



## INDIVIDUAL SOLUTIONS WITH THE **LIMBO MODULAR SYSTEM** PLUS EXPERT ADVICE AND SUPPORT

ATG Autotechnik GmbH's modular system Limbo for articulated bus systems includes articulations, platforms and cable guidance elements. It is completed with folding bellows from HÜBNER. Limbo is not a prefabricated product. In expert consultation, we create your individual system solution – with exactly the components that are best fitted to your vehicle. With us, the customer has the choice!

### OPTIONS FOR THE LIMBO MODULAR SYSTEM

#### Articulation

- Vertical load capacity between 25 and 32 kN (has an effect on component weight)
- If necessary, especially high load capacity at full bending of vehicle
- Shortening possible at the side of the front vehicle element (if appropriate mounting is available from the customer)
- Bending angle of 52 to 53.5°
- Stepped damping with central hydraulic system
- Stepped damping with redundant decentralized hydraulic system
- Stepless damping with central hydraulic system
- Stepless damping with redundant decentralized hydraulic system
- Under certain conditions a solution without damping is possible
- Monitoring of turning angle with 2 to 6 position switches
- Monitoring of turning angle with stepless, redundant and contact less turning angle sensor

#### Platform

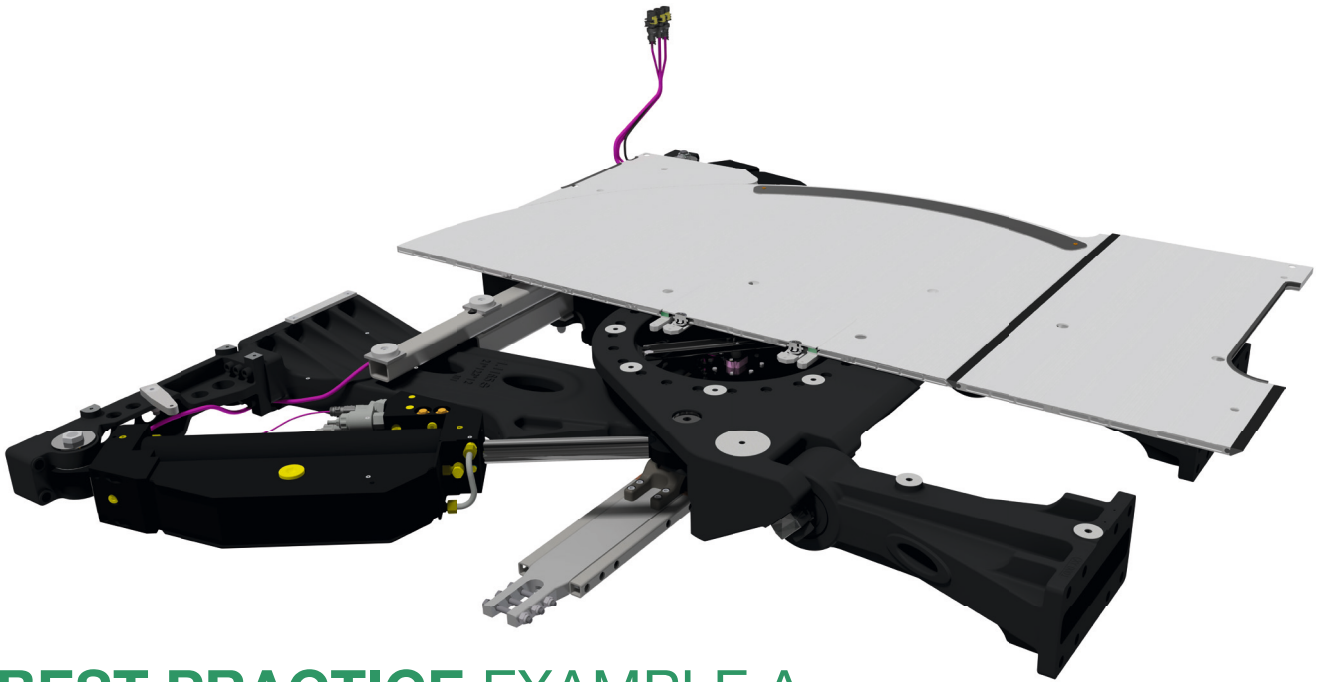
- Fully flat platform that always maintains the orientation of the front vehicle element
- Symmetrical platform with overhead beam that moves in conjunction with the folding bellows (allows for installation of seats in the gangway area)
- Aluminum in hollow chamber design (lightweight construction), solid aluminum or classic checker plate
- Surface options: Anodized or with anti-slip coating in color of choice (transparent also possible)

#### Cable guidance systems

- Cable guidance below the articulation possible (up to approx. 48mm Ø)
- Cable guidance in the side of the folding bellows
- Cable guidance above the folding bellows
- Cable guidance between the top of the folding bellows and the intermediate ceiling
- Fitting of cable guidance system with cables defined by the customer is possible

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## BEST PRACTICE EXAMPLE A FROM THE LIMBO MODULAR SYSTEM

### Proven articulation/platform combination

This combination is the result of intensive development work based on customer requirements. Previously, there was no appropriate solution to meet these requirements. Today, this combination is supplied to customers more than 1,000 times per year.

### Articulation

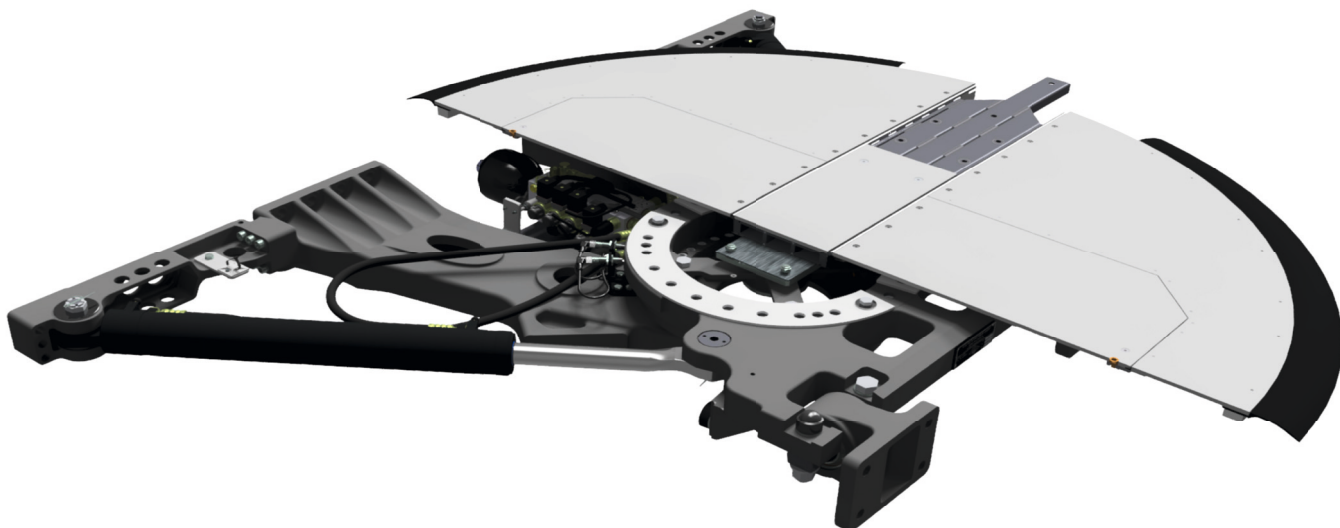
The mechanical system is not only capable of handling very high vertical loads, but also the enormous push and pull forces generated at the moment when the extremely flexible vehicle drives into end stops. The responsiveness of the redundant, stepless damping system is particularly impressive.

### Platform

The articulation is equipped with a visually attractive, fixed platform made of extruded aluminum profiles. A platform of this type is not only lighter than a solid platform, but also has significantly higher rigidity, which in turn provides improved slip resistance for passengers. The slip resistance is also enhanced through the principle of the so-called fixed platform, which reduces relative movements at the floor as much as possible.

### Key data

- Weight: 645 kg (including platform)
- Maximum bending angle: 53.5°
- Maximum pitching angle: +/- 10°
- Low overall height: 244 mm
- High, continuously adjustable damping torque
- Very high mechanical load capacity (32 kN)
- Contactless angle sensor
- Virtually maintenance-free
- Fully flat platform that always maintains the orientation of the front vehicle element
- Platform made of anodized aluminum in hollow chamber design (lightweight construction)



## BEST PRACTICE EXAMPLE B FROM THE LIMBO MODULAR SYSTEM

### Proven articulation/platform combination

This product is a combination of proven and new components and is based on a wide range of customer requirements. The aim was to provide a sturdy and easy to maintain product. In addition, providing seats in the gangway area was also a requirement. The articulated bus equipped with this system is the best-selling articulated bus in North America. To date, this combination has been sold more than 5,000 times.

### Articulation

This articulation combines lightweight construction with sturdy, maintenance-friendly technology. The three-step damping is realized through a central hydraulic system, with turning angle and direction detected via a four-point position switch system. The substantially shortened connecting brackets make it possible for customers to influence the overall weight of the 1.6-meter-long gangway system and thereby to potentially increase the “Buy America” share it represents.

### Platform

The platform with the overhead center hoop beam allows for the installation of seats/benches in the gangway area. It moves in sync with the folding bellows. The design with the two semi-circular flaps represents an outstandingly sturdy and easy-to-maintain solution. The anti-slip coating as well as the rubber lip can be produced in colors as required by the customer.

### Key data

- Weight: 535 kg (including platform)
- Maximum bending angle: 52°
- Maximum pitching angle: +/- 10°
- Low overall height: 232 mm
- 3 damping levels
- High mechanical load capacity (25 kN)
- 4 position switching system for bending angle detection
- Low-maintenance
- Easy-to-maintain platform that moves in conjunction with the bellows and allows for the installation of seats
- Platform in black or in other anti-slip coating colors