Membrane Air-Spring Insulator BiAir®
with deep natural frequency and adjustable dampening (pat.)
for vibration insulation of measuring and testing machines,
optical and electronic equipment, laser machines, fine machining
plant, vehicle and motor performance testers etc.

BiAir®

Product Description
The Air-Spring Insulator BiAir® consists of a cast aluminum body
whose air volume is enclosed by a thin-walled, flexible and pressure-
resistant rolling diaphragm. The piston is seated on this diaphragm
and is pushed into the air volume. This design causes highly effective
vibration insulation.
In order to obtain as high a dampening effect as possible, the air
space is split into two chambers (load/dampening volume) linked by
air pipe. By the adjustable valve the dampening can be easily chan-
ged from outside. Due to the friction caused by the air-stream passing
through the bypass valve, up to 20% dampening can be effected.
Additional safety valves will protect the roller diaphragm from get-
ing damaged by over-inflation.

Range of Application
Highly effective vibration insulation of sensitive measuring and test-
ing machines, fine-machining plant, as well as optical and electronic
equipment. Another important range of application is the vibration-
insulated foundation of vehicle, motor and other performance testers. 
BiAir® Air-Spring insulators are extremely well suited for the insula-
tion of foundations e.g. equivalent machine loads.

BILZ level controller systems
Level control is an important part of an optimally functioning air spring
system. The automatic level controller can be utilized to overcome the
problem associated with load changes in air-spring insulated machi-
nes, which can result in tilting of the machine.
The height of the specific elements BiAir® or FAEB® can be controlled
by changing the air pressure in the air-spring insulators. Quick inflation
or deflation will hold the machines level even if their center of gravity
keeps changing.

Advantages compared with conventional steel springs
BiAir® Air-Spring insulators with level control are an active system. The machine/foundation level consistency will always be preserved!
Automatic leveling/adjustment!

Control circuit
The circuit consists of at least three air springs. If more air springs are needed for structural or loading reasons, the system
must always include 3 position pickups, e.g. three controlled components in or-
der to avoid statical overdefinition. This is achieved by connecting sets of air springs in parallel.
Air springs with higher max. loads as well as air springs with lower natural frequencies can be supplied upon request!

<table>
<thead>
<tr>
<th>type</th>
<th>Ø A mm</th>
<th>Ø C mm</th>
<th>workheight H mm</th>
<th>max. load N at max. 4 bar</th>
<th>max. load N at max. 6 bar</th>
<th>natural frequency Hz (vertical) approx.</th>
<th>natural frequency Hz (horizontal) approx.</th>
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ST = Steel

When choosing the size of the air-spring consider loading at 4 bar only.

Air springs with higher max. loads as well as air springs with lower natural frequencies can be supplied upon request!
Membrane Air-Spring Insulator BiAir®
with level controller system

- **BiAir® mechanical-pneumatic positioner/controller (MPN-PVM)**

  The mechanical-pneumatic relief valves are a simple yet effective solution. The level is constantly scanned by a plunger. The plunger position is transmitted to a spool valve. Depending on the spool valve position, pressure is either applied to the air spring or vented from the inside of the air spring. The machine level can be maintained at an accuracy ± 1/100 mm.

  Principally three control valves are used. The incoming air supply is conditioned with a pressure regulator to limit system pressure to a maximum of 6 bar and with a water trap to remove vapor and an air filter to remove dust and any foreign bodies from the air supply.

- **BiAir® electro-pneumatic positioner/controller (EPN)**

  **Advantages**

  Important advantages of the BILZ level control are:

  - a high reset accuracy e.g. level accuracy of ± 1/100 mm
  - extremely short reaction time
    (within the milli-second range)
  - the general possibility of being able to optimally adapt (increase and reset) the speed of the system to the specific conditions (control circuit)
  - wear-resistant and sturdy relief valves
  - simple and effective set-up operation
  - for highly-dynamic machines with high precision requirements, we recommended the new **EPN – FAST**, which can handle very high volume flows and is fitted with frictionless embedded valves.

  System components

  Each system consists of 3 position sensors, 3 electro-pneumatical relief valves, one control unit (digital computer logic), the air-supply regulator and filter units.

  Even the most severe conditions are mastered by the electro-pneumatical positioner. It is used mainly where high reset precision and extremely short reaction times are required.

  Any deviation (difference between desired value and actual value) from the desired height (desired value) of the air spring insulators is measured at a precision of up to 1/100 mm accuracy by means of position sensors.

  In the control unit, these electronic signals will then be processed and the air spring elements will be inflated or deflated accordingly for level equalisation via the pneumatic relief valves.

- **Control unit**

  The control unit consists of a printed circuit board, containing the entire logic of the 3 control circuits, 3 air pressure displays for the air springs, adjusting screws for the adjustment of the machine, selection of the controller speed, and a switch to enable complete deflation of the air springs. The control unit can be supplied either as a 19 inch rack mount unit or completely enclosed within a cabinet.

  **Software**

  As an optional feature, a special software package is available. By means of this software, the adjustment and optimization of controlled conditions, the registration of adjustment parameters as well as error determination can be carried out via the serial interface (serial interface provided on the control unit).

  Furthermore, the integrated serial interface enables link-ups with available machine computers or systems to be insulated. A number of more complex system modes can be realized this way.