

GST-40 Tandem Industrial gas spring – push type

Optimized application of force for heavy flaps

Valve technology

Force range 300 N to 5,000 N

Stroke 50 mm to 400 mm

GST-40

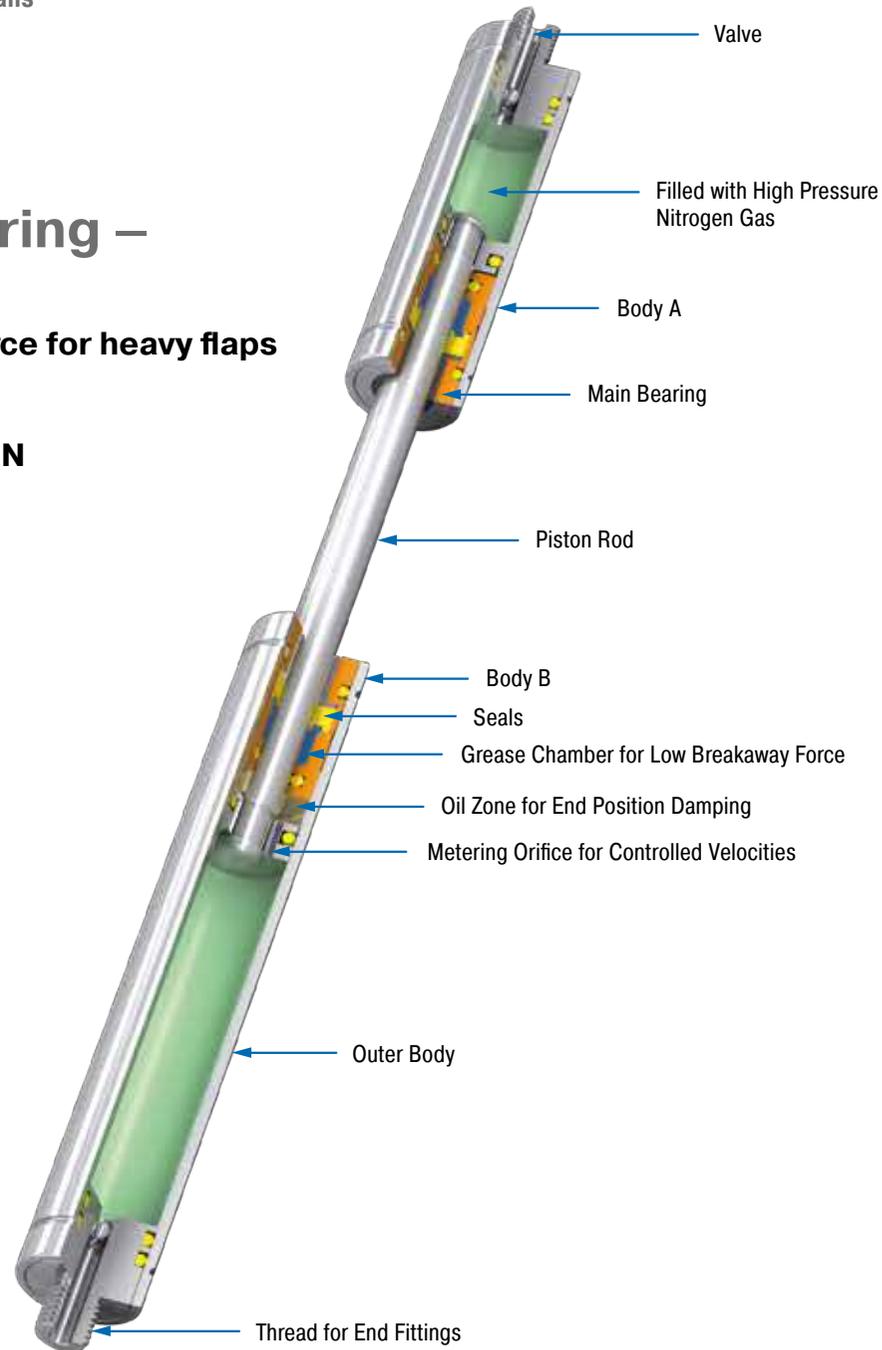


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General instructions

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 tandem 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

Tandem push type gas springs are maintenance-free and ready-to-install. They are available off-the-shelf with a body diameter of 40 mm and forces of between 300 N and 5,000 N with a valve.

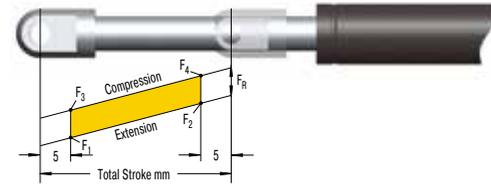
ACE push type gas springs are individually filled with a certain pressure (force range F_1) according to customer requirements. Taking into account the filling pressure, the cross-sectional area of the piston rod generates the force range $F = p \cdot A$.

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
GST-40-50-100	by calculation	10
GST-40-50-150	by calculation	10
GST-40-50-200	by calculation	20
GST-40-70-250	by calculation	20
GST-40-70-300	by calculation	30
GST-40-70-350	by calculation	30
GST-40-70-400	by calculation	40

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

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

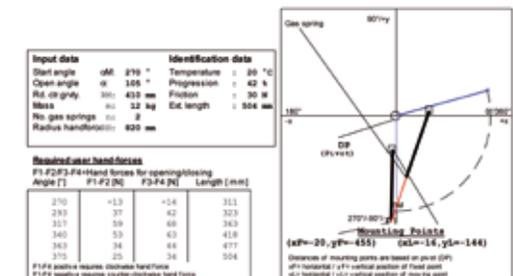
Push type gas springs are machine elements that are subject to continuous wear. Increased service life results in a reduced pushing (pulling) force. If this is no longer sufficient, the push type gas springs must be replaced or exchanged as appropriate.

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. 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

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: According to calculation. Please use the installation points calculated by ACE.

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

M14x1.5 mounting accessories

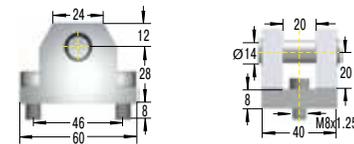
GST-40

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

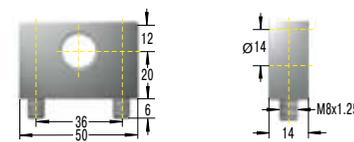
Note the dimensioning for mounting when using accessory parts. Bolts for fitting of accessories are not included.

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

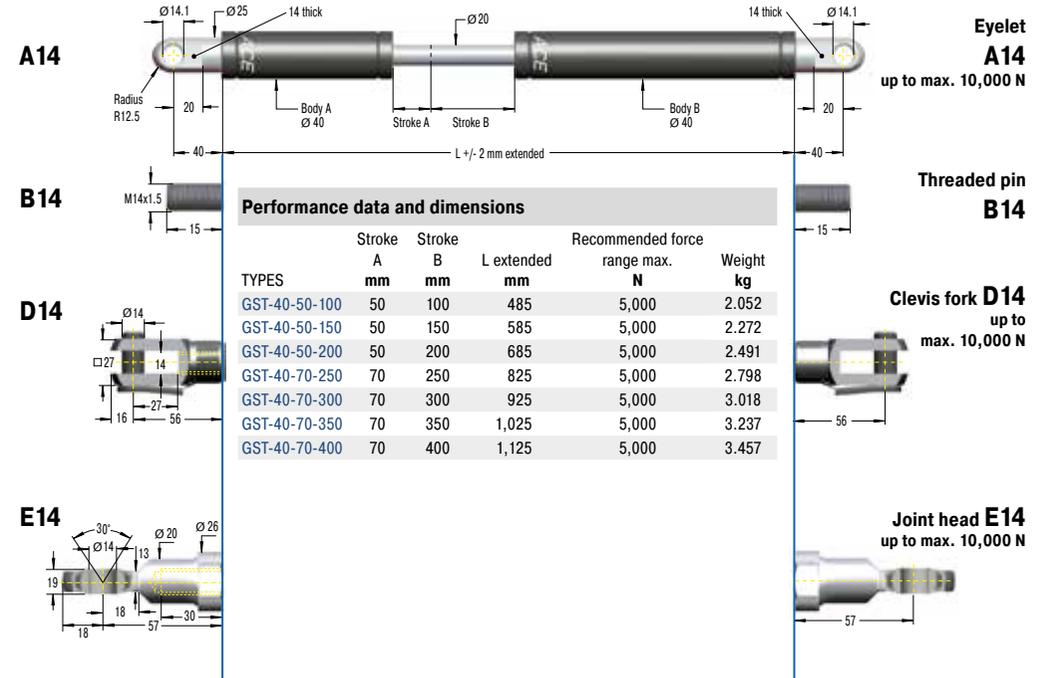


¹ Note! Max. static load in N; note force increase when pushing in (progression). Higher load possible on request.

Valve technology, force range 300 N to 5,000 N

End Fitting

Standard Dimensions



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 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.

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, 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 A mm	Stroke B mm	Force range min. N	Force range max. N	¹ Friction force F _R approx. in N	Weight kg
GST-40-50-100	50	100	300	500	10	2.052
GST-40-50-150	50	150	300	500	10	2.272
GST-40-50-200	50	200	300	500	20	2.491
GST-40-70-250	70	250	300	500	20	2.798
GST-40-70-300	70	300	300	500	30	3.018
GST-40-70-350	70	350	300	500	30	3.237
GST-40-70-400	70	400	300	500	40	3.457

¹ Depending on filling power

Technical data

Force range: 300 N to 5,000 N

Piston rod diameter: Ø 20 mm

Progression: Depending on calculation, corresponding to your application

Lifetime: approx. 10,000 m

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

Material: Outer body, end fittings: Zinc-plated steel;

Piston rod: Steel with wear-resistant surface coating

Operating fluid: Nitrogen and oil (for damping)

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

Mounting: In any position. Please use the installation points calculated by ACE.

End-position damping: Application-related end position damping and extension speed.

Positive stop: The customer must ensure an external positive stop at the stroke end.

Application field: Covers, flaps, machine housings, conveyor systems, flap elements, loading and lifting equipment

Note: These push type gas springs are made according to your application and are therefore not available off-the-shelf.

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. Material 1.4301/1.4305, AISI 304/303 (V2A) and 1.4404/1.4571, AISI 316L/316Ti (V4A).