

GZ-15 to GZ-40 Industrial gas springs – pull type

Individual strokes and force ranges

Valve technology

Force range 10 N to 13,000 N

Stroke 20 mm to 1,000 mm

GZ-15

GZ-19

GZ-28

GZ-40

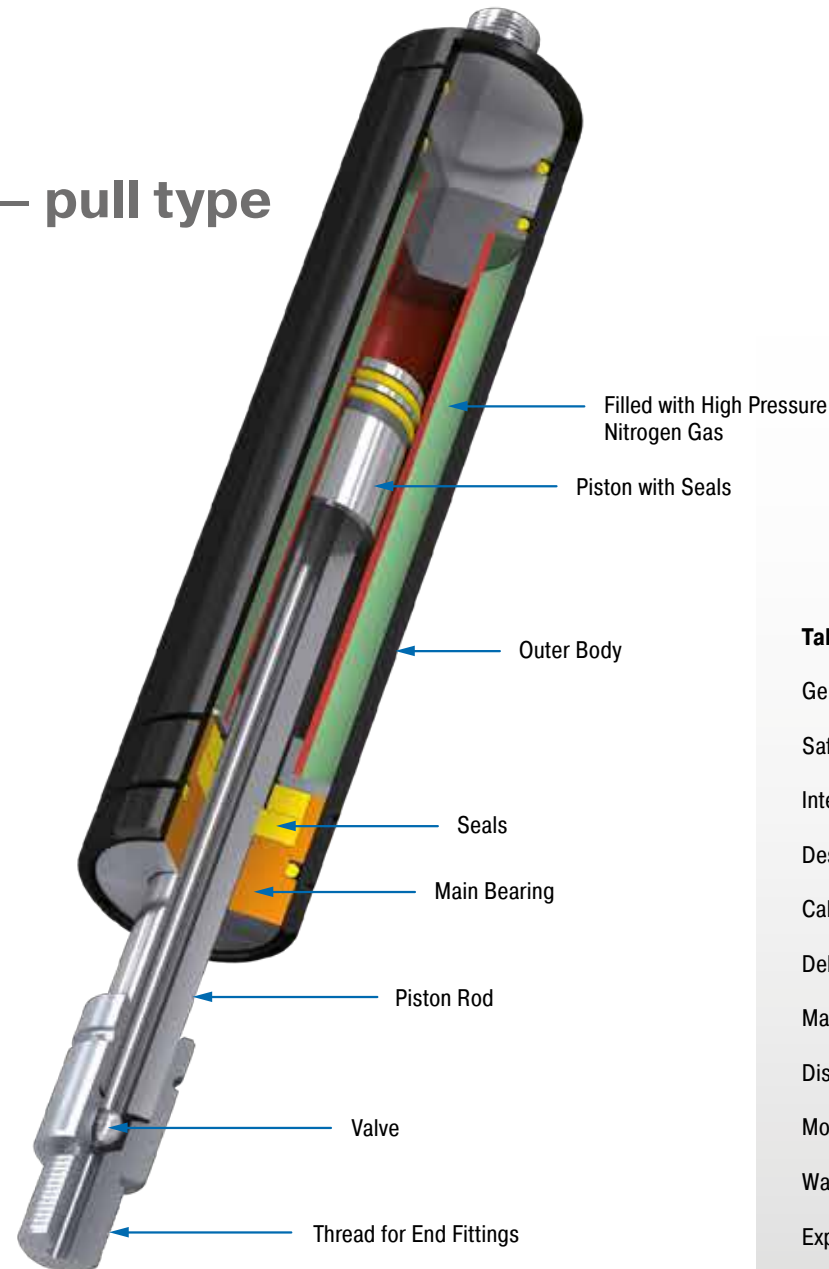


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General instructions

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 pull 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 (traction force range F_1) according to customer requirements.

Description and function

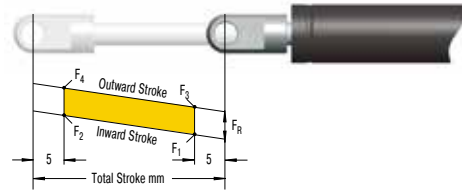
ACE industrial pull type gas springs are maintenance-free, closed systems that are filled with nitrogen that is under pressure.

ACE pull type gas springs work according to the reverse principle of the push type gas springs. The gas pressure in the body causes the piston rod to be pulled inwards.

The piston ring surface between the piston rod and the inner pipe is decisive for the function of the tension gas spring. The pull type gas springs are always fitted in a retracted state.

Calculation basis

Tension gas spring characteristic line in force-distance diagram



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

F_2 = force in extended state

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

F_3 = force at the start of the extension movement

F_4 = force at the end of the extension movement

Gas springs – pull type

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

¹ Depending on stroke

² Depending on filling power

Progression: Linear force increase during extension, 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.
- Pull type gas springs can generally be stored in any position.
- Always store pull 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 pull type gas springs are maintenance-free and ready-to-install. Regularly check the gas springs for oil loss, function and external damage.

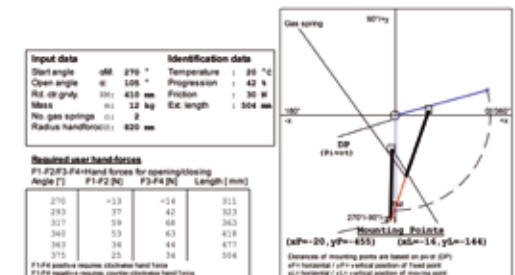
Pull type gas springs are machine elements that are subject to continuous wear. Increased service life results in a reduced pulling force. If this is no longer sufficient, the pull type gas springs must be replaced or exchanged as appropriate.

Disassembly and disposal

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

Gas springs cannot be repaired. 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 pull type gas springs in a completely retracted state. This allows the gas spring to be easily unhooked.



Example: Calculation offer with mounting information

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, ensure external positive stop in pulling direction

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

M3.5x0.6 mounting accessories











GZ-15

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

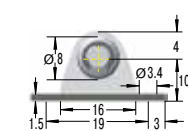
Note the dimensioning for mounting when using accessory parts. Bolts for fitting of accessories are not included.

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

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.

¹ Up to max. 180 N



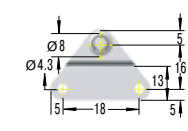
NA3.5



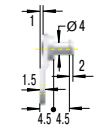
NG3.5



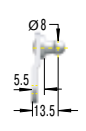
¹ Up to max. 180 N



OA3.5



OG3.5

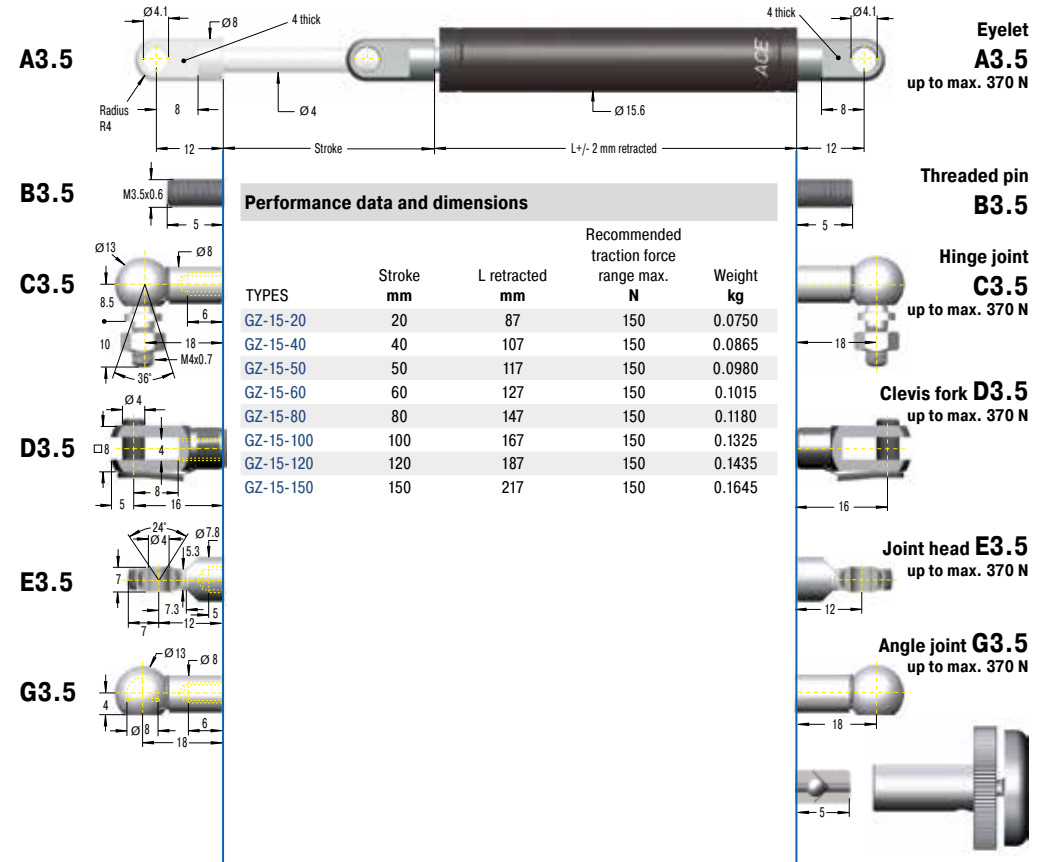


¹ Note! Max. static load in N; note force increase when pushing in (progression). Higher load possible on request.

Valve technology, traction force range 50 N to 150 N (extended to 183 N)

End Fitting

Standard Dimensions



Performance data and dimensions

TYPES	Stroke mm	L retracted mm	Recommended traction force range max. N	Weight kg
GZ-15-20	20	87	150	0.0750
GZ-15-40	40	107	150	0.0865
GZ-15-50	50	117	150	0.0980
GZ-15-60	60	127	150	0.1015
GZ-15-80	80	147	150	0.1180
GZ-15-100	100	167	150	0.1325
GZ-15-120	120	187	150	0.1435
GZ-15-150	150	217	150	0.1645

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

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.

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, ensure external positive stop in pulling direction

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

M8x1.25 mounting accessories

GZ-19

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

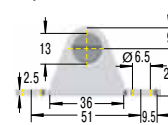
Note the dimensioning for mounting when using accessory parts. Bolts for fitting of accessories are not included.

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

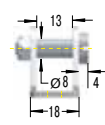
WARNING

- 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.

¹ Up to max. 1,800 N



MA8

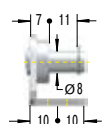


ME8

¹ Up to max. 1,000 N



NA8

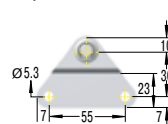


NE8

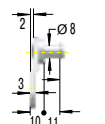
NG8



¹ Up to max. 1,200 N

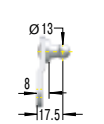


OA8

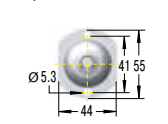


OE8

OG8



¹ Up to max. 1,200 N

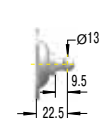


PA8



PE8

PG8



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

Valve technology, traction force range 40 N to 350 N (extended to 448 N)

End Fitting

Standard Dimensions



B8

C8

D8

E8

G8

Protective tube W8-19



Discharge tool DE-GAS-8

Dimensions

TYPES	Stroke mm	L retracted mm	Recommended traction force range max. N	Weight kg
GZ-19-30	30	112	350	0.1245
GZ-19-50	50	132	350	0.1300
GZ-19-100	100	182	350	0.1925
GZ-19-150	150	232	350	0.2395
GZ-19-200	200	282	350	0.2865
GZ-19-250	250	332	350	0.3365

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.

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

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, ensure external positive stop in pulling direction

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

M10x1.5 mounting accessories











GZ-28

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

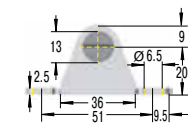
Note the dimensioning for mounting when using accessory parts. Bolts for fitting of accessories are not included.

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

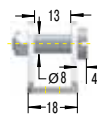
WARNING

-  **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.

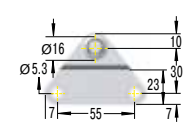
¹ Up to max. 1,800 N



MA10



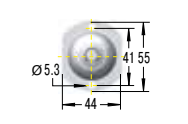
¹ Up to max. 1,200 N



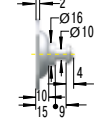
OE10



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, traction force range 150 N to 1,200 N (extended to 1,560 N)

End Fitting

Standard Dimensions



BA0

End Fitting

Eyelet

A10

up to max. 10,000 N

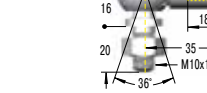
B10

M10x1.5

Dimensions

TYPES	Stroke mm	L retracted mm	Traction force range max.	Weight kg
GZ-28-30	30	130	1,200	0.3410
GZ-28-50	50	150	1,200	0.3875
GZ-28-100	100	200	1,200	0.4965
GZ-28-150	150	250	1,200	0.6105
GZ-28-200	200	300	1,200	0.7215
GZ-28-250	250	350	1,200	0.8360
GZ-28-300	300	400	1,200	0.9500
GZ-28-350	350	450	1,200	1.0600
GZ-28-400	400	500	1,200	1.1780
GZ-28-450	450	550	1,200	1.2955
GZ-28-500	500	600	1,200	1.3945
GZ-28-550	550	650	1,200	1.5160
GZ-28-600	600	700	1,200	1.6135
GZ-28-650	650	750	1,200	1.7365

C10



Threaded pin

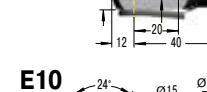
B10

Hinge joint

C10

up to max. 1,800 N

D10

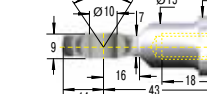


Clevis fork

D10

up to max. 10,000 N

E10

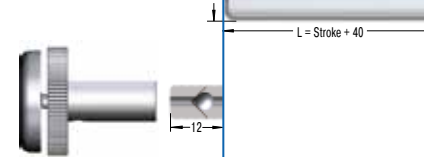


Joint head

E10

up to max. 10,000 N

Protective tube W10-28



Discharge tool DE-GAS-10

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

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, ensure external positive stop in pulling direction

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

M14x1.5 mounting accessories

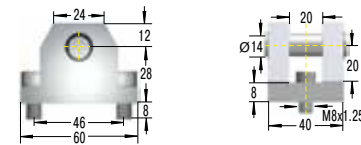
GZ-40

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

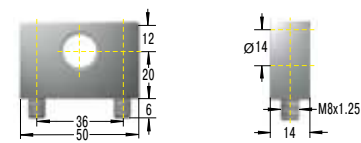
Note the dimensioning for mounting when using accessory parts. Bolts for fitting of accessories are not included.

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

¹ Up to max. 10,000 N



¹ Up to max. 10,000 N



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

Valve technology, traction force range 500 N to 5,000 N (extended to 7,250 N)

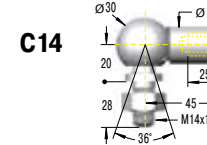
End Fitting

Standard Dimensions

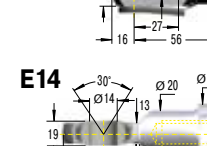


B14

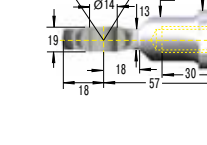
C14



D14



E14



Dimensions

TYPES	Stroke mm	L retracted mm	Traction force range max.	Weight kg
GZ-40-100	100	250	5,000	1.1510
GZ-40-150	150	325	5,000	1.3965
GZ-40-200	200	400	5,000	1.6275
GZ-40-250	250	475	5,000	1.8760
GZ-40-300	300	550	5,000	2.1180
GZ-40-400	400	700	5,000	2.6040
GZ-40-500	500	850	5,000	3.0890
GZ-40-600	600	1,000	5,000	3.5740

Protective tube W14-40



Discharge tool DE-GAS-14

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

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.

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, pull 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.

The lifetime of the tension gas spring is approx. 2,000 m depending on design. Adverse environmental and operating conditions can significantly reduce the expected service life.

Performance data

TYPES	Stroke mm	Traction force range min. N	Traction force range max. N	¹ Progression approx. %	² Friction force F _R approx. in N	Weight kg
GZ-15	20 - 150	50	150	12 - 22	55 - 140	0.075 - 0.1645
GZ-19	30 - 250	40	300	21 - 28	20 - 40	0.1245 - 0.3365
GZ-28	30 - 650	150	1,200	28 - 30	100 - 200	0.341 - 1.7365
GZ-40	100 - 600	500	5,000	43 - 45	100 - 200	0.151 - 3.574

¹ Depending on stroke

² Depending on filling power

Technical data

Traction force range: 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: **GZ-15:** V2A (1.4301/1.4305, AISI 304/303);

GZ-19 to GZ-40: Steel with wear-resistant surface coating

Operating fluid: Nitrogen

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

Mounting: Install piston rod pointing upwards.

End-position damping: Without damping. Use damping material (e.g. profile damper or SLAB) for end-position damping.

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, shipbuilding, assembly stations, vehicle technology, flap elements

End fittings: Can be combined in any manner and must be secured against twisting by the customer, if necessary.

On request: Special oils and other special options and further accessories are available. Pull type gas springs also available with end-position damping.