

Air springs - Instruction manual

1 | About this documentation

This documentation applies to air actuators/ air springs:

- → C-types, air actuators/air springs with permanently crimped connection parts
- → D-types, air actuators/air springs with removable connection parts
- → R-types, air actuators/air springs with mounting ring/bead ring
- → S-types, rolling lobe air springs or sleeve air springs

Air actuators/air springs are individual components, therefore please also observe the operating manual for the other system components.

2 | Presentation of information

2.1 Warnings

The following symbols are used in the operating manual to make you aware of particular dangers or notices.

2.2 Symbols

2.2.1. Danger



Imminent threat of danger to the life and health of people.

Failure to observe these instructions may have serious, even fatal, consequences for people's health.

2.2.2. Caution



Potentially dangerous situation.

Failure to observe these instructions may result in damage to property or malfunctions.

2.3 Safety information

Air actuators/air springs are manufactured in line with today's state-of-the-art technology as well as generally recognized safety rules and regulations. Nevertheless, there is a risk of personal injury and damage to property if you do not observe the following general safety information and warnings in this manual before commissioning and while using our products.

- → You should therefore read this operating manual thoroughly and in full before fitting any air actuators/air springs.
- Store the manual so that it remains accessible to all users at all times.

Only ever pass the air actuators/air springs on to third parties together with the operating manual.

3 | Intended use

Air actuators/air springs are single-acting, pneumatic cylinders that may be used to transmit pressure energy or for vibration insulation. The return stroke is effected by an external reset force.

Use the air actuators/air springs only for one of the intended purposes mentioned in the manual and under the specified operating conditions. Make sure you also observe the specified technical performance limits.

3.1 Personnel qualifications

Assembly requires basic pneumatic knowledge as well as knowledge of the associated technical terms. For these reasons, assembly may only be carried out by a pneumatics specialist or by a person trained under the supervision and guidance of a pneumatics specialist.

3.2 General safety instructions

- Observe the regulations on accident prevention and environmental protection in the country of use and at the workplace.
- As a rule, you may not modify, retool or repair the air actuators/air springs.
- Check the air actuators/air springs for any damage prior to assembly and regularly during operation.
- Damaged air actuators/air springs must not be used.
- Do not under any circumstances subject air actuators/air springs to torsion during operation.
- Protect the air actuators/air springs from constant contact with hydraulic oil, lubricants, solvents, metal chips and welding sparks.
- Leaks due to defects in the air actuators/air springs can lead to malfunctions. Therefore, make sure you immediately replace leaking air actuators/ air springs.
- Depressurize all relevant system parts before fitting or removing air actuators/air springs.



Risk of injury due to moving components!

→ Ensure that the air connections and fixings are connected correctly.

- Ensure that the forces are transmitted over the entire surface of the cover.
- For special design solutions, get in touch with your air actuator/air spring supplier.
- Do not apply any paint to the bellows.
- When used in hot systems, the metal surfaces can become very hot. Allow heated covers to cool down before working on the air actuator/ air springs.

4 | Transport and storage

Take into account the weight of the air actuator/air spring and avoid storing the air actuator/air spring in direct sunlight, at temperatures below 15°C or above 25°C, or at humidity above 70%.

You must also store the air actuator/air spring in such a way that it is stress free, protected from the effects of the weather (e.g. drafts) and kept away from ozone-generating equipment such as photocopiers and welding systems.

Also observe the general requirements for storing the product in accordance with ISO 2230 "Rubber Products – Guideline for Storage."

5 | Assembly/installation

5.1 Fitting air actuators / air springs

Air actuators/air springs are supplied ready for installation. The mounting surface must be smooth and level. Air actuators/air springs must never be twisted during assembly or later during operation.

Tighten connections to the specified torque using a torque wrench (see data sheet).

Then check that the air connection and all fixings are correctly connected.



5.2 Fitting the cover (D-types only)

On D series air actuators/air springs with stud bolts, the two covers lie inverted on the rubber bellows. Fit the covers as follows:

- **1.** Remove the protection caps from the stud bolts and remove the covers.
- **2.** Moisten the openings of the air actuator/air spring and the mounting area of the covers using soapy water or tire mounting paste.



- **3.** Turn the covers so that the mounting areas fit into the center of the bellows and the holes are aligned with the stud bolts. Now place the covers on the rubber bellows.
- **4.** Screw the nuts supplied onto the stud bolts and then tighten these crosswise to the permissible tightening torque using a torque wrench.

5.3 Installation space

Ensure there is sufficient space at the installation location over the entire stroke for the diameter of the air actuator/air spring to change during operation. Information on the required installation space can be found in the data sheet.

Contact between the bellows wall and the surrounding periphery is not permitted.

5.4 Installation position

Air actuators/air springs can be installed in any position. Only in the model series S should the piston not face upward, to prevent dirt from accumulating between the piston and the rubber bellows.

5.5 End stops

The movement of the air actuator/air spring must be limited using mechanical end stops. This prevents air actuators/air springs from being compressed to a height below H_{min} and becoming damaged. (fig. 1) Or is damaged due to excessive strain if the maximum installation height is exceeded. (fig. 2)







End stops are not included in the scope of delivery and must be provided separately.

5.6 Tilt angle and axial offset

Air actuators/air springs can perform their stroke at an angle. However, it is important to ensure that the height does not fall short of the minimum height at any point, and that the maximum height of the air actuator/air spring is not exceeded.

You should also ensure that the maximum tilt angle is not exceeded.

- → Single-convoluted air springs: max. 10° to 20°
- → Double-convoluted air springs: max. 15° to 25°
- → Triple-convoluted air springs: max. 15° to 30°
- → Sleeve air springs:

max. 15°





Avoid abrasion points when operating at a tilt angle!



5.7 In-series connection of air actuators/ air springs

Larger stroke ranges can be achieved, for example, by connecting two or more air actuators/air springs in series. In this constellation, the mounting plates required between two air actuators/air springs must be guided laterally.



5.8 Load force

The height in the center of the cover is decisive when it comes to determining the required force of the air actuator/air spring. The effective diameter changes together with the operating height. Depending on the type and size, air actuators/air springs therefore have a load force that decreases as the stroke increases.



When designing, use the force-height diagram to check whether the selected air actuator/air spring delivers the required force at both end points of the stroke to be performed as well as the pressure required for this.

6 | Commissioning

- Only pressurize the air actuator/air spring when it is installed.
- Ensure that the maximum operating pressure is not exceeded.
- Ensure that nobody is able to reach into the movement range in the direction of travel for the moving parts and that there are no foreign objects in the area.
- Reaching into the system is only possible when the system is at a complete standstill.
- Ventilate the system slowly to prevent uncontrolled movements.

6.1 Servicing

Air actuators/air springs are maintenance-free moving components. However, they will wear out over the course of the operating period and should therefore be visually inspected on a regular basis. If any cracks, bubbles, brittleness or any other external damage becomes visible, the air actuators/air springs must be replaced. These cannot be repaired.

6.2 Cleaning/maintenance

Soiled air actuators/air springs can be cleaned using commercially available alkaline cleaning agents. Diluted sodium hydroxide solution or a solution of ammonia in water can also be used to clean them. After cleaning, the air actuators/air springs should be rinsed with clear water to remove any traces of the cleaning agent.

The air actuators/air springs can also be cleaned using steam jets and high-pressure cleaners of up to 90 bar (at a minimum distance of 20 to 30 cm). Cleaning agent additives based on aliphatic or aromatic hydrocarbon, such as petroleum, white spirit, benzene and nitro thinner, etc., may not be used.

6.3 Replacing bellows (D- and R-types only)

- 1. Depressurize all relevant system parts.
- **2.** Loosen the screw connections and remove the two covers.
- **3.** Pull the bead rings off the bellows using a tire iron.



The tire irons must not have any sharp edges that could damage the bellows!

4. Check the connection parts for damage before reusing them. Replace damaged connection parts if necessary.



- 5. Pull the bead rings onto the new bellows using tire irons.
- 6. Moisten the openings of the air actuator/air spring and the mounting area of the covers using soapy water or tire mounting paste.
- 7. Turn the covers so that the mounting areas fit into the center of the bellows and the holes are aligned with the stud bolts/threaded blind holes. Now place the covers on the rubber bellows.
- **8a.** D-types: screw the nuts onto the stud bolts and tighten these crosswise to the permissible tightening torque using a torque wrench.
- **8b.** R-types: screw the screws into the threaded blind holes and tighten them crosswise to the permissible tightening torque using a torque wrench.



7 | Troubleshooting

Malfunction	Possible cause	Remedy
Air actuator/air spring does not move	No drive medium available	Check the connections/valves
Cracks or wear except for the reinforcing material	Mechanical or age-related wear	Replace the air actuator / air spring
Extended air actuator/air spring does not retract completely	Reset force too low	Increase the reset force

8 | Technical data

The technical data can be found in the respective product data sheet.



The content of this publication is not legally binding and is provided as information only. The trademarks displayed in this publication are the property of Continental AG and/or its affiliates. Copyright © 2025 ContiTech Deutschland GmbH, Hanover. All rights reserved. For complete information go to: www.continental-industry.com/discl_en





ContiTech Luftfedersysteme GmbH

30165 Hannover, Germany industrial@as.continental.com www.continental-industry.com