

MLT-SERIES

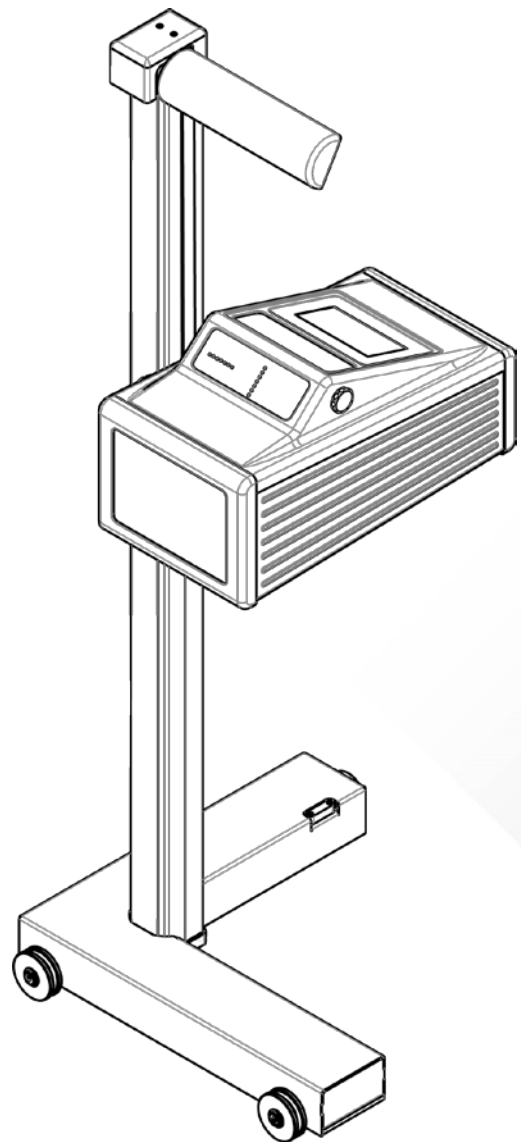


MLT 3000

Headlight Tester

Original Operating Instructions

BA380701-en



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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 Intended Use

This device only serves to check and adjust the alignment of vehicle headlights.

This device cannot be modified without the express, written consent of the manufacturer. Any infringement renders the conformity declaration invalid.

1.3 Requirements on Operating and Service Personnel

All persons employed in the operation, maintenance, installation, removal and disposal of the device must

- be at least 18 years old,
- be trained and instructed in writing,
- have read and understood this manual
- be on record as having been instructed in safety guidelines.

1.4 Safety Instructions

- This device must only ever be operated within its performance limits.
- All parts of the electrical system must be protected against damp and humidity.
- All service work must be performed by service technicians employed by the manufacturer or by authorized service partners.
- Never expose the lens to direct sunlight. The bundling of light may cause fire damage inside the housing.
- Only ever clean the lens with a soft cloth and a glass cleaning agent.
- Optional laser alignment unit: Never look into the laser beam (laser class 2M). Comply with work safety and accident prevention directives (H&SW regulations) in respect of laser radiation.

2 Description

2.1 Requirements for the Place of Installation

The location for the headlight adjustment points requires careful planning. Headlight beam-throw adjustment devices are sensitive measuring devices that are prone to malfunction if moved from one place to another in the workshop. Precise setting of headlights then ceases to be possible.

Headlights must be checked at a location that is completely flat. Irregularities, bulges, inclined and recessed areas give rise to measurement errors. Please observe the legislative requirements that, where applicable, contain details of the surface properties of the location to be chosen for setting up the equipment.

When choosing a suitable location, please also ensure that the lens is not exposed to direct sunlight.

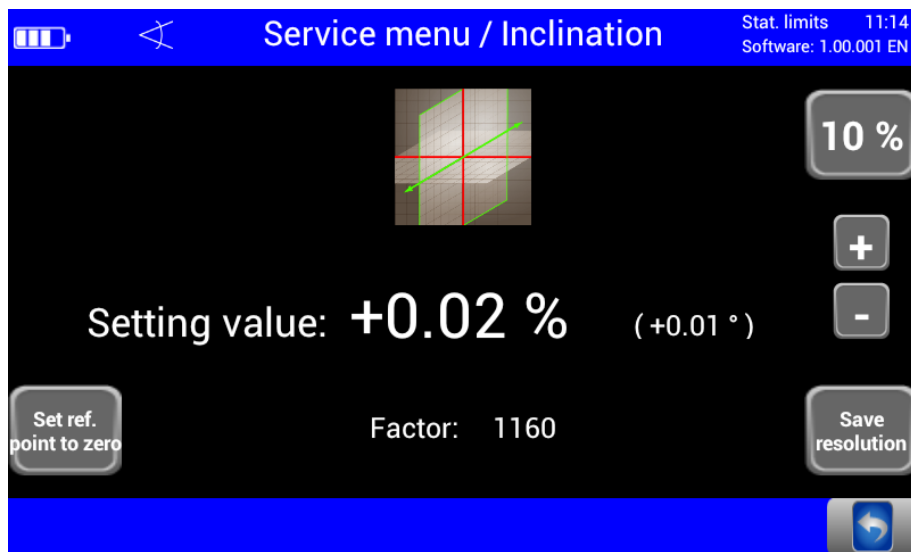
Approval testing as defined in the test equipment monitoring standard ISO 10604 must take place before a headlight testing station enters service. (more info in 'Headlight adjustment station for cars', based on ISO 10604).

2.2 Electronic Levelling

This headlight tester features an electronic world first: it comes standard with a sensor which is capable of compensating ground unevenness. This levelling function automatically adjusts the inclination of the headlight tester on the vehicle's longitudinal axis. The inclination of the z-axis (see Fig.) is considered by the software during data evaluation, while the display shows only the corrected measurement values.

Thus, the headlight tester provides faultless measurement results even for test locations with a ground unevenness that exceeds the permissible tolerance of ± 0.5 mm/m.

The inclination sensor can be enabled in the Service menu under "User settings".

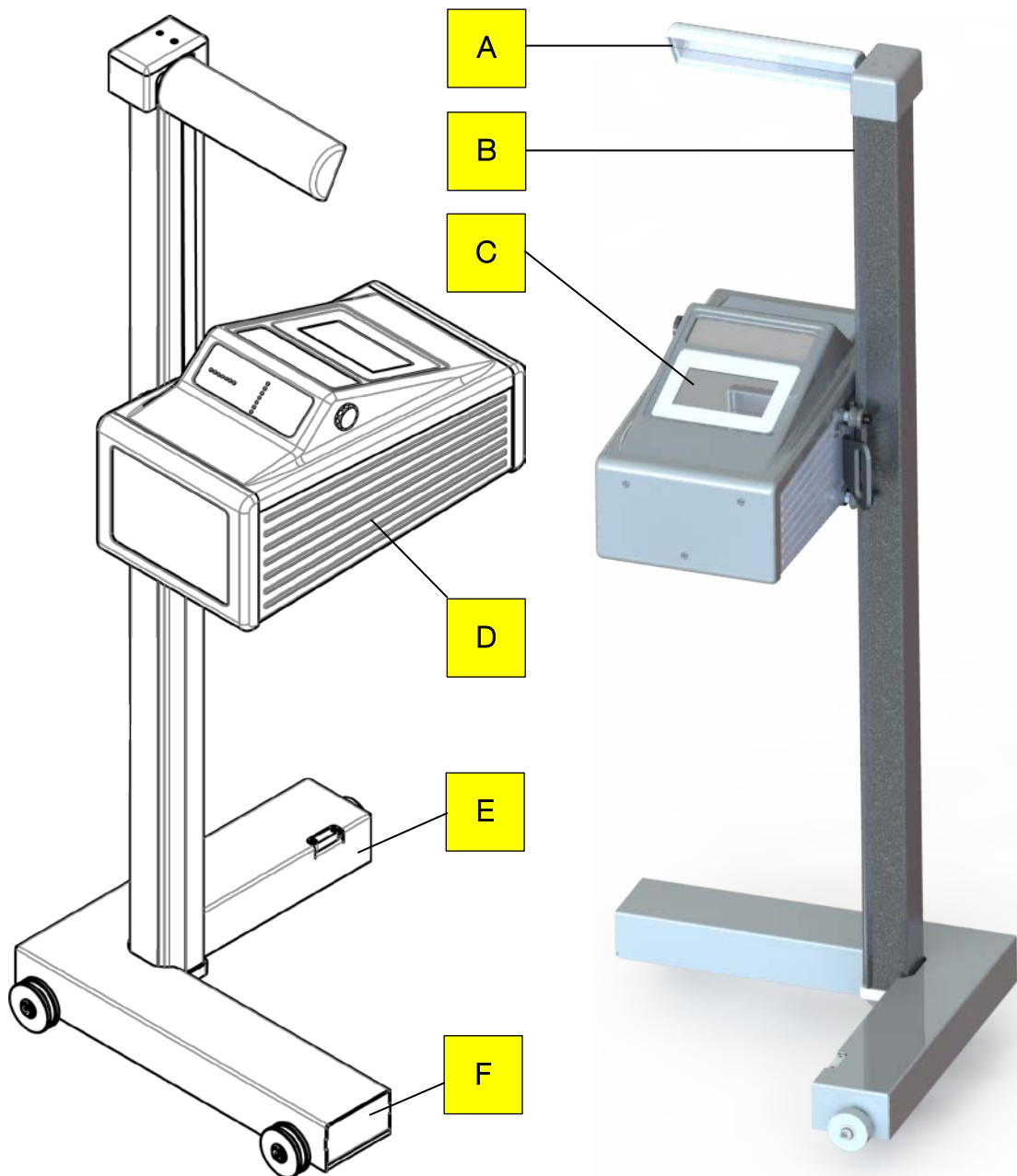


2.3 Specifications

Measuring range

above hotspot	0...800 mm / 10 m (0...8 %)
above pitch angle	0...300 mm / 10 m (0...3 %)
below	0...700 mm / 10 m (0...7 %)
left	0...1000 mm / 10 m (0...10 %)
right	0...1000 mm / 10 m (0...10 %)
Light intensity	0...125 000 cd
Illuminance	0...200 lx
Measuring distance	100...500 mm
Adjustment path of lens centre above floor	240...1500 mm
Deviation of intensity	+/-5 %
Deviation from one axle	+/-5'
Temperature	+5...+40 °C
Relative humidity	20...80 %
Supply voltage	100...240 V AC, 50/60 Hz
Charging voltage / Battery voltage	24 V DC / 12 V DC
Dimensions (W x H x D)	655 x 1770 x 720 mm
Net weight / Shipping weight	65 kg / 80 kg

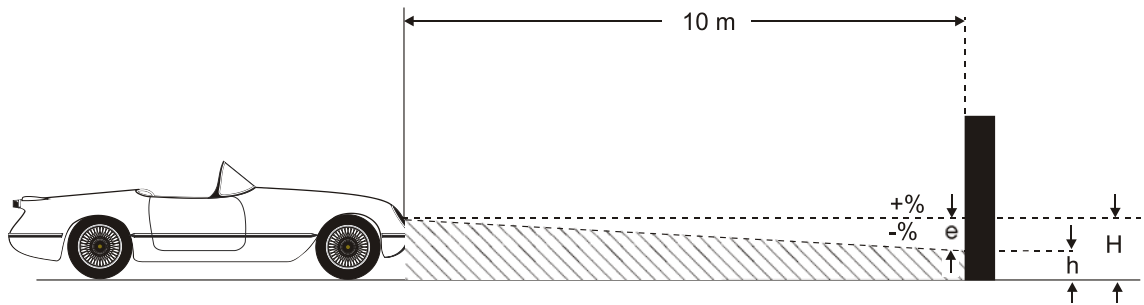
2.4 Design



- | | | | |
|---|---------|---|--------------------------------|
| A | Mirror | D | Casing (with adjusting handle) |
| B | Column | E | Carriage (with spirit level) |
| C | Display | F | Battery compartment |

2.5 Definition of Technical Terms

2.5.1 Pitch Angle

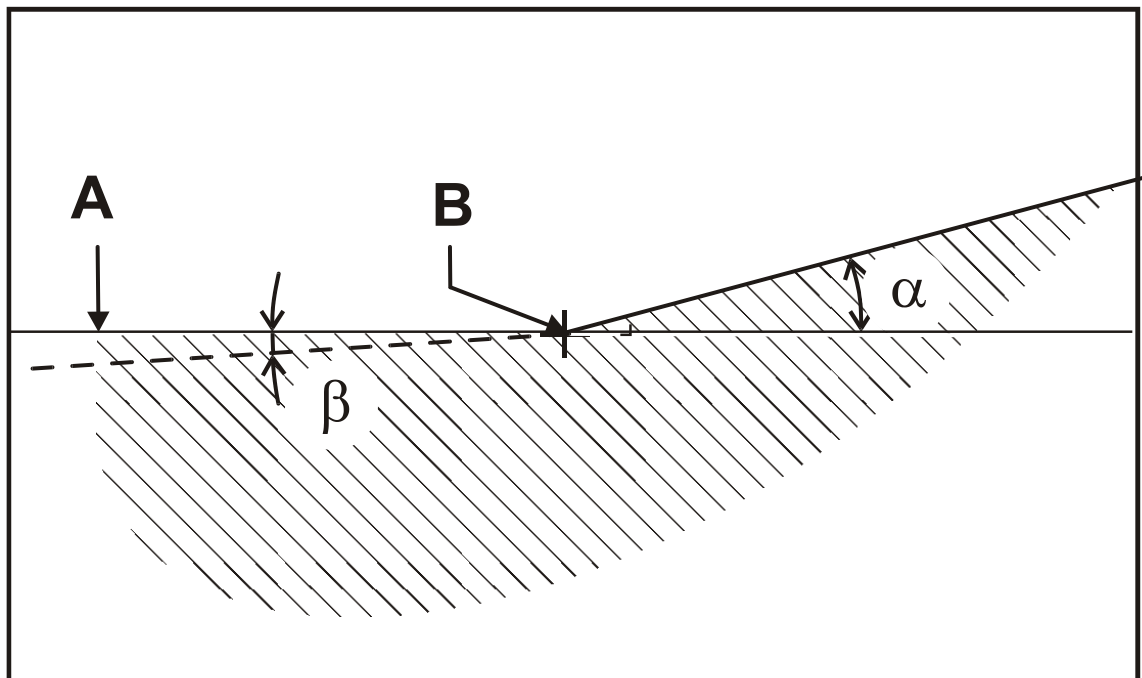


Angle of inclination of light-dark limit against the test surface.

The inclination of headlight lighting bundle against the test surface is expressed as a percentage, using 10 m as a reference parameter:

$$\frac{H - h}{1000} \times 100$$

2.5.2 Low Beam



Light-dark limit

- A Boundary for light distribution between 'top dark' and 'bottom light' for low-beam lights.

Inflection point

- B Synonymous with the light-dark limit for asymmetric low-beam lighting. The deviation of the inflection point is expressed in %. 10 meters is used as the reference dimension.

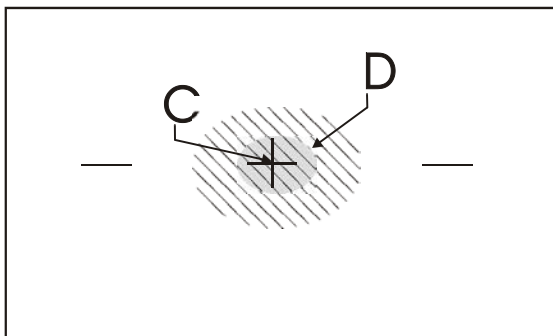
Yaw angle

- ☑ Angle between the inflection point on the rising component of the light-dark limit and the horizontal line for asymmetric low-beam light.

Rolling angle

- ☑ Angle between the left component of the light-dark limit and the horizontal, usually 0°.

2.5.3 High Beam

**Central mark**

- C From the central mark, the deviation of hot-spot is specified in X and Y directions.

Hot spot

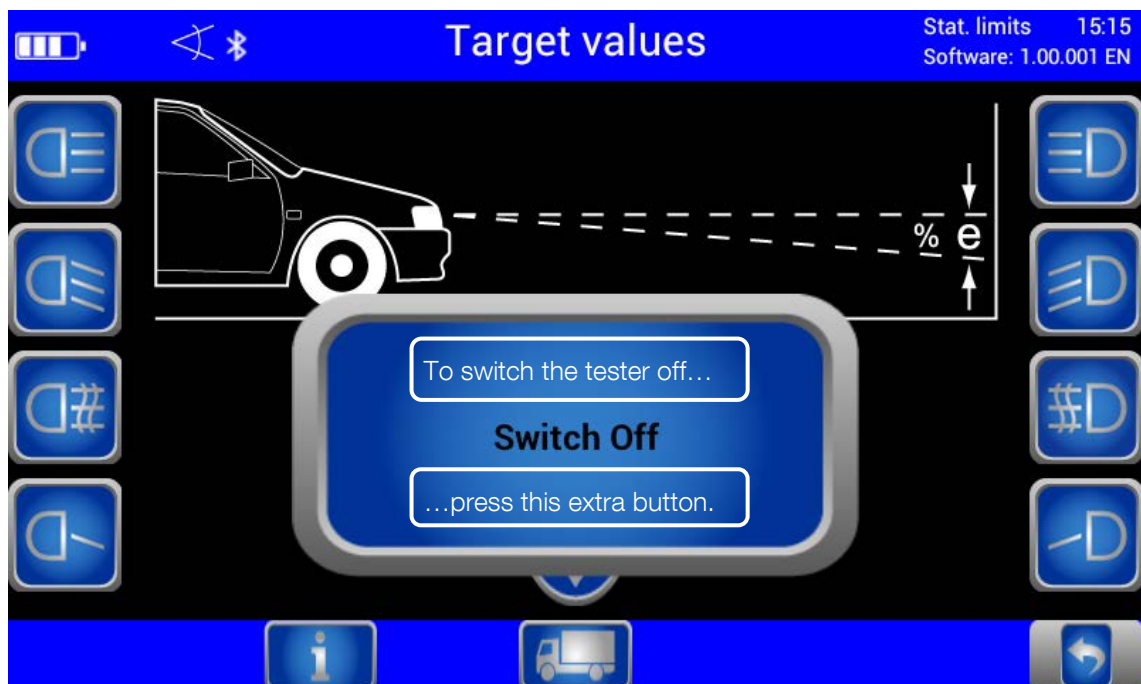
- D Center of light beam for high-beam. The deviation of hot spot from central mark is expressed in %. 10 meters is used as the reference dimension.

3 Operation

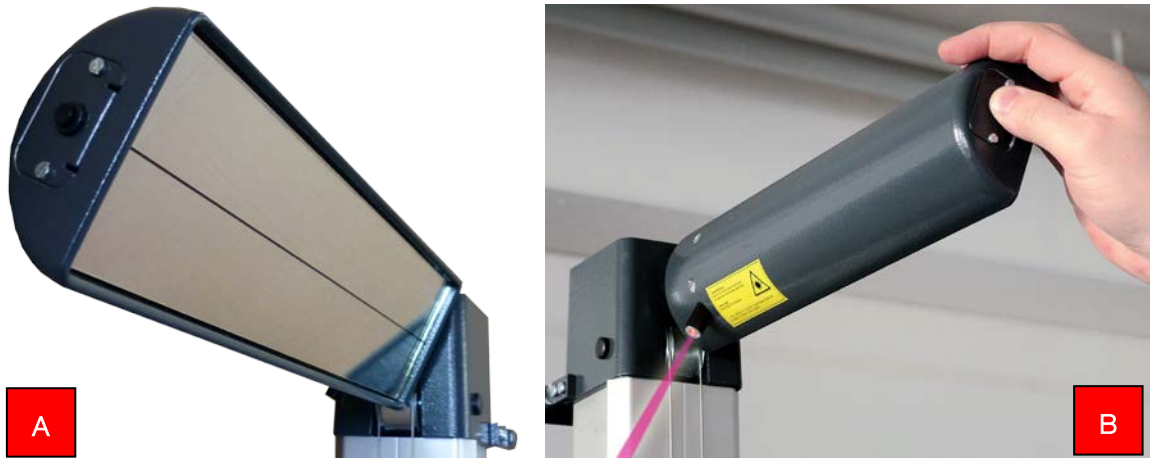
3.1 Switching On / Off

The light tester is mainly operated via the touch screen.

The button underneath the touch screen is currently only used to turn the tester on and off. Once the tester has been switched on, the system is booted up and is ready for operation in roughly 60 seconds.



3.2 Aligning

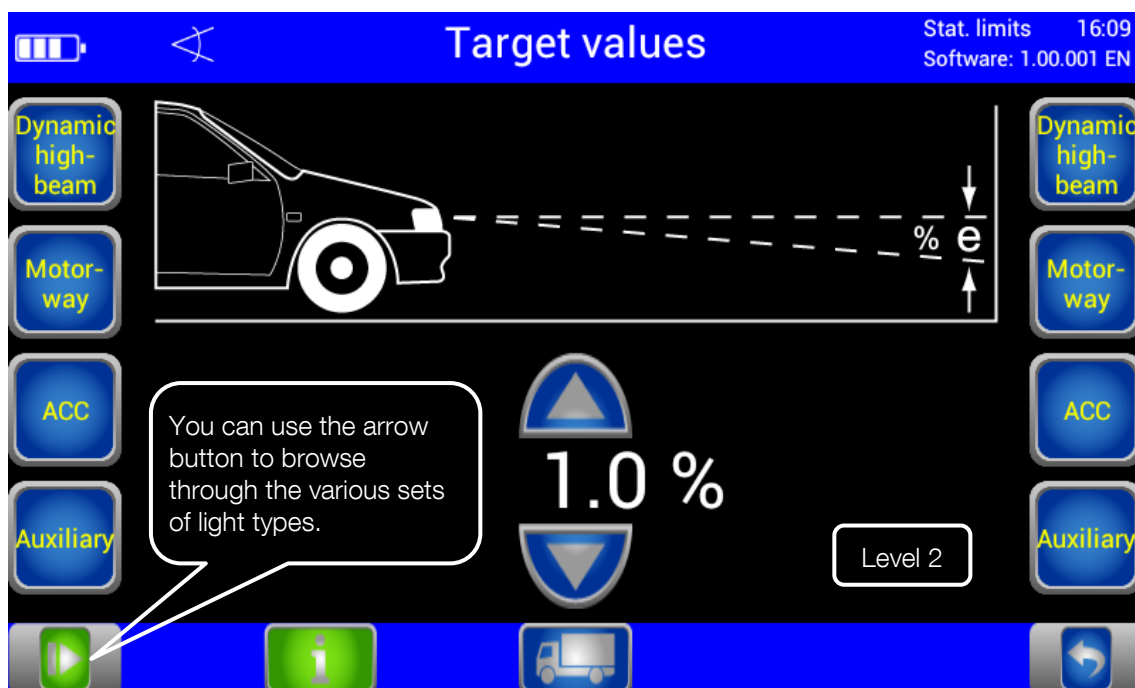
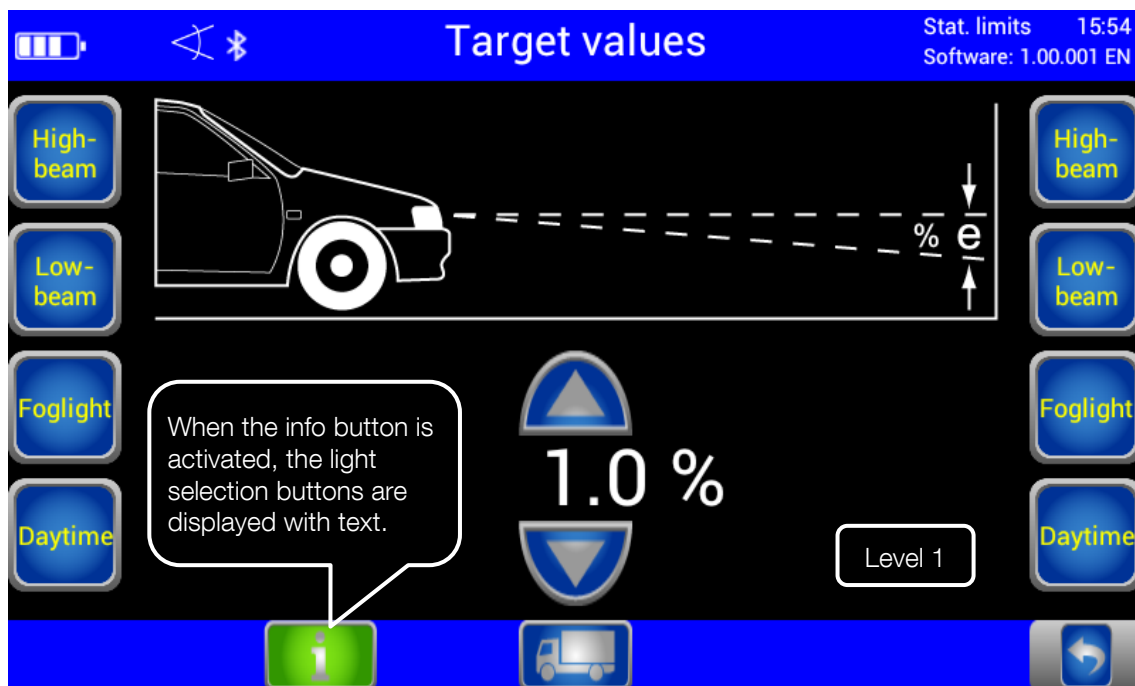


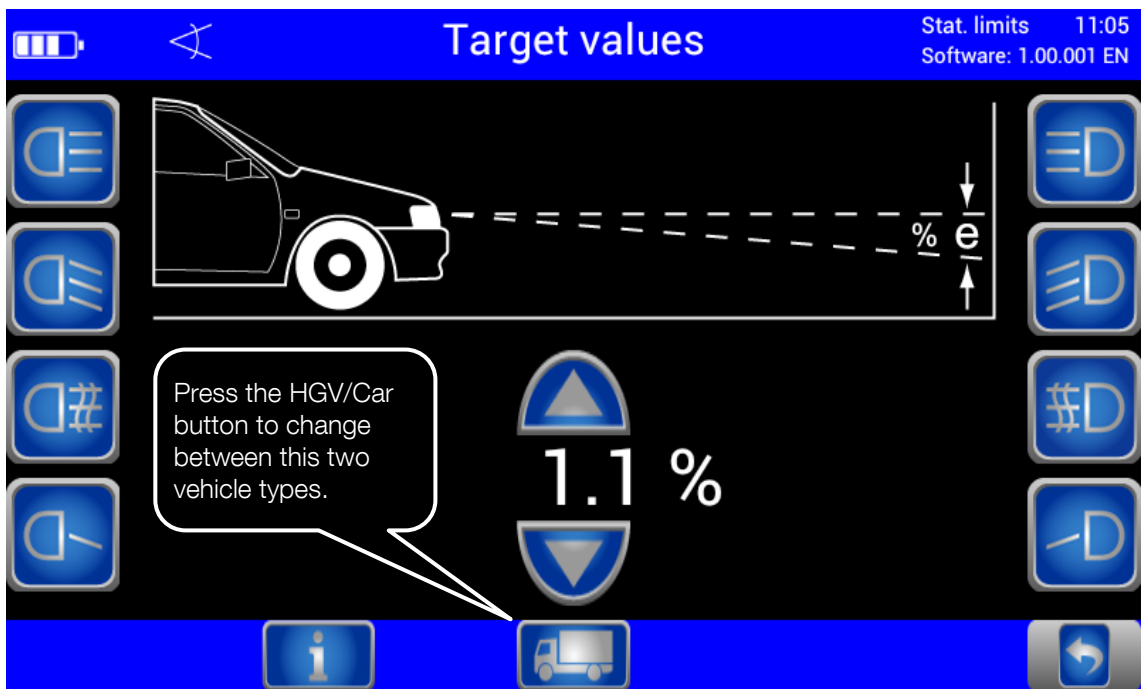
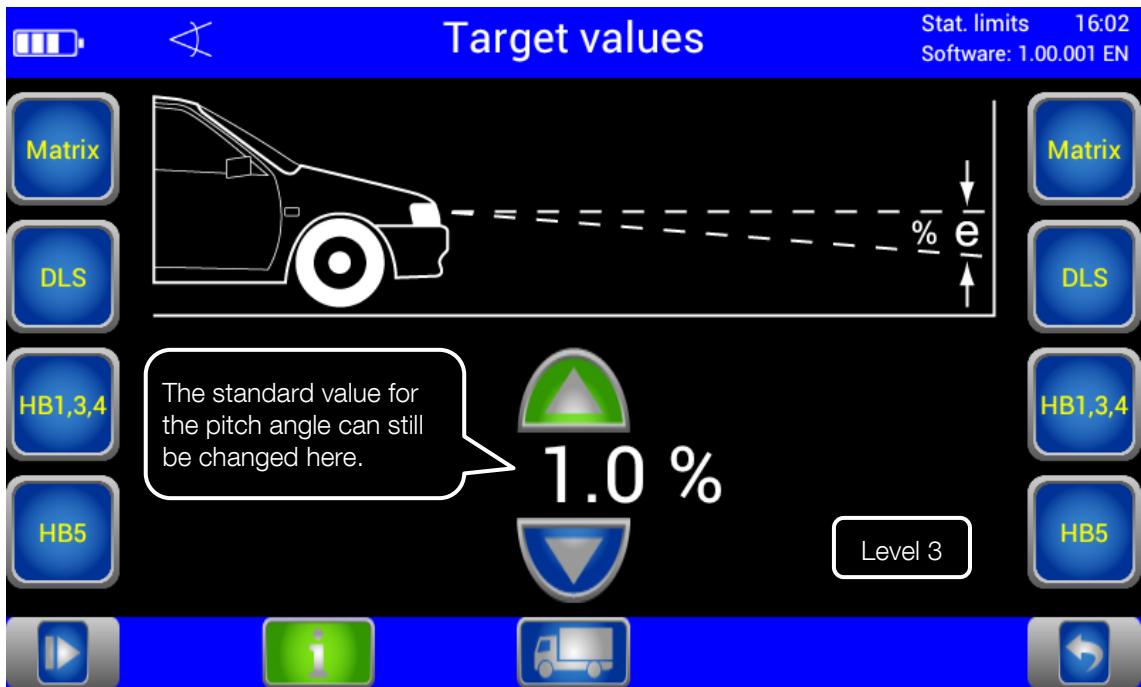
- 1 Position the device centrally in front of the vehicle.
- 2 The device is correctly aligned when two symmetrical reference points on the front of the vehicle are located on the black line of the alignment mirror (A).
The optional laser alignment unit (B) is integrated into the mirror holder. The device is correctly aligned when the laser pointer is parallel to two symmetrical reference points on the front of the vehicle.

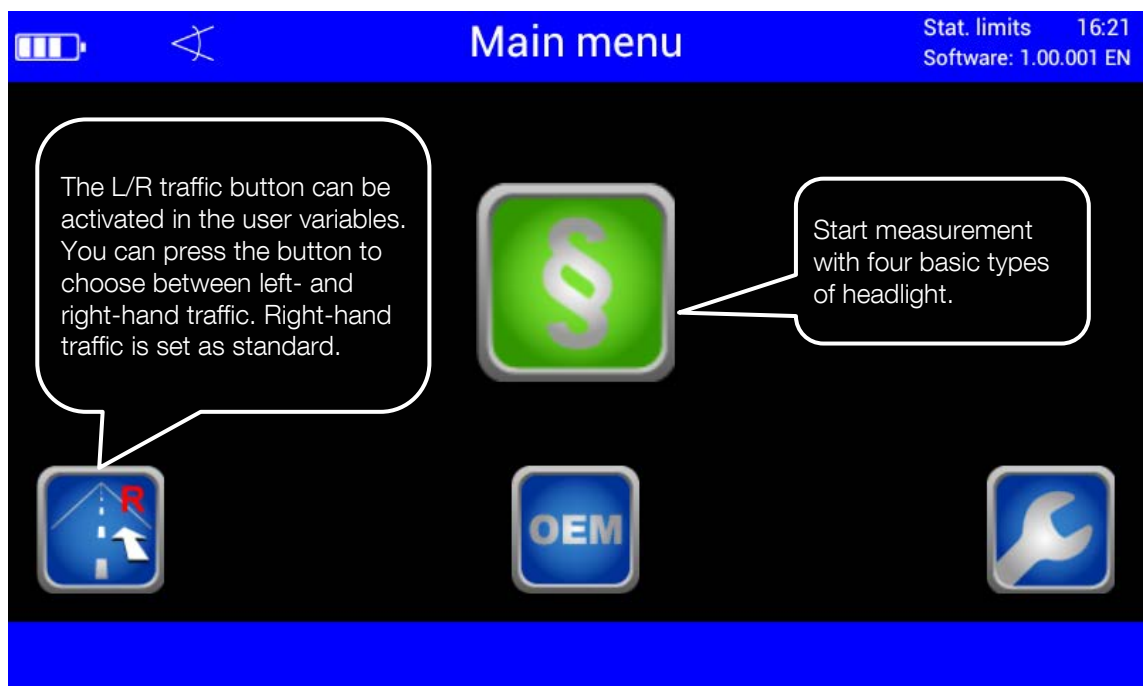
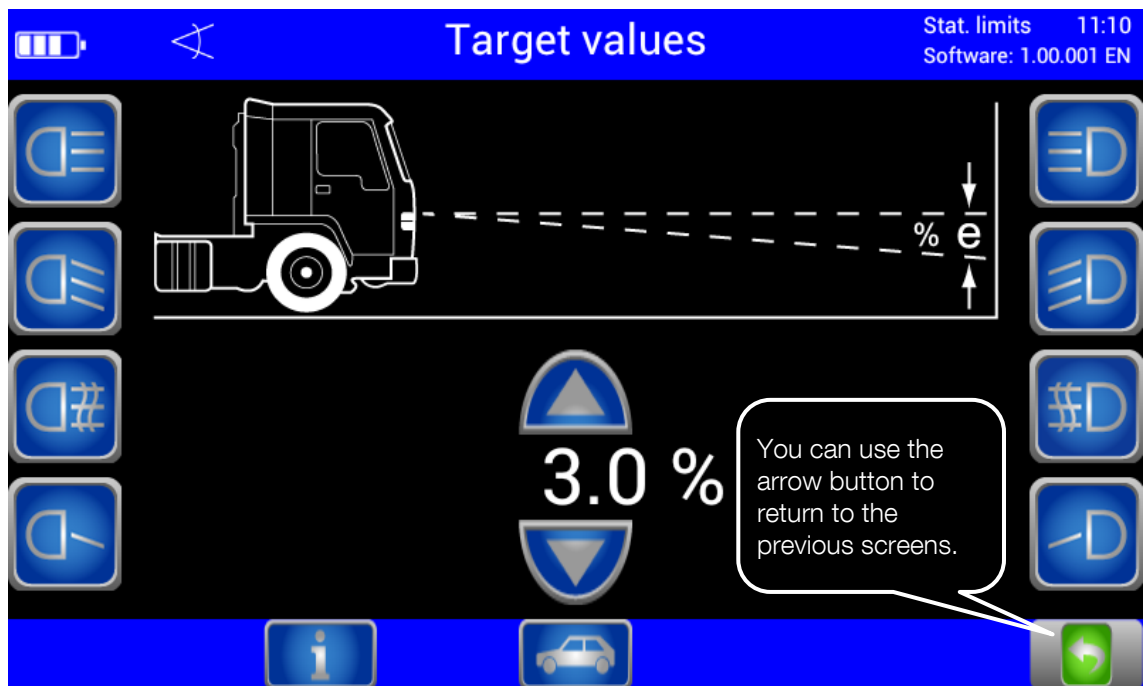
3.3 Light Selection Buttons

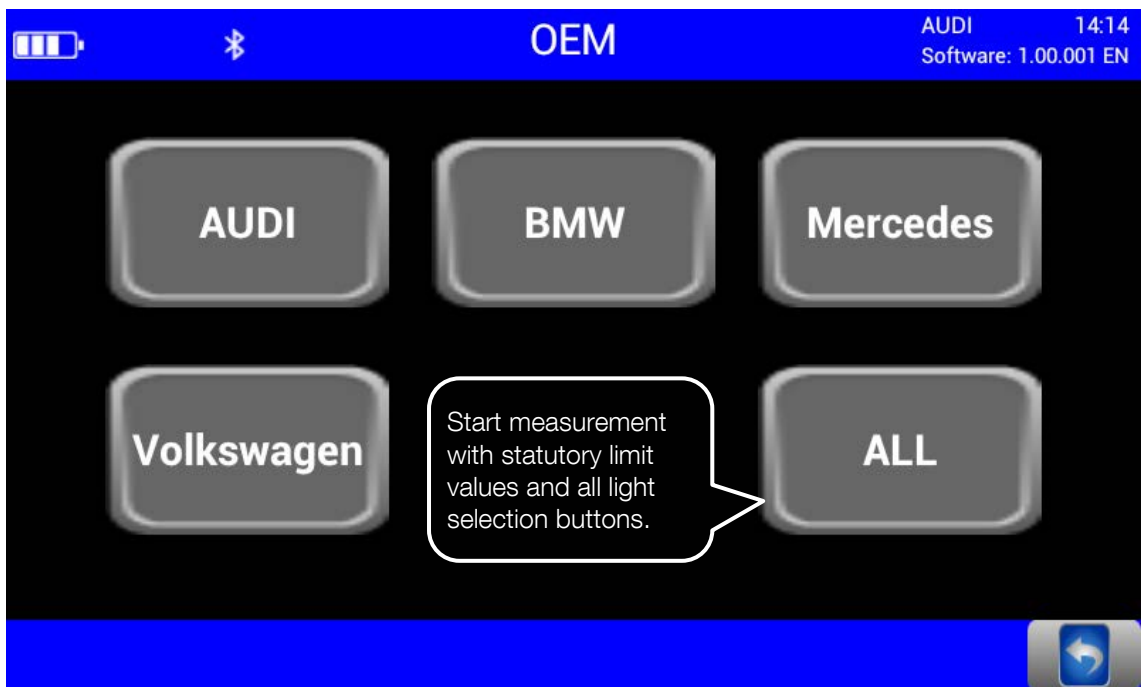
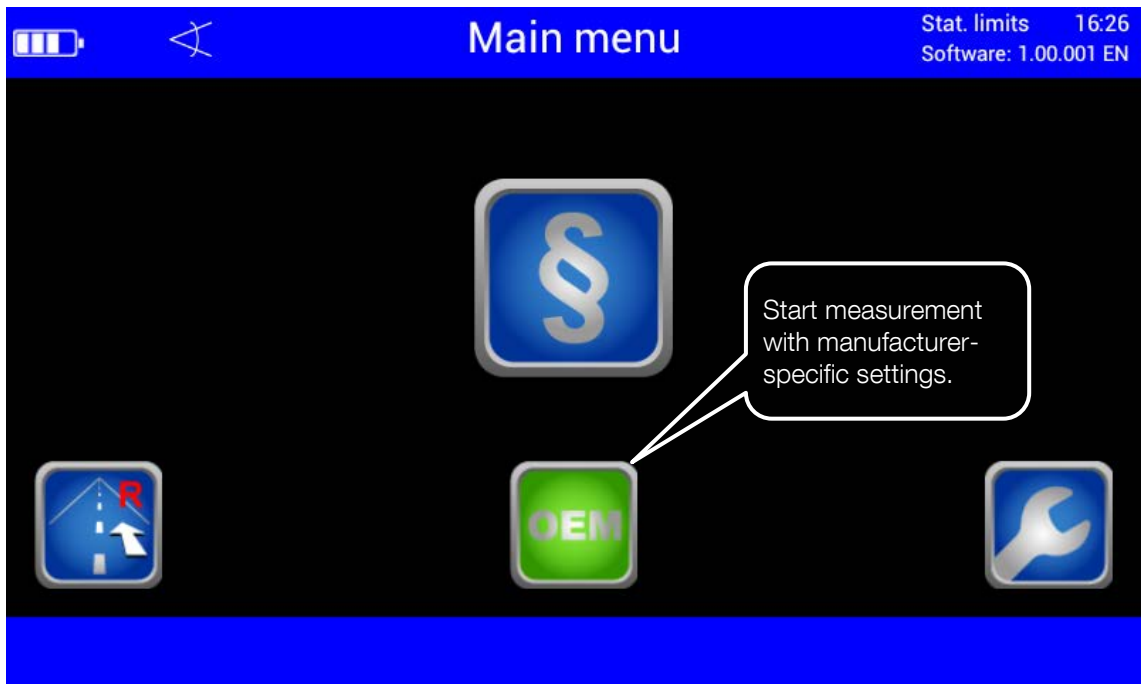
The headlight tester is operated via self-explanatory buttons on the touch display. The display is configured for use with gloves.

The following light selection buttons are available, depending on current settings:



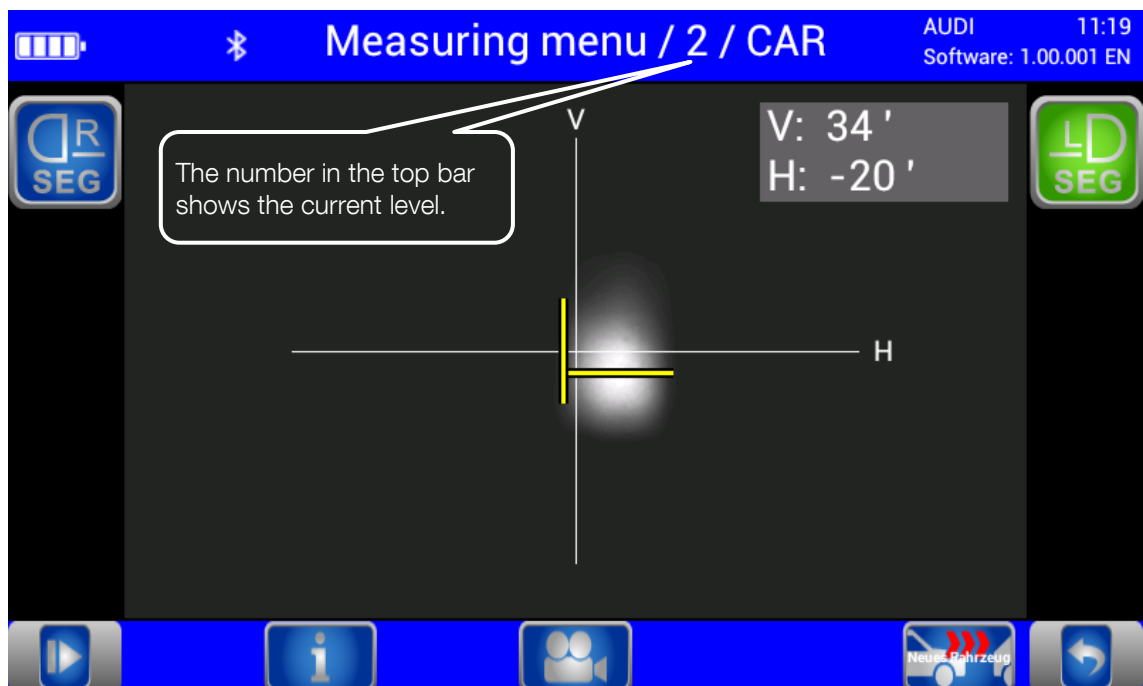
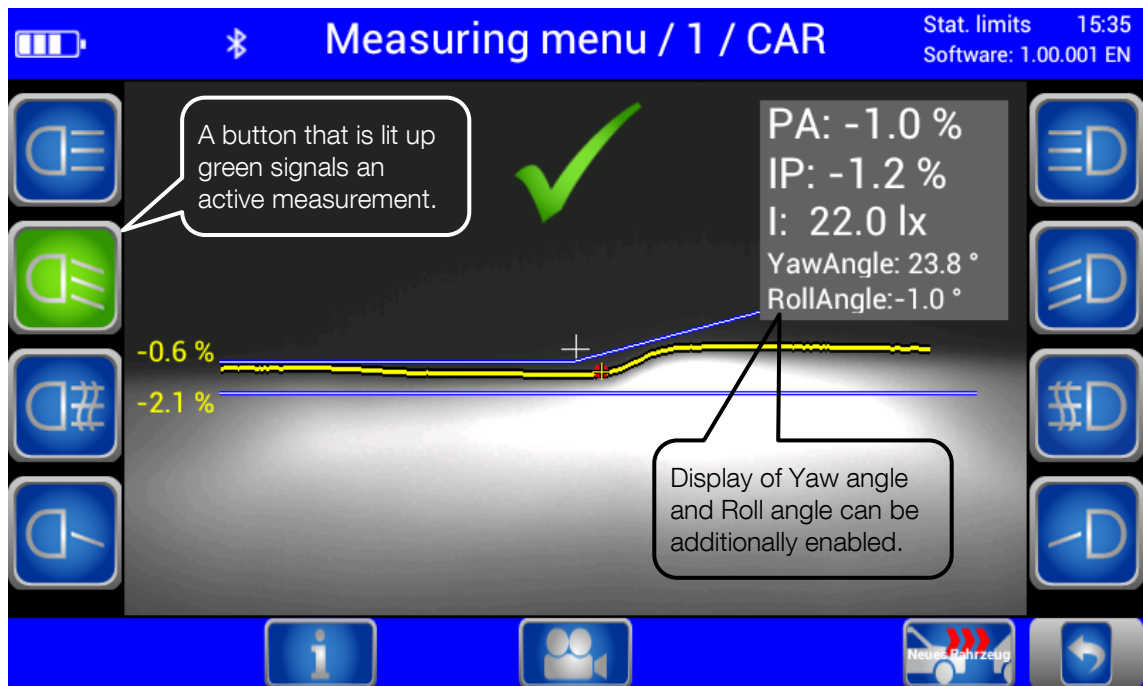


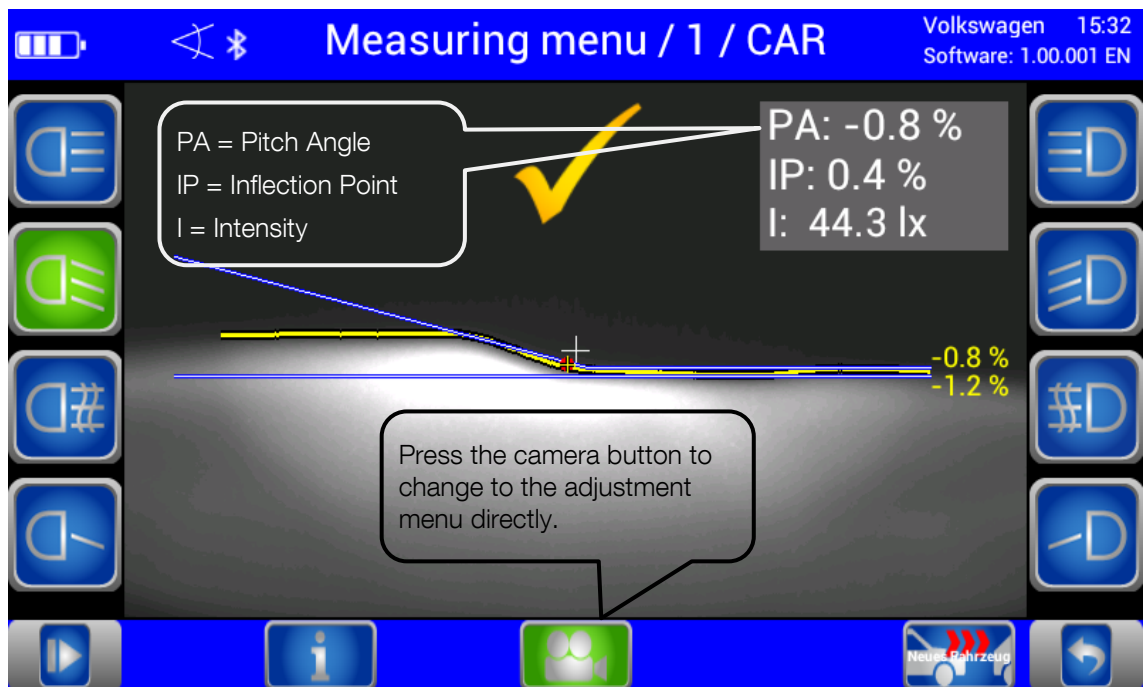
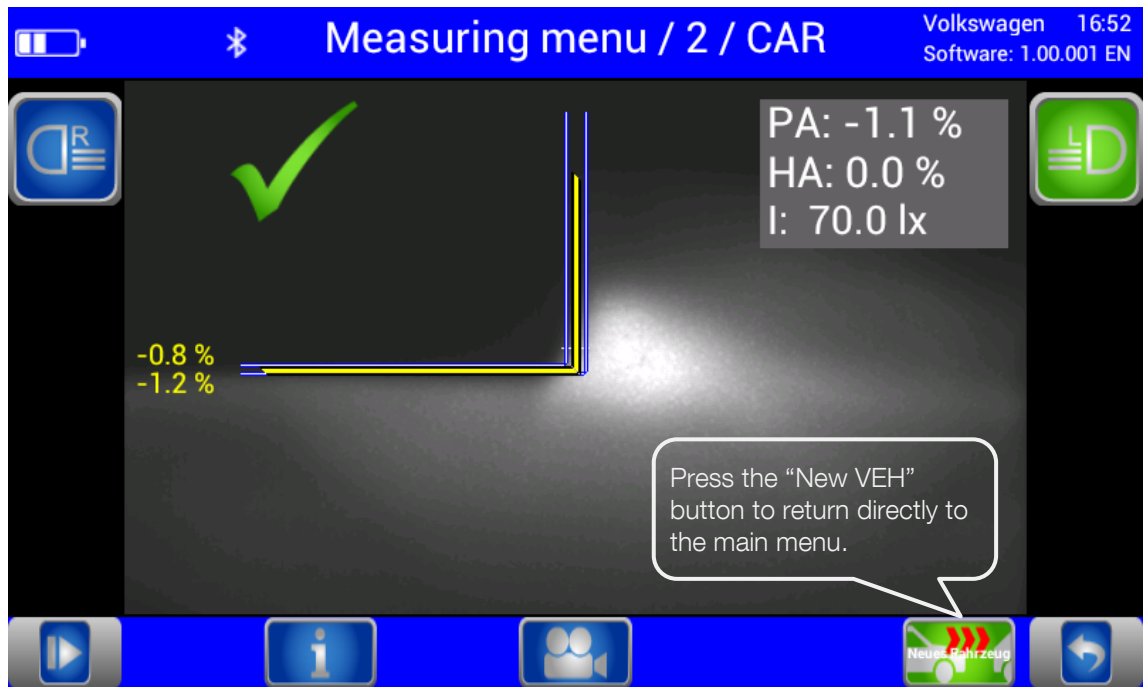




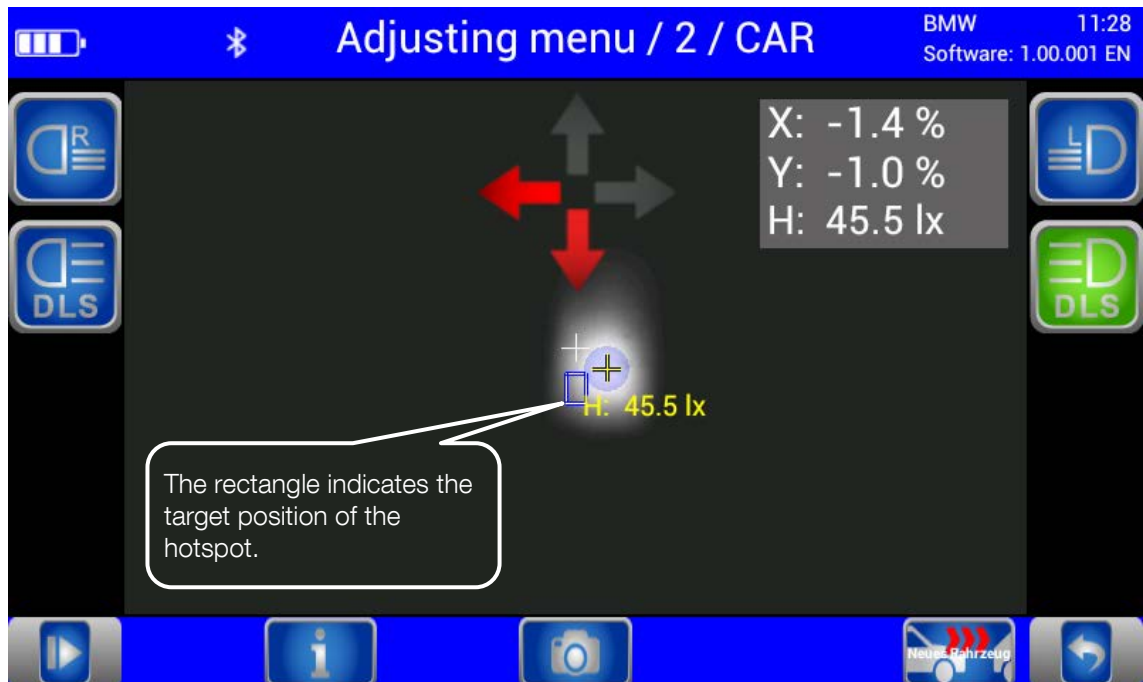
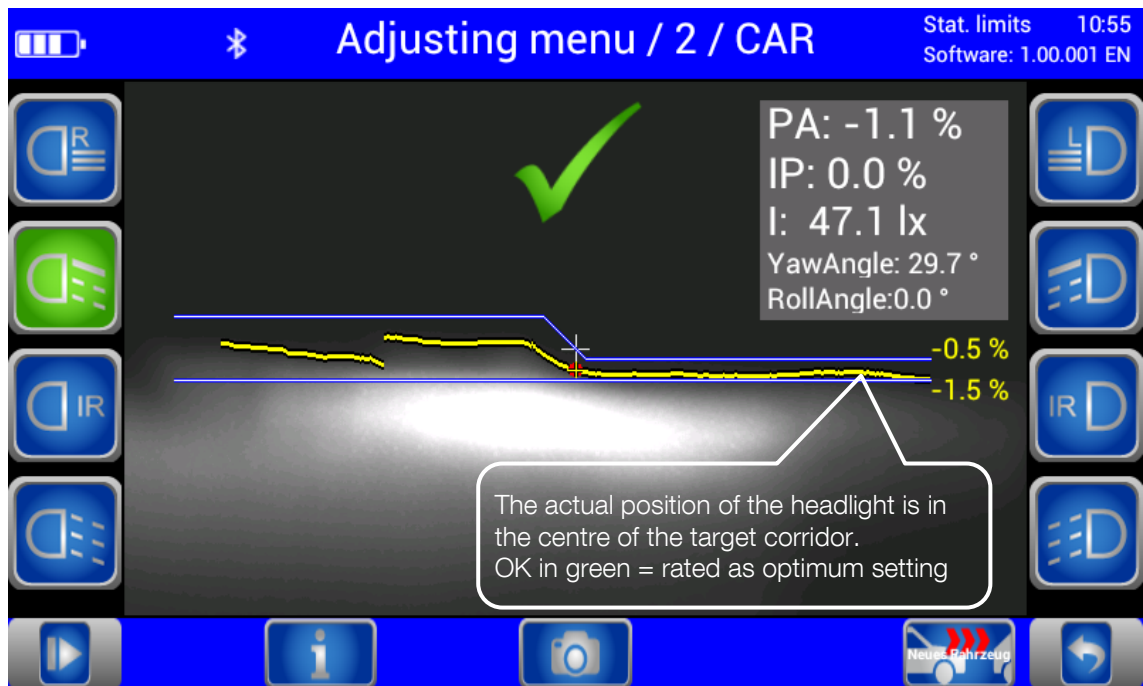
3.4 Testing the Headlights

3.4.1 Measuring



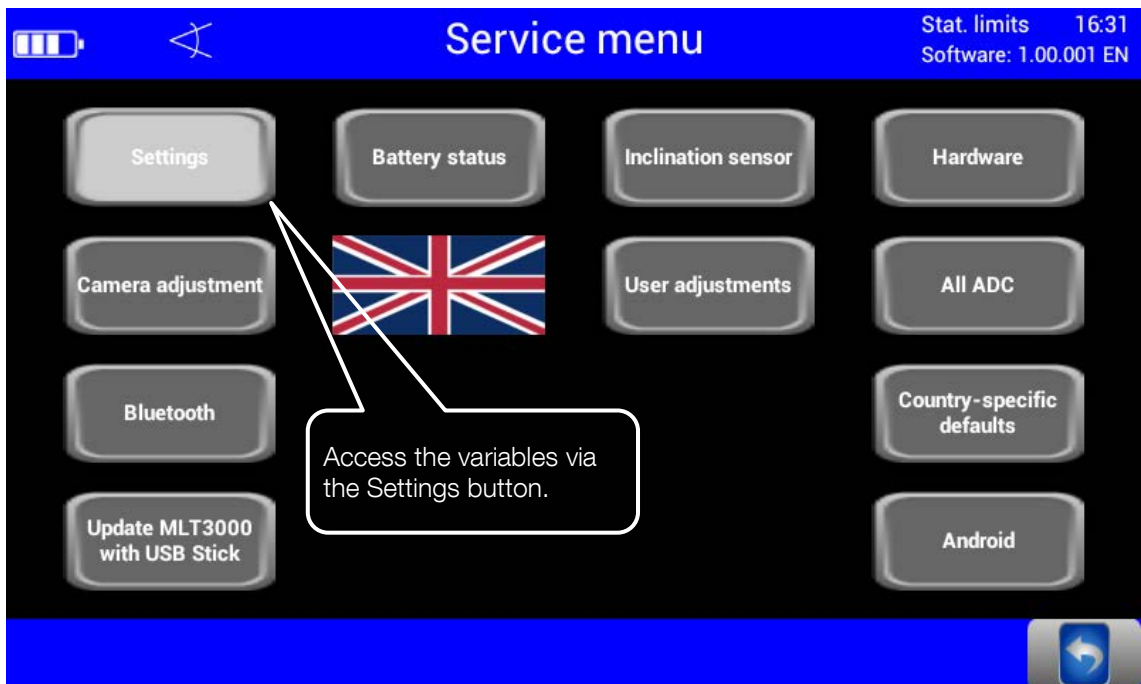
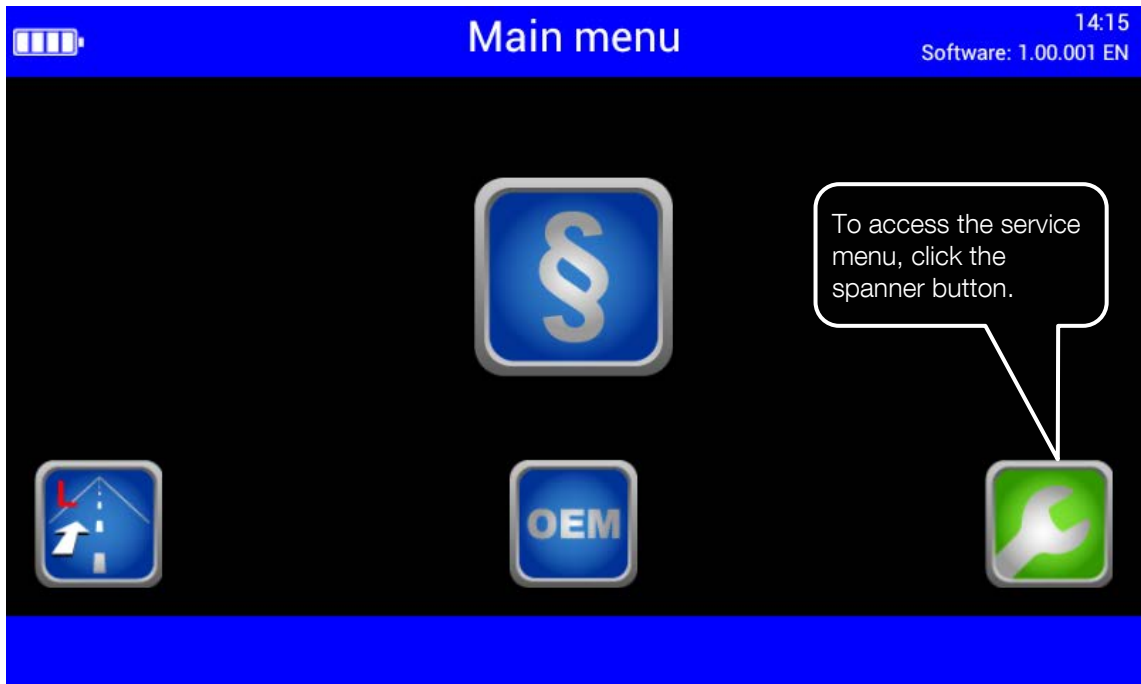


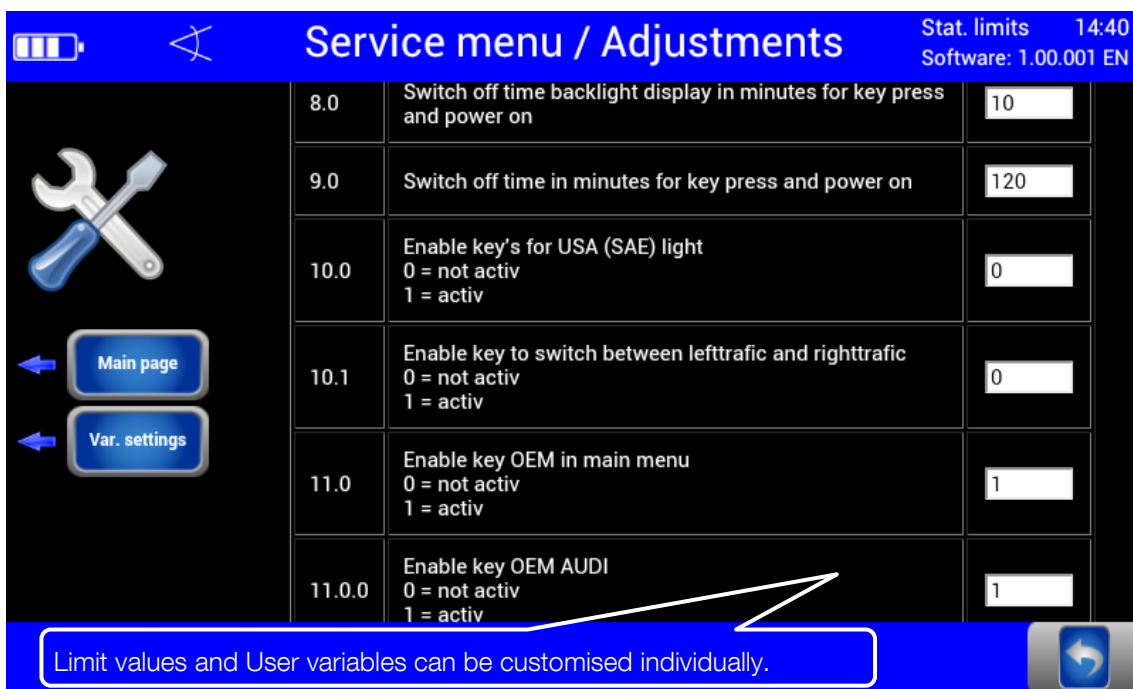
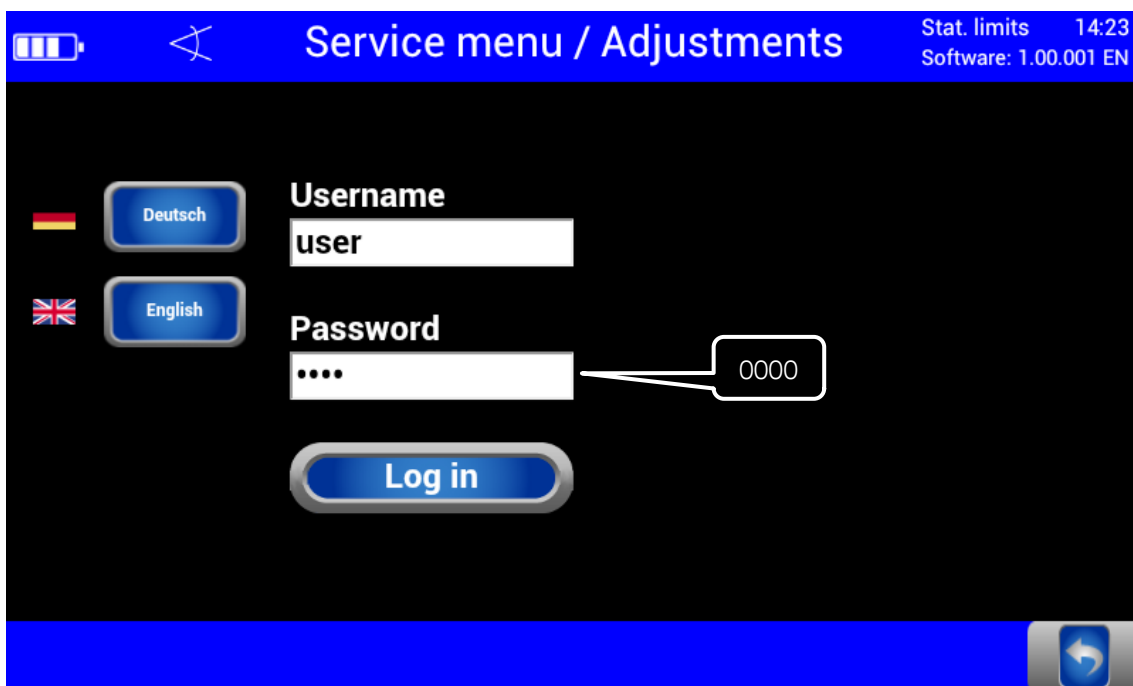
3.4.2 Adjusting

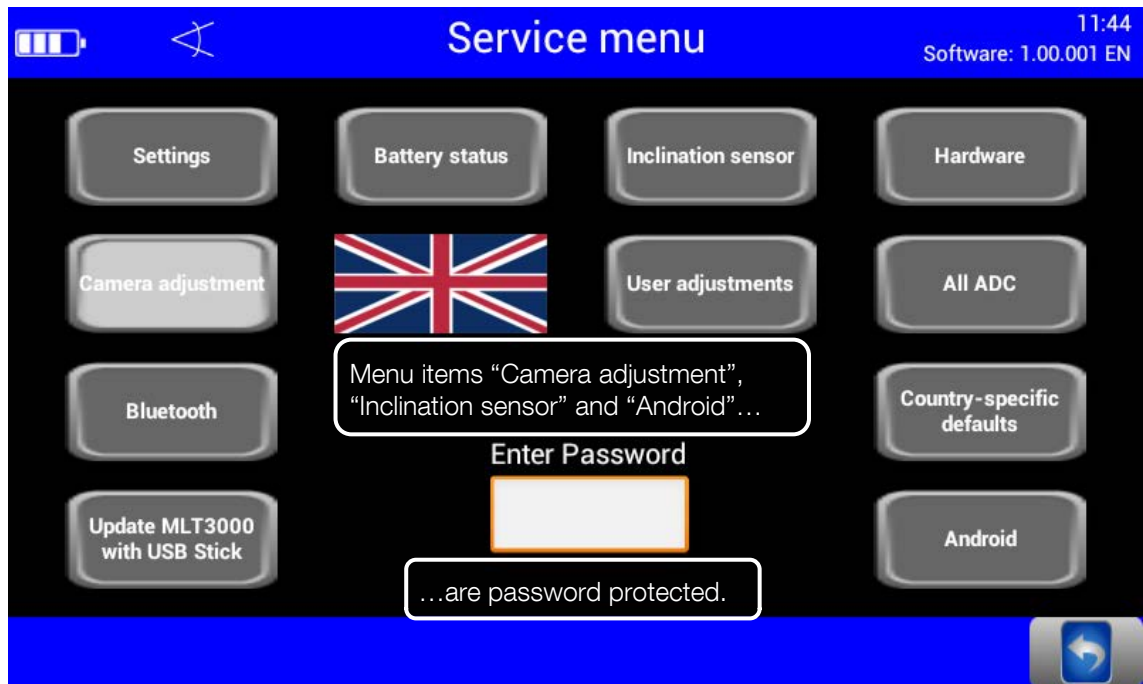


3.5 Settings

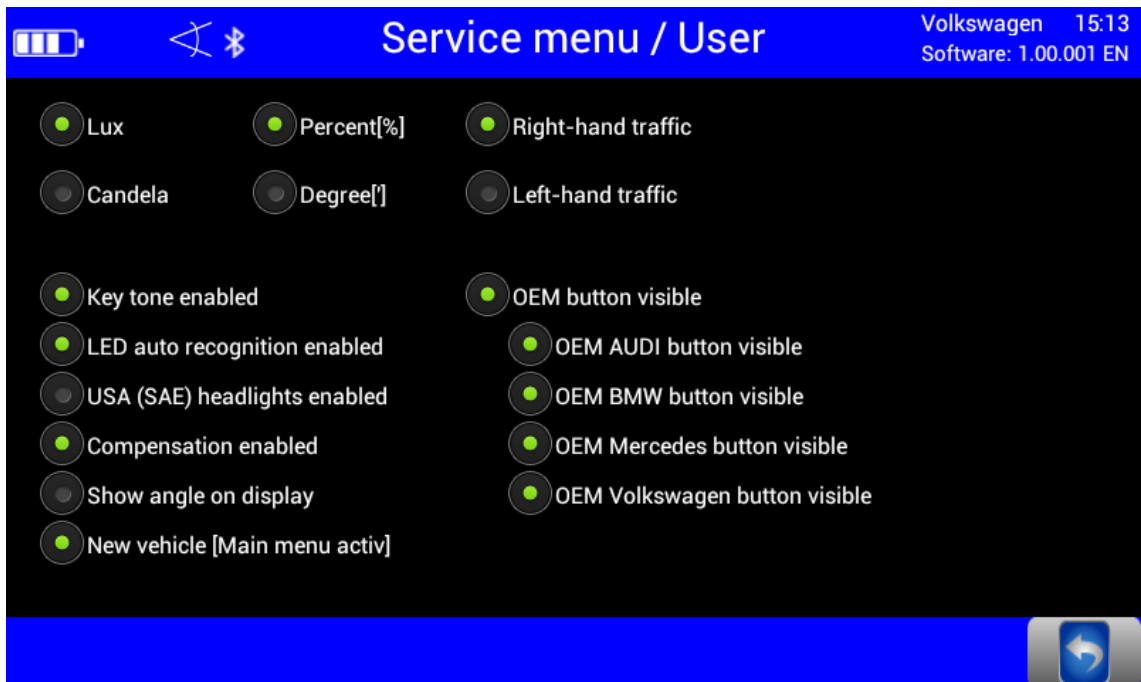
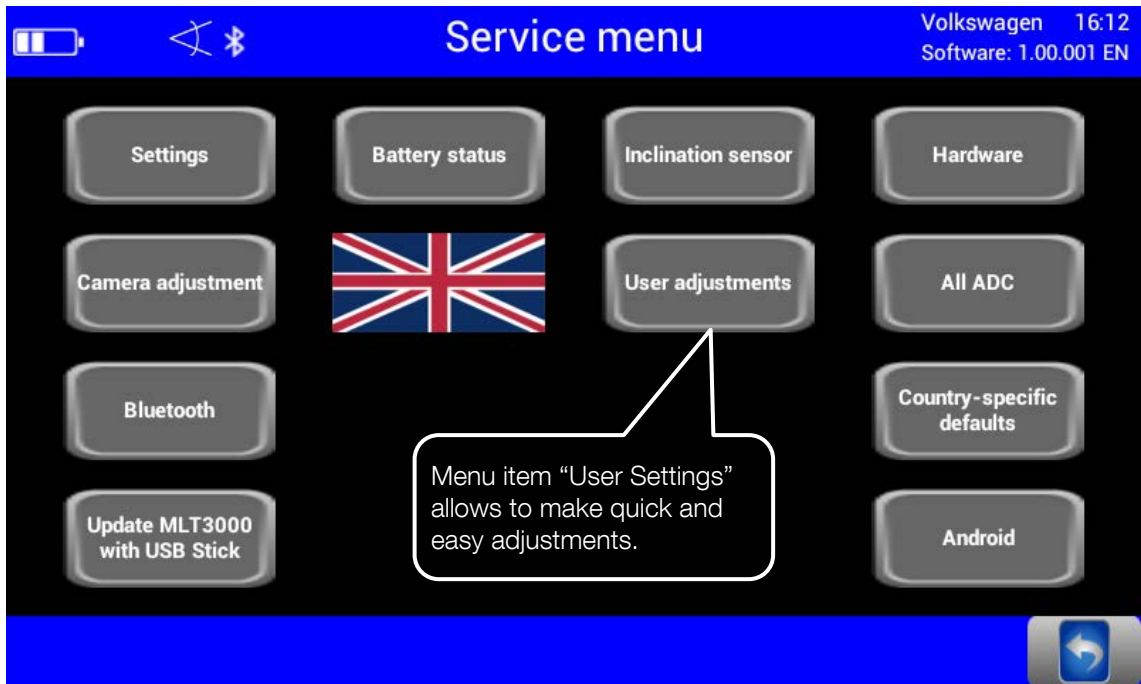
3.5.1 Variables



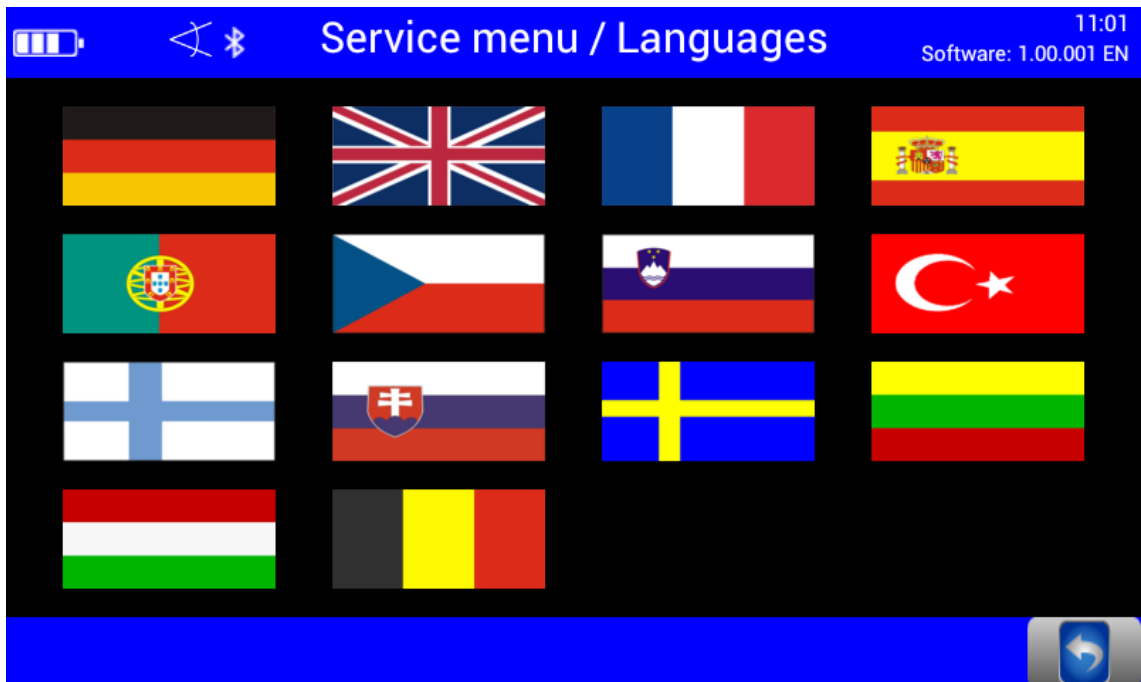
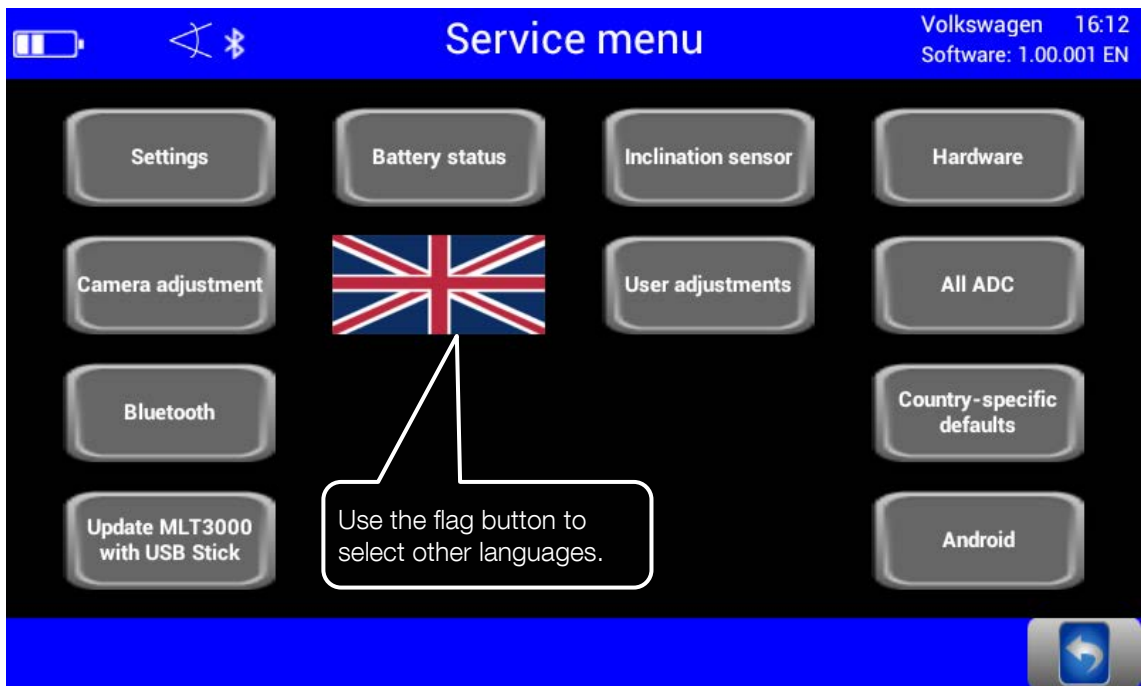




3.5.2 User Settings



3.5.3 Language



3.5.4 List of Variables

No.	User Variables	Default	Min	Max
0.0	Language 0 = German 7 = Turkish 1 = English 8 = Finnish 2 = French 9 = Slovakian 3 = Spanish 10 = Swedish 4 = Portuguese 11 = Lithuanian 5 = Czech 12 = Hungarian 6 = (in preparation) 13 = Flemish	0		
0.1	Manufacturer specifications	0		
0.2	Country specifications	0		
1.0	Test lane number	1	1	10
2.0	Car 0 / HGV 1	0	0	1
3.0	Percentage 0 / Degrees 1	0	0	1
4.0	Lux 0 / Candela 1	0	0	1
5.0	Left-hand traffic (1) / Right-hand traffic 0	0	0	1
6.0	Target value Pitch angle Car	11	0	50
6.1	Target value Pitch angle HGV	30	0	50
7.0	Display illumination in %	85	60	100
8.0	Switch-off time of display in minutes	10	2	1200
9.0	Switch-off time of tester in minutes	120	2	1200
10.0	SAE enabled 1 / disabled 0	0	0	1
11.0	Button RHT-LHT enabled 1 / disabled 0	0	0	1
12.0	Output yaw angle on display	0	0	1
13.0	RS232 protocol 0 = LITE 3 1 = LITE 1.2 2 = LITE 1.2 Gost	0	0	2
13.1	Send measured values after test 0 = Do not send 1 = Send using "Send" button 2 = Send at test completion	0	0	2
13.2	Delete measured values after transfer 0 = disabled 1 = enabled	0	0	2

No.	User Variables	Default	Min	Max
14.0	RS232 Baud rate Debug COM1 2400 baud 4800 baud 115200 baud	115200	2400	115200
14.1	RS232 Baud rate Debug COM2 2400 baud 4800 baud 115200 baud	115200	2400	115200
14.2	RS232 Baud rate Debug COM3 2400 baud 4800 baud 115200 baud	115200	2400	115200
15.0	Software France 0 = disabled 1 = enabled	0		
15.1	OTC-LAN 0 = disabled 1 = enabled	0		
15.2	Adjustment button France 0 = disabled 1 = enabled	0		
16.0	Beeper 0 = Beep at button-touch disabled 1 = Beep at button-touch enabled	1		
17.0	Automatic LED detection 0 = disabled 1 = enabled	1		
1000	Initialise default values of variables -1 = Load default values	42330		

3.6 Interfaces and Software Updates

Software updates are normally performed using a USB stick. Procedure:

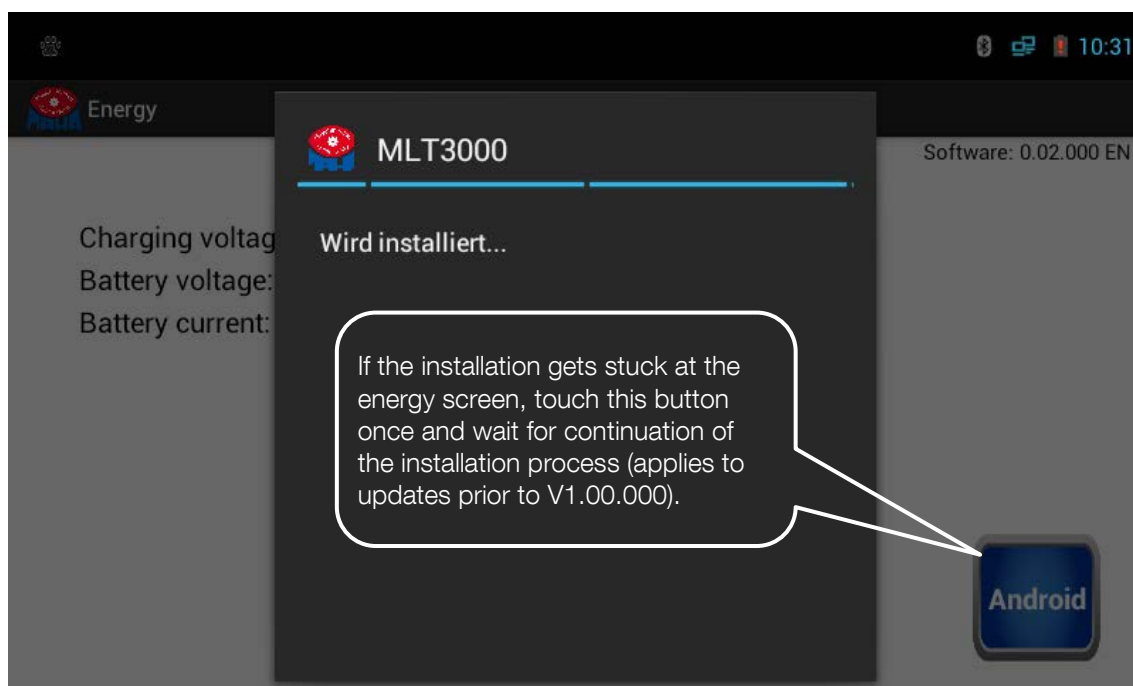
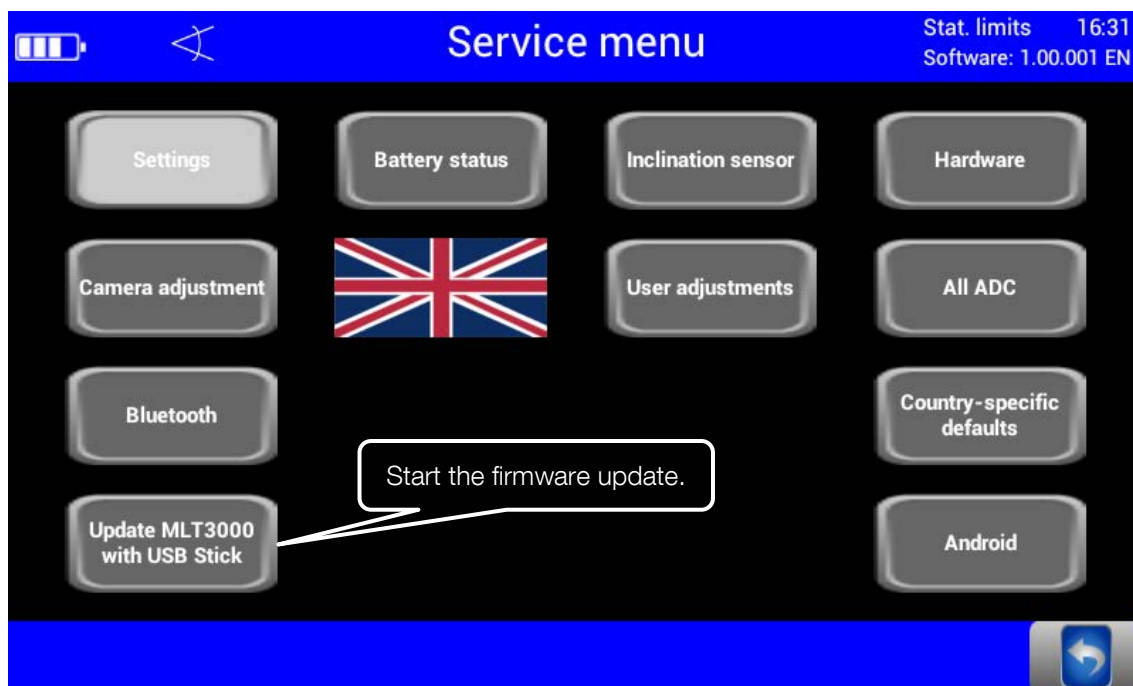
- Connect the USB stick containing the software update to the USB connector outside at the casing (see lower image).

IMPORTANT!

Note the file structure on the USB stick: MAHA\MLT3000\UPLOAD

The current firmware version can be downloaded from the MAHA homepage. In this case, the correct file structure is already preset and can be directly copied to a data carrier.





The following interfaces are also available:

- RS232 as cable connection (round connector, see section on 'Charging the Battery').
- Wireless connection via Bluetooth. For the Bluetooth connection, a USB stick needs to be installed on the PC. A suitable USB adapter is available from MAHA as an option. A connection to the MAHA software EUROSISTEM can be established via this interfaces.

3.7 EUROSYSYSTEM v7.50

After the connection has been established, the yellow indicator lamp is ON.



Set variables using System / Settings / Section, Lanes, External Devices.

- Variable 25: 1
 - Variable 26: COM port
- Reboot EUROSYSTEM.

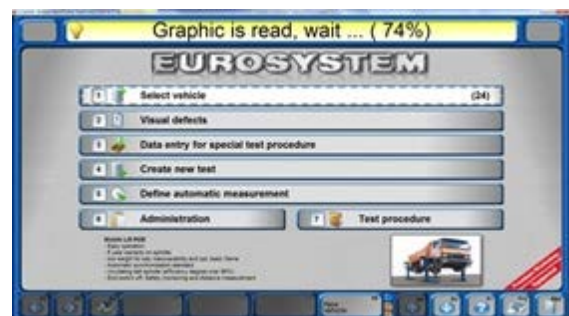


Test devices are connected automatically.



After the measurement has been started, all measured values are transferred to EUROSYSTEM.

The connection to the MLT 3000 is retained until EUROSYSTEM is quit.



Select menu item <Display measurement values>.

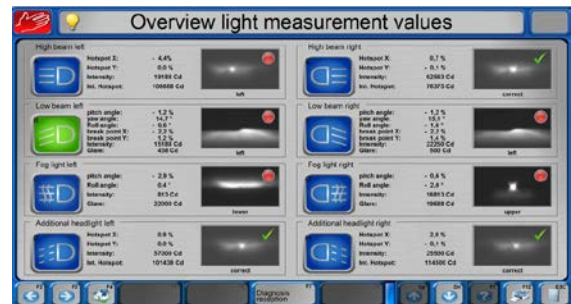


Select menu item <Light tester>.

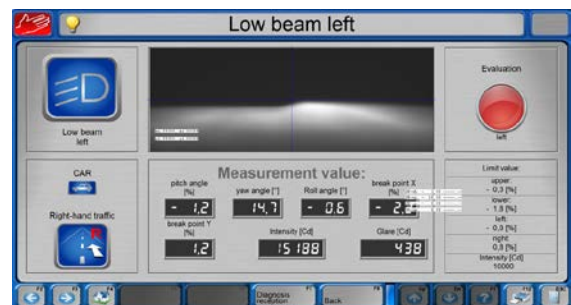


An overview of the measured values appears.

Select the desired measurement. In this example: second level with dynamic high-beam and motorway light.

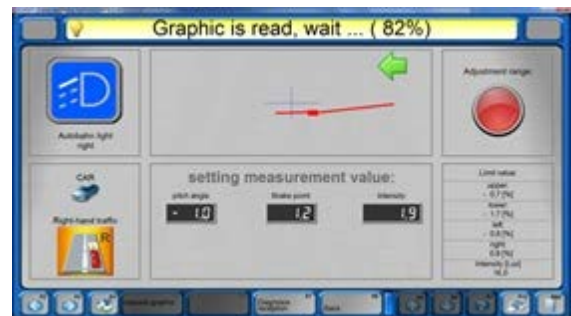


The selected measurement data is displayed in detail.



Graphic representation of headlight adjustment in EUROSYSYSTEM:

Use the camera button on the MLT 3000 display to switch over to headlight adjustment. EUROSYSYSTEM shows the coordinates, the measured values and the headlight image in real time.



The headlight pattern graphics can be updated manually using the <F6> button.



The image transmission can be completely disabled via soft DIP.



4 Energy Management and Troubleshooting

4.1 Charging the Battery

The plug of the charger is inserted into the round (Neutrik) connector on the underside of the housing (see image).

Please note: The moving bar in the upper display line of the battery display shows that battery charge is in progress, but it does not indicate the battery's state of charge.



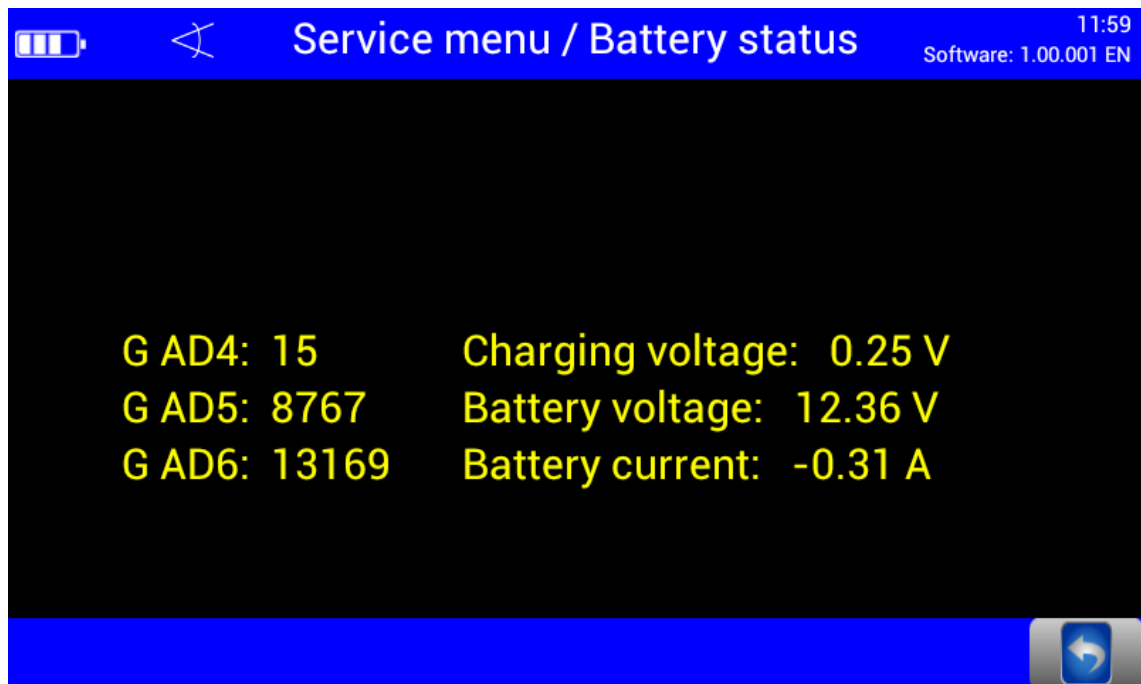
4.2 Battery Status and Energy Saving Functions

The battery has a capacity of 7500mAh and can provide roughly 10 hours of continuous operation at an optimum environmental temperature of 20°C.

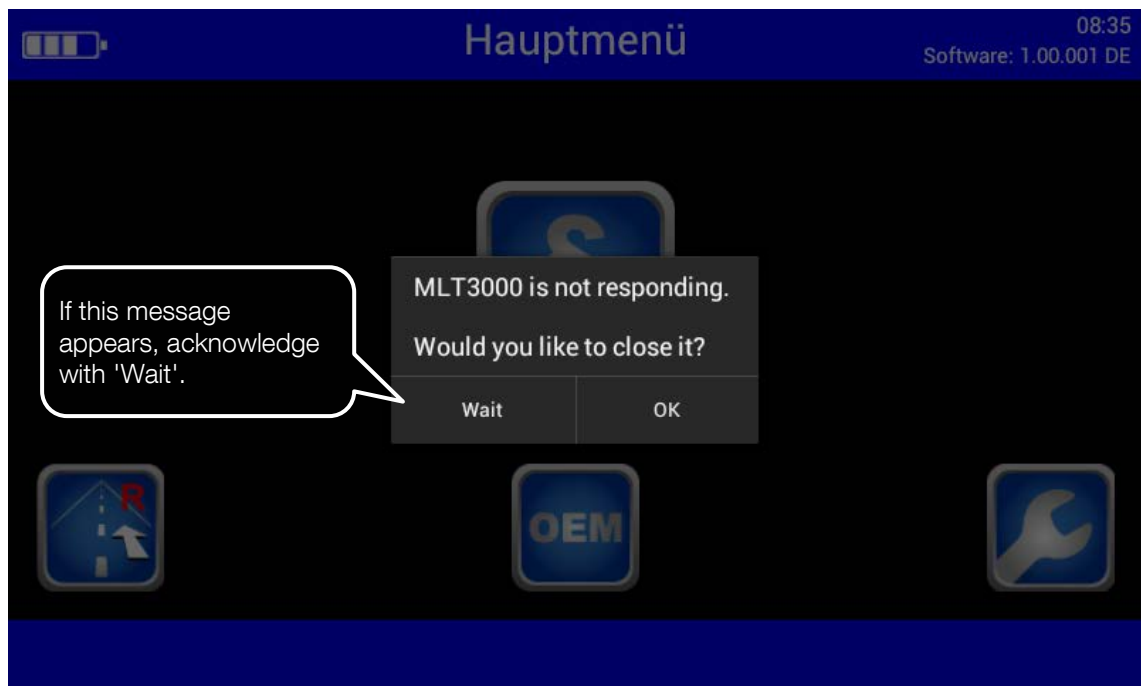
Full battery capacity is achieved when a battery voltage of roughly 14.00V is shown while the battery is being charged. To protect the battery from deep discharge, the unit switches off beyond 10.8V battery voltage.

The display switches off after 10 minutes of no activity. The unit is ready for operation again as soon as the touch screen is touched.

After 120 minutes of no activity, the unit switches off completely and then needs to be switched back on manually. The standard settings can be customised in the user variables.



4.3 Troubleshooting



4.4 Care Instructions

- Periodically clean the equipment and treat it with a care product.
- Usage of caustic cleaning agents or high pressure and steam jet cleaners may lead to equipment damage.



Regular care and maintenance is the key condition for functionality and long life expectancy of the equipment!

4.5 Spare Parts

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

5 Disposal

If you want to dispose of the equipment, please contact your MAHA dealer or the following address, indicating equipment type, date of purchase and serial number:

MAHA Maschinenbau Haldenwang GmbH & Co. KG
Hoyen 20
87490 Haldenwang
Germany

Phone: +49 (0) 8374 585 0
Fax: +49 (0) 8374 585 500
Email: altgeraete@maha.de

Alternatively, you may take the equipment to a specialised waste management plant to ensure that all components and operating liquids are properly disposed of.

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: MLT 3000 / SEP Comfort
Designation: Headlight Tester
Directives: 2014/30/EU; 2014/35/EU
Standards: DIN EN ISO 12100:2010; DIN EN 60204-1;
DIN EN 61000-6-3, DIN EN 61000-6-4

7 Company Information

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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.

Document

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