

## Deutsche Bahn's test winner for new technology

*DB Systemtechnik GmbH tests new transport measuring technology in Minden. The award went to the data logger MONI LOG® EnDaL curve from the SMT & HYBRID GmbH of Dresden.*

Understanding transport processes is becoming increasingly important, even in rail transport. Therefore, extensive tests were carried out in a selection process for re-equipping freight trains with data loggers.

To simulate typical switching impacts, the impact of an 80 tonne freight car on a stationary car was measured on a breakaway incline. These impact tests were – in accordance with UIC loading guidelines and DIN EN 12663-2 – recorded with data loggers from 6 different service providers and compared with the measurements of a reference sensor. Conclusion of the test report: "Only the MONI LOG® EnDaL curve device from SMT & HYBRID GmbH delivered plausible results".

The appropriate selection of sensors and the outstanding parameter adjustment options were a plus. The device can be configured to the respective measuring tasks for a various frequency range.

The first devices will go into use at DB Schenker in July in the cargo securement / loading consultancy sector.

Other uses, e.g. in the automotive sector, will follow. Here, the EnDaL curve transport data logger will be combined with a GPS / UMTS module.

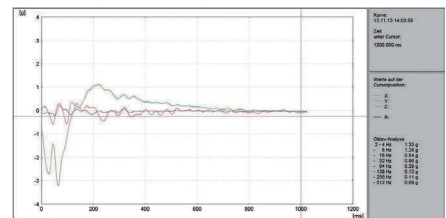
The MONI LOG® data logger incorporates practical knowledge acquired by SMT & HYBRID GmbH as the developer and producer of electronic assemblies and devices for the manufacturing, automotive, medicine and aerospace industries.

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Test wagon in Europe's largest railway testing centre, DB Systemtechnik GmbH Minden



Progress of a simulated freight train switching impact, measured by the EnDaL curve

Universal transport monitoring  
**MONI LOG®** EnDaL curve



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# Universal transport monitoring

## MONI LOG<sup>®</sup>

### EnDaL curve

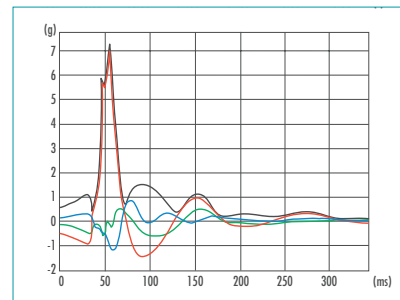
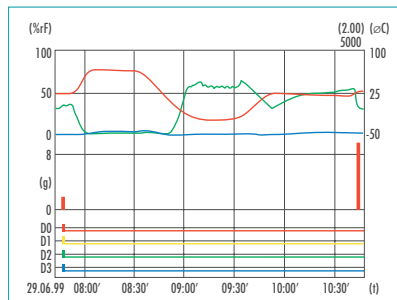


- Measures shock, temperature, humidity, inclination, and air pressure in any combination
- Records position coordinates from external GPS receiver
- Suitable for maritime transport, optimization of packaging and cleanroom operation
- Long operating time
- Compact, rugged unit and general-purpose accessories
- Including efficient analysis software

# MONI LOG<sup>®</sup> EnDaL curve



The EnDaL curve is an extremely versatile and modifiable data logger with sensors to measure and record mechanical shocks, temperature and humidity over an extended period of time. Additional sensors can be connected for combined measurement of air pressure, stack pressure, inclination and up to 4 digital signals. In addition, acceleration-time graphs are recorded for up to 20 peak acceleration events. The frequencies and the power spectral density of these graphs can be analyzed using external programs. All data can be transferred to a PC via an RS-232 interface or an USB-RS-232 port. It is possible to add a special GPS receiver. He records position coordinates of any event and the complete route. An easy-to-use software that facilitates device configuration and data evaluation is included in the delivery.



## Technical data

Parameters:	Acceleration (a) in three directions (x, y, z), temperature (T), humidity (% rH); other sensors can be connected and parametrised to analog and digital inputs
Measuring ranges:	Acceleration: 2, 5, 10, 20, 50, 100, 200 g with internal sensor; 100, 200, 500, 1000, 2000 $\mu$ C with external sensors, 50, 100, 200, 500, 1000 mV for external ICP <sup>®</sup> sensors (switchable); temperature: - 40...+75°C; humidity: 0.2...100% rH; analog channel 0...2.5V; digital channel (4 inputs); low: 0...0.8V; high: 2.4...12V
Memory:	16,384 acceleration values, 16,384 temperature and humidity values each, 10 or 20 acceleration-time graphs corresponding to the peak events, 4,096 digital events
Analog input filter:	0.2 ...16–1000Hz selectable, 4thOrder Bessel Filter for acceleration
Acceleration sensor:	Internal three-axial piezo-electric sensor and/or up to 3 external uni-axial sensors, special low-power 3D-ICP <sup>®</sup> acceleration sensors connected with voltage amplifier input, sensitivity of the charge and voltage amplifier configurable
Temperature sensor:	Internal or external sensor in a sensor tube
Humidity sensor:	Capacitive polymer sensor, arranged together with the temperature sensor in the sensor tube
Operating time:	1,000 h (rechargeable NiCd battery), 1,500 h (rechargeable NiMh battery), 2,500 h (alkaline or lithium battery). Alternatively, the device can be supplied by an external power source (10...32 V DC)
Power supply:	2 standard batteries size C
Data storage:	Min. 5 years, irrespective of battery status
Graph recording mode:	2 kHz sampling rate, max. 2 s recording per event
Channel selection:	All acceleration measuring channels can be activated individually
Dimensions and weight:	180x106x37mm/IP 65/800g/aluminum sensor tube, dia. 17mm, 80mm long, max. 10m cable
Data interfaces, Controls:	RS-232 port, Key for status control with 5 LED; magnetic ON/OFF switcher
Programming:	Sensitivity, channel selection and frequency range for acceleration measurements; acceleration response threshold: 5...75% of the measuring range; recording duration for acceleration-time time graphs; time interval of temperature and humidity measurements and analog channel; up to three measurement periods; password protection; alarm thresholds