



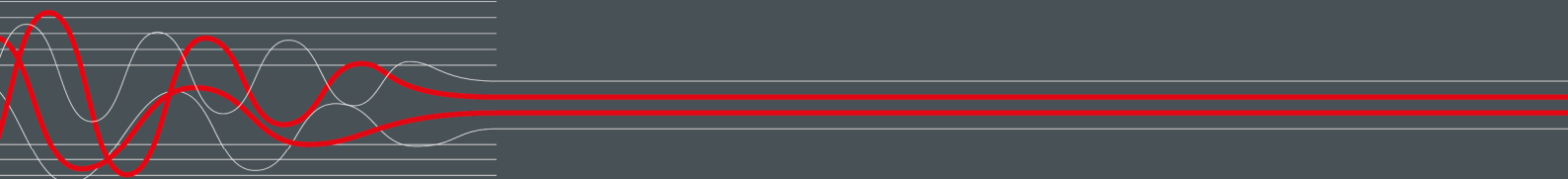
MAHAGROUP

MSD 3000

Axle Damping Tester

Original Operating Instructions

BA031701-en



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The contents of this edition have been checked with great care. However, errors cannot be fully excluded. Subject to technical change without notice.

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1 Safety

1.1 Introduction

Thoroughly read this manual before operating the equipment and comply with the instructions. Always display the manual in a conspicuous location.

Personal injury and property damage incurred due to non-compliance with these safety instructions are not covered by the product liability regulations.

1.2 Symbols



Important safety instructions. Failure to comply with instructions could result in personal injury or property damage.



Important information.

1.3 Intended Use

This equipment is to be used exclusively for the testing of shock absorbers and suspension systems of motor vehicles. Observe the rated axle load.

The equipment shall not be modified without the express written consent of the manufacturer. In case of non-compliance the declaration of conformity becomes void.

Any use other than described is inappropriate.

1.4 Safety Instructions

- The tester may not be installed in hazardous locations or moist rooms such as a car wash.
- The tester may only be used for its intended purpose and within its stated performance limits.
- The tester may only be operated by trained personnel.
- Keep the tester and the working area clean.
- The tester must be turned off when not in use.
- No persons are allowed in the danger zone of the tester. Plates in motion are potentially dangerous!
- Running vehicle engines represent a potential danger of poisoning. The owner/operator is responsible for providing sufficient air ventilation.
- Service work may be done by authorized service technicians only.
- Work on the electrical equipment may be done by certified electricians only.

- Turn off and padlock the main switch before doing any repair, maintenance or setup work.

1.5 What to Do in the Event of an Accident

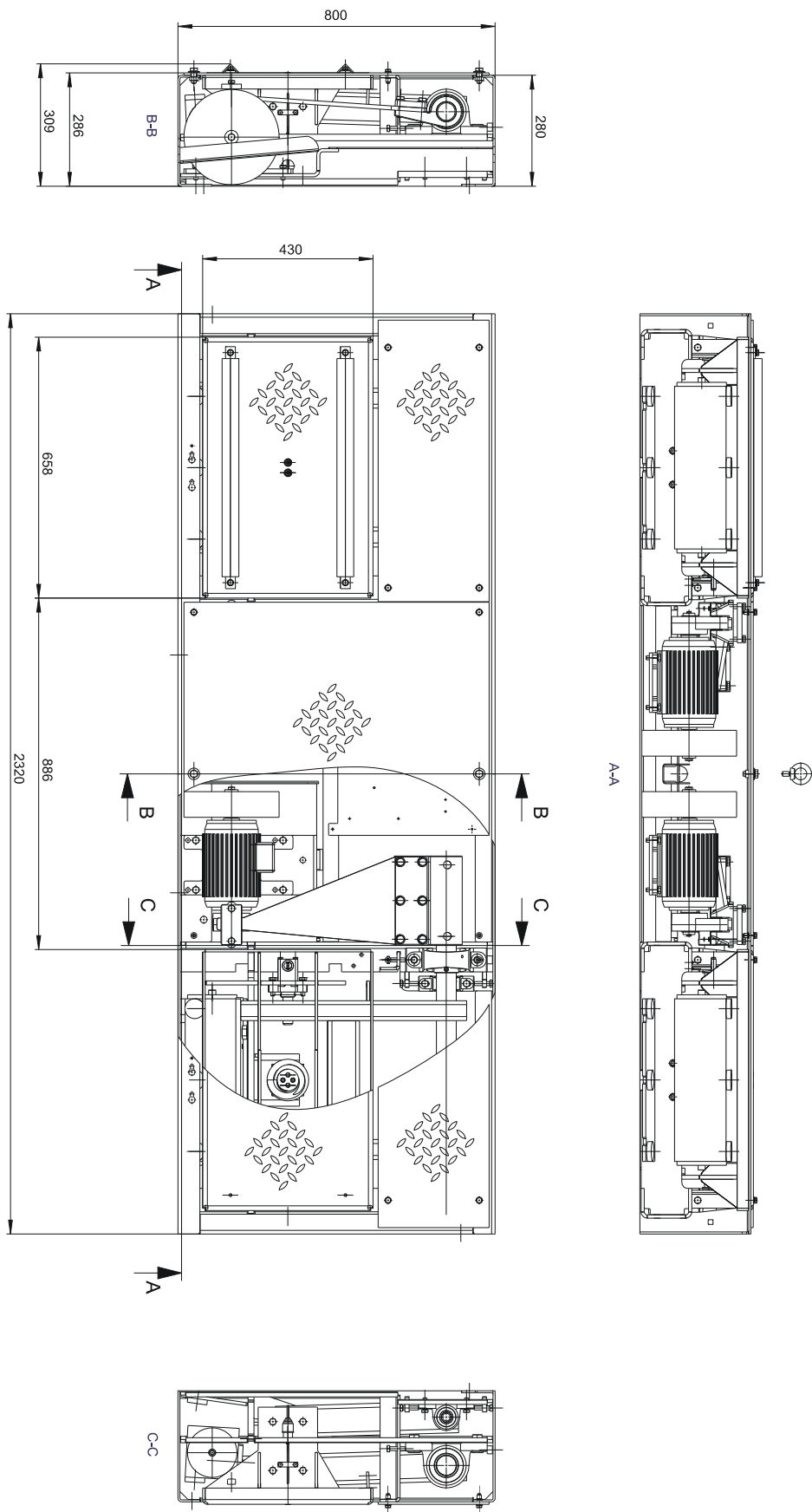
- The injured person is to be removed from the danger area. Find out where dressing and bandages are kept. Seek first-aid.
- Provide first-aid (stop bleeding, immobilise injured limbs), report the accident and seal off the accident site.
- Immediately report any accident to your supervisor. Make sure a record is kept of every occasion first-aid is provided, e.g. in an accident book.
- Remain calm and answer any questions that may arise.

2 Specifications

Track width (min....max.)	mm	880...2200
Exciter swing	mm	6.5
Exciter frequency	Hz	2...10
Measuring range (max.) displacement	mm	approx. 70
Indicating accuracy of full scale value	%	2
Axle load, testable	kg	2200
Axle load, traversable	kg	2500 (standard) / 13000 (option)
Supply voltage	V	1 x 230
Frequency	Hz	50/60
Fuse protection	A	16
Motor power	kW	2 x 1.1
Total weight	kg	approx. 650
Tester dimensions (L x W x H)	mm	2320 x 800 x 280
Shipping dimensions (L x W x H)	mm	2400 x 1000 x 700



Specifications are subject to change without notice.



3 Operation

3.1 Important Information



- Operation of this tester is supported by the EUROSYSYSTEM Software \geq V 7.10.
 - The tester shows its highest measuring accuracy at a limit value of $D = 0.1 \pm 0.01$.
 - Fully functional shock absorbers have a somewhat higher deviation ($D = 0.25 \pm 0.03$) due to their relatively small amplitude.
 - If a vehicle is tested several times in a row, the shock absorber fluid heats up and gets less viscous. This may also affect the shock absorber performance.
 - During the test place the gear lever in idle/neutral position, do not press the clutch pedal and do not apply the service brakes or the parking brake.
 - The tester measures the *complete* axle damping rate, *not* the condition of the shock absorbers.
 - The manufacturer is not liable for damage or costs incurred due to faulty evaluation of shock absorbers.
-

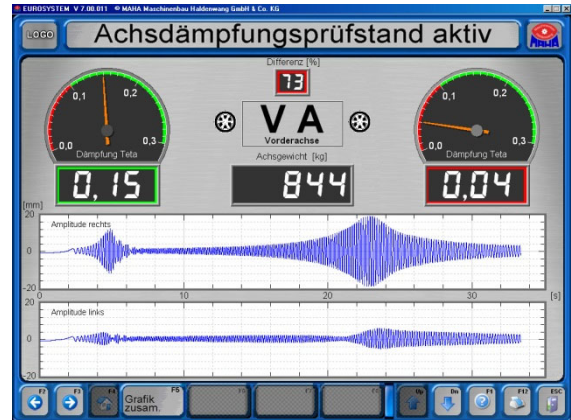
3.2 Button Assignment

Button	Key	Assignment
	F2	Previous page
	F3	Next page
	F4	Start page (Main menu)
	Page \uparrow	One level up
	Page \downarrow	One level down
	F1	Start help
	F12	Start printout
	Esc	Exit page

3.3 Test Procedure

- 1 Drive the vehicle onto the test plates with the front axle.
The wheels must be positioned straight in the center of the test plates and must not be blocked by an engaged gear or brake.
 - The tester is activated automatically once the load on both test plates exceeds 100kg.
 - The tester conducts a controlled measurement from 10...5 Hz. Both sides are measured simultaneously.
 - At completion of the measurement the tester switches off automatically.
 - The damping rate D is determined and displayed on the screen.
- 2 Drive the vehicle onto the test plates with the rear axle.
 - The test is repeated in the same way as for the front axle.

Use <F5> to display the amplitudes either in separate diagrams or one on top of the other in the same diagram.



3.4 Limit Values

3.4.1 Interpretation of Results

Display	GREEN	YELLOW		RED	
2nd Measurement (automatic, single wheel)	↓	D > 0.1 and $\Delta D \leq 40\%$	D ≤ 0.1 and/or $\Delta D > 40\%$	D > 0.1 and $\Delta D \leq 40\%$	D ≤ 0.1 and/or $\Delta D > 40\%$
Interpretation	OK	OK	Defective	OK	Defective



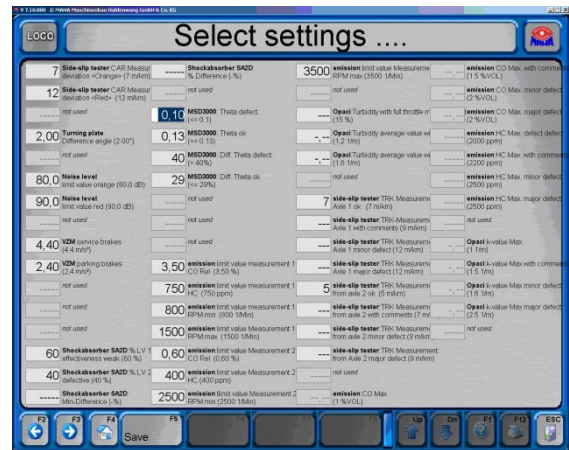
Reference value for new vehicles: D = 0.2...0.3

3.4.2 Setting the Limit Values

- 1 From the main menu, switch to the third level using <↓ Dn>.
- 2 <F5> System.
- 3 <2> Settings.
- 4 <M> Devices Limit values.

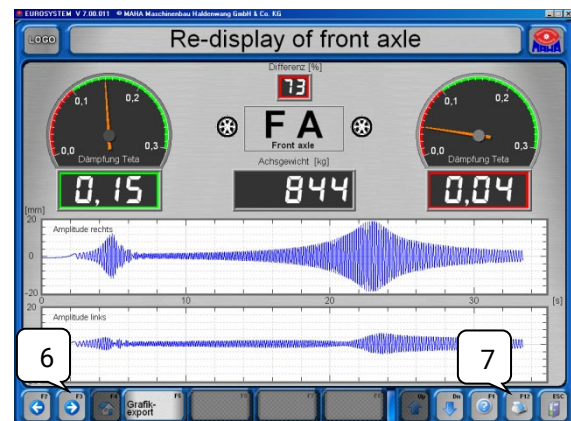
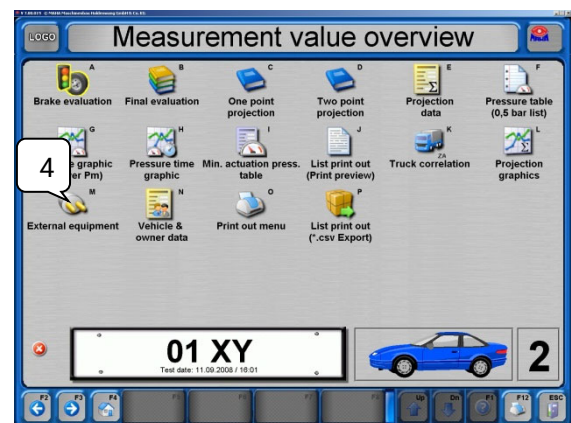
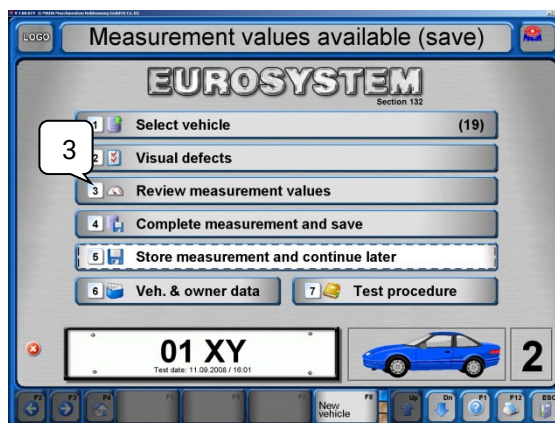
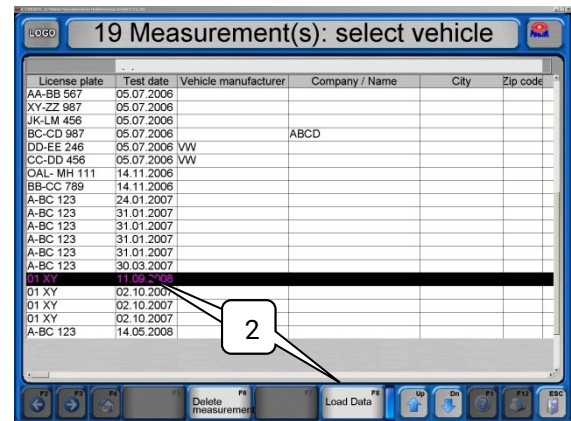
The following limit values can be set:

- D defective
- D ok
- Difference D defective
- Difference D ok



3.5 Redisplay of Measurements

- 1 In the main menu: Menu item <1> Select vehicle.
- 2 Mark desired entry and load data using <F8>.
- 3 <3> Review measurement values.
- 4 <M> External equipment.
- 5 <G> Shock tester.
- 6 Use <F2> and <F3> to switch between front and rear axle.
- 7 Use <F12> to start the printout.



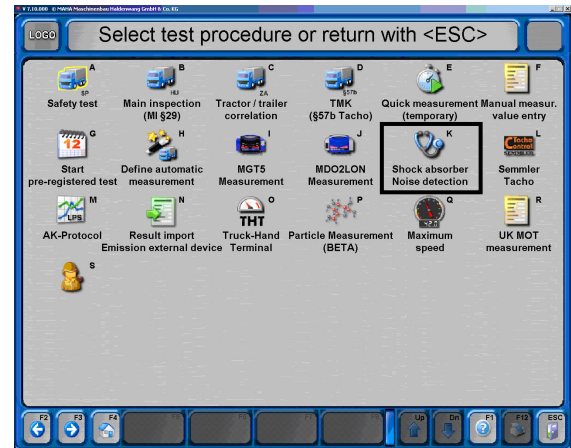
3.6 Additional Functions

3.6.1 Noise Detection



The Noise Detection option can be activated via software.

Selecting Noise Detection

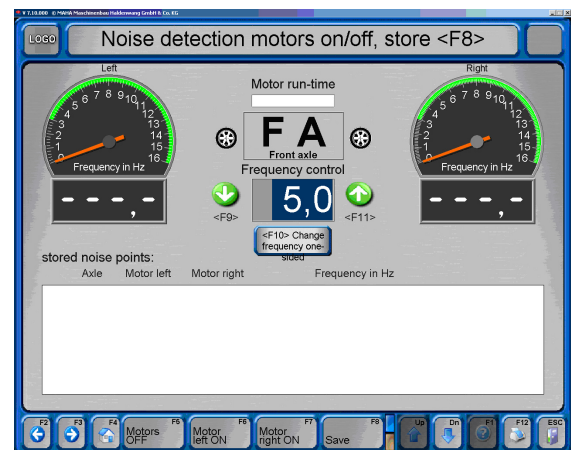


- 1 From the main menu, switch to the second level using <↓ Dn>.
- 2 <F8> Shock absorber.
- 3 <1> Noise detection.

- 1 In the main menu, select <7> Test procedure.
- 2 <K> Shock tester Noise detection.

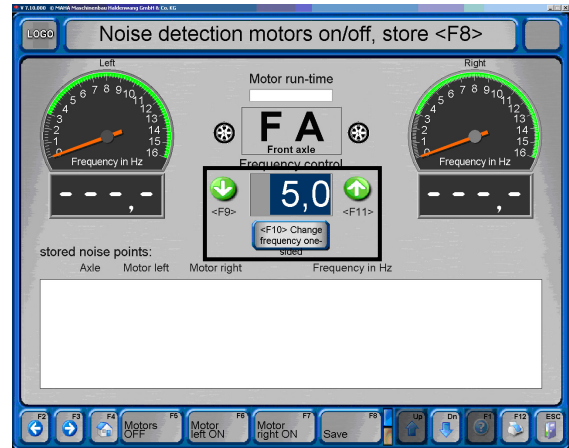
Starting the Motors

- Use <F6> or <F7> to start the left- or right-side motor respectively.
- Use <F5> to switch off both motors.



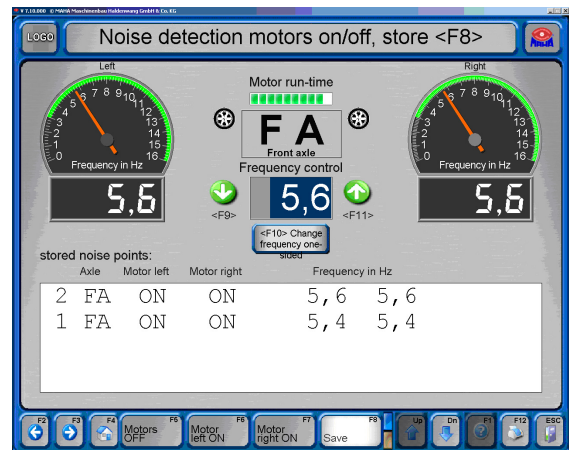
Changing the Frequency

- Use <F9> or <F11> to reduce or increase the frequency of the test plates.
- Use <F10> to determine *one particular* side to be changed.



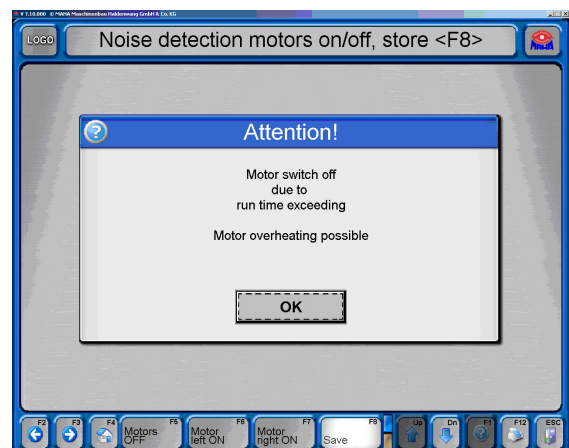
Storing Noise Points

- After setting the frequency the noise point can be stored using <F8>.
- A list with all noise points already stored appears on the display.



Automatic Shutdown

- After a preset operating time, the tester switches off automatically to prevent the motors from overheating.
- This screen appears for confirmation.



Setting the Installation Variables

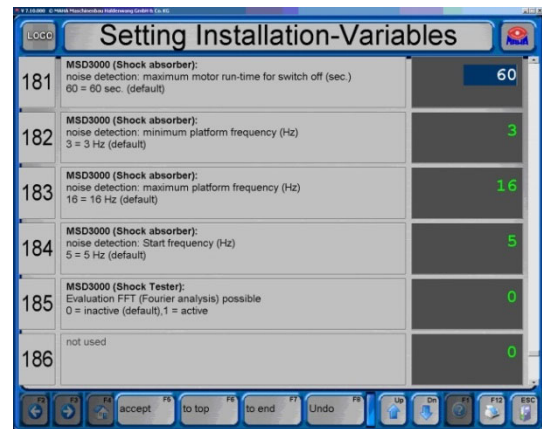


Accessing the Installation Variables requires a hardlock.

- 1 From the main menu, switch to the third level using <↓ Dn>.
- 2 <F5> System.
- 3 <1> LON Service.
- 4 <F> Installation variables.

The following Noise Detection variables can be set:

- 181 Max. operating time of motors [s]
- 182 Min. frequency of test plates [Hz]
- 183 Max. frequency of test plates [Hz]
- 184 Starting frequency [Hz]

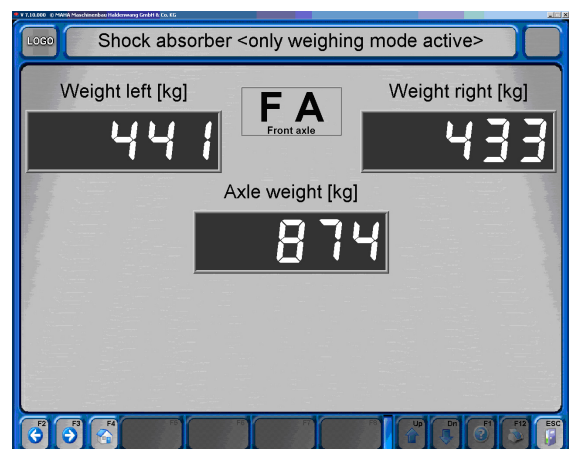


3.6.2 Weighing Mode

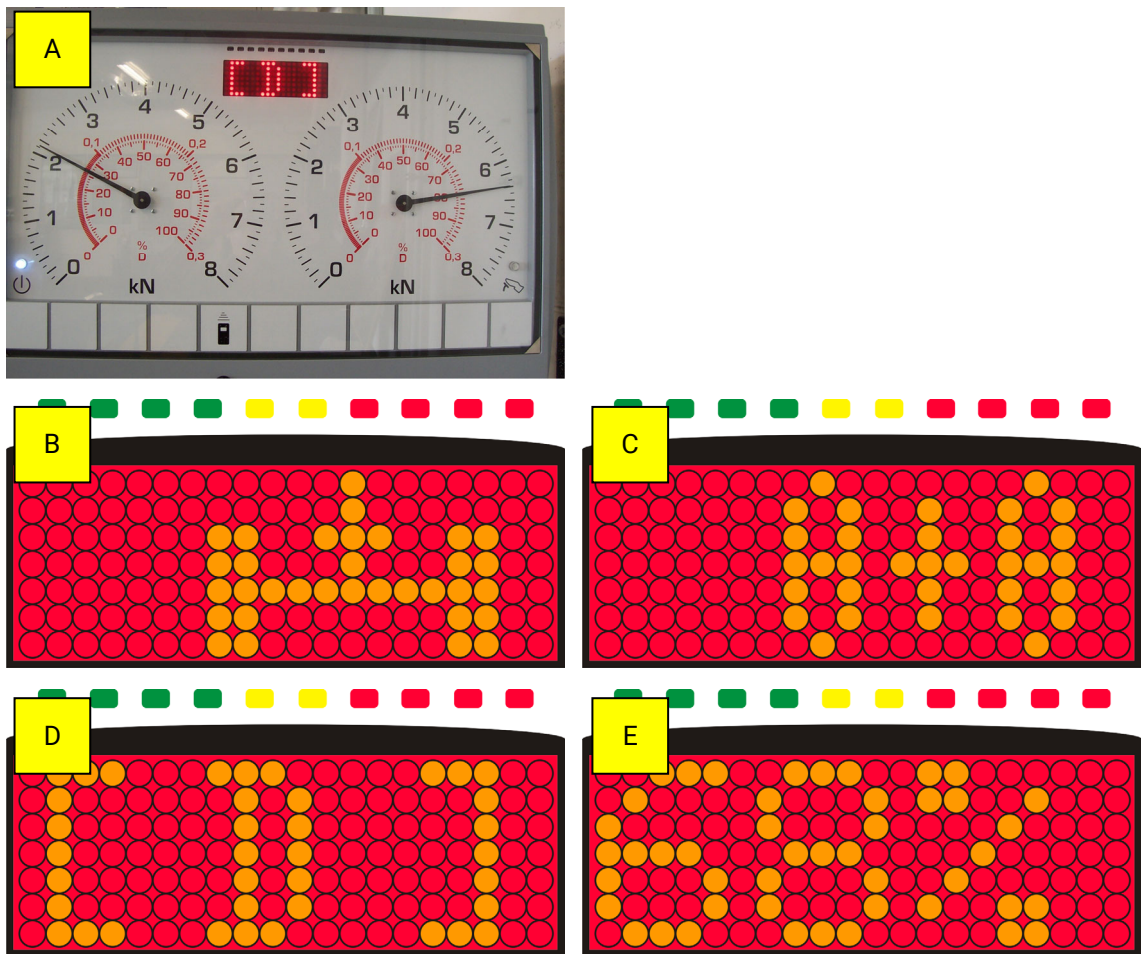
- 1 From the main menu, switch to the second level using <↓ Dn>.
- 2 <F8> Shock absorber.
- 3 <2> Shock tester mode.
- 4 <F9> Weigh only, confirm with <F2>.



→ The left-side, right-side and overall axle weights are displayed.



3.7 Operation with IW/MBT LON Brake Testers



Test

- 1 Drive onto the tester (A). Weight measurement (B)!
- 2 Both sides start up simultaneously (C).
- 3 After measurement completion the pointers move to test value 0 to 0.3 D. If the test value is above 0.3, the pointers move slightly above 0.3 D.
 - The display changes between the unit (D) and the difference (E) in % until the tester is exited. The differential value is based on the left and right measurement value.
 - If the measurement value of a wheel is under 0.13 D, or if the difference is > 29%, then an additional single wheel measurement is done of each wheel. The display flashes during the single wheel measurement (C).
- 4 Measurement values are automatically stored without remote control.



With 2 additional AN5-Displays the wheel weight is displayed during the measurement procedure, and the measurement value 0...0.3 is displayed after completed measurement.

Printing and Re-display of the Measurement Values

(Re-display of the measurement values is **not** possible with the RECO remote control.)

- The print program is started with F7. Enter Program 1 and confirm with star key (*). Printout follows.
- Re-display of the shock absorber with Shift + Axle number + key F10.



If AN5 displays are present, press the F10 key again to switch to the wheel weight.

-
- Re-display of the side-slip tester with Shift + Axle number + key F9 if available.
 - New vehicle (NEW) with pound key # and star key * (Delete all measurement values).

4 Maintenance



Risk of death or severe personal injury by electric shock

Before doing any maintenance work, turn off the main switch and protect it against tampering.

4.1 Annual Inspection



- The maintenance interval prescribed by the manufacturer is 12 (twelve) months. This maintenance interval refers to normal workshop usage. If the equipment is used more frequently or under severe operating conditions (e.g. outdoors), the interval must be reduced accordingly.
 - Maintenance work shall be done only by authorised and trained service technicians provided by the manufacturer, licensed dealers or service partners.
 - In case of non-compliance the manufacturer's warranty becomes void.
-

4.2 Maintenance by the Operator

Perform the following maintenance work every 200 operating hours or once annually:

- Clean and lubricate the tester.
- Check the fastening screws for tight fit.

- Visually check for:
 - correct screening of LON network
 - functionality of oscillating plate
 - corrosion
 - damaged cables
 - safe PE connection

4.3 Troubleshooting

Error	Diagnosis	Remedy
Tester does not start up.	Tester was already occupied when switched on.	Main switch off, remove vehicle, main switch on.

4.4 Spare Parts

To ensure safe and reliable operation, only use original spare parts supplied by the equipment manufacturer.

5 Dismantling

Decommissioning and dismantling of the equipment may be done only by specially authorized and trained personnel provided by the manufacturer, licensed dealers or service partners.

6 Contents of the Declaration of Conformity

MAHA Maschinenbau Haldenwang GmbH & Co. KG

herewith declares as a manufacturer its sole responsibility to ensure that the product named hereafter meets the safety and health regulations both in design and construction required by the EC directives stated below.

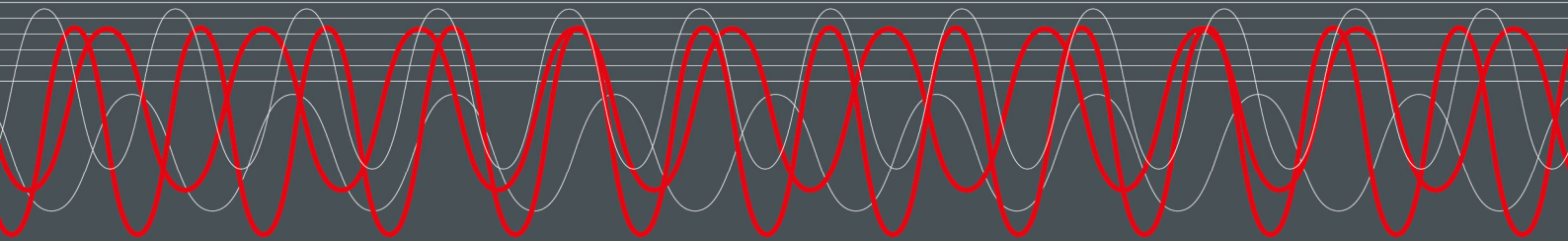
This declaration becomes void if any change is made to the product that was not discussed and approved by named company beforehand.

Model: MSD 3000

Designation: Shock Tester; Rated Axle Load 2500 kg

Directives: 2006/42/EC; 2014/30/EU

Standards: EN 12100-1/-2; EN 60204-1, EN 61000-6-3, EN 61000-6-2



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