

BERGHOF TESTING

Force Application Machine

Seat calibration with high-precision force control



PRODUCT INFORMATION **FAM**



- 01** Berghof Testing Software visualizes calibration processes and result data provided by the "Force Application Machine" (FAM) in the graphical user interface.
- 02** The FAM is used for the calibration of vehicle seats – for example with seat occupancy mats for passenger detection.

- 03** The FAM is available as a separate system for calibration of vehicle seats or as a combined test bench together with our "Seat Function Tester" SFT.

Seat calibration with fast and highly accurate force control

Many components of modern vehicles today contain a great deal of technology to provide best possible protection for vehicle occupants in the event of an accident. Car seats have also become a safety-relevant factor – since they determine, for example, whether and to what extent an airbag is activated or a seat belt tightens in case of a collision.

In an increasing number of countries of the global automotive market, vehicle seats are required to be equipped with seat occupant mats, so-called "Passive Occupant Detection Systems" (PODS). Depending on what weight (adult, child, shopping bag, nothing) is currently on the seat cushion of the front passenger seat, the PODS sensor activates the seat belt tensioner and also controls the activation of the front passenger airbag in the event of an accident. The seat occupancy mat consists of a gel-filled cushion, pressure sensors and an electronic control unit.

The solution: Calibration and function testing with Berghof

High-precision calibrated seat occupancy mats increase passenger safety and reduce the risk of product recalls. Berghof Testing's Force Application Machine (FAM) helps you, as a manufacturer of high-quality vehicle seats, to ensure that only functioning and properly calibrated seats will leave your plants. By applying various forces and using control unit communication, the FAM quickly and precisely performs mechanical end-of-line

function testing and calibration of your seats – and in doing so it is a reliable tool of quality assurance of your vehicle seats and occupancy mats.

The FAM covers three different processes:

- [Calibration of Aptiv bladder mats according to the new FTS method](#)
- [Seat Belt Reminder \(SBR\) testing in accordance with the Porsche guideline](#)
- [Bodysense testing in accordance with the IEE guideline](#)

It is also possible to combine all three processes in mixed operation with a single FAM. Flexible calibration of different seat variants and series in production is also made possible with the FAM thanks to variant-related parameterization of the pressure forces and pressure positions on the seat. The highly standardized FAM is available either as a separate system – or together with our "Seat Function Tester" SFT as a combined system.

The testing sequence by means of high-precision force control

After the seat being placed in the test system, it is connected to the seat control unit, and communication with the FAM is established via CAN, LIN or K-Line interface.

The components in the seat are tested and calibrated with the help of the so-called pressure stamp unit by means of defined pressure and squeezing forces. During automatic calibration, the stamp presses on the vehicle seat with varying intensity successively.

The force unit can be set with an accuracy of 0.5 N in a range

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from 0 to 1,000 N. Once the calibration process is completed, the graphical user interface clearly displays the results. The entire testing procedure takes just about 50 seconds in total. So laborious and slow testing procedures, for example those using weights, are a thing of the past.

Our FAM is used all over the world – for example in the laboratory, for endurance testing in prototype development, or in mass production as an automated EOL test system for quality assurance.

The core of excellence: Berghof's testing software

As in all our test systems, our core competence lies in our in-depth approach: Our software concept, the Berghof Testing Software, is used worldwide in a wide variety of test systems. And it is also used in the FAM for connectivity, reporting and as a database.

Just to mention two of the biggest advantages: First, multiple seat calibration and test systems can be linked together in a single central database on your company network – even connecting several plants. This not only provides a central overview of your plants, but also ensures increased data security and offers backup opportunities.

Second, you can even upgrade your already existing FAM facilities: Because here, too, you can now install the latest software.

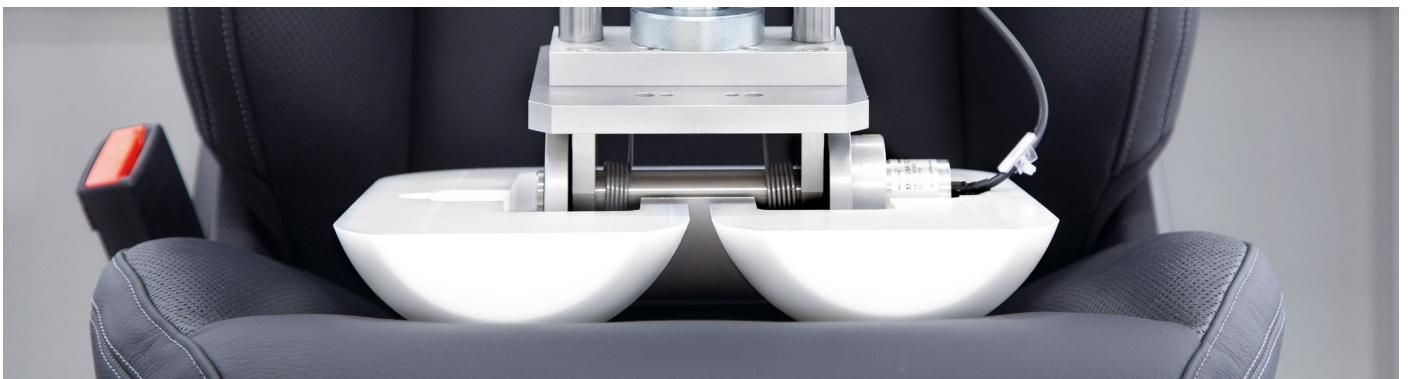
This also allows you to link your existing systems to the central database – your advantage: This gives you the opportunity to evaluate and compare or parameterize the result and parameter data of all your FAM and SFT systems in a single reporting tool

– no matter if you run one factory or several plants worldwide. This gives you investment protection for your existing plants and enables you to operate sustainably. In addition, this upgrade ensures standard operation and functioning across all your seat calibration systems.

At the same time, the user interface remains as user-friendly as you have always known it from Berghof Testing – including variant, parameter and user administration and extensive evaluation and filter functions that can easily be adapted and expanded to meet customer-specific requirements. Individual testing sequences also provide for simple or even parallel testing sequences.

Your advantages at a glance

- Modular structure, flexible deployment options and scalable results
- Fast and highly accurate self-calibration – for short cycle times (testing sequence of circa 50 sec.), high measurement accuracy and quality
- Standardized interfaces – Ethernet, EtherCAT, Profinet, CAN/FD, LIN, Flexray and many others
- Mixed operation of different variants, series and OEMs due to automatic parameter switching
- Meets all OEM internal standards
- Dynamic reporting, quick and easy to handle results at a glance, adaptable testing parameter output
- Remote maintenance and worldwide support service
- High operational reliability – proven in long-term 24/7 production operations



You can't get enough information about our system? Then feel free to contact [Thomas Brüggemeier](#) or click your way to [our website!](#)



TECHNICAL DATA **FORCE APPLICATION MACHINE**

| Force Application Machine (FAM) | |
|------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Standard Configuration | |
| Component | Details |
| Testing cell with feeding of the seats | Offline with manual feeding of the car seats Inline with automatic feeding of the car seats via existing conveyor technology |
| Force Unit | High-precision force control +/- 0.5 N for the calibration of passenger detection systems Variant-dependent parameterization of the compressive forces 0-1,000 N |
| Measurement of seat position | Measurement of the actual positions height, inclination, backrest, etc. with the help of triangulation measurement |
| Seat position adjustment | Manual adjustment of mechanical and electric seats Automatic adjustment of memory seats communicating with the seat control unit |
| Testing cable with plug tray | Robust test plugs with spring contact pins, easy to change |
| Calibration procedure | PODS-D with or without FTS in accordance with the Aptiv guideline Bodysense in accordance with the IEE guideline SBR test in accordance with the PV3555 guideline (VW, Porsche, Audi) |
| Interface to seat control units | CAN, CAN-FD, LIN, K-Line etc. |
| Interface to production control system | Take-over of variant data, transfer of result data |
| Interface to conveyor system | Digital-IO, Profinet, Profibus, Ethernet etc. |
| Berghof Testing Software | |
| User interface | Testing mask with result and status display Variant and parameter management User administration Language switching Service menus Fault reporting system |
| Testing sequence | Flexible arrangement of testing steps Parallel testing processes, thus optimized testing time |
| Database connection | Parameter and result data storage Variant tables Result reporting via testing systems of the entire production |
| Optional (at an additional charge) on request e.g.: | |
| XY gantry with X-axis | Variant-dependent positioning of the force unit |
| XY gantry with X and Y-axes | Variant-dependent positioning of the force unit |
| Trolley for seat feeding | Manual feeding of seats with trolley |
| Telescopic pull-out for seat feeding | Manual feeding of seats with telescopic pull-out |
| Image documentation | High-resolution cameras Four lateral views for backtracing in quality management |

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