

Hydropuls® Shock Absorber Test Machines

Type MSP



One, Two, Four or Six - Test as Many Shock Absorbers as You Wish

Ride comfort and safety are amongst the most important criteria when it comes to selecting a car. High speeds in particular make highest demands on modern vibration damper systems. Damper systems, McPherson struts and shock absorber systems used in modern axle designs, often electronically controlled, are exposed to extreme loads and they have to be capable of adapting their damping properties to varying driving conditions within milliseconds. Depending on the design criteria and vehicle type concerned, shock absorbers may have entirely different characteristics.

IST has been developing servohydraulic shock absorber testing systems for around 30 years. MSP test machines are based on this wealth of experience. They are conceived to analyse and assess accurately and reliably the material properties and characteristic parameters of single-tube and twin-tube shock absorbers, driver's cab dampers, seat and steering dampers and metallic impact absorbers.

User-friendly application software running under Windows® enables input of all relevant parameters, customizing of analysis procedures and storage of test procedures and measurement data. IST's MSP test system is therefore the ideal tool for reliable, fast and realistic tuning of vehicle chassis designs and development of shock absorber systems.



▲
Shock absorber test system

Benefits of the MSP System

Modular Structure

A modular system concept and an extensive range of accessories enable MSP test systems to adapt to virtually any shock absorber testing application.

High Test Velocity

A sturdy machine table accommodating the hydrostatically supported test actuator serves as seismic reaction mass. In conjunction with the extremely stiff and robust machine frame, highest test velocities can be achieved.

Optimum Damping Characteristics

Viscoelastic spring damping elements optimally cushion the shock type vibrations generated by the test system, meaning that no special foundation is required.



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Protective enclosure

Highest Operational Reliability

The amply dimensioned, hydrostatically supported piston rod is not only capable of withstanding the side loads commonly occurring during shock absorber testing, but also provides the machine with extraordinary reliability.

Future-Oriented

The DampPro software meets all relevant standards and specifications of the automotive industry, and can be upgraded with additional modules in accordance with the requirements in hand.

High Resolution of Measurement Results

With its high data acquisition rate of 5 kHz per channel and its 19 bit resolution, the Labtronic® 8800 digital measurement and control system guarantees accurate results even with highest test velocities.

Simple and Safe Operation

Simple and safe operation was one of the most important criteria in the development of the DampPro software, so as to enable complex testing tasks to be handled with a maximum of operating convenience. Individual DampPro modules can be combined arbitrarily into a complex, automatically executed test sequence.

Maximum Safety

The MSP system is equipped with state-of-the-art safety devices, and at the same time offers highest operating convenience during machine set-up. The basic configuration of the MSP machine includes a protective enclosure with a door monitored by safety switches. While the door is open, the machine operates in the load protect mode with reduced oil pressure and oil flow.

Applications

Depending on the MSP configuration chosen, the following typical test procedures in the area of shock absorber testing can be performed:

Damper Stroke

Determines the damper stroke.

Taring

Determines friction and gas force at low velocity.

Characterization

Determines the damper force as a function of velocity.

Valve Testing

Determines the service life of the bottom and piston valves.

Fade Test

Determines damper properties as a function of damper temperature.

High Velocity Test

Records and assesses the characteristic curve at high piston velocities.

Replay Test

Reproduces measured time histories.

Testing of CCD Dampers

Determines damper properties as a function of valve drive.

Endurance Test

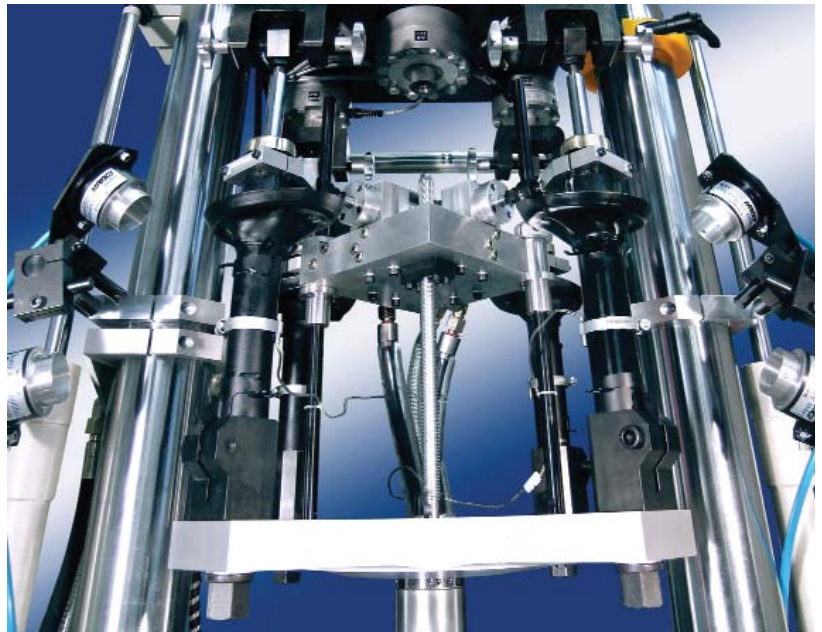
Determines damper properties after extended service.

Side Loading

Determines damper properties under side loads.

Accessories for Your Applications

A wide range of accessories enables the MSP system to be tailored even to highly specific requirements. You will be able to benefit from IST's long-standing experience in the area of shock absorber testing. Be it special-purpose mechanical grips, temperature equipment or side load input - the MSP system is extremely flexible and can be customized to your particular requirements. Many other testing applications not featured on these pages have already been realized by IST. Our specialists will be pleased to consult you.



▲ Testing of four shock absorbers with temperature measurement and air cooling equipment

Mechanical Grips

Mechanical fixture for clamping a damper at the swivel eyes. A threaded adapter is available for dampers with threaded attachment.



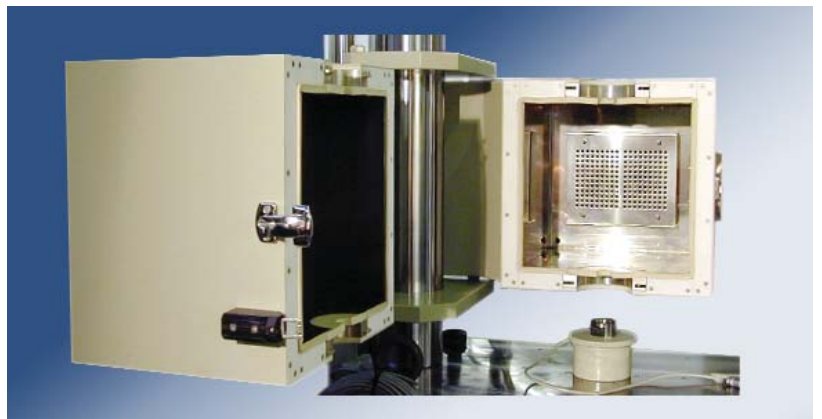
▲ Specimen grips

Temperature Control

The system includes one temperature sensor with 2-point control per shock absorber. The temperature sensors measure actual specimen temperature and transmit this information to the temperature monitoring system (temperature controller). The DampPro software enables temperature limits to be set and the desired action to be defined.

Temperature Chamber

For direct heating of the dampers. Scope of supply includes pull rods and frame attachment. Working temperature range from -40°C to $+200^{\circ}\text{C}$.



▲ Temperature chamber

Side Load System

To introduce side loads at the top bearing of the damper.



▲ Side load input for six dampers



▲ Side load input into a single damper



▲ Side load input into four dampers.
System includes air cooling

Accumulator System

In case of high velocities the accumulator system covers the oil demand for a limited number of strokes.



▲ Accumulator system



▲ MSP test system for testing six shock absorbers

Air-Cooling

An air-cooling system avoids overheating of the dampers. The system is controlled by the DampPro software as a function of temperature. Cooling cycles are run if necessary.

Software DampPro

Powerful and Easy-to-Use

The DampPro software was developed on the basis of the standards and test specifications of the automotive industry with a view to providing maximum ease of operation. DampPro controls the entire test procedure, including data acquisition, analysis and final presentation in a test report.

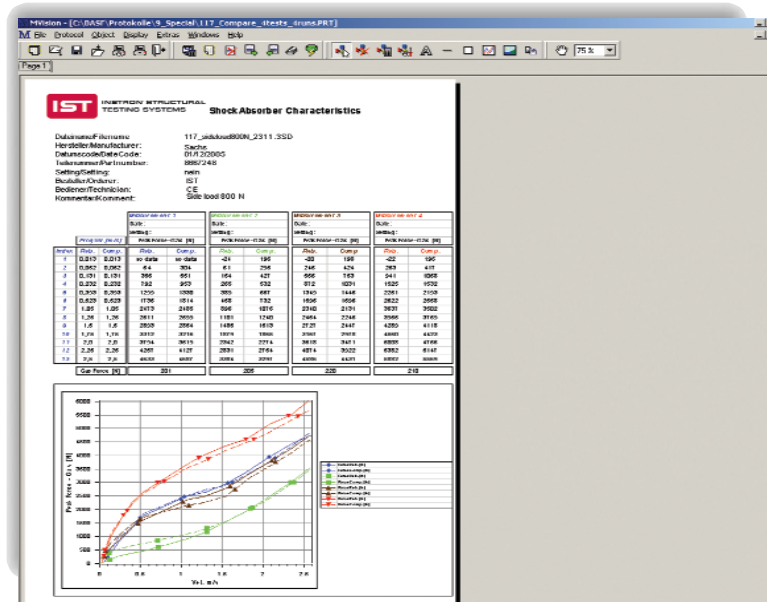
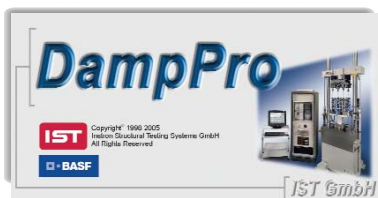
With DampPro, new complex tests can be set up easily and saved for subsequent re-use. Such a test procedure might look, for example, as follows:

- Friction test with determination of gas force
- Determination of the damper force at various velocities
- Endurance test

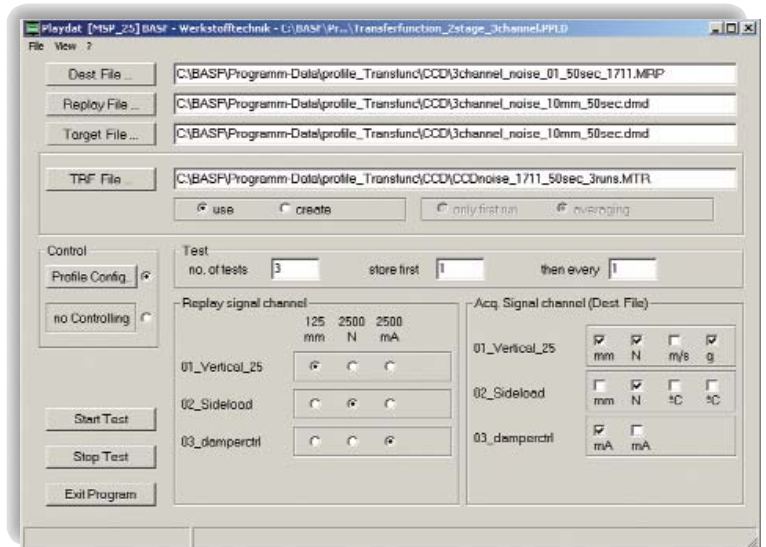
This sequence can be repeated several times.

Throughout the test procedure, DampPro monitors temperature, initiates air-cooling and conducts cooling cycles if necessary.

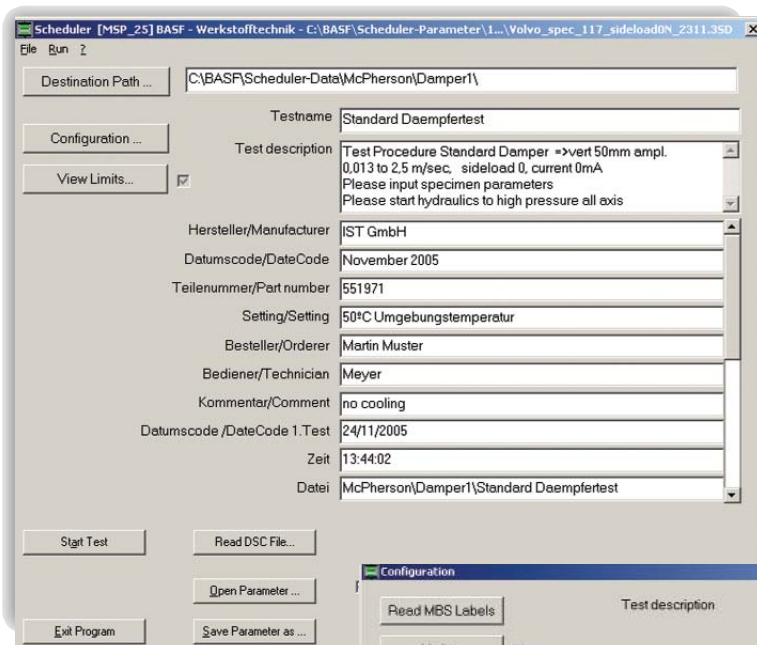
DampPro's integral report generator enables customized test reports to be created. Apart from damper force versus velocity plots or force-displacement hysteresis loops, customer-specific illustrations or corporate logos can be included in the report.



▲ Report



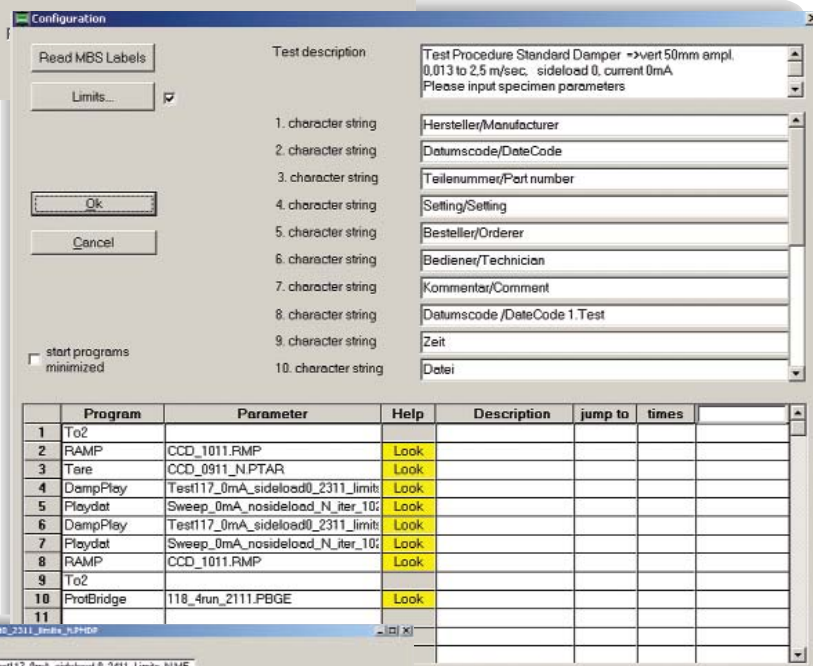
▲ PlayDat - Test definition



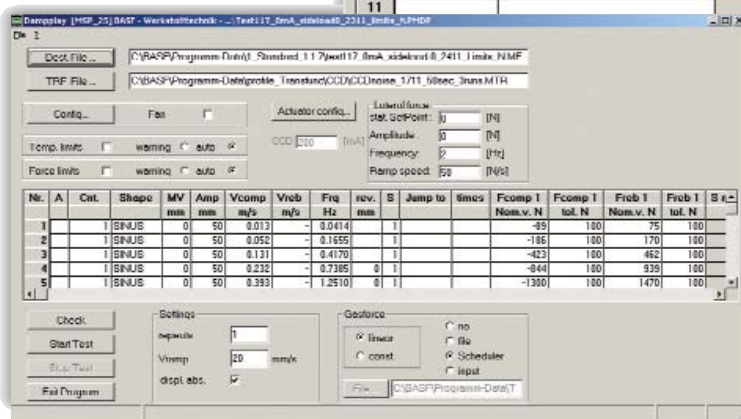
▲ Scheduler

DampPro Benefits

- Developed on the basis of the standards and test specifications of the automotive industry
- Makes use of IST's longstanding experience in the area of damper testing
- Easy and convenient operation through Windows® - based user interface
- Comprehensive monitoring of the test procedure
- Smart presentation of test results with integration of your corporate logo



▲ Scheduler Configuration



▲ DampPlay zur Parametrierung des Prüfablaufs

Technical Specifications

		MSP 25	MSP 34	MSP 50
Area of Application		Cars	Cars, Vans, SUVs	Commercial vehicles and simultaneous testing of 6 dampers
Actuator Rated Force Capacity		25 kN	34 kN	50 kN
Piston Stroke		250 mm	250 mm	250 mm
Piston Rod Diameter		80 mm	80 mm	80 mm
Hydrostatic Piston Rod Bearing		Yes	Yes	Yes
Frame Stiffness		500 kN/mm	500 kN/mm	500 kN/mm
Integral Seismic Mass		Yes	Yes	Yes
System Pressure		280 bar	280 bar	280 bar
Velocity*, Type I	0% of load	7.4 m/sec	5.7 m/sec	3.7 m/sec
	40% of load	4.1 m/sec	3.2 m/sec	2.1 m/sec
Velocity*, Type II	0% of load	9.8 m/sec	8.9 m/sec	9.0 m/sec
	40% of load	6.2 m/sec	5.0 m/sec	4.9 m/sec

* Depending on the supplementary mass, consisting of specimen grips and moving damper mass, other velocities may be obtained.



Sturdy Actuator Design



High Operational Reliability

Low Maintenance Requirements

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