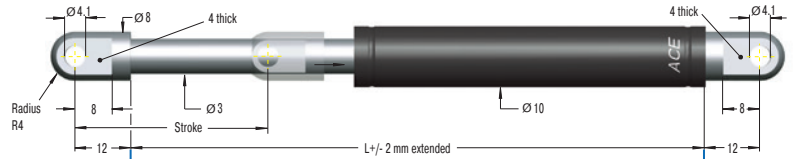


[1] Note! Max. static load in N; note force increase when pushing in (progression). Higher load possible on request.

Valve technology, force range 10 N to 100 N (retracted to 116 N)

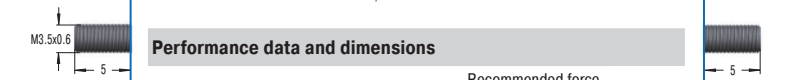
End Fitting — **Standard Dimensions** — **End Fitting**

A3.5



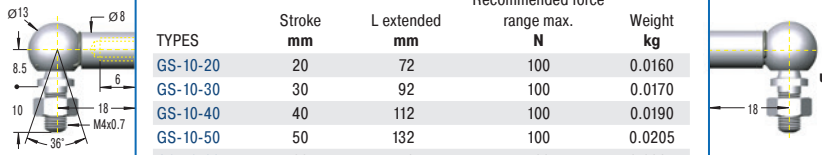
Eyelet A3.5
up to max. 370 N

B3.5



Threaded pin B3.5

C3.5

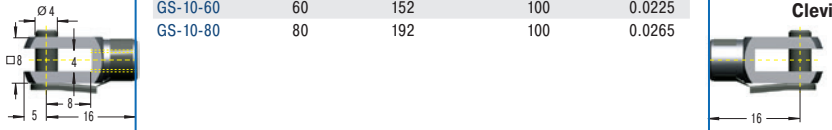


Hinge joint C3.5
up to max. 370 N

Performance data and dimensions

TYPES	Stroke mm	L extended mm	Recommended force range max. N	Weight kg
GS-10-20	20	72	100	0.0160
GS-10-30	30	92	100	0.0170
GS-10-40	40	112	100	0.0190
GS-10-50	50	132	100	0.0205
GS-10-60	60	152	100	0.0225
GS-10-80	80	192	100	0.0265

D3.5



Clevis fork D3.5
up to max. 370 N

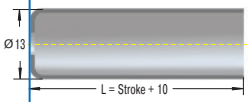
E3.5

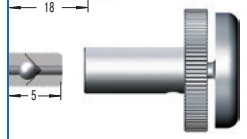
Joint head E3.5
up to max. 370 N

G3.5

Angle joint G3.5
up to max. 370 N

Protective tube W3.5-10





Discharge tool DE-GAS-3.5

The end fittings can be combined in any manner and must be secured against twisting by the customer, if necessary. See mounting accessories.

Industrial gas spring – push type GS-12 (with valve technology)

Mounting instructions and mounting accessories

Installation instructions

Gas springs are maintenance-free and ready to install. Before installation and use, check whether the identification number on the gas spring matches the respective designation on the delivery note.

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

Temperature effect: Due to physical restrictions the force of the gas springs changes by 3.4% every 10 °C.

Mounting: Install piston rod pointing downwards, then the end-position damping acts during opening and the piston rod of the gas spring is lubricated.

Filling tolerance: -20 N to +40 N or 5% to 7%

WARNING

The flap/mass can fall down during installation of the gas springs.
Secure the flap/mass to be moved against falling down. Always install push type gas springs in extended state, pull type gas springs in retracted state.

If the temperature exceeds or falls below the maximum or minimum temperature, the gas spring may fail.
Always maintain temperature range of -20 °C to +80 °C.

Fluids, gases and dirt particles in the environment can attack or destroy the seal system of the gas spring and cause it to fail.
Protect piston rod and seal system from external materials in the environment.

Damage to the piston rod surface can destroy the seal system.
Do not grease, oil, paint piston rod, etc.; protect against dirt particles.

Tilting and lateral forces can lead to leaks from the gas spring or blocking of the piston rod.
Check installation and ensure suitable end fittings and guides. There must be no tension on mounting parts; if necessary, allow a little free play.

The body tube can become deformed.
Do not allow any transverse or lateral forces on the gas spring. Do not clamp the body tube.

End fittings can come loose from the gas spring.
Always completely screw on the end fittings and, if necessary, secure with threadlocker (Loctite).

High forces may cause the gas spring to compress or overstretch.
Apply mechanical stops.

Danger of kinking.
Avoid long stroke lengths combined with a high force range.

Max. force.
The max. forces for the mounting parts and fittings relate to the compressed gas spring. If these are exceeded there is a risk of breakage.

Packaging disposal

Please dispose of the transportation packaging in an environmentally-friendly manner. Recycling packaging materials saves raw materials and reduces waste. The packaging materials do not contain any prohibited materials.

M3.5x0.6 mounting accessories

GS-12

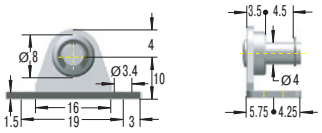
Before installation check whether the identification number on the packaging matches the respective designation on the delivery note.

Note the dimensioning for mounting when using accessory parts. Bolts for fitting of accessories are not included.

If you have any questions, please phone +49 (0)2173 - 9226-20 for free advice.

[1] Up to max. 180 N

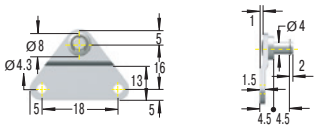
NA3.5



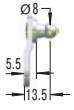
NG3.5

[1] Up to max. 180 N

OA3.5



OG3.5

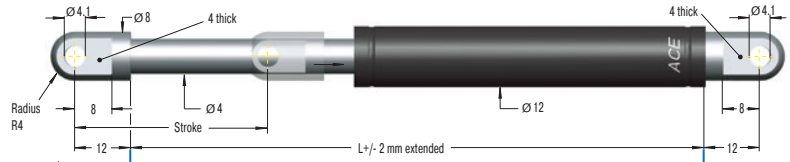


[1] Note! Max. static load in N; note force increase when pushing in (progression). Higher load possible on request.

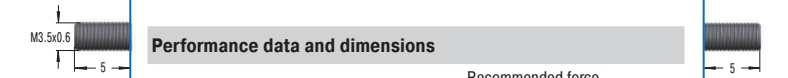
Valve technology, force range 15 N to 180 N (retracted to 243 N)

End Fitting | **Standard Dimensions** | **End Fitting**

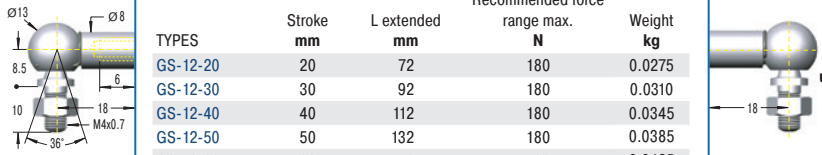
A3.5



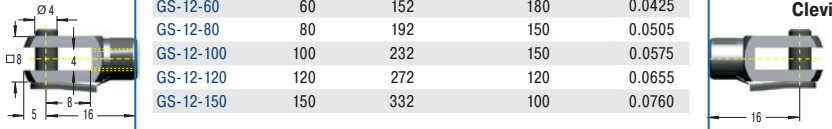
B3.5



C3.5



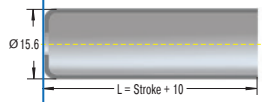
D3.5



E3.5

G3.5

Protective tube
W3.5-12



Performance data and dimensions

TYPES	Stroke mm	L extended mm	Recommended force range max. N	Weight kg
GS-12-20	20	72	180	0.0275
GS-12-30	30	92	180	0.0310
GS-12-40	40	112	180	0.0345
GS-12-50	50	132	180	0.0385
GS-12-60	60	152	180	0.0425
GS-12-80	80	192	150	0.0505
GS-12-100	100	232	150	0.0575
GS-12-120	120	272	120	0.0655
GS-12-150	150	332	100	0.0760

Eyelet
A3.5
up to max. 370 N

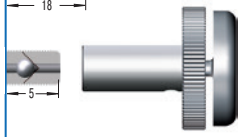
Threaded pin
B3.5

Hinge joint
C3.5
up to max. 370 N

Clevis fork D3.5
up to max. 370 N

Joint head E3.5
up to max. 370 N

Angle joint G3.5
up to max. 370 N



Discharge tool
DE-GAS-3.5

The end fittings can be combined in any manner and must be secured against twisting by the customer, if necessary. See mounting accessories.

Industrial gas spring – push type GS-15 (with valve technology)

Mounting instructions and mounting accessories

Installation instructions

Gas springs are maintenance-free and ready to install. Before installation and use, check whether the identification number on the gas spring matches the respective designation on the delivery note.

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

Temperature effect: Due to physical restrictions the force of the gas springs changes by 3.4% every 10 °C.

Mounting: Install piston rod pointing downwards, then the end-position damping acts during opening and the piston rod of the gas spring is lubricated.

Filling tolerance: -20 N to +40 N or 5% to 7%

WARNING

The flap/mass can fall down during installation of the gas springs.
Secure the flap/mass to be moved against falling down. Always install push type gas springs in extended state, pull type gas springs in retracted state.

If the temperature exceeds or falls below the maximum or minimum temperature, the gas spring may fail.
Always maintain temperature range of -20 °C to +80 °C.

Fluids, gases and dirt particles in the environment can attack or destroy the seal system of the gas spring and cause it to fail.
Protect piston rod and seal system from external materials in the environment.

Damage to the piston rod surface can destroy the seal system.
Do not grease, oil, paint piston rod, etc.; protect against dirt particles.

Tilting and lateral forces can lead to leaks from the gas spring or blocking of the piston rod.
Check installation and ensure suitable end fittings and guides. There must be no tension on mounting parts; if necessary, allow a little free play.

The body tube can become deformed.
Do not allow any transverse or lateral forces on the gas spring. Do not clamp the body tube.

End fittings can come loose from the gas spring.
Always completely screw on the end fittings and, if necessary, secure with threadlocker (Loctite).

High forces may cause the gas spring to compress or overstretch.
Apply mechanical stops.

Danger of kinking.
Avoid long stroke lengths combined with a high force range.

Max. force.
The max. forces for the mounting parts and fittings relate to the compressed gas spring. If these are exceeded there is a risk of breakage.

Packaging disposal

Please dispose of the transportation packaging in an environmentally-friendly manner. Recycling packaging materials saves raw materials and reduces waste. The packaging materials do not contain any prohibited materials.

M5x0.8 mounting accessories

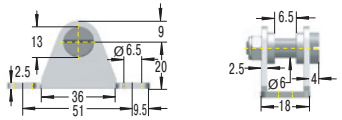
GS-15

Before installation check whether the identification number on the packaging matches the respective designation on the delivery note.

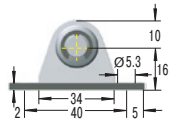
Note the dimensioning for mounting when using accessory parts. Bolts for fitting of accessories are not included.

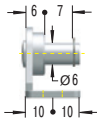
If you have any questions, please phone +49 (0)2173 - 9226-20 for free advice.

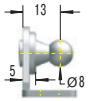
[1] Up to max. 500 N — **MA5**



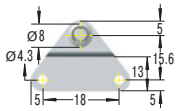
[1] Up to max. 400 N — **NA5** — **NG5**

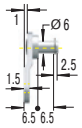




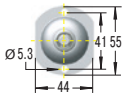


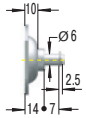
[1] Up to max. 180 N — **OA5** — **OG5**

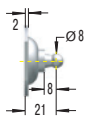




[1] Up to max. 500 N — **PA5** — **PG5**





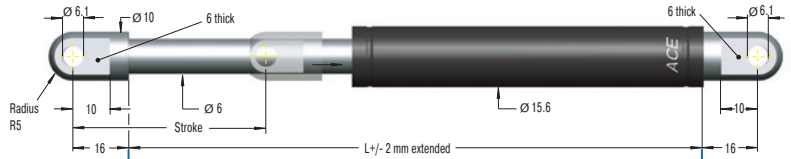


[1] Note! Max. static load in N; note force increase when pushing in (progression). Higher load possible on request.

Valve technology, force range 40 N to 400 N (retracted to 560 N)

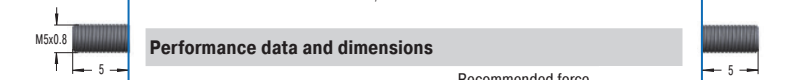
End Fitting — **Standard Dimensions** — **End Fitting**

A5



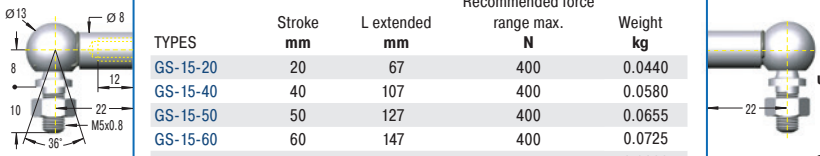
Eyelet A5
up to max. 800 N

B5



Threaded pin B5

C5



Hinge joint C5
up to max. 500 N

Performance data and dimensions

TYPES	Stroke mm	L extended mm	Recommended force range max. N	Weight kg
GS-15-20	20	67	400	0.0440
GS-15-40	40	107	400	0.0580
GS-15-50	50	127	400	0.0655
GS-15-60	60	147	400	0.0725
GS-15-80	80	187	400	0.0860
GS-15-100	100	227	400	0.1000
GS-15-120	120	267	400	0.1135
GS-15-150	150	327	400	0.1350
GS-15-200	200	427	350	0.1680

D5

Clevis fork D5
up to max. 800 N

E5

Joint head E5
up to max. 800 N

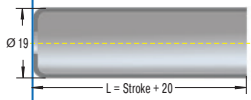
F5

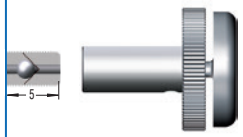
Joint screw F5
up to max. 500 N

G5

Angle joint G5
up to max. 500 N

Protective tube W5-15





Discharge tool DE-GAS-5

The end fittings can be combined in any manner and must be secured against twisting by the customer, if necessary. See mounting accessories.

Industrial gas spring – push type GS-19 (with valve technology)

Mounting instructions and mounting accessories

Installation instructions

Gas springs are maintenance-free and ready to install. Before installation and use, check whether the identification number on the gas spring matches the respective designation on the delivery note.

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

Temperature effect: Due to physical restrictions the force of the gas springs changes by 3.4% every 10 °C.

Mounting: In any position. Install piston rod pointing downwards, then the end-position damping acts during opening.

Filling tolerance: -20 N to +40 N or 5% to 7%

WARNING

The flap/mass can fall down during installation of the gas springs.
Secure the flap/mass to be moved against falling down. Always install push type gas springs in extended state, pull type gas springs in retracted state.

If the temperature exceeds or falls below the maximum or minimum temperature, the gas spring may fail.
Always maintain temperature range of -20 °C to +80 °C.

Fluids, gases and dirt particles in the environment can attack or destroy the seal system of the gas spring and cause it to fail.
Protect piston rod and seal system from external materials in the environment.

Damage to the piston rod surface can destroy the seal system.
Do not grease, oil, paint piston rod, etc.; protect against dirt particles.

Tilting and lateral forces can lead to leaks from the gas spring or blocking of the piston rod.
Check installation and ensure suitable end fittings and guides. There must be no tension on mounting parts; if necessary, allow a little free play.

The body tube can become deformed.
Do not allow any transverse or lateral forces on the gas spring. Do not clamp the body tube.

End fittings can come loose from the gas spring.
Always completely screw on the end fittings and, if necessary, secure with threadlocker (Loctite).

High forces may cause the gas spring to compress or overstretch.
Apply mechanical stops.

Danger of kinking.
Avoid long stroke lengths combined with a high force range.

Max. force.
The max. forces for the mounting parts and fittings relate to the compressed gas spring. If these are exceeded there is a risk of breakage.

Packaging disposal

Please dispose of the transportation packaging in an environmentally-friendly manner. Recycling packaging materials saves raw materials and reduces waste. The packaging materials do not contain any prohibited materials.

M8x1.25 mounting accessories

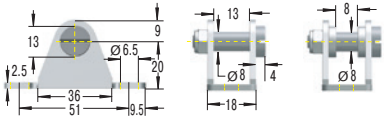
GS-19

Before installation check whether the identification number on the packaging matches the respective designation on the delivery note.

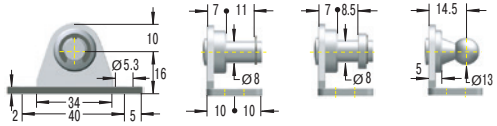
Note the dimensioning for mounting when using accessory parts. Bolts for fitting of accessories are not included.

If you have any questions, please phone +49 (0)2173 - 9226-20 for free advice.

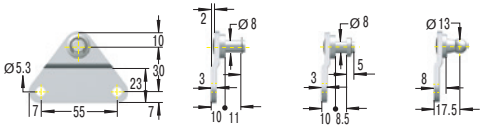
[1] Up to max. 1,800 N — MA8, ME8



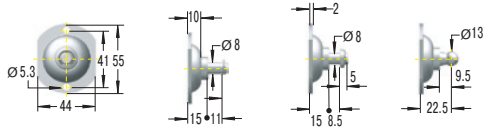
[1] Up to max. 1,000 N — NA8, NE8, NG8



[1] Up to max. 1,200 N — OA8, OE8, OG8

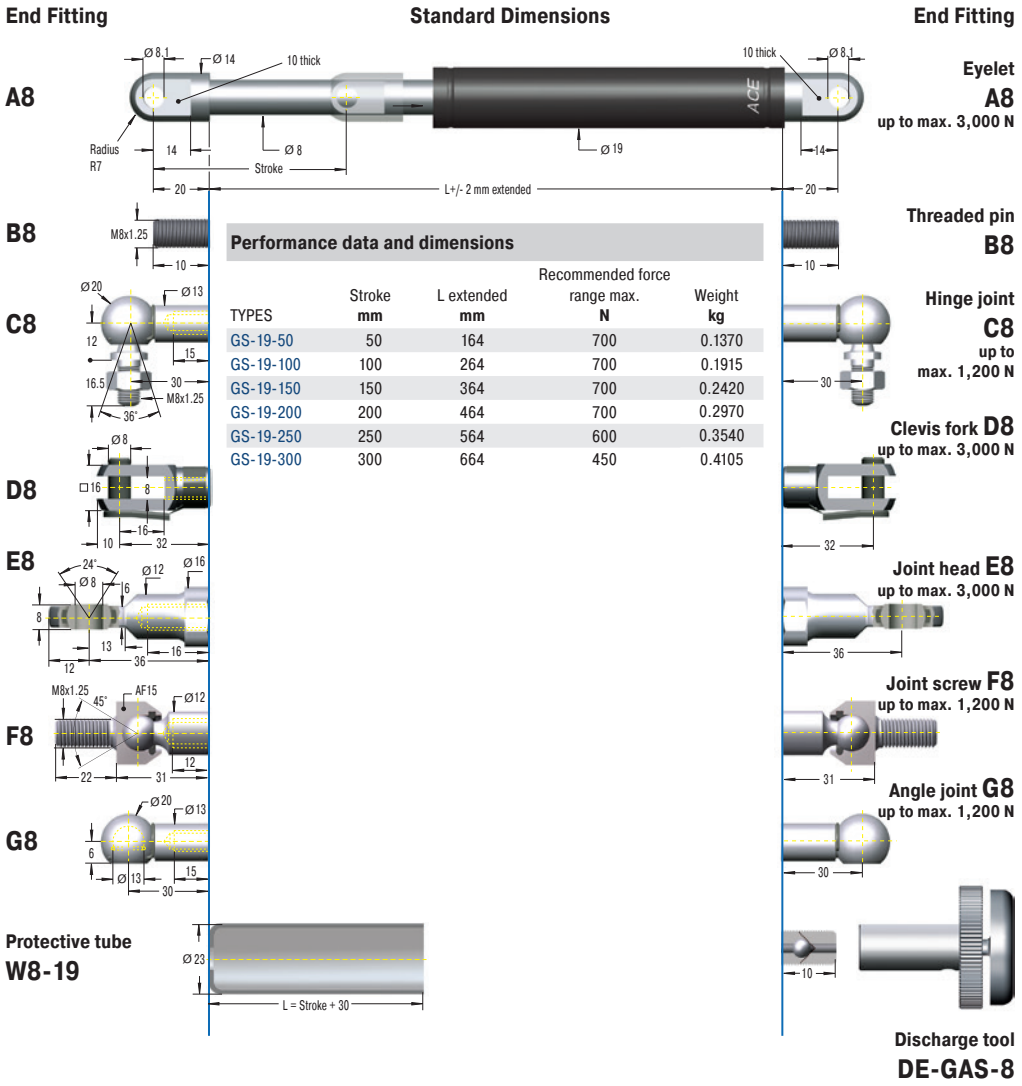


[1] Up to max. 1,200 N — PA8, PE8, PG8



[1] Note! Max. static load in N; note force increase when pushing in (progression). Higher load possible on request.

Valve technology, force range 50 N to 700 N (retracted to 945 N)



Performance data and dimensions

TYPES	Stroke mm	L extended mm	Recommended force range max. N	Weight kg
GS-19-50	50	164	700	0.1370
GS-19-100	100	264	700	0.1915
GS-19-150	150	364	700	0.2420
GS-19-200	200	464	700	0.2970
GS-19-250	250	564	600	0.3540
GS-19-300	300	664	450	0.4105

The end fittings can be combined in any manner and must be secured against twisting by the customer, if necessary. See mounting accessories.

Industrial gas spring – push type GS-22 (with valve technology)

Mounting instructions and mounting accessories

Installation instructions

Gas springs are maintenance-free and ready to install. Before installation and use, check whether the identification number on the gas spring matches the respective designation on the delivery note.

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

Temperature effect: Due to physical restrictions the force of the gas springs changes by 3.4% every 10 °C.

Mounting: In any position. Install piston rod pointing downwards, then the end-position damping acts during opening.

Filling tolerance: -20 N to +40 N or 5% to 7%

WARNING

The flap/mass can fall down during installation of the gas springs.
Secure the flap/mass to be moved against falling down. Always install push type gas springs in extended state, pull type gas springs in retracted state.

If the temperature exceeds or falls below the maximum or minimum temperature, the gas spring may fail.
Always maintain temperature range of -20 °C to +80 °C.

Fluids, gases and dirt particles in the environment can attack or destroy the seal system of the gas spring and cause it to fail.
Protect piston rod and seal system from external materials in the environment.

Damage to the piston rod surface can destroy the seal system.
Do not grease, oil, paint piston rod, etc.; protect against dirt particles.

Tilting and lateral forces can lead to leaks from the gas spring or blocking of the piston rod.
Check installation and ensure suitable end fittings and guides. There must be no tension on mounting parts; if necessary, allow a little free play.

The body tube can become deformed.
Do not allow any transverse or lateral forces on the gas spring. Do not clamp the body tube.

End fittings can come loose from the gas spring.
Always completely screw on the end fittings and, if necessary, secure with threadlocker (Loctite).

High forces may cause the gas spring to compress or overstretch.
Apply mechanical stops.

Danger of kinking.
Avoid long stroke lengths combined with a high force range.

Max. force.
The max. forces for the mounting parts and fittings relate to the compressed gas spring. If these are exceeded there is a risk of breakage.

Packaging disposal

Please dispose of the transportation packaging in an environmentally-friendly manner. Recycling packaging materials saves raw materials and reduces waste. The packaging materials do not contain any prohibited materials.

M8x1.25 mounting accessories

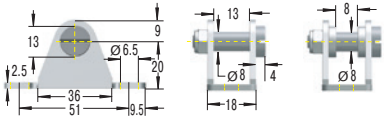
GS-22

Before installation check whether the identification number on the packaging matches the respective designation on the delivery note.

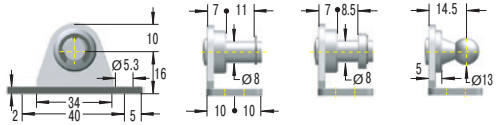
Note the dimensioning for mounting when using accessory parts. Bolts for fitting of accessories are not included.

If you have any questions, please phone +49 (0)2173 - 9226-20 for free advice.

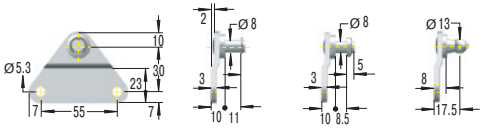
[1] Up to max. 1,800 N — MA8, ME8



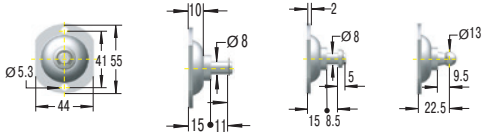
[1] Up to max. 1,000 N — NA8, NE8, NG8



[1] Up to max. 1,200 N — OA8, OE8, OG8



[1] Up to max. 1,200 N — PA8, PE8, PG8

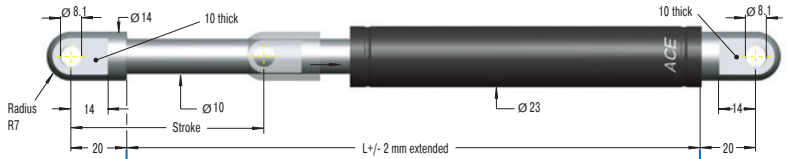


[1] Note! Max. static load in N; note force increase when pushing in (progression). Higher load possible on request.

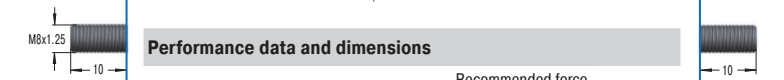
Valve technology, force range 80 N to 1,300 N (retracted to 1,820 N)

End Fitting — **Standard Dimensions** — **End Fitting**

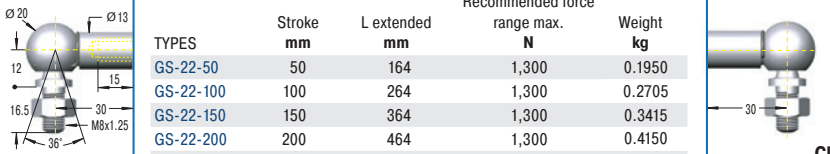
A8



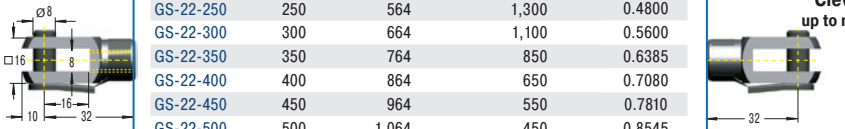
B8



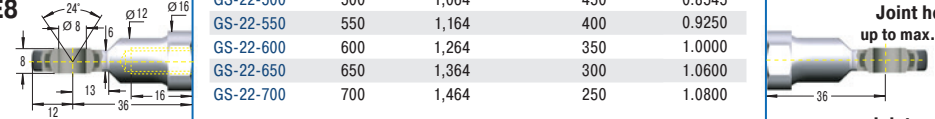
C8



D8



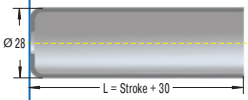
E8



F8

G8

Protective tube
W8-22



Eyelet
A8
up to max. 3,000 N

Threaded pin
B8

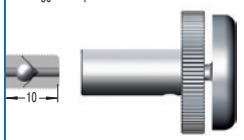
Hinge joint
C8
up to max. 1,200 N

Clevis fork D8
up to max. 3,000 N

Joint head E8
up to max. 3,000 N

Joint screw F8
up to max. 1,200 N

Angle joint G8
up to max. 1,200 N



Discharge tool
DE-GAS-8

Performance data and dimensions

TYPES	Stroke mm	L extended mm	Recommended force range max. N	Weight kg
GS-22-50	50	164	1,300	0.1950
GS-22-100	100	264	1,300	0.2705
GS-22-150	150	364	1,300	0.3415
GS-22-200	200	464	1,300	0.4150
GS-22-250	250	564	1,300	0.4800
GS-22-300	300	664	1,100	0.5600
GS-22-350	350	764	850	0.6385
GS-22-400	400	864	650	0.7080
GS-22-450	450	964	550	0.7810
GS-22-500	500	1,064	450	0.8545
GS-22-550	550	1,164	400	0.9250
GS-22-600	600	1,264	350	1.0000
GS-22-650	650	1,364	300	1.0600
GS-22-700	700	1,464	250	1.0800

The end fittings can be combined in any manner and must be secured against twisting by the customer, if necessary. See mounting accessories.

Industrial gas spring – push type GS-28 (with valve technology)

Mounting instructions and mounting accessories

Installation instructions

Gas springs are maintenance-free and ready to install. Before installation and use, check whether the identification number on the gas spring matches the respective designation on the delivery note.

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

Temperature effect: Due to physical restrictions the force of the gas springs changes by 3.4% every 10 °C.

Mounting: In any position. Install piston rod pointing downwards, then the end-position damping acts during opening.

Filling tolerance: -20 N to +40 N or 5% to 7%

WARNING

The flap/mass can fall down during installation of the gas springs.
Secure the flap/mass to be moved against falling down. Always install push type gas springs in extended state, pull type gas springs in retracted state.

If the temperature exceeds or falls below the maximum or minimum temperature, the gas spring may fail.
Always maintain temperature range of -20 °C to +80 °C.

Fluids, gases and dirt particles in the environment can attack or destroy the seal system of the gas spring and cause it to fail.
Protect piston rod and seal system from external materials in the environment.

Damage to the piston rod surface can destroy the seal system.
Do not grease, oil, paint piston rod, etc.; protect against dirt particles.

Tilting and lateral forces can lead to leaks from the gas spring or blocking of the piston rod.
Check installation and ensure suitable end fittings and guides. There must be no tension on mounting parts; if necessary, allow a little free play.

The body tube can become deformed.
Do not allow any transverse or lateral forces on the gas spring. Do not clamp the body tube.

End fittings can come loose from the gas spring.
Always completely screw on the end fittings and, if necessary, secure with threadlocker (Loctite).

High forces may cause the gas spring to compress or overstretch.
Apply mechanical stops.

Danger of kinking.
Avoid long stroke lengths combined with a high force range.

Max. force.
The max. forces for the mounting parts and fittings relate to the compressed gas spring. If these are exceeded there is a risk of breakage.

Packaging disposal

Please dispose of the transportation packaging in an environmentally-friendly manner. Recycling packaging materials saves raw materials and reduces waste. The packaging materials do not contain any prohibited materials.

M10x1.5 mounting accessories

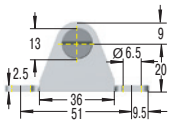
GS-28

Before installation check whether the identification number on the packaging matches the respective designation on the delivery note.

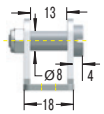
Note the dimensioning for mounting when using accessory parts. Bolts for fitting of accessories are not included.

If you have any questions, please phone +49 (0)2173 - 9226-20 for free advice.

[1] Up to max. 1,800 N

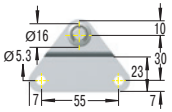


MA10

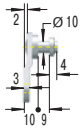


ME10

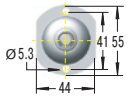
[1] Up to max. 1,200 N



OE10



[1] Up to max. 1,200 N



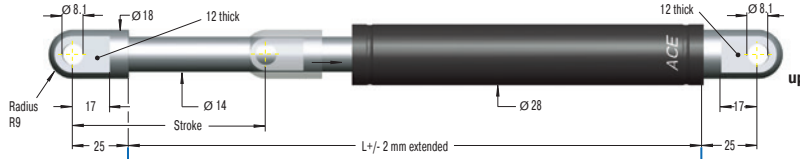
PE10

[1] Note! Max. static load in N; note force increase when pushing in (progression). Higher load possible on request.

Valve technology, force range 150 N to 2,500 N (retracted to 4,400 N)

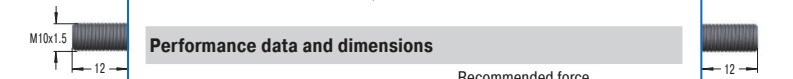
End Fitting — **Standard Dimensions** — **End Fitting**

A10



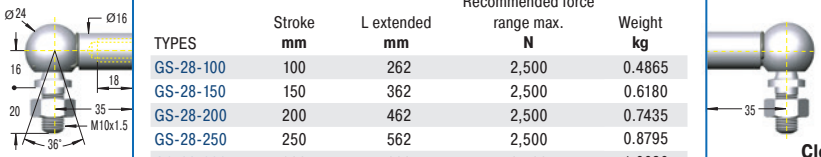
Eyelet A10
up to max. 10,000 N

B10



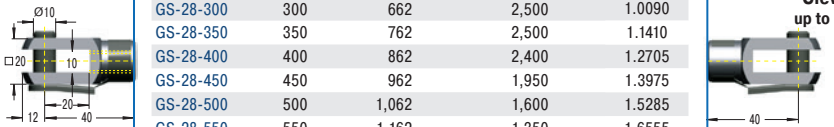
Threaded pin B10

C10



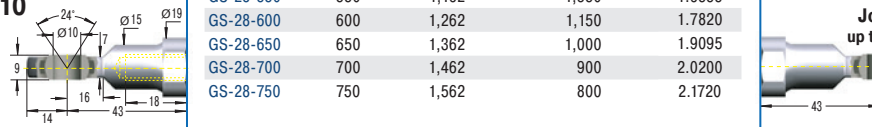
Hinge joint C10
up to max. 1,800 N

D10



Clevis fork D10
up to max. 10,000 N

E10



Joint head E10
up to max. 10,000 N

F10

Joint screw F10
up to max. 1,800 N

Protective tube W10-28

Discharge tool DE-GAS-10

Performance data and dimensions

TYPES	Stroke mm	L extended mm	Recommended force range max. N	Weight kg
GS-28-100	100	262	2,500	0.4865
GS-28-150	150	362	2,500	0.6180
GS-28-200	200	462	2,500	0.7435
GS-28-250	250	562	2,500	0.8795
GS-28-300	300	662	2,500	1.0090
GS-28-350	350	762	2,500	1.1410
GS-28-400	400	862	2,400	1.2705
GS-28-450	450	962	1,950	1.3975
GS-28-500	500	1,062	1,600	1.5285
GS-28-550	550	1,162	1,350	1.6555
GS-28-600	600	1,262	1,150	1.7820
GS-28-650	650	1,362	1,000	1.9095
GS-28-700	700	1,462	900	2.0200
GS-28-750	750	1,562	800	2.1720

The end fittings can be combined in any manner and must be secured against twisting by the customer, if necessary. See mounting accessories.

Industrial gas spring – push type GS-40 (with valve technology)

Mounting instructions and mounting accessories

Installation instructions

Gas springs are maintenance-free and ready to install. Before installation and use, check whether the identification number on the gas spring matches the respective designation on the delivery note.

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

Temperature effect: Due to physical restrictions the force of the gas springs changes by 3.4% every 10 °C.

Mounting: In any position. Install piston rod pointing downwards, then the end-position damping acts during opening.

Filling tolerance: -20 N to +40 N or 5% to 7%

WARNING

The flap/mass can fall down during installation of the gas springs.
Secure the flap/mass to be moved against falling down. Always install push type gas springs in extended state, pull type gas springs in retracted state.

If the temperature exceeds or falls below the maximum or minimum temperature, the gas spring may fail.
Always maintain temperature range of -20 °C to +80 °C.

Fluids, gases and dirt particles in the environment can attack or destroy the seal system of the gas spring and cause it to fail.
Protect piston rod and seal system from external materials in the environment.

Damage to the piston rod surface can destroy the seal system.
Do not grease, oil, paint piston rod, etc.; protect against dirt particles.

Tilting and lateral forces can lead to leaks from the gas spring or blocking of the piston rod.
Check installation and ensure suitable end fittings and guides. There must be no tension on mounting parts; if necessary, allow a little free play.

The body tube can become deformed.
Do not allow any transverse or lateral forces on the gas spring. Do not clamp the body tube.

End fittings can come loose from the gas spring.
Always completely screw on the end fittings and, if necessary, secure with threadlocker (Loctite).

High forces may cause the gas spring to compress or overstretch.
Apply mechanical stops.

Danger of kinking.
Avoid long stroke lengths combined with a high force range.

Max. force.
The max. forces for the mounting parts and fittings relate to the compressed gas spring. If these are exceeded there is a risk of breakage.

Packaging disposal

Please dispose of the transportation packaging in an environmentally-friendly manner. Recycling packaging materials saves raw materials and reduces waste. The packaging materials do not contain any prohibited materials.

M14x1.5 mounting accessories

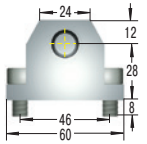
GS-40

Before installation check whether the identification number on the packaging matches the respective designation on the delivery note.

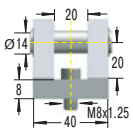
Note the dimensioning for mounting when using accessory parts. Bolts for fitting of accessories are not included.

If you have any questions, please phone +49 (0)2173 - 9226-20 for free advice.

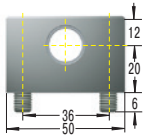
[1] Up to max. 10,000 N



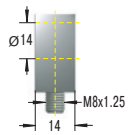
ME14



[1] Up to max. 10,000 N



ND14

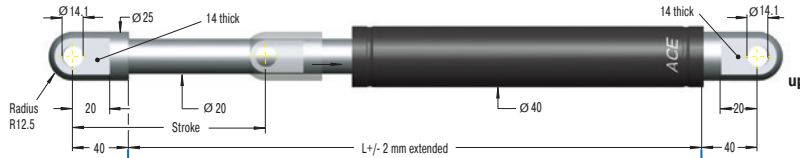


[1] Note! Max. static load in N; note force increase when pushing in (progression). Higher load possible on request.

Valve technology, force range 500 N to 5,000 N (retracted to 7,500 N)

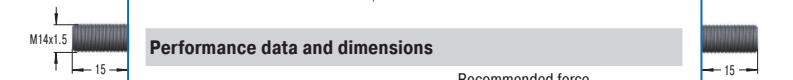
End Fitting | **Standard Dimensions** | **End Fitting**

A14



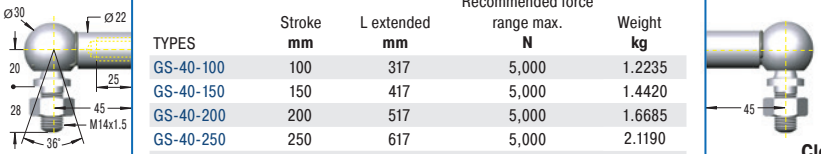
Eyelet A14
up to max. 10,000 N

B14



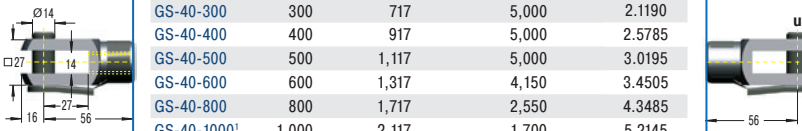
Threaded pin B14

C14



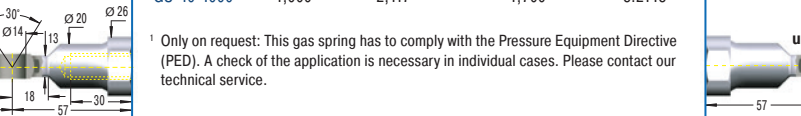
Hinge joint C14
up to max. 3,200 N

D14



Clevis fork D14
up to max. 10,000 N

E14



Joint head E14
up to max. 10,000 N

F14

Joint screw F14
up to max. 3,200 N

Protective tube W14-40

Discharge tool DE-GAS-14

Performance data and dimensions

TYPES	Stroke mm	L extended mm	Recommended force range max. N	Weight kg
GS-40-100	100	317	5,000	1.2235
GS-40-150	150	417	5,000	1.4420
GS-40-200	200	517	5,000	1.6685
GS-40-250	250	617	5,000	2.1190
GS-40-300	300	717	5,000	2.1190
GS-40-400	400	917	5,000	2.5785
GS-40-500	500	1,117	5,000	3.0195
GS-40-600	600	1,317	4,150	3.4505
GS-40-800	800	1,717	2,550	4.3485
GS-40-1000[1]	1,000	2,117	1,700	5.2145

[1] Only on request: This gas spring has to comply with the Pressure Equipment Directive (PED). A check of the application is necessary in individual cases. Please contact our technical service.

The end fittings can be combined in any manner and must be secured against twisting by the customer, if necessary. See mounting accessories.

Industrial gas spring – push type GS-70 (with valve technology)

Mounting instructions and mounting accessories

Installation instructions

Gas springs are maintenance-free and ready to install. Before installation and use, check whether the identification number on the gas spring matches the respective designation on the delivery note.

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

Temperature effect: Due to physical restrictions the force of the gas springs changes by 3.4% every 10 °C.

Mounting: In any position. Install piston rod pointing downwards, then the end-position damping acts during opening.

Filling tolerance: -20 N to +40 N or 5% to 7%

WARNING

The flap/mass can fall down during installation of the gas springs.
Secure the flap/mass to be moved against falling down. Always install push type gas springs in extended state, pull type gas springs in retracted state.

If the temperature exceeds or falls below the maximum or minimum temperature, the gas spring may fail.
Always maintain temperature range of -20 °C to +80 °C.

Fluids, gases and dirt particles in the environment can attack or destroy the seal system of the gas spring and cause it to fail.
Protect piston rod and seal system from external materials in the environment.

Damage to the piston rod surface can destroy the seal system.
Do not grease, oil, paint piston rod, etc.; protect against dirt particles.

Tilting and lateral forces can lead to leaks from the gas spring or blocking of the piston rod.
Check installation and ensure suitable end fittings and guides. There must be no tension on mounting parts; if necessary, allow a little free play.

The body tube can become deformed.
Do not allow any transverse or lateral forces on the gas spring. Do not clamp the body tube.

End fittings can come loose from the gas spring.
Always completely screw on the end fittings and, if necessary, secure with threadlocker (Loctite).

High forces may cause the gas spring to compress or overstretch.
Apply mechanical stops.

Danger of kinking.
Avoid long stroke lengths combined with a high force range.

Max. force.
The max. forces for the mounting parts and fittings relate to the compressed gas spring. If these are exceeded there is a risk of breakage.

Packaging disposal

Please dispose of the transportation packaging in an environmentally-friendly manner. Recycling packaging materials saves raw materials and reduces waste. The packaging materials do not contain any prohibited materials.

M24x2 mounting accessories

GS-70

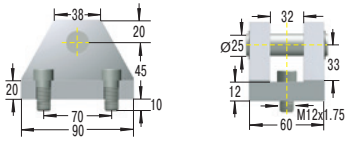
Before installation check whether the identification number on the packaging matches the respective designation on the delivery note.

Note the dimensioning for mounting when using accessory parts. Bolts for fitting of accessories are not included.

If you have any questions, please phone +49 (0)2173 - 9226-20 for free advice.

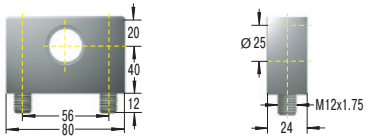
[1] Up to max. 50,000 N

ME24



[1] Up to max. 50,000 N

ND24

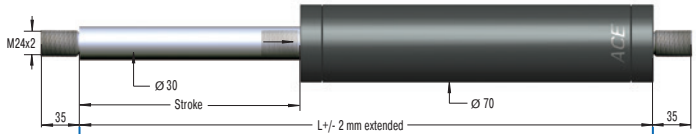


[1] Note! Max. static load in N; note force increase when pushing in (progression). Higher load possible on request.

Valve technology, force range 2,000 N to 13,000 N (retracted to 16,250 N)

End Fitting | **Standard Dimensions** | **End Fitting**

B24



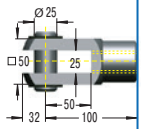
Threaded pin B24

Performance data and dimensions

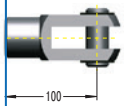
TYPES	Stroke mm	L extended mm	Recommended force range max. N	Weight kg
GS-70-100	100	320	13,000	4.8
GS-70-200	200	520	13,000	6.0
GS-70-300	300	720	13,000	7.2
GS-70-400[1]	400	920	13,000	8.4
GS-70-500[1]	500	1,120	13,000	9.6
GS-70-600[1]	600	1,320	13,000	10.8
GS-70-700[1]	700	1,520	13,000	12.0
GS-70-800[1]	800	1,720	11,550	13.2

[1] Only on request: This gas spring has to comply with the Pressure Equipment Directive (PED). A check of the application is necessary in individual cases. Please contact our technical service.

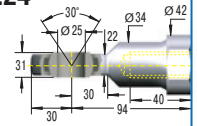
D24



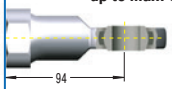
Clevis fork D24
up to max. 50,000 N



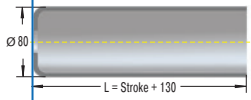
E24



Joint head E24
up to max. 50,000 N



Protective tube
W24-70



The end fittings can be combined in any manner and must be secured against twisting by the customer, if necessary. See mounting accessories.

Industrial gas springs – push type GS-8 to GS-70 (with valve technology)

Warranty

Fundamentally, all modifications to the product by third parties lead to exclusion from the warranty.

Obvious defects must be reported to the vendor in writing immediately after delivery, no later than one week, but in any case before processing or installation, otherwise the assertion of a warranty claim is excluded. A timely dispatch is sufficient to keep the term.

The vendor is to be given an opportunity to check on site. If the complaint is justified the vendor offers warranty by repair or replacement at its own discretion. If the rectification fails, the buyer may choose to demand reduction of payment (abatement) or cancellation of the contract (withdrawal). If there is only a minor lack of conformity, particularly with only minor defects, the buyer nevertheless has a right of withdrawal.

If, after failed rectification, the buyer chooses to cancel the contract due to a defect of title or material defect, they are not entitled to additionally claim for damages.

If, after failed fulfilment, the buyer chooses compensation, the goods remain with the buyer, if this is reasonable. The compensation is limited to the difference between the purchase price and the value of the defective item. This does not apply if the vendor maliciously causes the breach of contract.

The quality of the goods is only considered as agreed upon with the product description of the vendor. Public statements, claims or advertising of the manufacturer do not represent an additional contractual specification of quality of the goods.

If the buyer receives defective mounting instructions, the buyer is only obligated to deliver defect-free mounting instructions and only if the defect to the mounting instructions prevents proper mounting.

The warranty period is two years and begins upon completion. Exchange and return of custom products are fundamentally excluded. The factory conditions of the manufacturing factory apply to parts not manufactured and processed by the vendor, which can be viewed by the orderer at the vendor at any time. Construction and installation parts are delivered according to the present standard of engineering.

Expected service life

In general, push type gas springs are machine elements that are subject to wear. Wear parts such as seals and pistons are excluded from the general warranty. The wear of seals is largely dependent upon the operating conditions and the respective application with its operating parameters.

In general, ACE push type gas springs are tested over a lifetime of approx. 70,000 to 100,000 complete strokes. This represents a lifetime of the seals of approx. 10,000 m depending on type. No more than 5% pressure may be lost in this period.

Adverse environmental and operating conditions can significantly reduce the expected service life.

Performance data

TYPES	Stroke **mm**	Force range min. **N**	Force range max. **N**	[1] Progression approx. **%**	[2] Friction force F_R approx. in **N**	Extension speed	End-position damping	Weight **kg**
GS-8	20 - 80	10	100	29 - 33	10	medium	medium	0.0118 - 0.0234
GS-10	20 - 80	10	100	13 - 16	10	medium	medium	0.016 - 0.0265
GS-12	20 - 150	15	180	20 - 35	20	medium	medium	0.0275 - 0.076
GS-15	20 - 200	40	400	30 - 40	20	medium	medium	0.044 - 0.168
GS-19	50 - 300	50	700	24 - 35	30	slow	strong	0.137 - 0.4105
GS-22	50 - 700	80	1,300	30 - 40	30	slow	strong	0.195 - 1.08
GS-28	100 - 750	150	2,500	63 - 76	40	slow	strong	0.4865 - 2.172
GS-40	100 - 1,000	500	5,000	38 - 50	50	slow	strong	1.2235 - 5.2145
GS-70	100 - 800	2,000	13,000	25	50	medium	medium	4.8 - 13.2

[1] Depending on stroke
[2] Depending on filling power

Technical data

Force range: 10 N to 13,000 N
Piston rod diameter: Ø 3 mm to Ø 30 mm
Progression: approx. 13% to 76% (depending on construction size and stroke)
Lifetime: approx. 10,000 m
Operating temperature range: -20 °C to +80 °C
Material: Outer body: **GS-8 to GS-12, GS-70:** Steel coated;
GS-15 to GS-40: Steel coated with UV paint;
piston rod: **GS-8 to GS-12:** V2A (1.4301/1.4305, AISI 304/303);
GS-15 to GS-40: Steel with wear-resistant surface coating;
GS-70: Chrome-plated steel;
end fittings: Zinc-plated steel
Operating fluid: Nitrogen and oil (for damping)
Filling tolerance: -20 N to +40 N or approx. 5% to 7%
Mounting: Install piston rod pointing downwards, then the end-position damping acts during opening and the piston rod of the gas spring is lubricated.
GS-19 to GS-70: In any position. Install piston rod pointing downwards, then the end-position damping acts during opening.
End-position damping: approx. 5 mm to 70 mm (depending on stroke)
Positive stop: The customer must ensure an external positive stop at the stroke end.
Application field: Covers, flaps, machine housings, conveyor systems, switch cabinets, furniture industry, stroke applications, assembly stations, vehicle technology, flap elements
Note: Increased clamping torque with longer downtimes
End fittings: Can be combined in any manner and must be secured against twisting by the customer, if necessary.
Safety information: Push type gas springs should not be installed with preloading.
On request: Special oils and other special options and further accessories are available. Various end-position dampings and extension speeds.