BiAir®
Membrane air spring isolators

Low-frequency Bilz BiAir® membrane air spring with precise adjustable damping for effective vibration isolation of sensitive measurement and testing equipment, precision finishing machines, laser equipment and optical and electronic instruments as well as vehicle, engine and gearbox test beds, etc.
Without isolation

With isolation

BiAir® MEMBRANE AIR SPRING ISOLATOR WITH ADJUSTABLE DAMPING

The BiAir® membrane air spring isolator is made of machined or cast aluminium. The air space is enclosed by thin-walled flexible and pressure-resistant rolling membrane. A piston sits on top of the membrane and is pressed into the air space. This design allows a highly-effective isolation against vibration. In order to simultaneously achieve a high degree of damping, the air space within the isolator is divided into two chambers connected with an air tube (load/damping volume). An adjustable throttle valve is used to set the flow cross section to the desired damping effect from the outside. The friction in the air flow generated by the throttle valve can create a damping effect of up to 15 %.

Damage to the rolling membrane due to overpressure is virtually eliminated through the use of additional safety valves or a mechanical piston stroke limit.

- Highly effective vibration isolation of
  - sensitive measurement and testing equipment,
  - precise finishing machines,
  - laser equipment as well as optical and electronic instruments.
- Vibration isolated mountings of vehicles, engines and gearbox test stands.
- Foundation isolation

Advantages compared to conventional steel springs

The use of Bilz BiAir® air spring isolators with active level control constantly maintains the correct level of machines or foundations. The level control and adjustment is completely automatic!

The pressure in the air springs is appropriately adjusted by inflating or deflating in response to load changes. This keeps the isolating effect constant in every case.

Unlike steel springs air springs do not transmit structure-borne sound.
Note:
- BiAir® membrane air springs are available in the following materials depending on size:
  - BiAir®-ED: Cast aluminium, powder coated RAL similar to 7037 dusty grey
  - BiAir®-ED-AL: Aluminium (naturally anodized)
- BiAir are available with a nose for mounting valves (MPN) or position sensors with the tubing connection on the left (NL) or on the right (NR).

**TYPE SERIES BiAir®-ED-AL IN ANODISED ALUMINIUM**

Natural frequency vertical approximately 2.5 Hz, horizontal approximately 2.8 Hz.

<table>
<thead>
<tr>
<th>Type</th>
<th>No Nose</th>
<th>Aluminium BiAir®-ED-AL</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>Working height H</th>
<th>+/- travel</th>
<th>max. load N** at an air pressure of 4 bar</th>
<th>6 bar</th>
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</thead>
<tbody>
<tr>
<td>0.125</td>
<td>-</td>
<td>50-0002</td>
<td>75</td>
<td>74</td>
<td>77</td>
<td>+/-2.0</td>
<td>390</td>
<td>580</td>
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<tr>
<td>0.15</td>
<td>-</td>
<td>50-0005</td>
<td>75</td>
<td>74</td>
<td>77</td>
<td>+/-2.0</td>
<td>670</td>
<td>1,000</td>
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<tr>
<td>0.25</td>
<td>-</td>
<td>50-0129 50-0135 50-0136</td>
<td>120</td>
<td>110</td>
<td>87</td>
<td>+/-2.5</td>
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<td>1,700</td>
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<td>50-0131 50-0139 50-0140</td>
<td>200</td>
<td>200</td>
<td>100</td>
<td>+/-2.5</td>
<td>2,670</td>
<td>4,000</td>
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<tr>
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<td>50-0146 50-0147 50-0148</td>
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<td>230</td>
<td>100</td>
<td>+/-3.5</td>
<td>10,170</td>
<td>15,260</td>
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<tr>
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<td>2</td>
<td>50-0153 50-0141 50-0144</td>
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<td>260</td>
<td>100</td>
<td>+/-2.5</td>
<td>14,200</td>
<td>21,500</td>
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<td>50-0154 50-0142 50-0143</td>
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<td>100</td>
<td>+/-3.0</td>
<td>19,670</td>
<td>29,500</td>
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</table>

* Natural frequency vertical approximately 3.0 Hz, horizontal approximately 3.5 Hz
** When selecting the size of air spring please select an air pressure of 4 bar.

**TYPE SERIES BiAir®-ED/-HE/-HE-MAX IN CAST ALUMINIUM**

Natural frequencies vertical BiAir®-ED approx. 2.5 Hz, BiAir®-ED-HE approx. 1.7 Hz, BiAir®-ED-HE-MAX approx. 1.2 Hz

<table>
<thead>
<tr>
<th>Type</th>
<th>Item no.</th>
<th>ØA</th>
<th>BC</th>
<th>Working height H in mm</th>
<th>+/- travel</th>
<th>max. load N** at an air pressure of 4 bar</th>
<th>6 bar</th>
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</thead>
<tbody>
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<td>50-0012</td>
<td>50-0145</td>
<td>-</td>
<td>120 216 129 157 307</td>
<td>-</td>
<td>+/-2.5</td>
<td>2,670 4,000</td>
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<tr>
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<td>50-0026</td>
<td>50-0027 50-0035</td>
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<td>50-0021 50-0025</td>
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<td>50-0046 50-0054</td>
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<td>50-0065 50-0066</td>
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<td>-  50-0075</td>
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<td>+/-3.5 155,730 233,600</td>
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</tbody>
</table>

* For the sizes 1 to 3 of series ED/HE-MAX the ØA is the same as ØC (piston diameter)
** When selecting the size of air spring please select an air pressure of 4 bar.

Note:
- The maximum movement in the horizontal plane is between approximately 1 to 2 mm depending on the size of the air spring.
- In addition to the standard solutions listed here we also offer numerous air springs with a larger stroke and lower natural frequency.
- Powder coated air springs are also available in other RAL colors on request.
- Allowable temperature range: -20 °C to +80 °C (-5 °F to +175 °F)
- If you have any questions please contact us, we would be happy to advise you.
We reserve the right to make changes without prior notice.
MPN
Mechanical pneumatic level control for Bilz air springs

Bilz mechanical pneumatic level control for air spring systems with FAEBI® and FAEBI®-HD rubber or BiAir® membrane air springs. Powerful vibration isolation with maximum level control.
Mechanical pneumatic level control **MPN**

Bilz level control systems are significant components in the optimum function of vibration isolation using FAEBI® and FAEBI®-HD rubber or BiAir® membrane air springs. They reliably prevent any unwanted deflections of the isolators or an out-of-level condition of the machine that can be caused by load changes on an air spring mounted machine or system. Rapidly adding or venting air enables the air pressure within the air spring to be matched to the respective load, automatically controlling the height of the individual air springs. This enables the highest degree of stability and effective isolation even with changes in the center of gravity.

**Valve functions**

The level is continuously monitored by the plunger. The position of the plunger is directly applied to the slide valve and the air spring is either pressurized or vented. The target level is adjusted by turning the knurled adjustment ring. The height and level of the machine is adjusted using three valves.

**Design**

At least three air springs are controlled (Fig. 1). If more isolators are required due to reasons of design or load, the system must still be set up in three controlled groups, as otherwise the system is statically indeterminate. This is achieved by using multiple isolators in parallel as a group (Fig. 2). An additional air maintenance unit is installed upstream of the control valves to prepare the compressed air. See also Page 52.

**MPN-LCV**

Item no. 61-0012

Very robust, zinc plated proportional valve. Repeatable accuracy of ± 1/10 mm (±0.004”). Suitable for Bilz FAEBI®, FAEBI®-HD and BiAir® air spring isolators.

Available in the following versions:
- **MPN-LCV**: Item no. 61-0012
  - Standard version of the LCV with hard metal discs
- **MPN-LCV-KURZ-Pad-A**: Item no. 61-0054
  - Shortened version of the LCV with plunger isolation pad

**MPN-PVM**

Item no. 61-0010

High-precision chromate plated proportional valve. Repeatable accuracy of ± 1/100 mm (±0.0004”). Suitable for Bilz BiAir® air spring isolators.

Available in the following versions:
- **MPN-PVM**: Item no. 61-0010
  - Standard version of the PVM with hard metal discs
- **MPN-PVM-KURZ-Pad-A**: Item no. 61-0058
  - Shortened version of the PVM with plunger isolation pad

**Note**

- Supplied as a complete set which includes the 3 control valves and all necessary tubing and fittings. All components are also individually available as spare parts.
- In addition to the standard solutions listed here we also supply special versions with regard to material, flow, accuracy and restoring force.
- On the LCV model the air flow can be reduced using the throttle valve should the control system tend to overshoot. The PVM model can also be fitted with a throttle valve as an option.
- If you have any questions please contact us, we would be happy to advise you.
To reduce the vibrations and disturbances transmitted through the valve plunger we offer a specially matched plunger isolation pad. The plunger isolation pad is an additional isolation disc that is inserted between the valve plunger and the machine that reduces disturbances that would otherwise be transmitted through the valve plunger. This facilitates improved isolation of sensitive machinery, particularly where the load is low. The plunger isolation is normally ordered with the appropriate level control, see p. 51. The additional installation height must be taken into account. Shortened valves must be used when using with the BiAir® membrane air spring. Item no. for individual ordering: 61-0026

With the finger pinch protection installed, the risk of pinching a finger in the area of the valve or plunger will be reduced. The finger pinch protection can be placed on the hard metal disc and can therefore be retrofitted to existing systems. For maintenance purposes, the finger pinch protection can be removed without damage for maintenance work. The finger pinch protection is compatible with both the PVM and with LCV valves, and the electronic systems AIS™ and EPPC™. Item no. for individual ordering: 50-0092

Air maintenance units with pressure regulators
The air maintenance units are used to set the optimum system pressure and prepare the compressed air for the air spring system. The integrated compressed air preparation system traps incidental condensate and cleans the compressed air of particles such as rust and dust.

WFD-M: Item no. 61-0045
Version with filter, matched for use with MPN-LCV
WFD-M-PVM: Item no. 61-0048
Version with fine filter, matched for use with MPN-PVM
WFD-M-PVM-ÖL-FILTER: Item no. 61-0049
Version with ultra fine filter, matched for use with MPN-PVM with contaminated/oily air*

* Must be checked against the air class.

Note
- For the operation of the pneumatic air springs, a compressed air quality in accordance with ISO 8573-1:2010 must be given:
  - In combination with MPN-PVM: Air class 2.4.2;
  - below 15 °C (60 °F): Air class 2.3.3
  - In combination with MPN-LCV: Air class 3.4.3
- If you have any questions please contact us, we would be happy to advise you.