

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 insulation at very high level consistency.



Mechanical pneumatic level control **MPN**

Bilz level control systems are significant components in the optimum function of vibration insulation using FAEBI® and FAEBI®-HD rubber or BiAir® membrane air springs. They prevent impermissible and undesired deflection of the insulators 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 insulation even with changes in the centre of gravity.

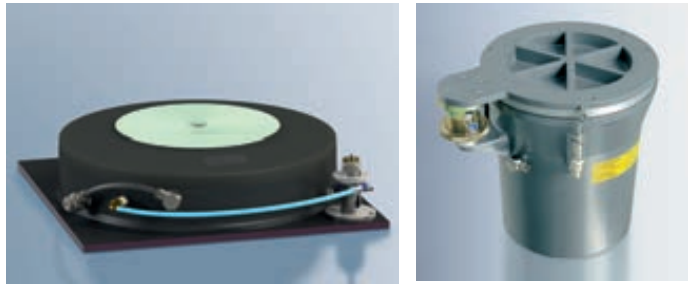
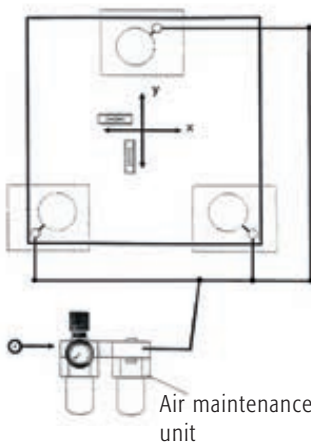


Fig. 1



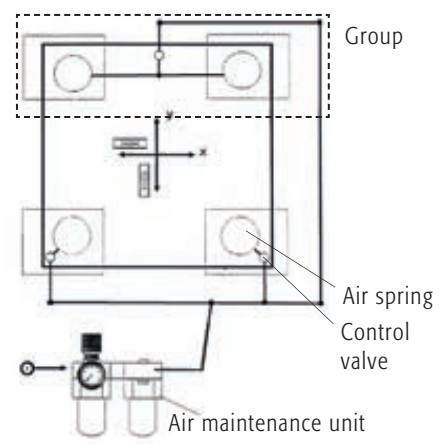
Valve functions

The level is continuously sensed using 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 insulators are required due to reasons of design or load, the system must still be worked in three controlled groups, as otherwise the system is statically overdetermined. This is achieved by using multiple insulators 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.

Fig. 2



MPN-LCV

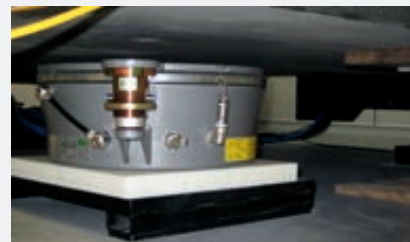
Item no. 61-0012



Very robust galvanised proportional valve. Level accuracy is approximately $\pm 1/10$ mm. Suitable for Bilz FAEBI®, FAEBI®-HD and BiAir® air spring insulators.

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 insulation pad



MPN-PVM

Item no. 61-0010



High-precision chromed proportional valve. Level accuracy is $\pm 1/100$ mm. Suitable for Bilz BiAir® air spring insulators.

Available in the following versions:

- MPN-PVM: Item no. 61-0010
Standard version of the PVM with carbide washers
- MPN-PVM-KURZ-Pad-A: Item no. 61-0058
Shortened version of the PVM with stem insulation pad

Note

- Supplied as a complete set which includes the 3 control valves and all necessary hose lines and connectors. All components are also individually available as spare parts.
- In addition to the standard solutions listed here we also hold special versions with regard to material, flow, accuracy and restoring force.
- On the LCV variant the air flow can be reduced using the throttle valve should the control system tend to overshoot. The PVM variant 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.

PLUNGER INSULATION PAD



To reduce the vibrations and disturbances transmitted through the valve plunger we offer a specially matched stem insulation pad.

The plunger insulation pad is an additional insulation 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 insulation of sensitive machinery, particularly where the load is low.

The plunger insulation 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

ANTI-TRAPPING PROTECTION

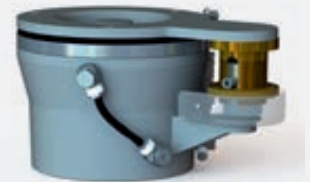


Anti-trapping protection reduces the risk of trapping in the vicinity of the valve or sensor plunger.

The anti-trapping protection can be plugged onto the hard metal disc and can therefore be retrofitted to existing systems. The anti-trapping protection can be removed without damage for maintenance work.

The anti-trapping protection is compatible with PVM and LCV valves, and also with the AIS™ and EPPC™ electronic systems.

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*



WFD-M



WFD-M-PVM



WFD-M-PVM-ÖL-FILTER

* Must be checked against the air class.

Note

- For the operation of the pneumatic elements 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: Air class 2.3.2
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.

EPPC™

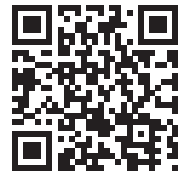
Electronic Pneumatic Position Control

EPPC™

Electronic Pneumatic Position Control

Real-time level control for efficient vibration insulation of vibration sensitive, highly dynamic machines and strict requirements on positional accuracy and setting time.





Please watch our EPPC™ video!

ELECTRONIC PNEUMATIC POSITION CONTROL EPPC™

EPPC™ System properties

- Real-time control of up to six degrees of freedom
- Optimum positional accuracy ($\pm 8 \mu\text{m}$)
- Individually adjustable system parameters (such as damping)
- Short deflection and settling times in response to load changes
- One high-performance servo valve and one displacement sensor per degree of freedom
- Optimized connecting system using CAN bus technology
- Intelligent browser-based user interface for setting, diagnostics and monitoring, connection via Ethernet, remote maintenance possible
- Operator state display, (for example, ready, working position, motion complete, error)
- Digital I/O interface for external control and monitoring
- Optimized pneumatic design
- Noiseless control using high-resolution signal processing and servo valve technology
- Robust and proven air spring technology, can be combined with Bilz standard air springs
- No disturbing heat generation, magnetic field fluctuations or high power consumption as is the case with electro-magnetic actuators

Applications:

- High-precision machines
- Vibration-sensitive and highly dynamic measuring machines
- Microscopes
- Test and production machines in the semiconductor industry

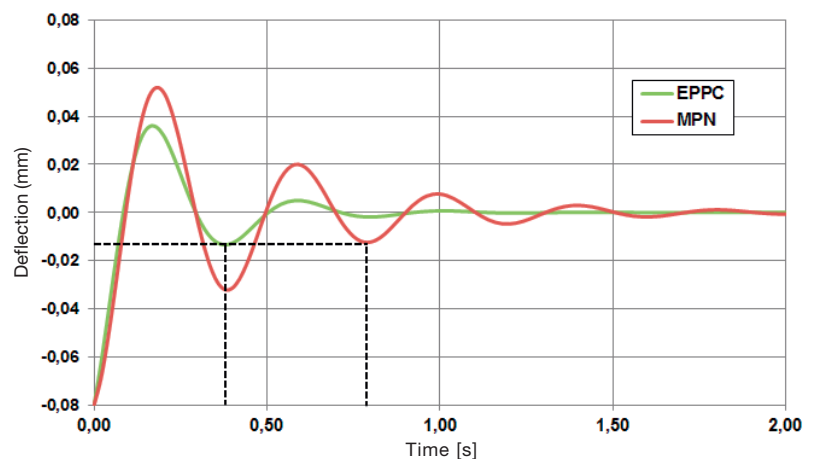
EPPC™ real-time level control achieves an optimum production accuracy of $\pm 8 \mu\text{m}$ and a significant reduction of the deflection and settling times in response to dynamic load changes

EPPC™ can be combined with three to six air spring control groups and control up to six degrees of freedom. Bilz offer a wide range of different size air springs for system design.

The high-performance electronics (14 bit AD converter, 16-bit signal processor) and

compressed air valves are mounted directly to the respective air springs, enabling virtually noise-free control without losses due to a pressure drop in the hose connections. The use of CAN Bus technology ensures the simplest electrical cabling and makes it possible to install the control unit up to 20 m away.

In comparison to conventional mechanical-pneumatic level control systems (for example Bilz MPN) the settling time can be significantly reduced using EPPC™.



Theoretical MPN vibration curve compared with EPPC™. At a deflection of $-80 \mu\text{m}$ the MPN reaches a stable position within a tolerance of $\pm 15 \mu\text{m}$ after 0.75 seconds. With EPPC™ the deflection time is reduced by 45 % to 0.4 seconds.