

Automotive industry: safety testing of active headrests for cars

In use

Pneumatic cylinder DNC, variant S11, proportional pressure regulators

Benefits

- Reliable testing with exact force and excellent repeatability, accuracy and component durability
- Very fast testing with short set-up times of max. 15 minutes
- Highly versatile for a large number of seat variants

Intelligent headrests

There are no other countries that produce as many cars per head as the Czech Republic and Slovakia. The quality levels in these countries conform to the usual world standards, with design, performance and safety technology equal to that of international competitors. One major contribution to safety is made by TMT with its test stations for active headrests. The reliable testing which they provide using Festo proportional pneumatics helps to prevent whiplash.



▲ Is the headrest safe? This is one of many test procedures to which car seats are subjected.

■ The operational principle is as follows. In the case of a collision, the headrest automatically moves forward towards the passenger's head. This ensures that the distance between the head and headrest is not too large, thus reducing the effective force of the impact. It is this reactive behaviour which is tested on this station. The required properties are accuracy, controllable force, repeatability and com-

ponent durability. Proportional pneumatics from Festo is the key to meeting these requirements.

Plenty of force – but correctly controlled

A pneumatic cylinder type DNC-S11 with reduced friction presses on the headrest. The pressure applied to the cylinder can be varied to simulate various levels of force. A proportional pressure reg-

is 1402

Proportional pressure regulators
and directional control valves

TMT, spol. Sr. O.

Products	Assembly and test stations; transport technology for bulk materials and separate work- pieces
Contact	CZ-53701 Chrudim www.tmt.cz

ulator type MPPEs provides the right pressure. The air pressure at the valve output is controlled by analogue signals in the value range of 4 to 20 mA, thus ensuring that the cylinder delivers a reliable test force.

The forward motion of the headrest is measured by test stations with a position-measurement scanning laser. The test loop also includes a tensometer, which measures the force actually developed by the cylinder. The output of the tensometer has a feedback function. On this basis, the control system determines whether the actual forward motion of the headrest is appropriate to the forces acting on the seat backrest.

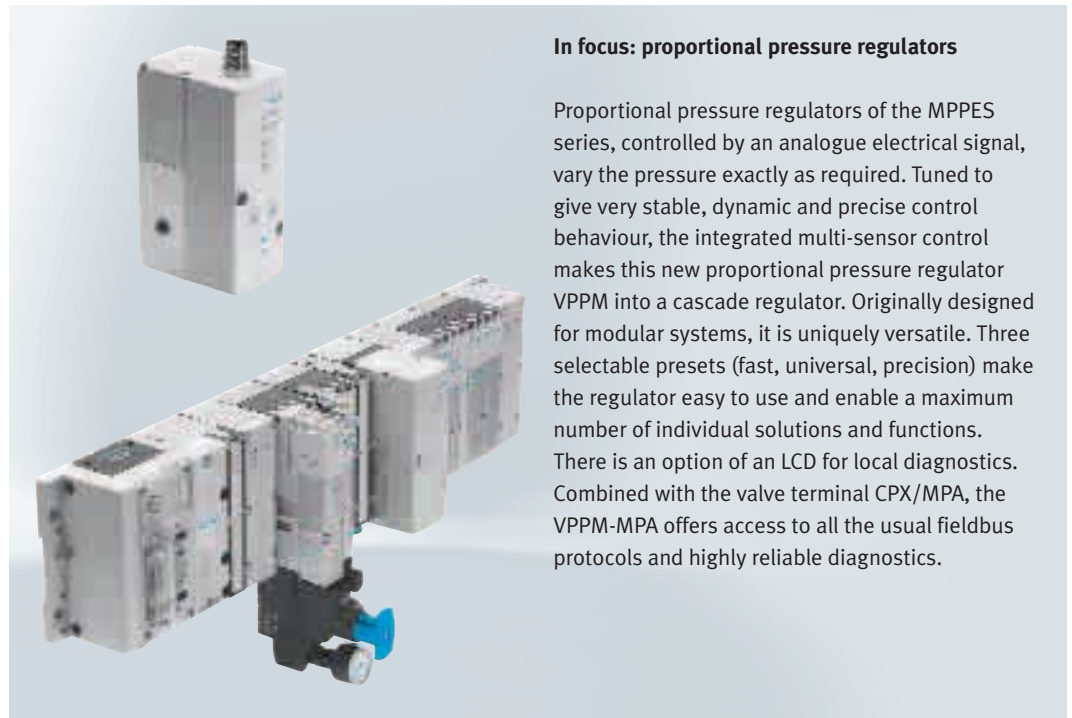
Need for very short set-up times

Hundreds of different seats are installed by each automotive manufacturer in terms of models, versions and levels. Flexibility was thus the primary requirement for the design of assembly and test stations. The production line must be of a universal design and be very easy to change from one product to another in order to meet the requirements of the just-in-time production method in the automotive industry. Festo provid-

ed an exemplary answer to these requirements, for example with unrestricted access to all functions from the same side. This means that set-up time for a different product takes no more than 15 minutes. ■



▲ A DNC cylinder assumes the role of a passenger and simulates his or her weight. The forward motion of the headrest is then measured by a scanning laser to determine its position. A tensometer measures the actual force provided by the test cylinder.

**In focus: proportional pressure regulators**

Proportional pressure regulators of the MPPEs series, controlled by an analogue electrical signal, vary the pressure exactly as required. Tuned to give very stable, dynamic and precise control behaviour, the integrated multi-sensor control makes this new proportional pressure regulator VPPM into a cascade regulator. Originally designed for modular systems, it is uniquely versatile. Three selectable presets (fast, universal, precision) make the regulator easy to use and enable a maximum number of individual solutions and functions. There is an option of an LCD for local diagnostics. Combined with the valve terminal CPX/MPA, the VPPM-MPA offers access to all the usual fieldbus protocols and highly reliable diagnostics.