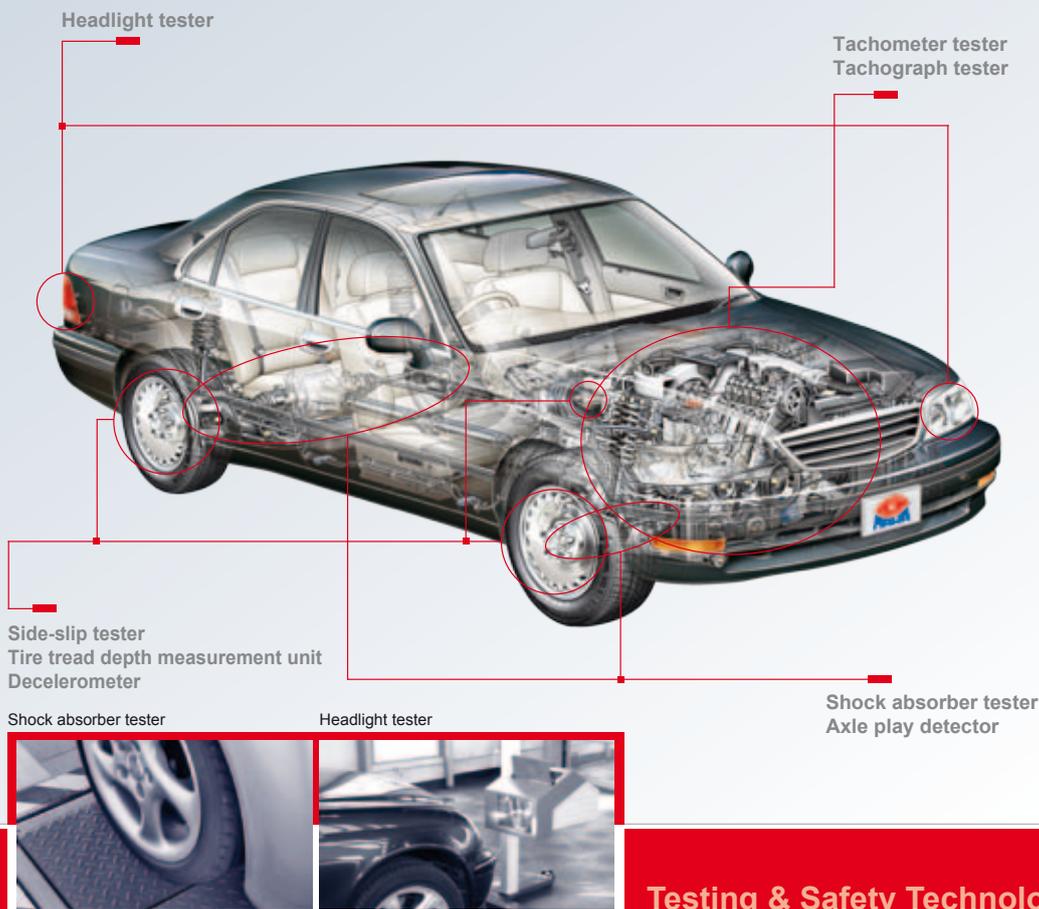




MAHA Diagnostic Units

for Passenger Cars, Vans and Commercial Vehicles



Testing & Safety Technology



DIN EN ISO 9001:2008
ISO 14001:2004
DIN EN 16001:2009

- ▶ Slip-side tester
- ▶ Tachometer tester
- ▶ Tachograph tester
- ▶ Shock absorber tester
- ▶ Tire tread depth tester
- ▶ Axle play detector
- ▶ Headlight tester
- ▶ Decelerometer
- ▶ Radio touch screen
- ▶ Closing force sensor
- ▶ Speed limit tester
- ▶ Truck hand terminal

Premium Workshop
Equipment



Welcome to the center of excellence for the lifting and inspecting of vehicles Welcome to MAHA

MAHA Maschinenbau Haldenwang GmbH & Co. KG stands for high-tech in the fields of motor vehicle testing and workshop equipment. All over the world, motorcycles, cars, commercial vehicles and special vehicles are measured and inspected on testing devices from MAHA.



The workshop equipment from MAHA covers the complete range of lifting devices from service units to exhaust gas measurement technology. The option to link individual testing devices to universal safety test lanes makes MAHA the expert technology partner of vehicle manufacturers, testing organisations and workshops around the world.

Despite all the high-tech, MAHA has not forgotten that business is conducted locally. For this reason, branches and representatives in over 130 countries provide ideal customer care on-site.

Individual supervision and a high degree of flexibility are the strong points of MAHA and this has made the company a global player in the international test business over 40 years. We are committed to continuing this to provide tailor-made solutions and investment security for the future.

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Side-Slip Tester

Model: MINC Profi • MINC I • MINC II

for Trucks, Passenger Cars and Motorcycles



- ▶ Instant checking of axle geometry
- ▶ Easiest possible handling with fully automatic measurement
- ▶ Display, evaluation and documentation of measurement values via existing brake tester display

Tachometer Tester

Model: TPS I • TPS II • TPS III

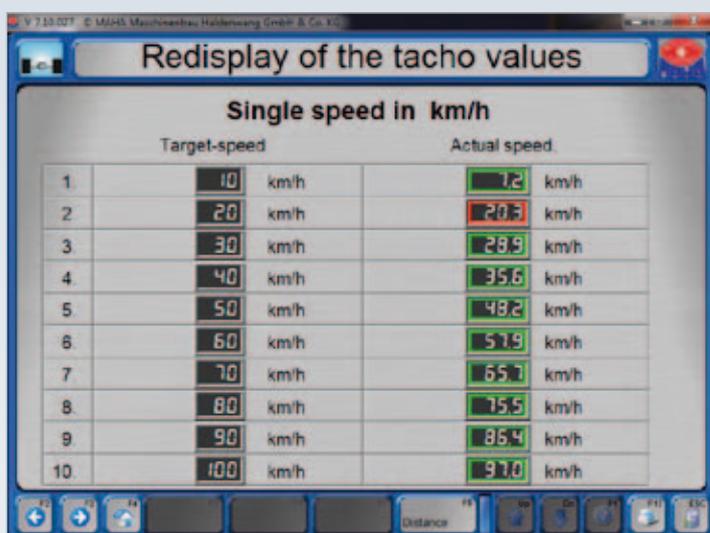
for Trucks, Passenger Cars and Motorcycles



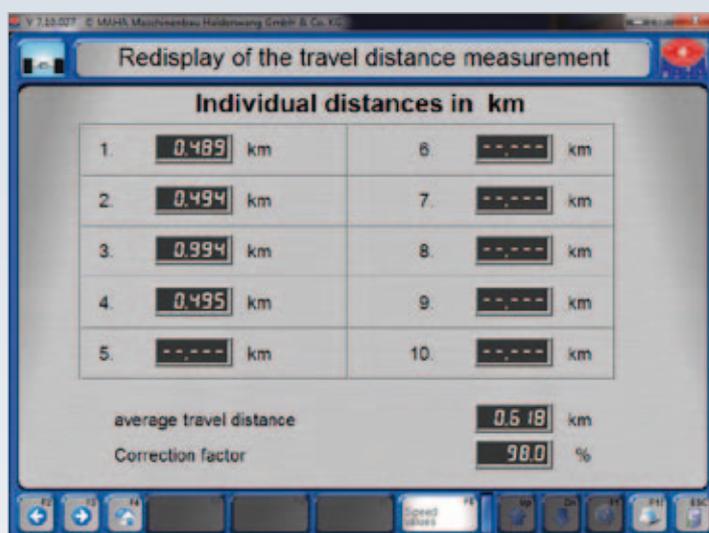
- ▶ Electronic speed and distance measurement in the roller set
- ▶ Display of the actual speed
- ▶ Assessment of the deviation using the EUROSYSYSTEM software
- ▶ Self supporting roller set with extension aid or lifting sill

TPS - Easy Tachometer and Travel Distance Measurement on the Roller Test Stand

The vehicle is accelerated by the operator to the predefined speed stages (tachometer display). After confirmation (automatically or manually via remote control) of the speed reached, the software automatically documents and assesses the actual deviation for the actual speed.



The EUROSISTEM software compares the target speeds with the actual speeds. The deviations are assessed in compliance with a permitted tolerance (adjustable).



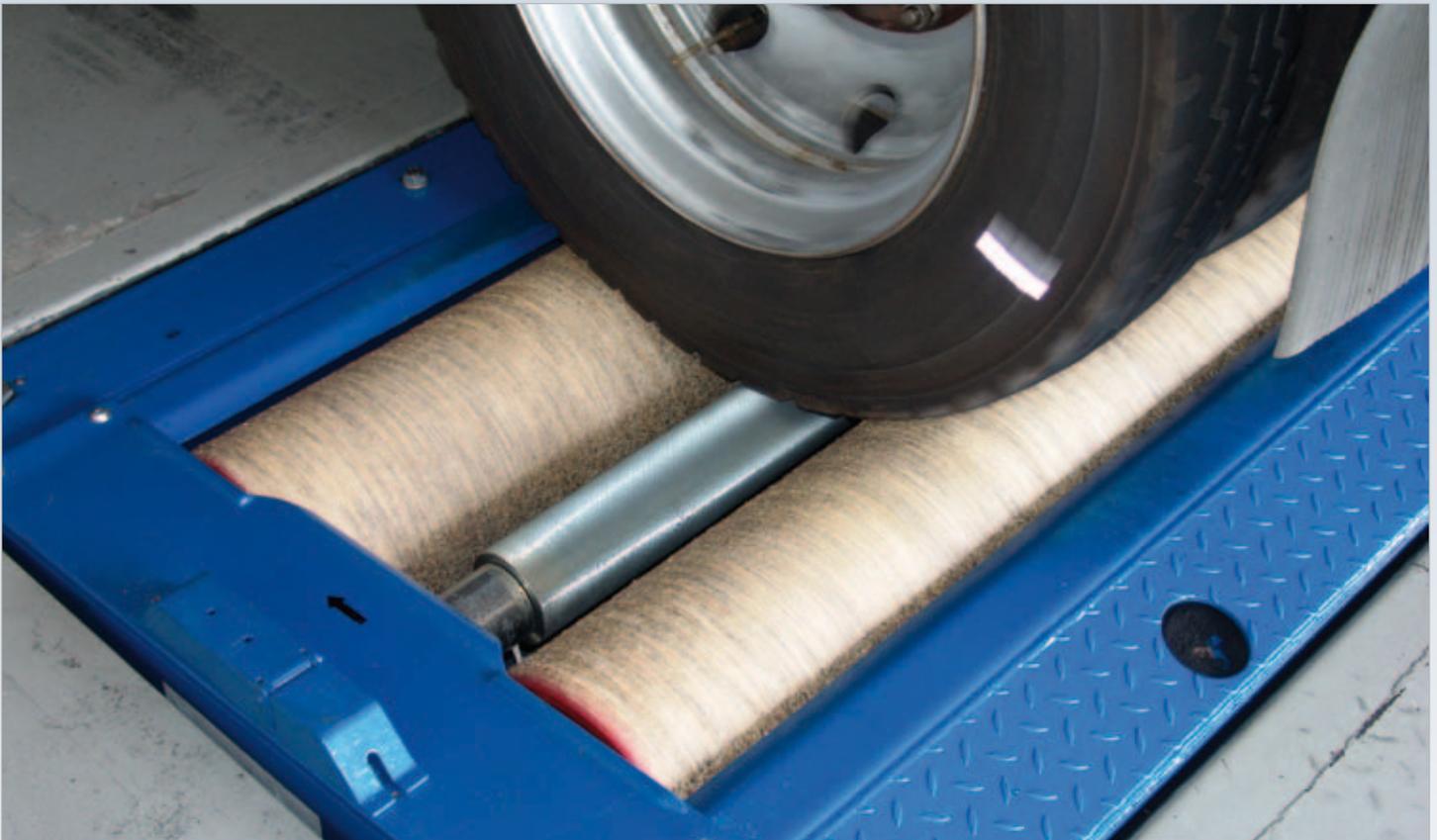
The actual number of kilometres driven can be compared with the number of kilometres measured by the vehicle for the distance measurement.

Technical data	TPS I	TPS II	TPS III
Vehicle type	Passenger car	Passenger car and truck	Motorcycle
Drive	via vehicle	via vehicle	via vehicle
Self-driven using controllable electric motor	On request, observe the separate assembly plan	Not available	On request, observe the separate assembly plan
Axle load	3000 kg	13000 kg	2000 kg
Toe min.	780 mm	820 mm	n/a
Toe max.	2200 mm	2620 mm	n/a
Roller length	720 mm	900 mm	200 mm
Roller diameter	202 mm	318 mm	202 mm
Roller connection	Kardanwelle	Kardanwelle	n/a
Drive up aid	Return stop on rear rollers	Hydraulic lifting sill with brake, lifting force 10,000 kg	None
Operating unit	communication desk MCD with test software "EUROSISTEM"		
Test speed	0 - 160 km/h		
Roller set dimensions (H x W x D)	2320 x 580 x 250 mm	3000 x 840 x 400 mm	500 x 580 x 220 mm

EG Control Device and Tachograph Test Device

Model: TCS Basic • TCS Comfort • TCS SMG

for Vans, Trucks and Buses



- ▶ Trip recorder test according to par. 57b and 57 d of the German Road Traffic Licensing Regulations (StVZO) or in accordance with country-specific laws
- ▶ Determination of the distance/speed; distance/number of pulses for all mechanical and electronic trip recorders
- ▶ Programming of FTCO 1319 and MTCO 1324, TVI 2400, prepared for EFAS (EFKON), Smar-Tach (Actia), DTCO
- ▶ Print-out and save test seals with date, test centre number, address, measured values and chassis number
- ▶ Street measurement possible (optional)

Shock Absorber Tester

Model: MSD 3000

for Passenger Cars and Vans

For simple and exact inspection of the axle damping – indirect shock absorber test according to the Theta principle



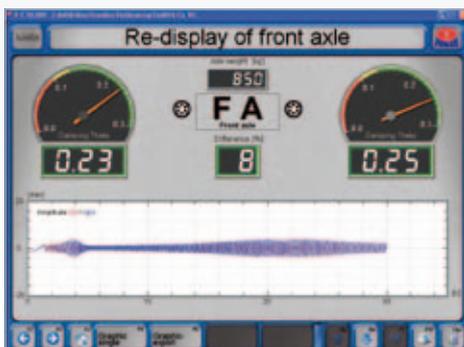
- ▶ Fast, physical inspection of axle damping
- ▶ Assessment according to damping factor “D”
- ▶ Automatic tester type after loading both test plates
- ▶ Fully automatic test sequence
- ▶ Automatic determination of the axle and vehicle weight
- ▶ Prepared for frequency-controlled noise detection

The MSD 3000 – Simple use with a high significance

Extremely easy handling is guaranteed using the fully automatic test sequence. The customer can be presented with a substantial document with a print-out of the measured values with date and company address. The comprehensive graphic representation of the waveform using the EUROSYSYSTEM software eases the assessment even more. A comparative measurement with previous measurements can be conducted with measurements of the same or same type of vehicles. In this way, the motor vehicle specialist is given a useful supporting aid when dealing with customers.

There are also further advantages for motor vehicle workshops:

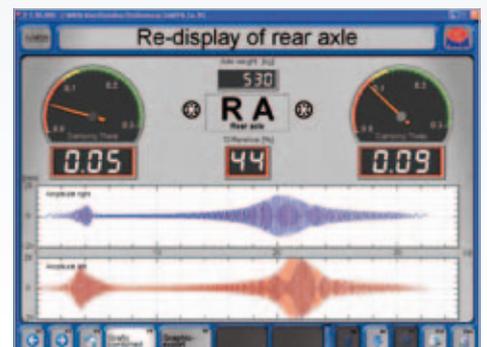
- ▶ Image revaluation as a specialist operation using a professional chassis service
- ▶ Increase in workshop utilisation and parts sales as a result of repair orders



Digital and graphic representation of measured values using the EUROSYSYSTEM software



Significant representation of defective axle damping (example)



Separate representation of measured values for clear assessment.

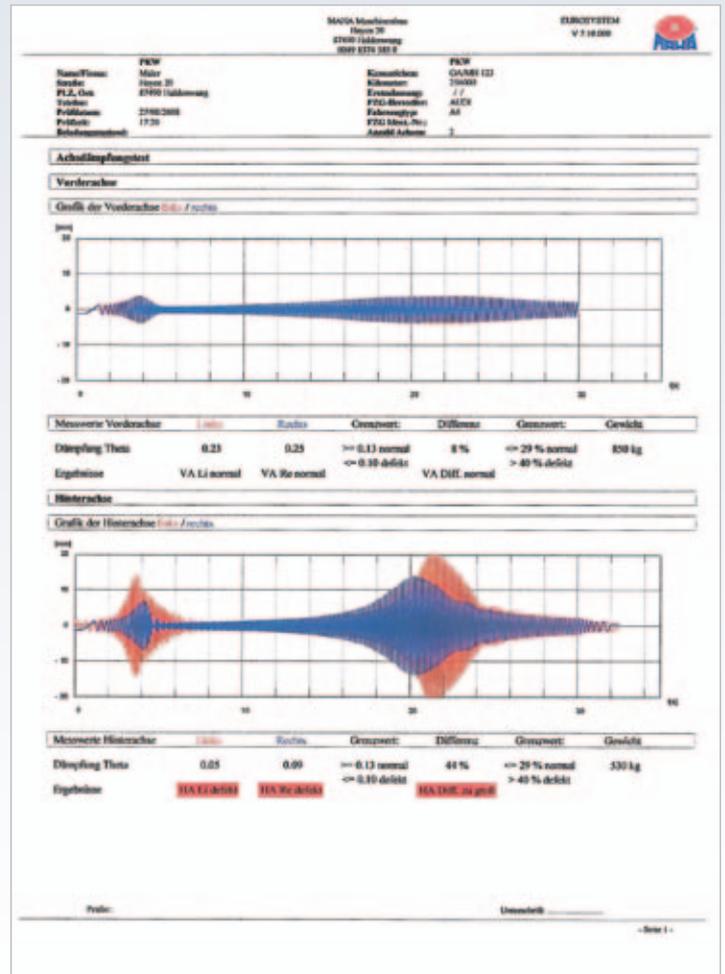
Assessment with the MSD 3000 – The new axle damping tester from MAHA

The MSD 3000 from MAHA Maschinenbau Haldenweg can quickly and clearly test and assess axle damping as it makes a determination on a physical basis. The MSD 3000 operates according to the resonance method and analyses the resonance frequency of the energy present at the vibration system during resonance (wheels, axle and car body). The dimensional damping factor (also known as damping factor "D") can be determined by an additional physical assessment. This measurement principle is considered to be the most precise and was already confirmed by extensive serial examinations and comparative tests.

$$D = \frac{d}{2\sqrt{k * m}} \qquad d(\delta) = \frac{(C_{Ges} * r)}{2\pi * f_{Messung} * X_1} - d_{Prüfstand}$$



MDS 3000 floor group integrated in the EUROSISTEM test lane



Print-out

The test result can be documented and presented to the customer when the measured values are printed out.

The MSD 3000 – The noise detection option for test drives in the workshop

Further development of motor vehicles also brings about a reduction in interior vehicle noises. The noise level has been drastically reduced especially in passenger vehicles. As a result, customers are considerably more sensitive to unexpected ambient noises. The detection of noise sources is often associated with time-consuming test drives and this is not always successful. To solve this problem, MAHA has developed this new simulation option.



The controller enables individual switching of test plates as well as simultaneous activation of both plates. In addition, the frequency can be changed independently at each side by the operator. Due to extremely quiet operation of the tester, noises that arise during the simulation process can be detected and localised without problem. After the fault is rectified, the success of the work can be checked by the same simulation.

Technical data		MSD 3000
Floor group		
Testable axle load		2200 kg
Drivable axle load		2500 kg / 13000 kg (option)
Driving power		(2 x) 1,1 kW
Excitation stroke		6,5 mm
Excitation frequency (controlled)		2 - 10 Hz
Maximum plate stroke approx.		70 mm
Track width min. / max.		880 / 2200 mm
Measurement range for damping factor "D"		0.02 – 0.3 (no units)
Voltage supply / fuse		230 V, 1 phase, 50/60 Hz /16 A (time delay)
Start of tester		Automatic with load on both sides with more than 60 kg (adjustable)
Display accuracy		2% of measurement range value, 2 % difference between left and right side
Floor group dimensions (L x W x H)		2320 x 800 x 280 mm
Packaging height (L x W x H)		2400 x 1000 x 700 mm
Total weight approx.		650 kg
Display/controller		
	LON	EUROSYSTEM
Display unit	Analogue via pointer representation	Digital via screen
Controller	Fully automatic via LON controller	Fully automatic via communication panel
Measured values	Damping factor "D", difference right/left	Damping factor "D", difference right/left, graphic representation, result, axle weight
Display unit dimensions (H x W x D)	Analogue display for passenger cars 630/910 x 870 x 240/300 mm	Communication panel MCD 2000 1230 x 860 x 350 mm

Axle Play Detector

Model: PMS • LMS

for Passenger cars, Vans, Buses and Trucks up to a max. axle load of 20t



- ▶ Fast determination of faults and wear at steering parts, wheel bearings, spring systems and mounting suspensions
- ▶ Single man operation
- ▶ Check the wheel bearing clearance without lifting the vehicle
- ▶ Extremely robust self-supporting design
- ▶ Two test plates integrated in the base at ground level
- ▶ Powerful even movement using a hydraulic drive
- ▶ Low-maintenance
- ▶ Low noise oil-submerged unit (over-oil unit, optional)



PMS, type 3/X can be integrated in an installation pit or in a lift, e.g. DUO. We recommend the other types for the installation pit.



Operation with a cable inspection lamp as standard



Operation optionally also possible with LED radio hand-held lamp



Two test plates at ground level integrated in the base

Option:

Radio Handlamp for Axle Play Detector:

- ▶ Small size for excellent handling L x W x H = 190 x 60 x 36 mm, low weight and ergonomic form as well as anti-slip, rubber surface
- ▶ Shatter resistant casing
- ▶ LED lighting with intense lighting power and low electrical consumption
- ▶ Battery 3.6 VDC / 2100 mAh with high capacity (ca. 7 h constant light with fully charged battery possible, recharging time ca. 6 h with completely discharged battery)
- ▶ Various fixing and storage possibilities via loop, clip and (removable) magnet
- ▶ Rugged, mechanical transmission key
- ▶ Rugged foil keypad as function keys

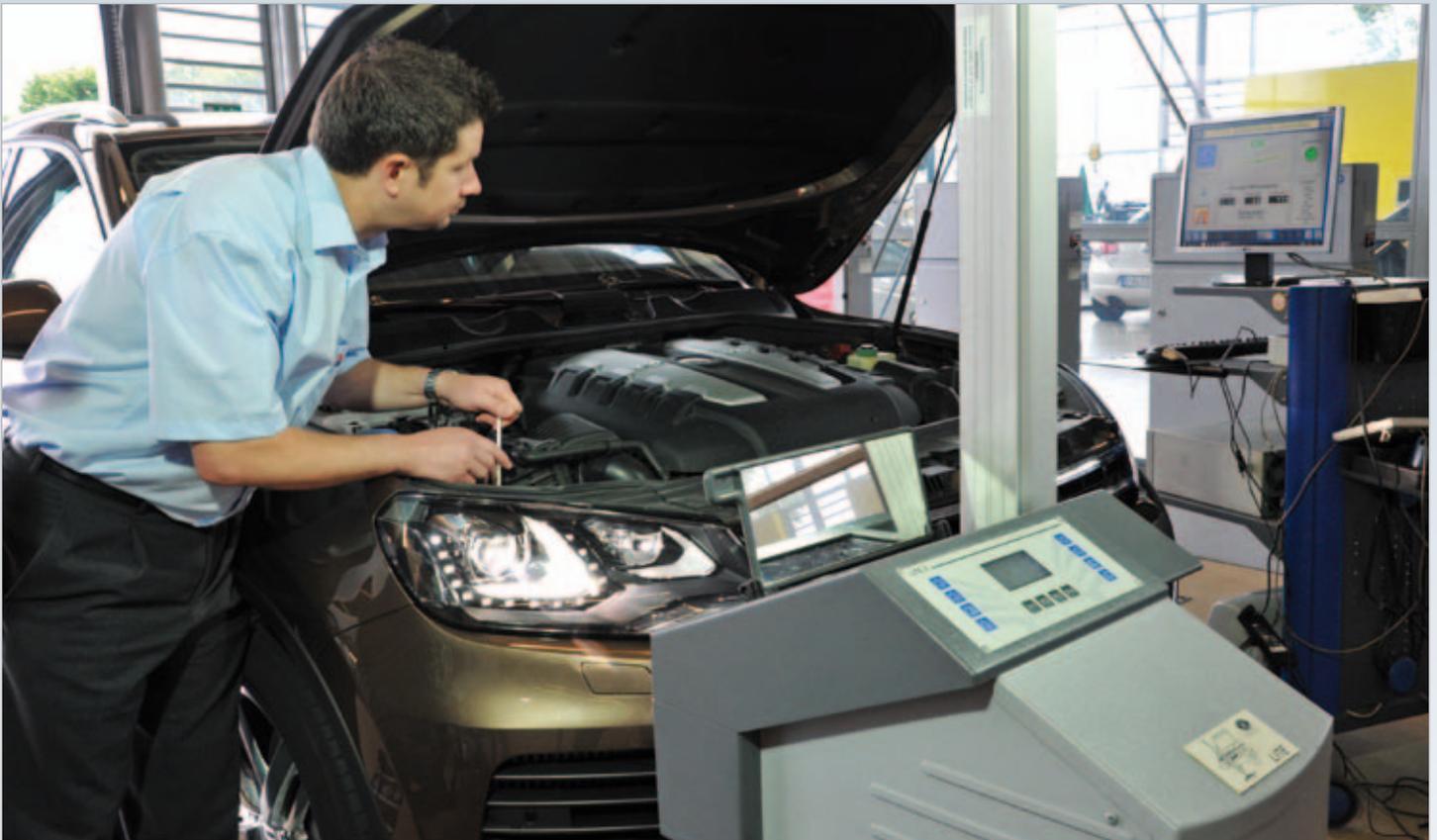
Technical data	PMS 101	LMS 101	PMS 3 / 2 PMS 3 / X-Pit	LMS 20 / 2	PMS 3 / X PMS 3 / XL
	Plates guided on maintenance-free Teflon rail, manual switching of crosswise and longitudinal movement		Plates guided by hard chrome-plated round guide in friction bearings. All crosswise and longitudinal movements can be controlled by the inspection lamp.		For installation in MAHA lifts
Max. axle load	3500 kg	18000 kg	3500 kg	20000 kg	3500 kg
Movement of test plate	100 mm	104 mm	100 mm	104 mm	75 mm
Hydraulic oil filling level	15 l	15 l	15 l	15 l / 20 l *	(dependent on platform)
Test plate dimensions (LxWxD)	625 x 625 x 150 mm	750 x 750 x 232 mm	625 x 625 x 150 mm	750 x 750 x 232 mm	500 x 500 x 120 mm
Movement speed (for standard movement)	70 mm/s	30 mm/s	145 mm/s	30 mm/s / 58 mm/s *	145 mm/s
Max. thrust for each side	11 kN	30 kN	11 kN	30 kN / 31 kN *	11 kN
Hydraulic pressure	120 bar	120 bar	120 bar	120 bar / 130 bar *	120 bar
Motor of hydraulic unit	2.5 kW	2.5 kW	2.5 kW	2.5 kW	(dependent on platform)
Voltage supply / fuse	3 x 400 V / 16 A	3 x 400 V / 16 A	3 x 400 V / 16 A	3 x 400 V / 16 A	

* Country-specific design (not standard)

Headlight Tester

Model: LITE 1 • LITE 1.1 • LITE 3

for Analogue or Digital Headlight Testing



- ▶ Exact and quick testing of headlight setting
- ▶ User-friendly and self-explanatory operation
- ▶ Precise measurement equipment using wear and tear-free guidance tracks
- ▶ Running tracks for ideal measurement location design
- ▶ Wear and tear-free locking of the measurement head via compensation weight in the column
- ▶ Different country variations available

LITE 1 • LITE 1.1 – Analogue Headlight Testing with Precision

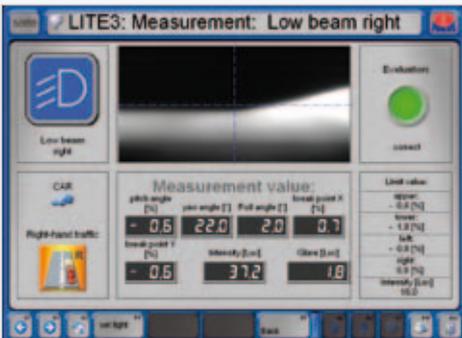


Even the low cost version "LITE 1" offers the highest precision with an aluminum guidance column in conjunction with the solid frame.



Due to the large scale Fresnel lens of the "LITE 1.1" multiple light sources can be tested without constant new positioning. Additionally, the robust version with a light weight design offers a high quality and ergonomic design.

LITE 3 – Digital Headlight Test at the Highest Level



Representation with EUROSYSTEM test software from MAHA



The tool

The unit is equipped with an "acoustic adjustment mode".

This functions as follows:

The more the actual headlight position deviates from the target position, the slower the tone interval. If this actual headlight position is readjusted in the direction of the target position, the tone interval is shorter. When the optimum adjustment position is reached, a continual tone is heard.

LITE 3 – The innovations in detail

► User-friendly

Simple and clearly arranged user guide with graphic menu guide on a multi-functional LCD display

► Latest electronics and camera technology

An individual high dynamic range CMOS camera digitalises the headlight reflection and transmits it to the control electronics of the unit for processing.

► Programmable single chip electronics

Using a single chip processor with Flash memory, the unit can be adapted at any time, e.g. to other legal regulations.

► Objective result determination

The headlight adjustment unit independently determines a test result and transmits it to the LCD graphic display for assessment. The result on the display includes particular specifications about the light position, yaw angle, intensity, hotspot, etc. and also graphically depicts the headlight reflection.

► PC connection

You can transfer the data acquired (headlight reflection and result assessment) to a PC. The “PC cable connection” or “PC Bluetooth connection” are available for this as an option.

► Ergonomic handling

Comfortable single hand height adjustment of the measurement housing without jamming using a balance weight integrated in the column.

► Robust and maintenance-free design

A technically proven unit construction with wear-free precision guide columns guarantees many years of use even under highly frequented conditions.

► “Acoustic adjustment mode”

Fats and comfortable headlight adjustment without visual contact with the adjustment unit using the acoustic adjustment mode.



LITE 3 – Operation

► Large and clearly arranged operating panel

The headlight to be tested such as the high beam, fog light, and daytime running light can be selected directly using the individual keys.

All keys as well as the display are integrated in the operating panel and are splashproof.

► Graphic display

The graphic display also enables the assessment of the headlight reflection without a PC.

The LCD display is available with the associated selection keys for all other functions with the menu guide that is user-friendly.

► Battery Operation

The headlight adjustment unit is fitted with a rechargeable battery and can be used in stand-alone mode for up to 14 hours without problem. A power supply for recharging is included.

LITE 1 • LITE 1.1 • LITE 3 – The Versions

Equipment and Standard Delivery	LITE 1	LITE 1.1	LITE 3
Height adjustable measurement casing with automatic locking	X	X	X
High precision aluminum guidance column for measurement casing	X	X	X
Large scale Fresnel lens for bundling of headlight light	-	X	X
Analogue Luxmeter for intensity measurement	-	X	-
Digital Luxmeter for intensity measurement	X	-	X
Suitable for measurements with both left- and right-hand traffic	O	X	X
Various country variations and approvals	O	X	X
Rotatable mirror for precision alignment to vehicle	X	X	X
Laser alignment unit for precision alignment to vehicle	-	O	O
Height adjustable projection screen for analog evaluation	X	X	-
Movable robust housing on synthetic rollers	X	O	O
Movable robust housing on steel rollers (tracks necessary)	O	X	X
Easy measurement image control from device backside via deflect mirror	-	X	X
Operator friendly menu guidance via LCD graphic display	-	-	X
Digital measurement recording via CMOS camera technology	-	-	X
Result evaluation via integrated control electronic	-	-	X
"Stand-Alone" version with PC connection capability	-	-	X
Easy setting of the vehicle headlight via "acoustic setting mode"	-	-	X

Explanation:

- X: already available standard delivery
- O: Optionally available
- : Not available



All headlight adjustment units can be fitted with rails or plastic rollers.

The correct alignment of the unit to the vehicle is achieved with a mirror....

...or optionally using a line laser (LITE 1.1/3 only).

Module PC cable connection for LITE 3

Module PC Bluetooth connection for LITE 3 only

Technical Data		LITE 1	LITE 1.1	LITE 3
Measurement range	Upper	-	-	0 - 600 mm / 10 m
	Lower	0 - 40 cm / 10 m	0 - 60 cm / 10 m	0 - 600 mm / 10 m
	Left	0 - 80 cm / 10 m	0 - 100 cm / 10 m	0 - 600 mm / 10 m
	Right	0 - 80 cm / 10 m	0 - 100 cm / 10 m	0 - 600 mm / 10 m
Illumination level	0 - 240 lx (Lux)	0 - 64 lx (Lux)	0 - 200 lx (Lux)	
Luminous intensity	0 - 150,000 cd (Candela)	0 - 40,000 cd (Candela)	0 - 125,000 cd (Candela)	
Operating temperature	+5°C - + 45°C	+5°C - + 45°C	+5°C - + 45°C	
Dimensions (W x H x D)	620 x 1805 x 750 mm	600 x 1805 x 720 mm	600 x 1805 x 720 mm	
Adjustment track lens centre over floor	300 - 1280 mm	200 - 1300 mm	200 - 1300 mm	

Tire Tread Depth Measurement Tester

Model: TM 1000

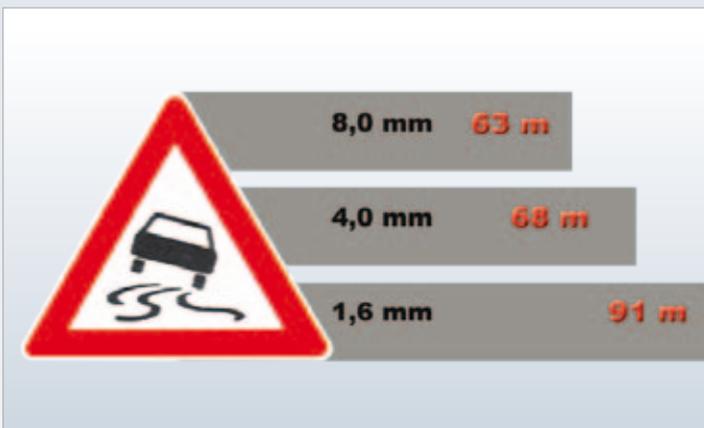
Automatic Tire Tread Depth Measurement in the Roller Brake Tester



- ▶ Contactless tread depth measurement using laser technology
- ▶ Measurement procedure done within the context of the brake test by installation in the brake tester.
- ▶ The measurement data is secure against manipulation by transferring to the existing EUROSISTEM test software
- ▶ Graphic representation with print-out of a test log
- ▶ Automatic cleaning of the sensor head during the measurement process using compressed air

The tire tread depth measurement unit TM 1000 from MAHA automatically measures the tread over the whole tire length and the whole tire width

Braking distance on wet road for different tread depths at 100 km/h:

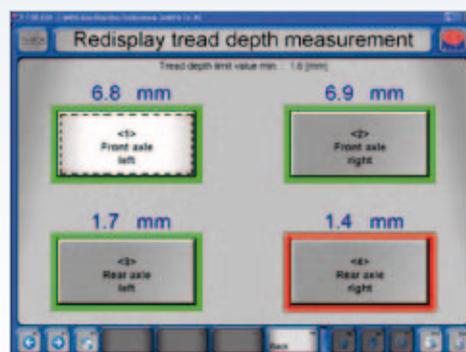


The tread depth measurement makes a significant contribution to the increase in traffic safety. As the tread depth decreases, the risk of aquaplaning increases. A regular check is essential for safety reasons.

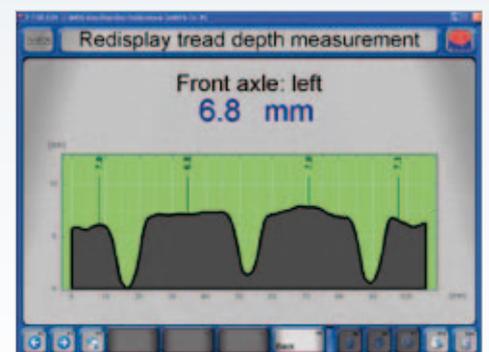
A conventional tread profile measurement determines the values on a random basis at fewer points on the tire and therefore has a limited significance on the state of the entire tread.



Integrated in the test software "EUROSISTEM"



Result display with the lowest tread depth for each tire



Graphic representation of the measurement results

Radio Touch Screen

Model: FTS 2010

for Simultaneous Operation and Transfer of the Measurement Screens



- ▶ Simultaneous remote display of the EUROSYSTEM test software via radio transmission
- ▶ Direct operation of the test units via touch screen and virtual screen keyboard
- ▶ Mobile direct acceptance and vehicle assessment
- ▶ Compact and robust housing with lateral rubber protection, weatherproof and impact-resistant according to JIS/IP54
- ▶ Brilliant and shockproof 8.4" TFT colour display (21.3 cm visible diagonally)

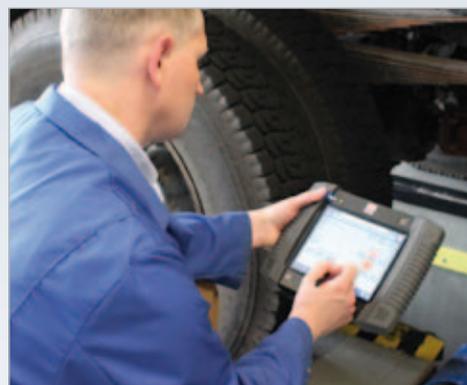
The FTS 2010 serves to simultaneously operate and display the measurement screen of the test software "EUROSYSTEM".

All entries that are made at the PC using the keyboard can be executed on the touch screen. A virtual keyboard can be called up by pressing a key and enables mobile recording of vehicle data, customer data, faults, etc.

When used together with the test software "EUROSYSTEM", a virtual remote control for user-friendly operation of the brake tester can be called up. An additional remote control is consequently not required. The tester can be operated and controlled using the large area buttons of the EUROSYSTEM operator interface. All popular functions can be quickly and directly activated with your finger using the large area keys of the EUROSYSTEM operator interface.

Scope of delivery

8.4" radio touch screen FTS 2010, operating pen, display protection film, docking station with integrated charger, power supply, WLAN router with 10 m cable, 2x lithium ion batteries, carrying case with belt, car charger adapter, recovery CD, remote software with license.



The radio touch screen is perfect for use in the workshop with its robust shockproof housing.



(1) Access point (2) Patch cable (3) FTS 2010 with docking station (4) Replacement power pack (5) 12 V motor vehicle charger cable (6) Protective sleeve (7) Mains supply (8) Belt holder for replacement power supply

Technical data	
LCD panel	8.4" TFT display (SVGA) 21.3 cm visible diagonally Built-in touch screen
Dimensions (W x H x D) incl. rubber protector	289 x 214 x 46 mm
Approx. weight	1700 g
Power supply	Lithium ion battery Wall power supply 110-240V AC/19 V DC Car charger adapter 10.5 – 14.5 V DC
Connection	LAN connection via patch cable
Approx. range	50 m in buildings 200 m in open air expandable with several WLAN access points
Temperature range	- 20 °C to + 50 °C

Decelerometer

Model: VZM 300

for Recording Acceleration and Braking Forces



- ▶ Light, handy and network-independent
- ▶ Menu-controlled operator guide
- ▶ Integrated tilting angle compensation
- ▶ Documentation via integrated printer
- ▶ Option to connect to PC
- ▶ Determination of the average full deceleration (guideline 71/320/EC)

VZM 300 – For the mobile measurement of acceleration and braking forces

The decelerometer VZM 300 was specially developed for the measurement of brake decelerations with effectiveness testing of brake systems on motor vehicles and trailers. Approval by the "Physikalisch Technische Bundesanstalt (PTB)" means it meets all statutory requirements and can be used internationally. With various external sensors (e.g. brake force, pedal force etc.) the VZM 300 offers the chance to record other parameters to evaluate the measurement.



The VZM 300 measurement unit is simply placed on the floor of the vehicle for the measurement



Simple and clearly arranged operator guide using a menu guide on the LCD display



Additional measurement value recording using a pedal force sensor during the brake test

Integrated tilting angle compensation

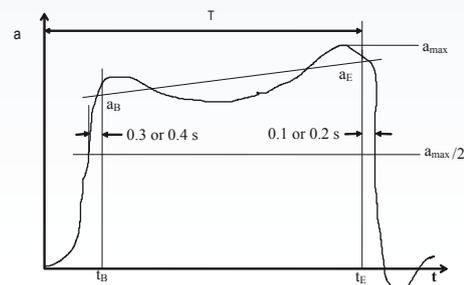
The tilted angle behaviour of the vehicle when braking normally leads to an angle-dependent effect on the deceleration values to be measured. To compensate for this effect, the value of the tilting angle is measured and saved simultaneously for the value of the deceleration. The unit then corrects the deceleration measured values to compensate for the systematic error caused by the tilting angle behaviour.

Determination of the average full deceleration

The required calculation of the **average full deceleration** according to **EC guideline 71/329/EC** is represented by the VZM 300 after the measurement directly. A separate calculation is consequently no longer required.

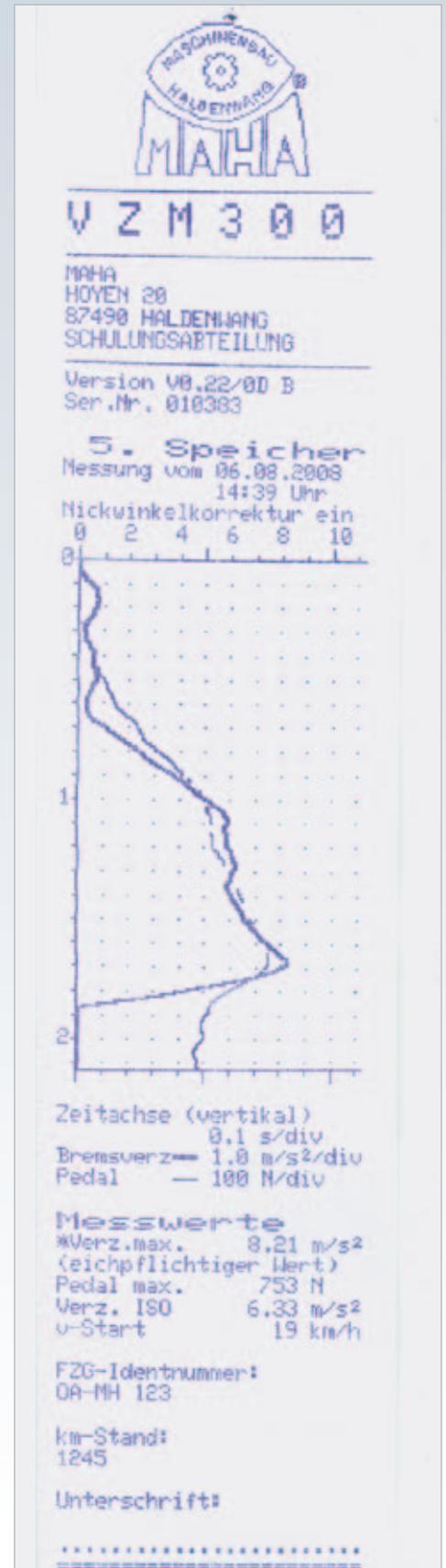
Average full deceleration according to guideline 71/320/EC

$$a_{msN} = \frac{\frac{1}{2} \left(\sum_{i=B+1}^E \frac{a_{i-1} + a_i}{2} \times \Delta t \right)^2}{(t_E - t_B) \times \sum_{i=B+1}^E \frac{a_{i-1} + a_i}{2} \times \Delta t - \sum_{i=B+1}^E \sum_{j=B+1}^i \frac{a_{j-1} + a_j}{2} \times \Delta t^2 + \sum_{i=B+1}^E \frac{a_{i-1} + a_i}{4} \times \Delta t^2}$$



VZM 300 – The operator stages

- ▶ Install the deceleration measurement unit horizontally in the vehicle
- ▶ Accelerate the vehicle up to the test speed
- ▶ Release the clutch and brake until the vehicle comes to a standstill
- ▶ Read or print out the measured values on the display



VZM 300 – The Functions

- ▶ Chronological measurement and documentation of the vehicle deceleration
- ▶ Fully automatic and manual operation possible
- ▶ Menu-controlled operator guide
- ▶ Clearly arranged operating elements
- ▶ Alphanumeric keyboard for inputting the vehicle data
- ▶ Integrated matrix printer to log the measured values
- ▶ Specification of the vehicle speed and the braking distance
- ▶ Tilted angle compensation
- ▶ Average value calculation of the brake deceleration
- ▶ Determination of the average full deceleration
- ▶ Determination of trailer braking
- ▶ 6 measurements can be saved
- ▶ Connection option of 5 sensors at the same time
(pneumatic/hydraulic pressure sensor, pedal force, tractive force)
- ▶ Exact display on via the horizontal unit position on the digital display)
- ▶ Digital display of the measured values
- ▶ Power pack capacity for approx. 50 measurements
(connection to cigarette lighter (12/24 V) possible)
- ▶ Connection option using RS-232 or IrDA interface to PC with transfer protocol
for standard table software, e.g. MS Excel, Lotus
- ▶ PTB-tested 18.05
02.02

VZM 300 – The accessories



- ▶ Pedal force sensor
- ▶ Tractive force sensor
- ▶ Pneumatic pressure sensor
- ▶ Hydraulic pressure sensor
- ▶ Adapter for 12 V power supply from the vehicle's on-board power supply via the cigarette lighter
- ▶ Mechanical manual trigger
- ▶ Additional analogue display
- ▶ Hand lever adapter for the pedal force sensor
- ▶ Sensor connection switch for simultaneous connection of pedal/traction sensors and 3 compressive force sensors
- ▶ Interface cable RS 232 incl. PC data transfer program with transfer protocol
- ▶ Plug charger
- ▶ Plastic storage case

Technical data		
Measurement ranges		
Braking deceleration		0 - 20 m/s ²
Pedal force sensor		0 - 1000 N
Pneumatic pressure sensor		0 - 20 bar
Hydraulic pressure sensor		0 - 300 bar
Traction force sensor		0 - 20 KN
Automatic scaling measurement ranges		1 / 2 / 3 / 4 / 10 / 20 / 30 / 50
Measured data memory		7 for 100 measured points / 14 for 500 measured points
Power supply		
Power pack		6 V / 1.8 Ah
Charger		230 V / 15 V AC
Connection to on-board power supply		12 / 24 V
Max. current consumption		700 mA
Dimensions (L x W x H)		260 x 124 x 60 mm
Approx. weight		1 kg

Closing Force Sensor

Model: SKM 2

Measurement of the Closing Pressure of Power-Operated Equipment



- ▶ Fast and easy test for the closing force at power-operated operational doors and closing equipment
- ▶ Complies with requirements according to par. 29 StVZO and guideline 2001/85/EC
- ▶ Measurement of the effective force (F_e) and the peak force (F_s)
- ▶ Digital representation of the measured values on the lit display at the manual terminal
- ▶ Network-independent pack operation

SKM 2 – For quick testing of the closing force on power-operated closing equipment



The activation forces at power-activated equipment can be checked with the closing force sensor. The application area includes doors at the bus and track, lifts, cableways, electrical activated window as well as sliding roofs, etc.



The measured values are output via a lit LCD display. The effective force and the peak force reached is represented. When switched on, the SKM 2 checks the measurement electronics independently and performs an automatic zero balance.



Basic scope of delivery:
Closing force sensor with LCD hand terminal and wall power supply unit



Option:
Robust case for storing closing force sensor and accessories.

Technical data	
Measurement range	0 - 995 N
Measurement accuracy	+/- 10 N
Height of measurement cell	115 mm
Diameter of measurement cell	100 mm
Display resolution	64 x 128 pixel
Internal voltage supply	NiMh battery 6 V, 700 mA
Wall charger voltage supply	230 V DC / 12 V AC
Approx. weight incl. transport case	3.5 kg

Speed Limit Tester

Model: Speed Control

for Checking of Speed Limiters and Tachographs



- ▶ Instantaneous function test of speed limiters and tachographs based on § 57d StVZO
- ▶ Prepared for all conventional analog and digital types of tachographs
- ▶ Illuminated display with easy-to-use operator guidance
- ▶ Portable hand-held device stored in practical plastic case

Speed Control – Mobile hand-held unit for testing of speed limiters and tachographs

- ▶ Mobile applicable at 12 V or 24 V
- ▶ Measurement of tachograph constants
- ▶ Manual input of tachograph constants
- ▶ Checking of the speed limiter control system based on § 57d StVZO (EWG 92/6)
- ▶ Speed simulation with the issued frequency



Prepared for following types of tachographs:

- ▶ Actia SmarTach
- ▶ Stoneridge SE 5000
- ▶ VDO/Siemens DTCO 1381
- ▶ VDO-Kienzle-Tachograph TCO 1314
- ▶ VDO-Kienzle-Tachograph KTCO 1318, TVI 8400
- ▶ VDO-Kienzle-Tachograph FTCO 1319, TVI 2400
- ▶ VDO-Kienzle-Tachograph MTCO 1324
- ▶ TVI-VR 8400 (VeederRoot)
- ▶ MotoMeter EGK 100
- ▶ Actia-Poltik 026, 028

Standard delivery:

- ▶ Speed Control-Brain with display and operating elements
- ▶ Test cable for all tachographs
- ▶ Ground connection cable with clamp
- ▶ On-board power supply adapter 12/24 V DC with 12 V DC re-charging voltage
- ▶ Plastic case

Technical Data	
Operating temperature	-10 - +45 °C
Voltage supply	10.5 - 30 V
Measurement accuracy	±0.3 %
Measurement range of tachograph constants	2 000 - 24 000 Imp/km
Manual input of tachograph constant	2 000 - 99 999 Imp/km
Measurement range of driving simulation	20 - 240 km/h
Safety class	IP 64

Truck Hand Terminal

Model: THT

Test Case for Function Test of Air Brake Systems



- ▶ Quick, accurate testing of air brake systems
- ▶ Direct pressure display of up to 5 pressure circuits
- ▶ Cable-free pressure transmission via radio pressure sensor
- ▶ Function check of trailer interface ISO 11992
- ▶ Simulation of the trailer interface ISO 11992
- ▶ Remote display and operation via PC or Laptop
- ▶ Graphic plotting and display of measurement value results
- ▶ Documentation of measurement values via existing PC
- ▶ PTB-tested 16.10 - type approval based on §26 of Calibration Regulations
03.01

Truck Hand Terminal (THT) – The test case for the wide spectrum diagnosis of air pressure brake systems

The THT test case enables a quick and precise checking of air pressure brake systems of commercial vehicles. Equipped with up to five radio pressure sensors comprehensive brake systems can be exactly observed and inspected for malfunctions in regards to their functions. Additionally the test case offers the possibility of a function test of the electronic trailer interface "ISO 11992". A specially developed test module can check the data output for plausibility.

The THT test case has a one and two point projection function as additional aid. Brake calculations based on this procedure can be done directly and without connection to the brake tester.

The test case can be seen as the ideal aid for use during the periodic vehicle inspection, the main inspection or with the safety test based on §29, Appendix VIII and Appendix VIIIa Road Traffic Approval Regulation (StVZO).



Cable and hose-free pressure transmission of measurement values via radio pressure sensor



Remote display and operation via PC or Laptop



Function test of electronic trailer interface ISO 11992

Standard Delivery Basic Unit:

- ▶ THT test case with integrated control electronic and radio module for pressure sensors
- ▶ Radio pressure sensor with connection hoses (3)
- ▶ Integrated re-charging box for max. 5 radio converters
- ▶ Power supply 100 – 240V AC, 50 – 60Hz
- ▶ Motor vehicle DC converter 12 – 24 V
- ▶ Test software for PC or laptop
- ▶ Sturdy synthetic transport case with storage compartments for accessories and tools.

Accessories:

- ▶ Radio pressure sensor in addition to basic case (a total of max. 5)
- ▶ Test and simulation module of the trailer interface ISO 11992 (W-LAN receiver module required)
- ▶ Coupling head yellow with test connection
- ▶ Coupling head red with test connection
- ▶ Precision control valve
- ▶ Duomatik adapter with test connection
- ▶ Pressure discharge valve

Technical Data:	
Measurement range	0 – 20 bar (pneumatic)
Measurement accuracy	± 1% of measurement range end value
Radio frequency	433 MHz
Voltage supply - on-board voltage	12 – 24 V DC
Voltage supply - power supply plug	100 – 240 V AC, 50 – 60 Hz
Interface	USB
Dimensions large / small (L x W x H)	approx. 625 x 220 x 500 mm / 510 x 145 x 370 mm
Weight (depending on version)	approx. 6 – 15 kg

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DIN EN ISO 9001:2008
 ISO 14001:2004
 DIN EN 16001:2009
 DIN EN ISO/IEC 17025:2005

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