MLT 3000

Headlight Tester

Original Operating Instructions

BA380701-en

BA380701-en
2025-02-24

Manufacturer

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

Phone: +49 8374 585-0
Fax: +49 8374 585-590
Mail: maha@maha.de
Web: www.maha.de

Service

MAHA SERVICE CENTER
Maybachstraße 8
87437 Kempten
Germany

Phone: +49 8374 585-100
Fax: +49 8374 585-491
Mail: service@maha.de
Web: www.mahaservicecenter.de

Dear Customer,

MAHA is one of the world's leading manufacturers of testing and lifting technology and places particular emphasis on quality and performance. The company's concept includes the development, manufacture and sale of products for use in automotive workshops, by vehicle manufacturers and testing organisations.

MAHA's claim is to also be a leader in the areas of reliability, safety and sustainability – this can be seen in many details that have been developed with these aspects in mind.

We are convinced that you will be more than satisfied with the quality and performance of our products for many years. With the purchase of our products you will also receive professional assistance in case of need for service and repair.

Please remember to keep these operating instructions in a safe place. Accurately following their contents will significantly extend the life of your product and also increase its resale value. If you sell your product, please also pass on the operating instructions.

MAHA is constantly working on the further development of all products and therefore reserves the right to make changes, e.g. in shape and appearance, without prior notice.

Extensive accessories, useful assembly material and auxiliary materials are available for our products. For further information, please ask your dealer or your MAHA contact person at any time.

Thank you for choosing a MAHA product!

Contents

1 Safety 5
1.1 Introduction 5
1.2 Symbols and Signal Words 5
1.2.1 Personal Injury 5
1.2.2 Property Damage 5
1.2.3 Information 5
1.3 Intended Use 6
1.4 Requirements on Operating and Service Personnel 6
1.5 Safety Instructions 6
2 Description 7
2.1 Requirements for the Place of Installation 7
2.2 Technical Data 7
2.3 Design 8
2.4 Electronic Levelling 9
2.4.1 Compensation Coordinate Axes 9
2.4.2 Angle Symbols 10
2.5 Definition of Technical Terms 11
2.5.1 Pitch Angle 11
2.5.2 Low Beam 11
2.5.3 High Beam 12
3 Operation 13
3.1 Switching On / Off 13
3.2 Aligning 14
3.2.1 Laser Alignment Unit (Option) 14
3.2.2 LED Adjustment Aid (Option) 15
3.3 Light Selection Buttons 16
3.3.1 Headlight Test according to § 29 StVZO (Germany) 16
3.3.2 Showing the Button Labels 17
3.3.3 Adjusting the Pitch Angle 17
3.3.4 Choosing the Vehicle Class 18
3.3.5 Browsing back through the Test Screens 18
3.3.6 Choosing between Left-Hand or Right Hand Traffic 19
3.3.7 Manufacturer-Specific Test Instructions (OEM) 19
3.3.8 Navigating through the Test Levels 21
3.4 Testing the Headlights 22
3.4.1 Test Phase Indication via Light Buttons 22
3.4.2 Measuring 22
3.4.3 Light Selection Buttons Disabled 23
3.4.4 Adjusting: Setting the Headlights in Real Time 24
3.4.5 Saving the Measurement Values to PDF 25
3.5 Settings 27
3.5.1 Variables 27
3.5.2 User Settings 29

3.5.3 Language 30
3.5.4 Calibrating the Camera according to Directive 31
3.5.5 Country Specifications 33
3.5.6 Settings with Password 34
3.5.7 List of Variables (Extract) 34
3.6 Software Update 35
3.7 EUROSYSTEM 38
4 Energy Management and Troubleshooting 44
4.1 Charging the Battery 44
4.2 Battery Status 45
4.2.1 Battery Life 45
4.2.2 Energy Saving Function 45
4.2.3 Protection against Deep Discharge 45
4.2.4 Protection against Mechanical Damage 45
4.2.5 Data Recording for Error Analysis 46
4.3 Troubleshooting 47
5 Maintenance 48
5.1 Care Instructions 48
5.2 Spare Parts 48
6 Disposal 48
7 Declaration of Conformity 48

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 and Signal Words

1.2.1 Personal Injury

DANGER

indicates an immediate hazard which, if not avoided, will result in death or severe personal injury.

WARNING

indicates a potential hazard which, if not avoided, could result in death or severe personal injury.

CAUTION

indicates a potential hazard which, if not avoided, could result in moderate or minor personal injury.

1.2.2 Property Damage

NOTICE

indicates a potentially harmful situation which, if not avoided, could result in damage to the equipment or surrounding objects.

1.2.3 Information

indicates important information notes.

1.3 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.

1.4 Requirements on Operating and Service Personnel

WARNING

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

- be at least 18 years old,
- be mentally and physically suited for these activities,
- be demonstrably trained and instructed in writing,
- have read and understood the operating instructions, especially the instructions what to do in the event of defects or malfunctions,
- be on record as having been instructed in safety guidelines,
- have practical experience in working with vehicle lifts and the hazards inherent in such equipment.

1.5 Safety Instructions

NOTICE

- 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.

CAUTION

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

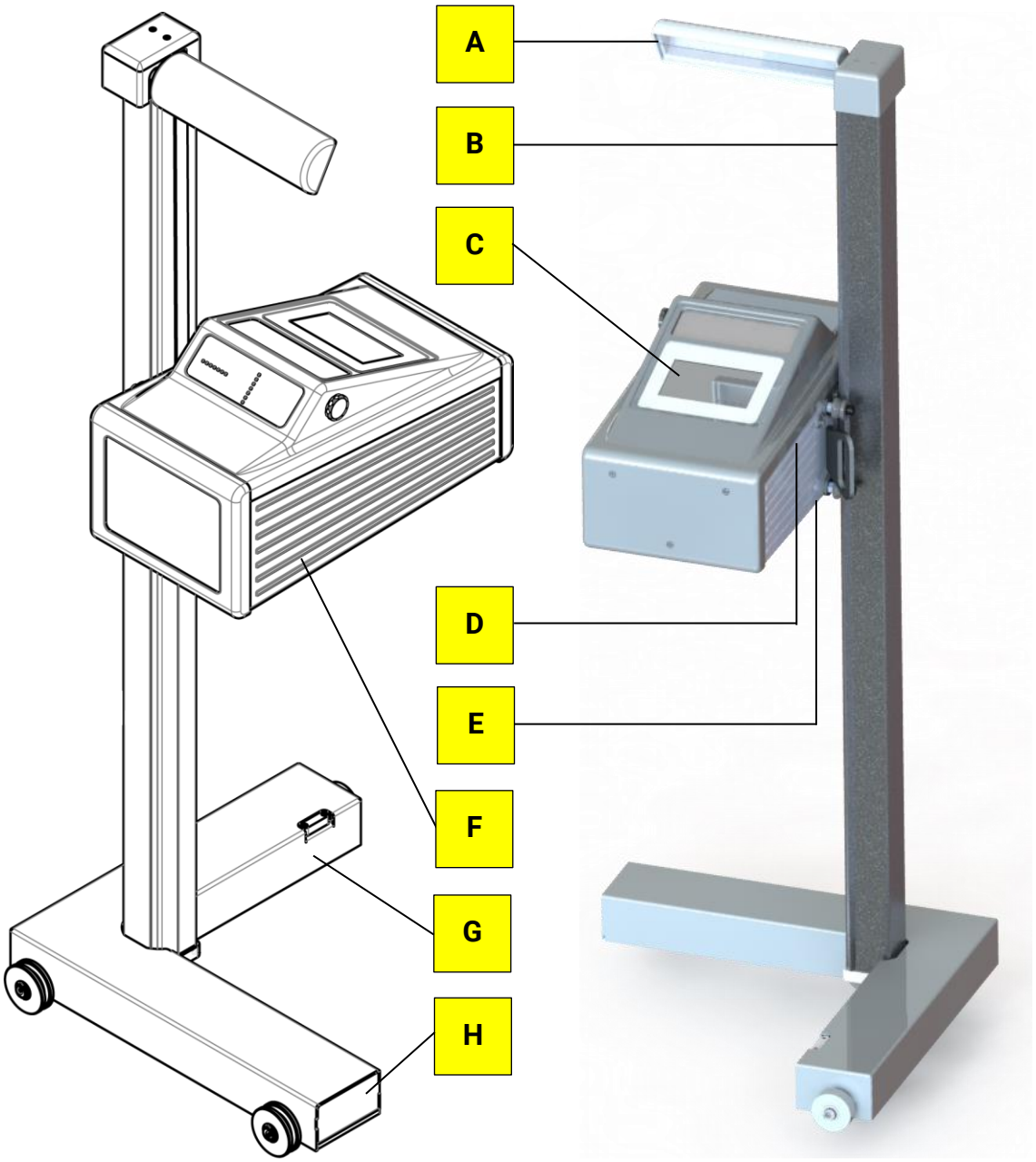
2.1 Requirements for the Place of Installation

Please observe your national directives and specifications.

2.2 Technical Data

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		standard	240…1500 mm
		flat foot	220…1500 mm
Deviation of intensity			±5 %
Deviation from one axle			±5'
Compensation of ground unevenness			±3 %
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
Type approval number			TPN100110935

2.3 Design



A	Mirror, with optional laser alignment unit	**E**	Charging socket
B	Column	**F**	Casing, with adjusting handle
C	Display	**G**	Carriage, with spirit level
D	USB port	**H**	Battery compartment

2.4 Electronic Levelling

This headlight tester comes standard with an electronic position sensor which determines the inclination angle of the device. The software compensates possible deviations in the X- and Z-axes while calculating the position of the headlights.

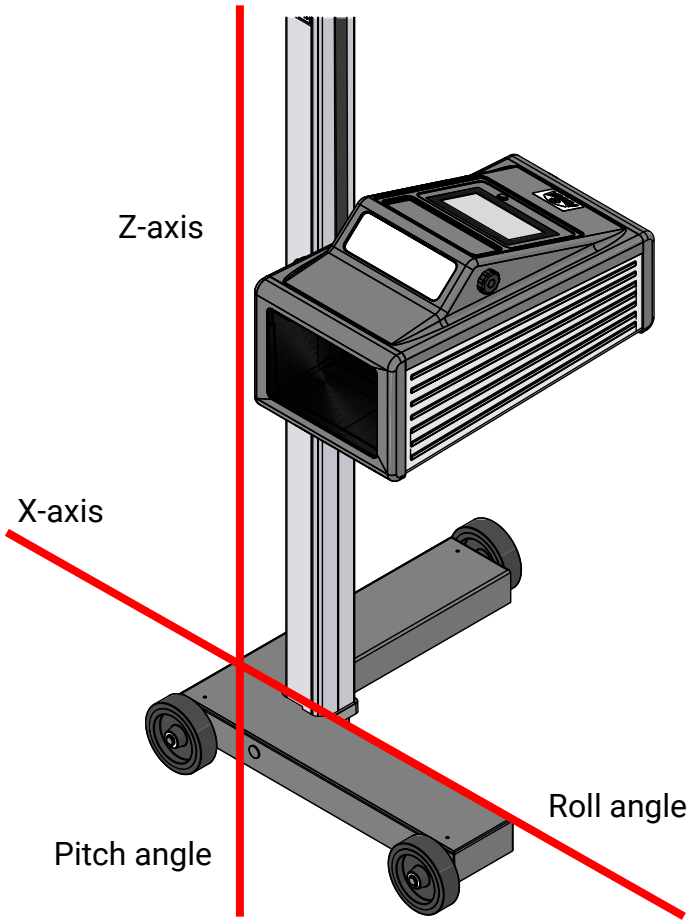
The headlight tester may be set up on uneven surfaces even if the ground unevenness is outside the permissible tolerances, provided that the maximum unevenness does not exceed the headlight tester's self-levelling capacity of 3%.

After enabling the respective function, the compensation values can be checked using a dot or cross hair laser. See section "Operation > Settings > Calibrating the Camera according to Directive".

NOTICE

This function must be enabled exclusively by authorised service technicians and is applicable for the respective test surface only.

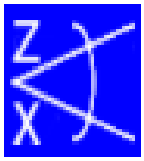
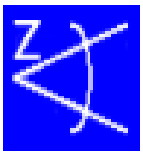
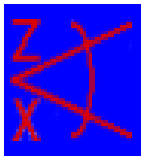
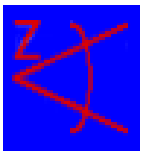
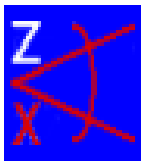
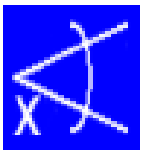
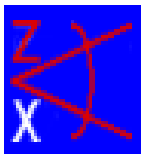
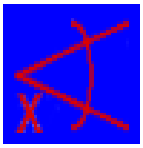
2.4.1 Compensation Coordinate Axes



2.4.2 Angle Symbols

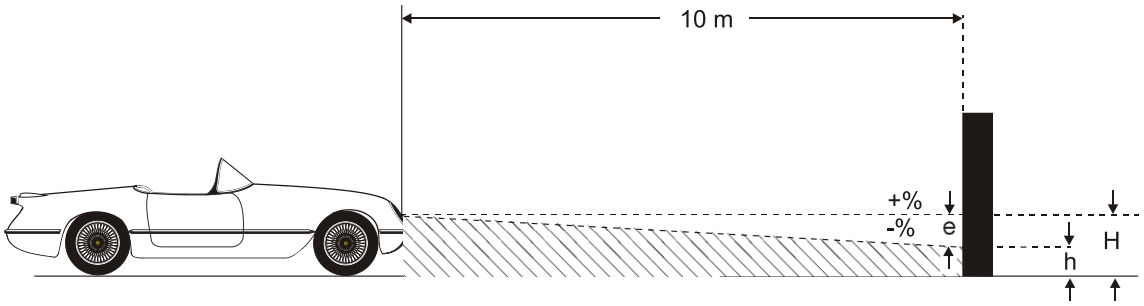
Once the adjustment of the inclination sensor has been completed, an angle symbol appears in the info bar to indicate the adjusted/active inclination axes.

Overview of symbols:

	Both axes adjusted/active, headlight tester ready for operation	Z-axis active, headlight tester ready for operation	
	Both axes active, inclination of Z- and X-axis too large, no measurement possible	Z-axis active, inclination too large, no measurement possible	
	Both axes active, inclination of X-axis too large, no measurement possible	X-axis active, headlight tester ready for operation	
	Both axes active, inclination of Z-axis too large, no measurement possible	X-axis active, inclination too large, no measurement possible	

2.5 Definition of Technical Terms

2.5.1 Pitch Angle

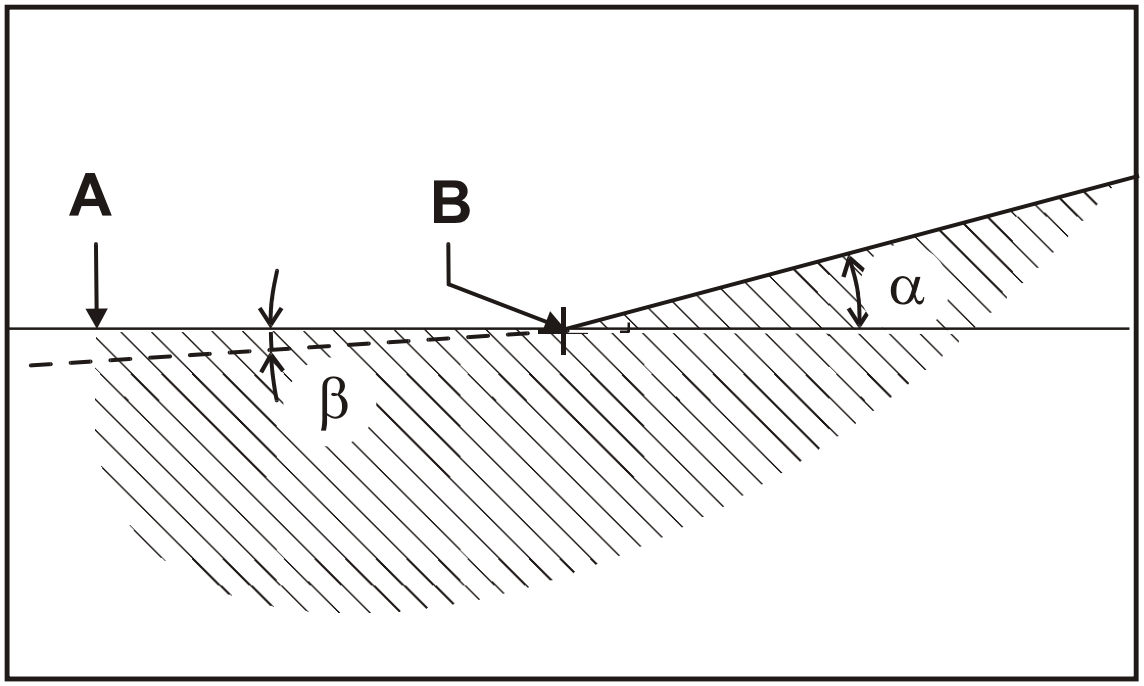


Angle of inclination of light-dark limit against the test surface.

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

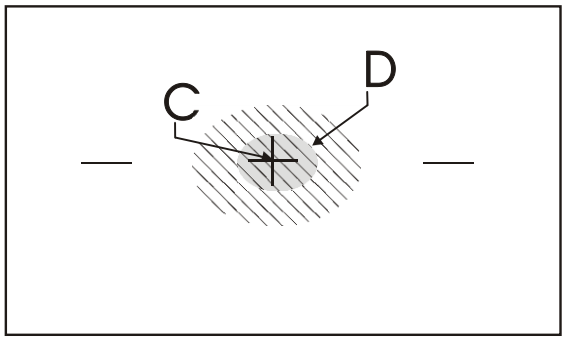
$$\frac{H-h}{1000} \text{ X } 100$$

2.5.2 Low Beam



A	**Light-dark limit** Boundary for light distribution between ‘top dark’ and ‘bottom light’ for low-beam lights.
B	**Inflection point** 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.
α	**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.
β	**Rolling angle** Angle between the left component of the light-dark limit and the horizontal, usually 0°.

2.5.3 High Beam



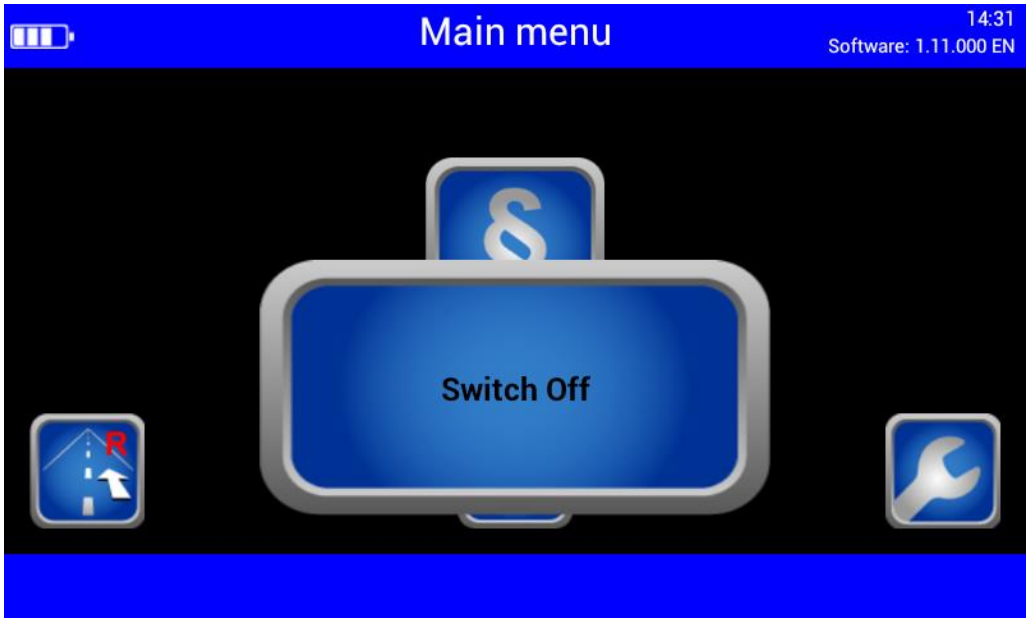
C	**Central mark** From the central mark, the deviation of hot-spot is specified in X and Y directions.
D	**Hot spot** Center of light beam for high-beam. The deviation of hot spot from central mark is expressed in %.10 meters is used as the reference dimension.

3 Operation

3.1 Switching On / Off

The headlight tester is operated via touchscreen buttons. The resistive touch-screen reacts to pressure and can also be operated while wearing work gloves.

The On/Off button is on the right-hand side underneath the touchscreen.



Press to confirm Switch Off.

3.2 Aligning

When using guide rails, position the device centrally in front of the vehicle.

Without guide rails, the device must be adjusted in front of each headlight. Please observe your national guidelines and specifications.

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.

3.2.1 Laser Alignment Unit (Option)

The optional unit 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.

Observe manufacturer's instructions according to workshop manual.

CAUTION

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.

The AA Mignon batteries powering the laser are located in the alignment unit and can be easily replaced.

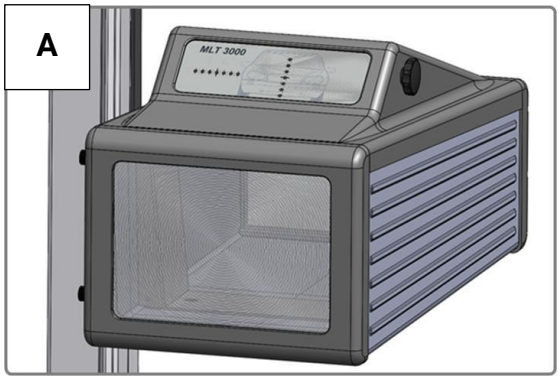
3.2.2 LED Adjustment Aid (Option)

This optional unit is integrated into the window housing (A) above the Fresnel lens. The colour LEDs (B) pointing toward the vehicle indicate the direction of adjustment.

Green LED = Optimum setting
(corresponds to green rating in the display centre)

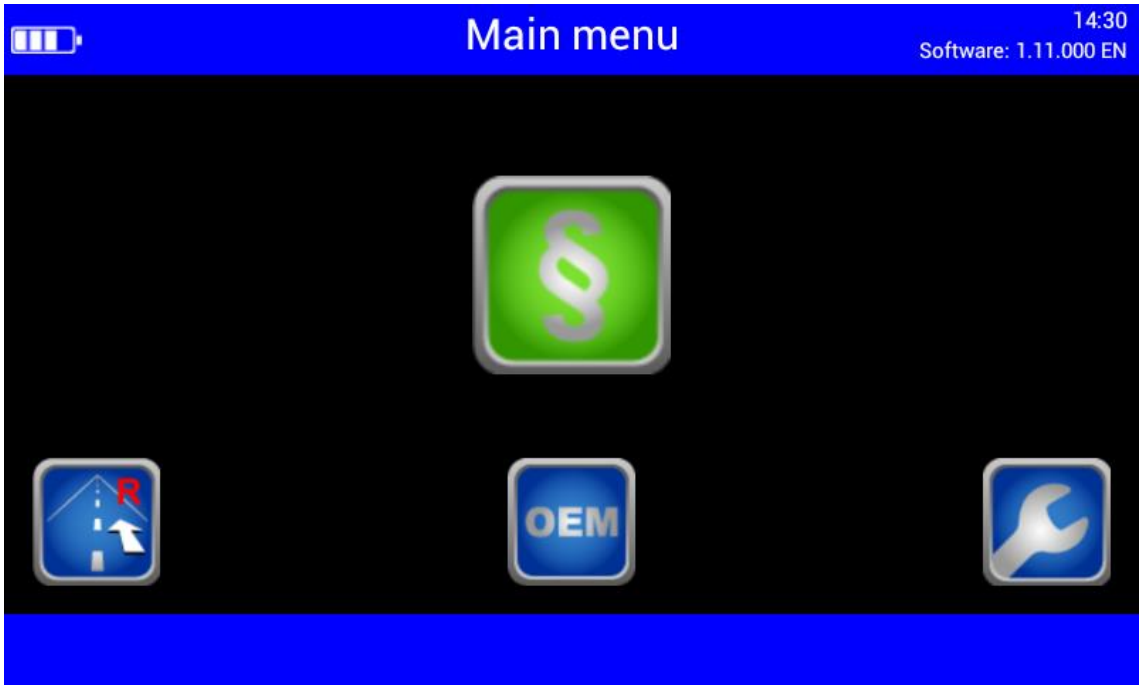
Yellow LED = Minor deviation within tolerance range
(corresponds to yellow direction arrows on the display)

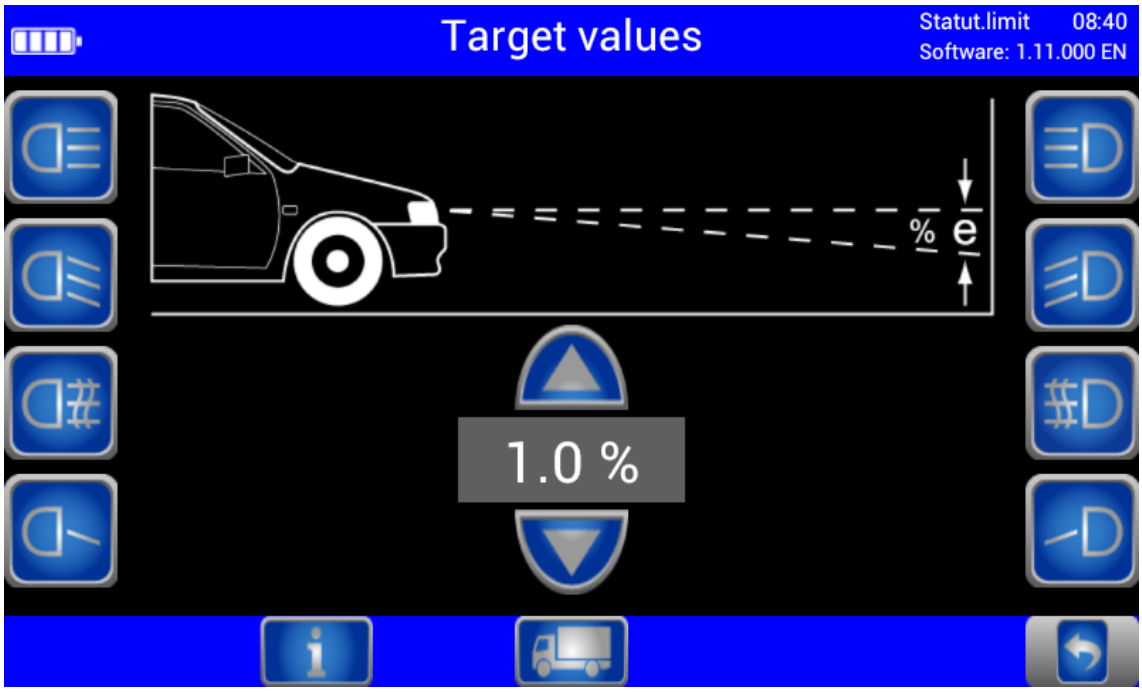
Red LED = Outside tolerance
(corresponds to red direction arrows on the display)



3.3 Light Selection Buttons

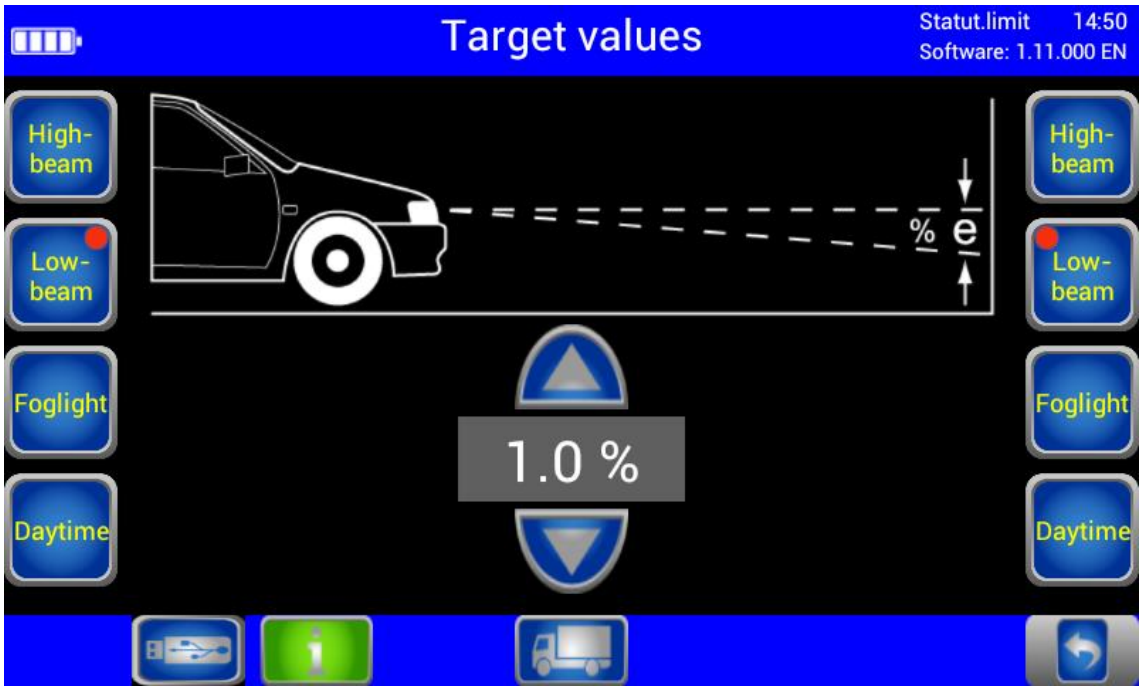
3.3.1 Headlight Test according to § 29 StVZO (Germany)





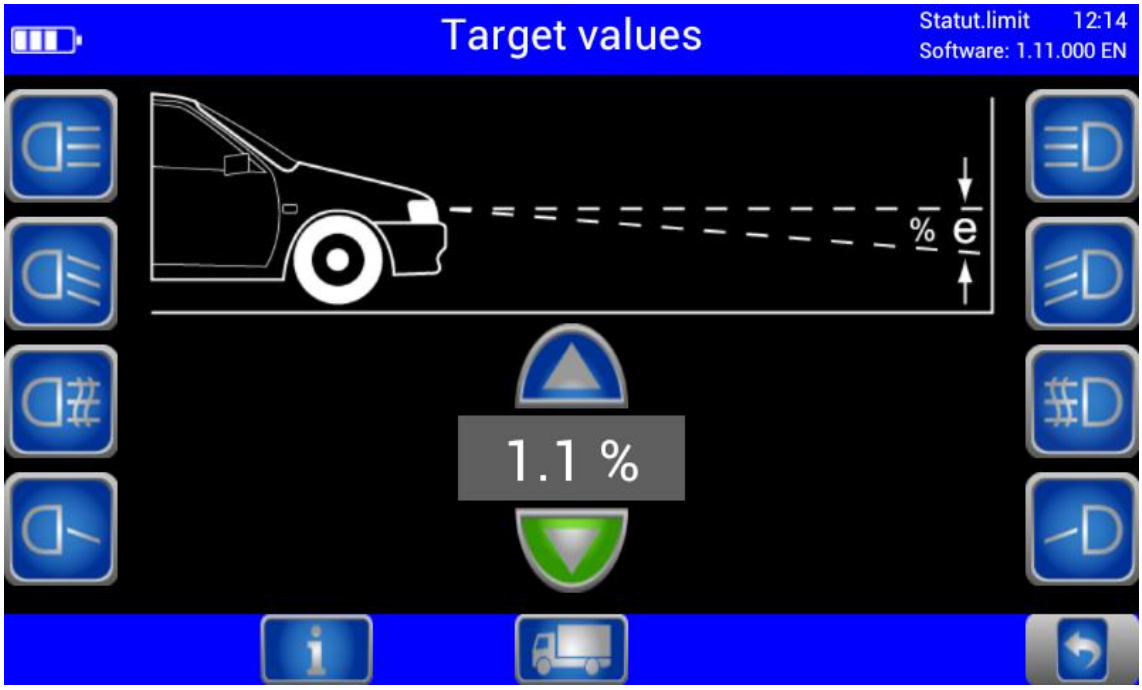
Headlight test according to § 29 StVZO (Germany).
Use the OEM button for manufacturer-specific test instructions.

3.3.2 Showing the Button Labels



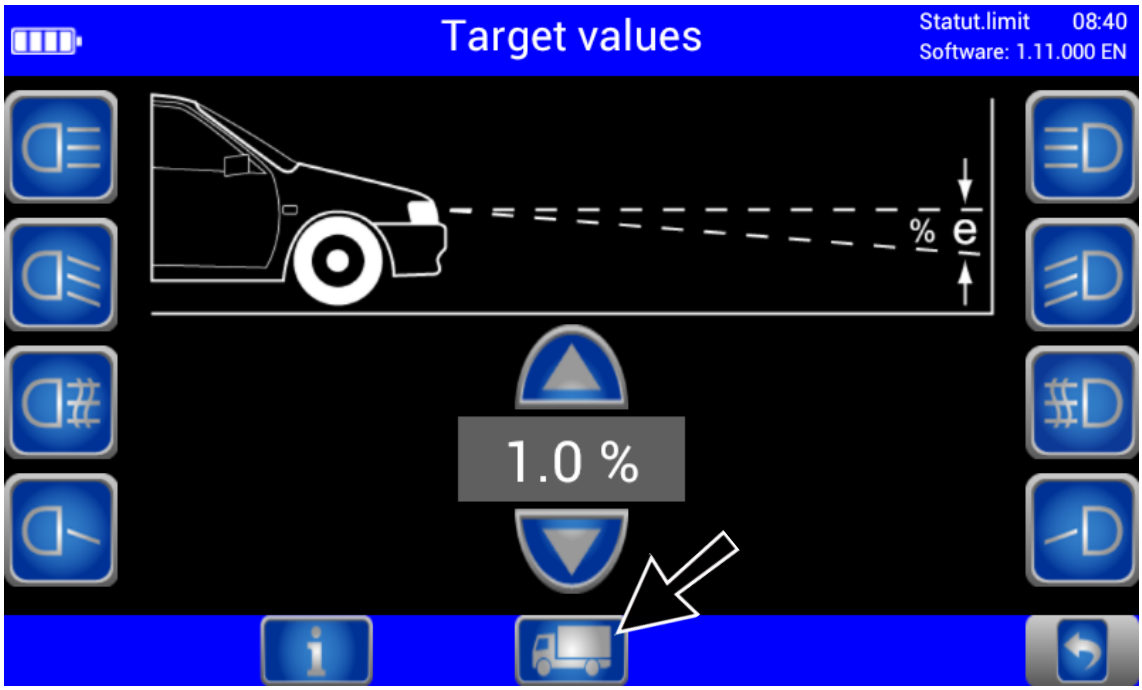
When the Info button is activated, the button labels are shown instead of the symbols.

3.3.3 Adjusting the Pitch Angle



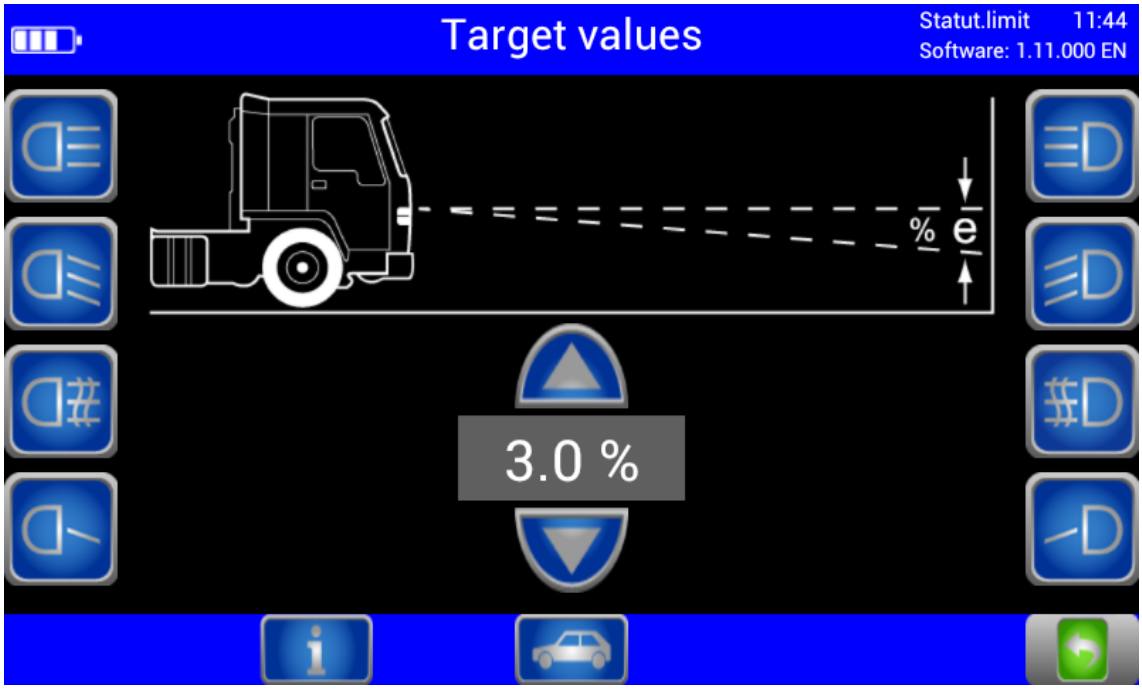
The pitch angle can be increased or reduced using the Arrow buttons.

3.3.4 Choosing the Vehicle Class



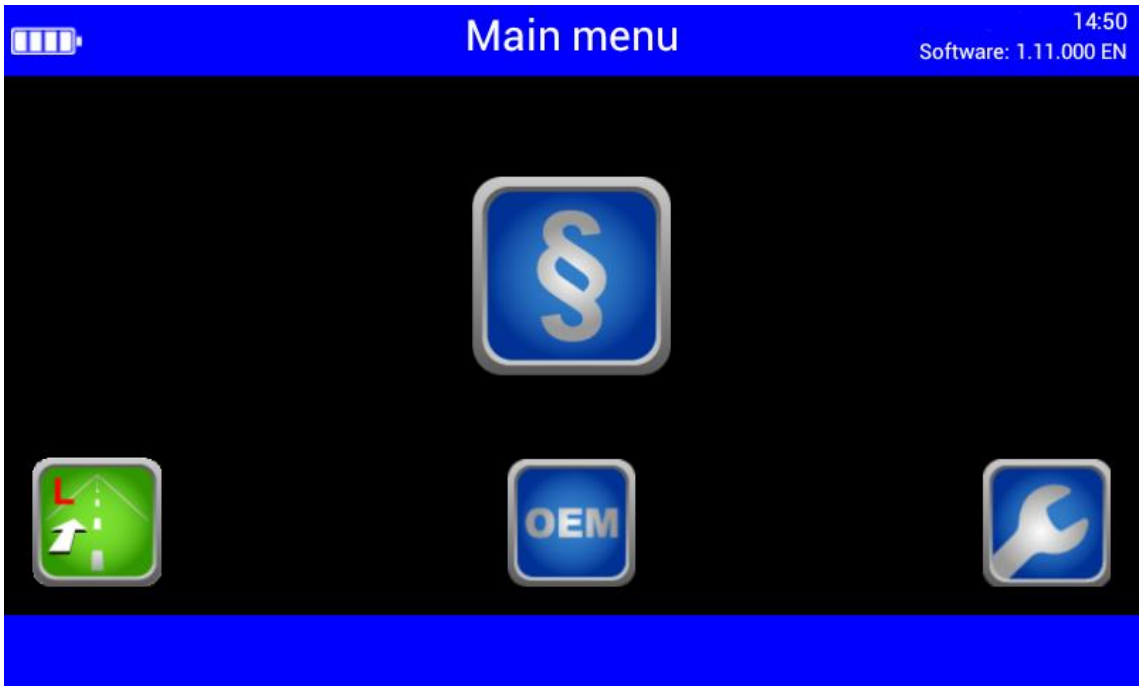
The Truck/Car button activates the appropriate settings for the respective vehicle class.

3.3.5 Browsing back through the Test Screens



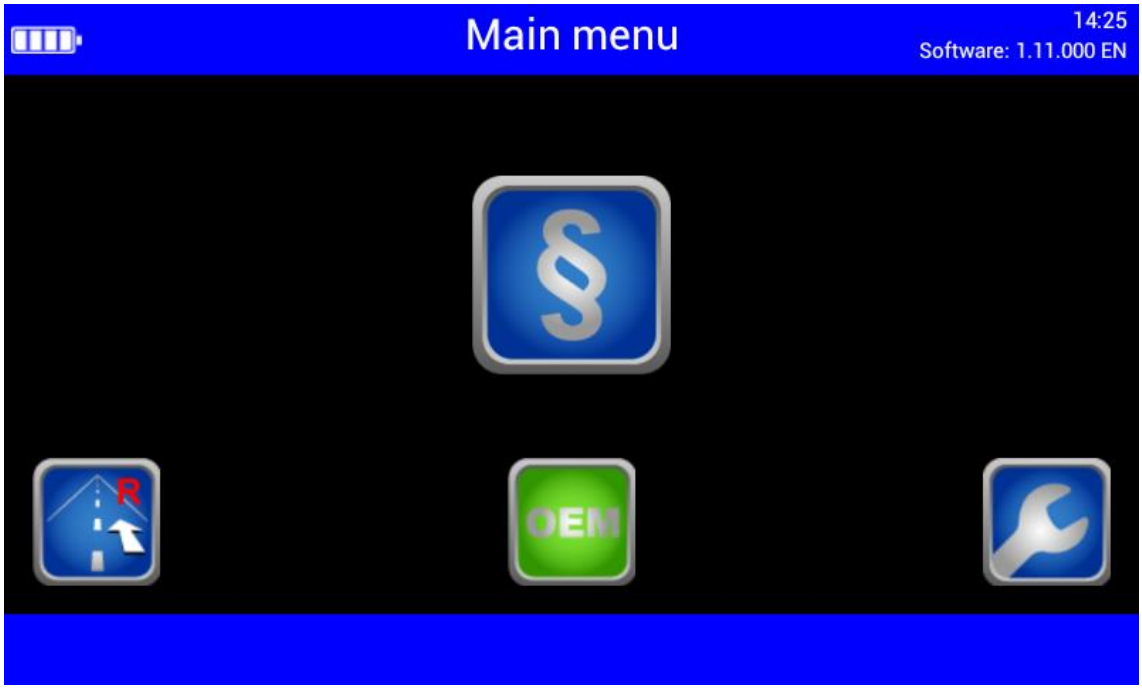
Use the Back Arrow button to browse back through the test screens one by one.

3.3.6 Choosing between Left-Hand or Right Hand Traffic

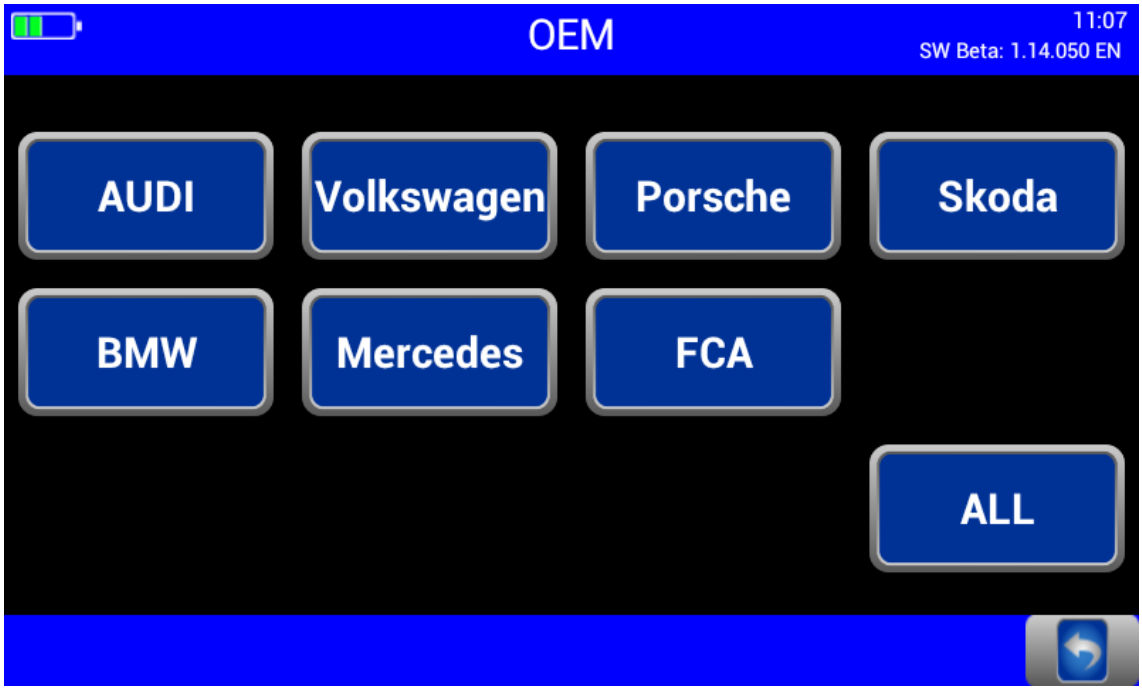


Left-hand/Right-hand traffic can be changed under “User Settings”. Right-hand traffic is preset by default.

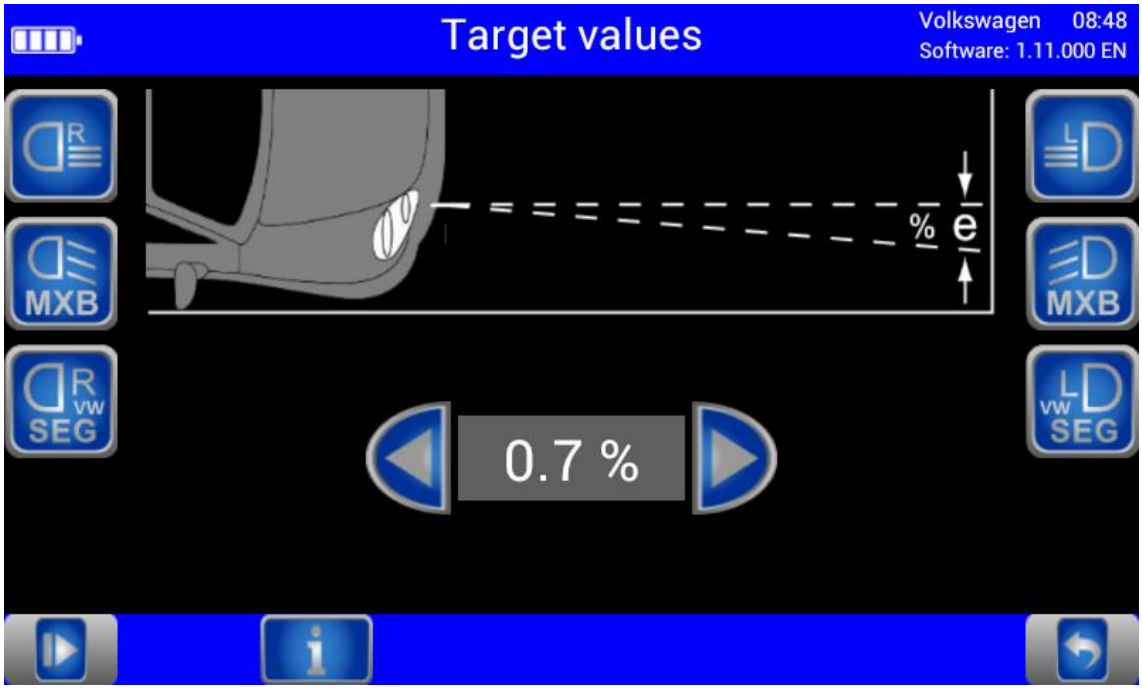
3.3.7 Manufacturer-Specific Test Instructions (OEM)



OEM area! Perform the test according to manufacturer’s instructions.

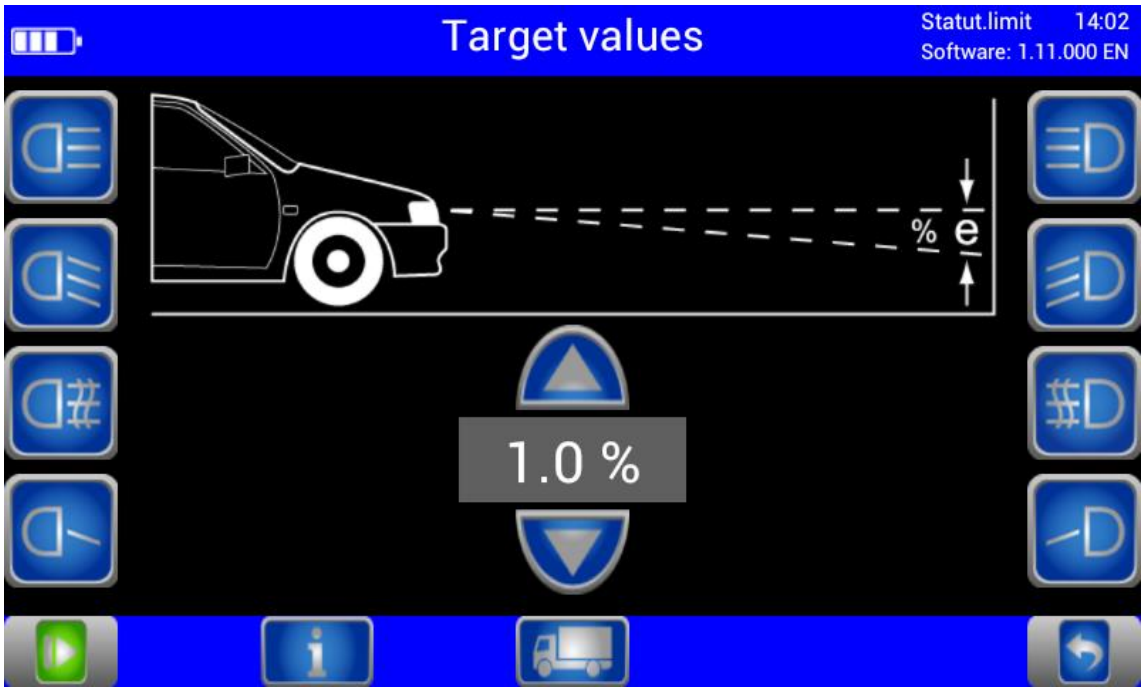


Button “ALL“ makes several test levels available.



Example: testing Volkswagen matrix headlights
OEM area! Perform the test according to manufacturer’s instructions.

3.3.8 Navigating through the Test Levels



Use the Play button to open the activated test levels one by one.

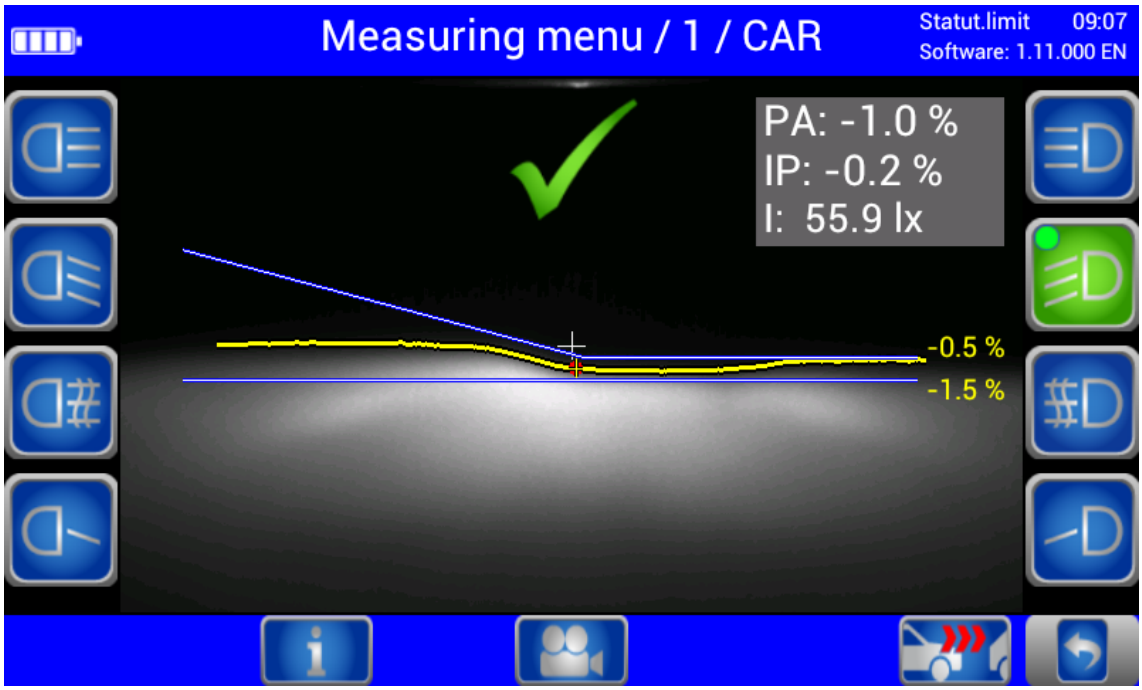
3.4 Testing the Headlights

3.4.1 Test Phase Indication via Light Buttons

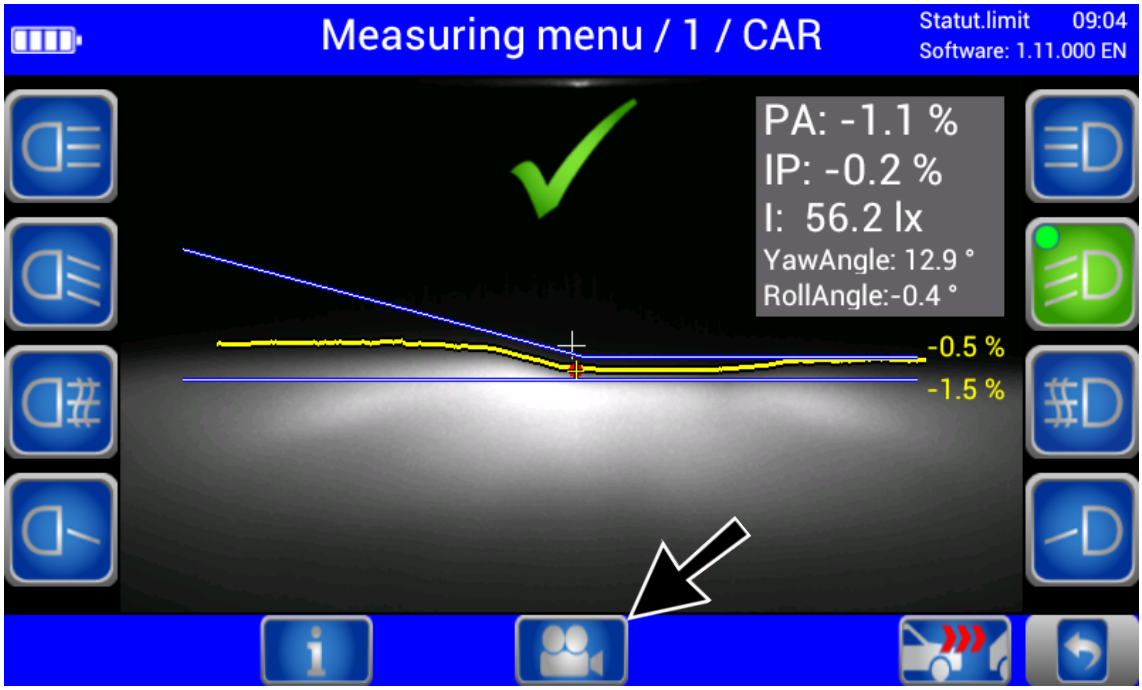
Green dot = Headlight tested, measurement OK
Red dot = Headlight tested, not OK
Grey dot = Headlight without evaluation

Adjusting direction:
Yellow arrow = Minor deviation within tolerance range
Red arrow = Outside tolerance

3.4.2 Measuring



Rating in centre = Headlight within tolerance range

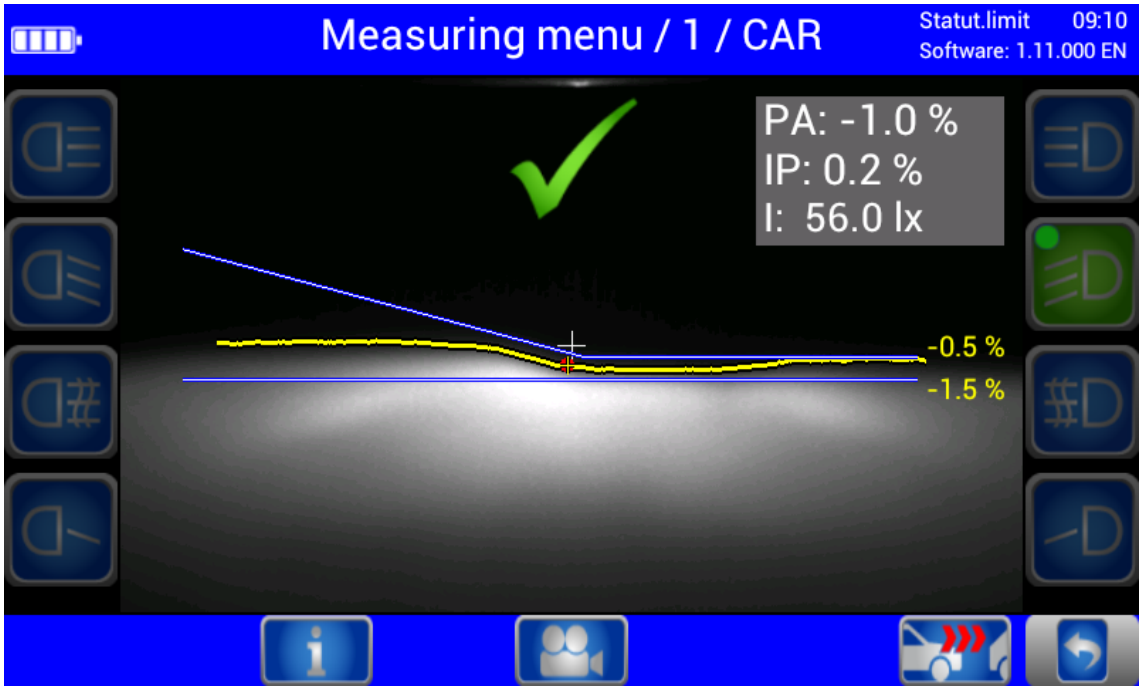


PA = Pitch Angle; IP = Inflection Point; I = Intensity

Yaw and Rolling angles can be additionally activated under “User Settings”.

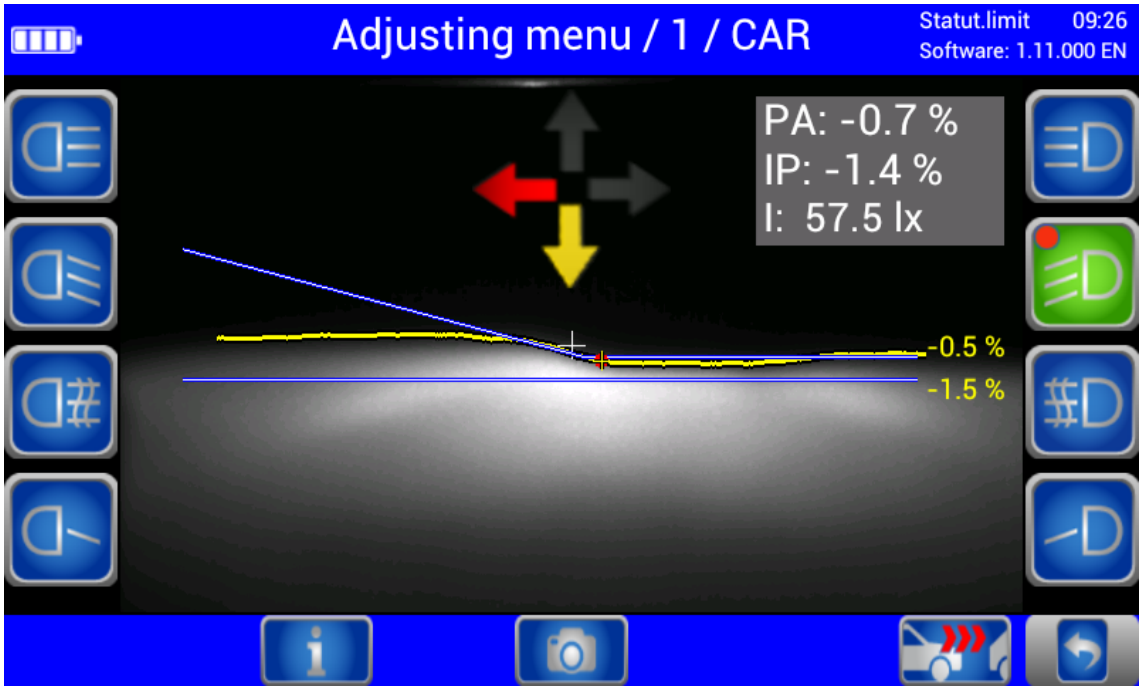
Use the Camera button (bottom centre) to change from the Measuring menu to the Adjusting menu.

3.4.3 Light Selection Buttons Disabled

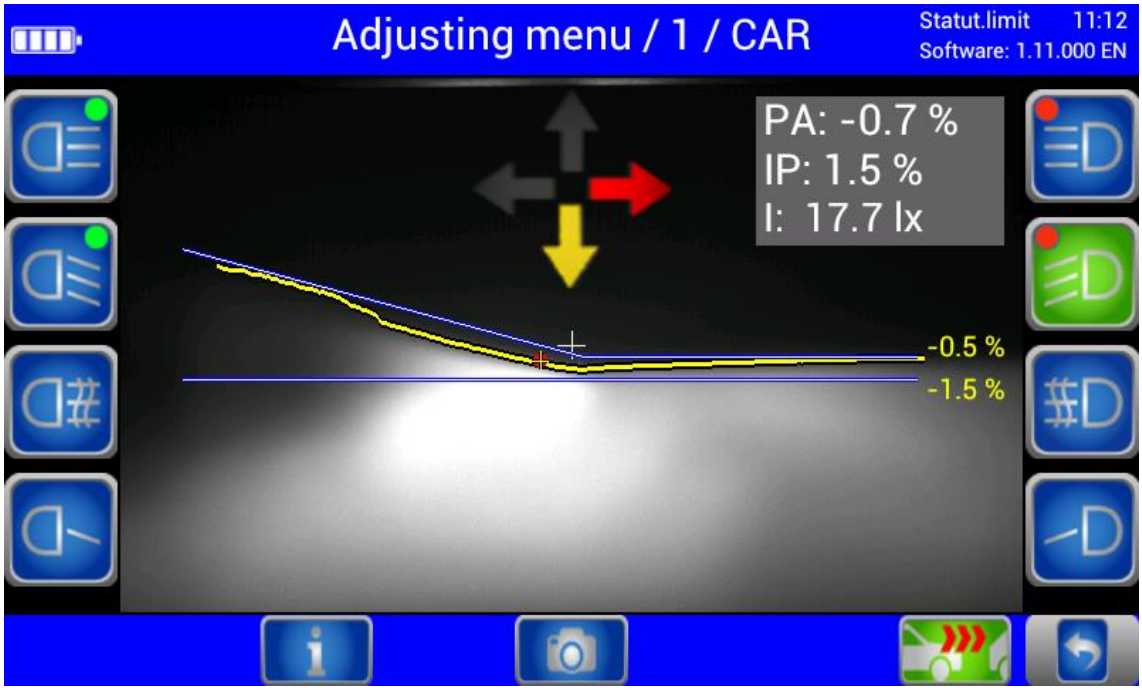


During measurement the light selection buttons are disabled.

3.4.4 Adjusting: Setting the Headlights in Real Time

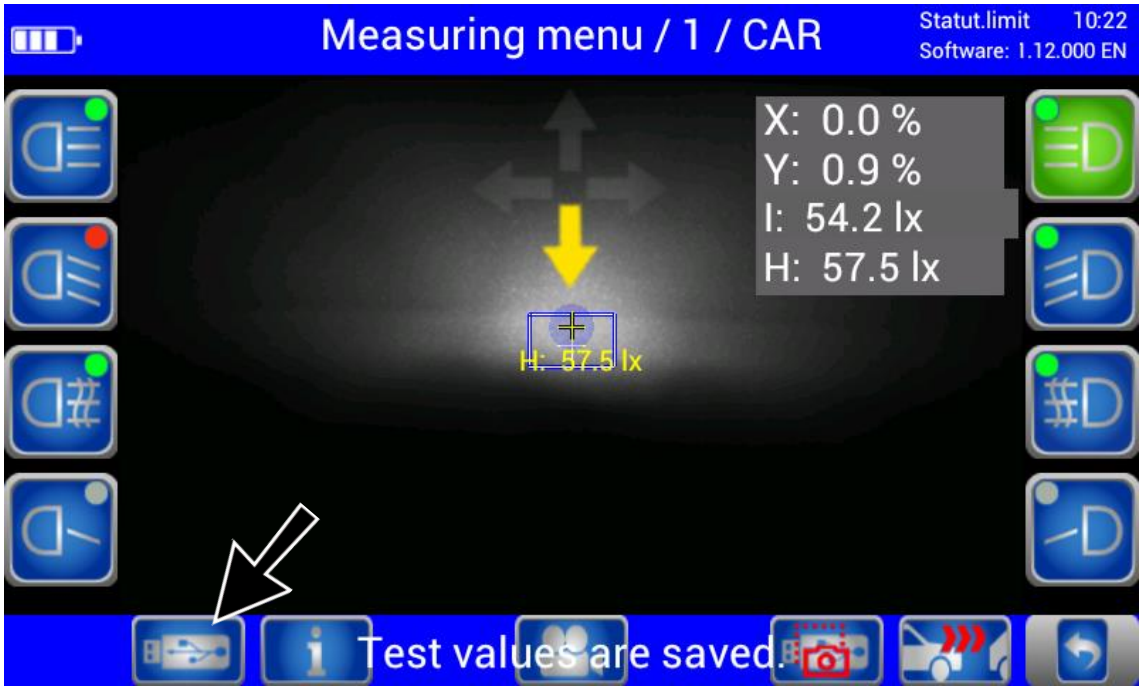


Green light button = Current measurement



Use the “New vehicle” button to change back to the Main menu.

3.4.5 Saving the Measurement Values to PDF



Using the USB stick button, all available test values can be saved as PDF to a USB stick. The button appears only in the Measuring and Adjusting menus and if a USB stick has been detected by the headlight tester.

The values are saved to folder “MLT3000 Results” with date and time stamp, for example: “Testvalues14082018_153922.pdf“.

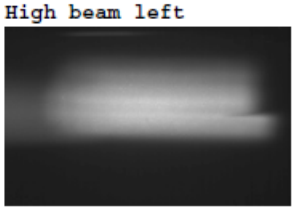
Autohaus Mustermann
Service Joe Sixpack

MAHAGROUP

Type: MLT 3000
Serial no: 655264
Software: V1.14.050

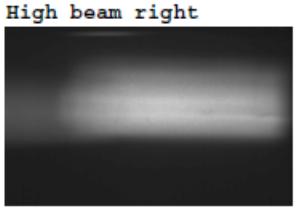
Print out: 17.03.2021 11:23h
Ident. no: _____

High beam left — Evaluation: Correct



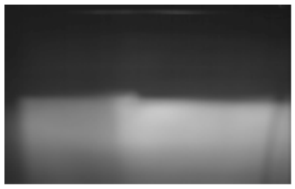
Hotspot X:	-0.7 %
Hotspot Y:	1.4 %
Intensity:	105.5 lx
Int.hotspot:	106.2 lx

High beam right — Evaluation: Correct



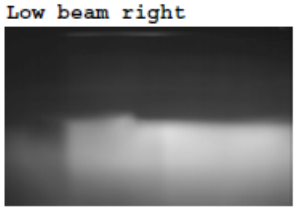
Hotspot X:	-1.9 %
Hotspot Y:	1.2 %
Intensity:	101.7 lx
Int.hotspot:	103.9 lx

Low beam left — Evaluation: Correct



Pitch angle:	-0.5 %
Yaw angle:	29.2 °
Roll angle:	0.9 °
Infl. point X:	0.5 %
Infl. point Y:	-0.5 %
Intensity:	20.0 lx
Glare:	0.9 lx

Low beam right — Evaluation: not correct

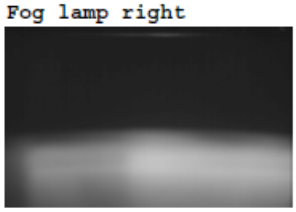


Pitch angle:	-0.5 %
Yaw angle:	17.0 °
Roll angle:	1.3 °
Infl. point X:	1.0 %
Infl. point Y:	-0.5 %
Intensity:	17.8 lx
Glare:	0.9 lx

Fog lamp left — Evaluation: Correct

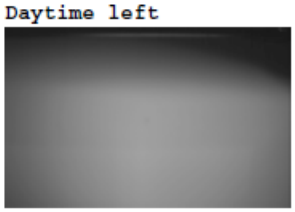
Pitch angle:	-1.8 %
Intensity:	5.8 lx
Glare:	0.0 lx

Fog lamp right — Evaluation: Correct



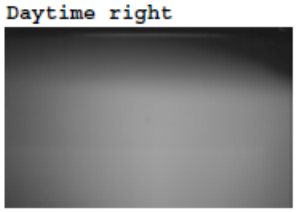
Pitch angle:	-1.7 %
Intensity:	6.5 lx
Glare:	0.0 lx

Daytime left



Hotspot X:	-0.2 %
Hotspot Y:	-3.1 %
Int.hotspot:	0.9 lx

Daytime right



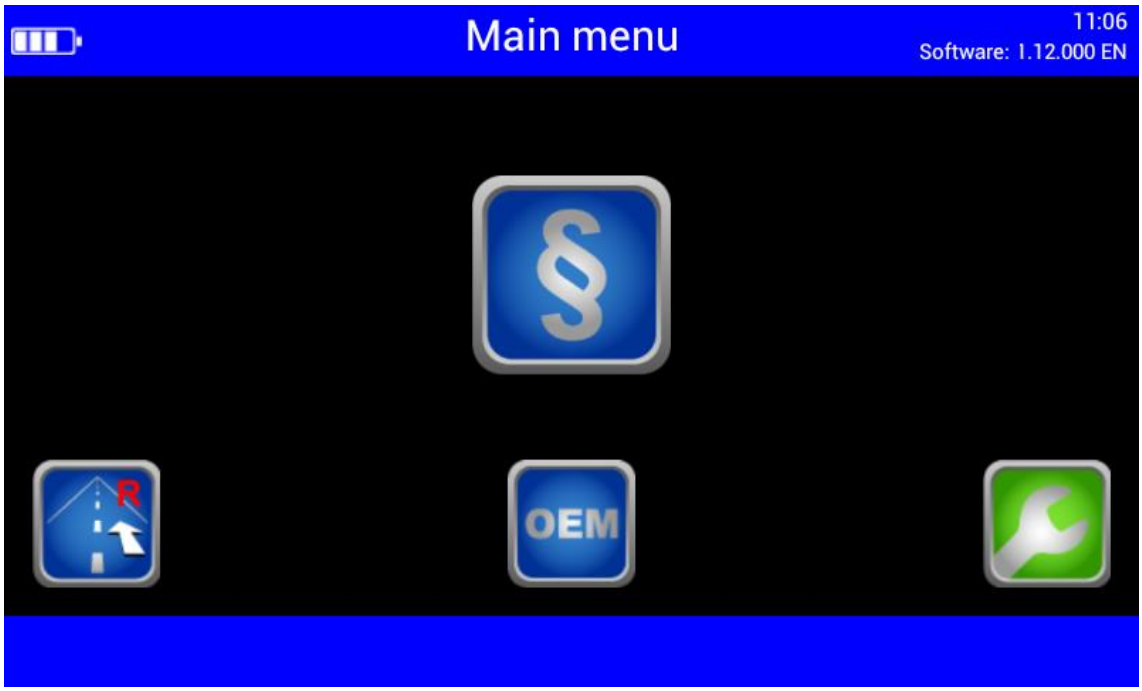
Hotspot X:	-2.2 %
Hotspot Y:	-3.0 %
Int.hotspot:	0.9 lx

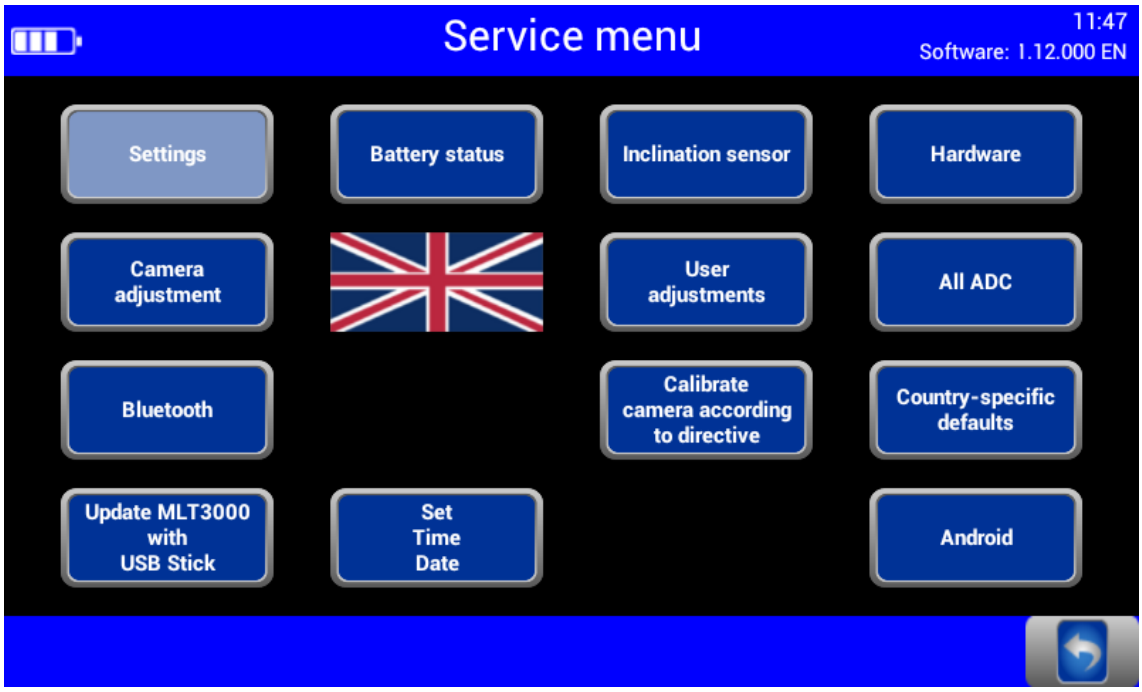
Inspector: _____

Overview of test results as PDF file (example)

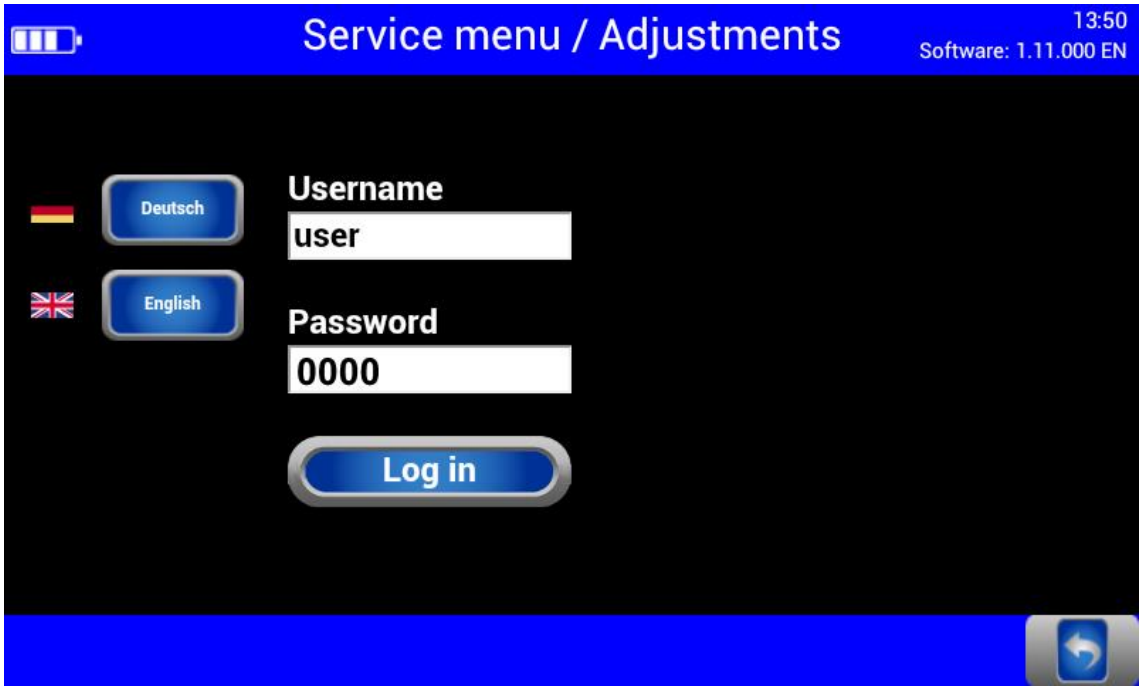
3.5 Settings

3.5.1 Variables



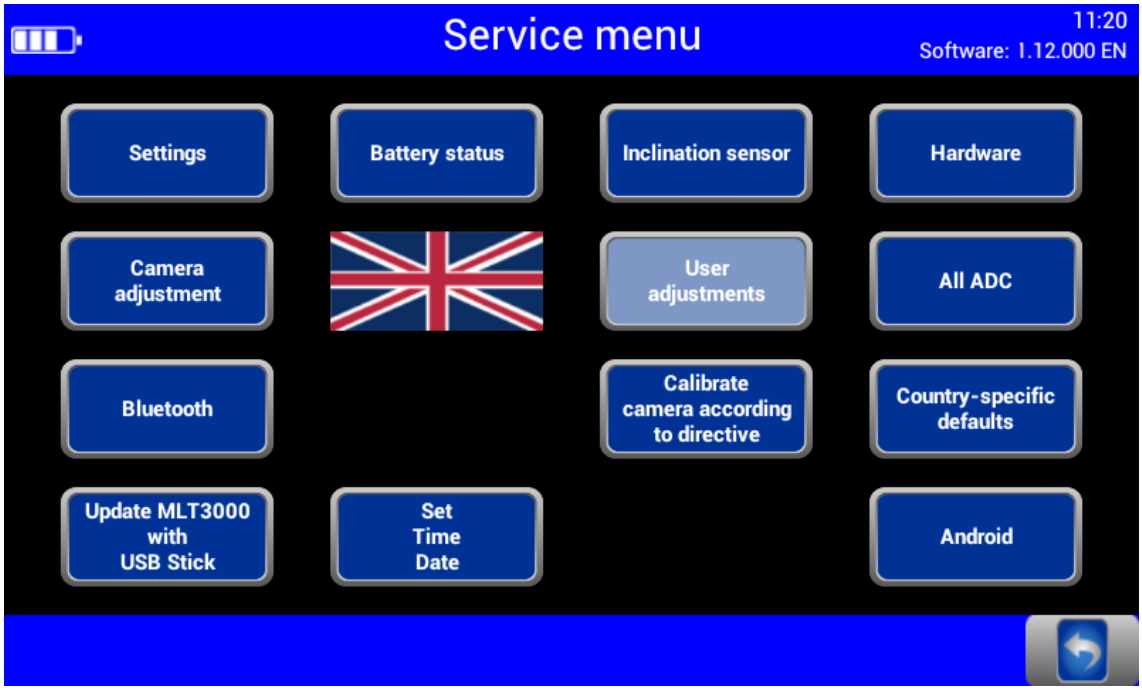


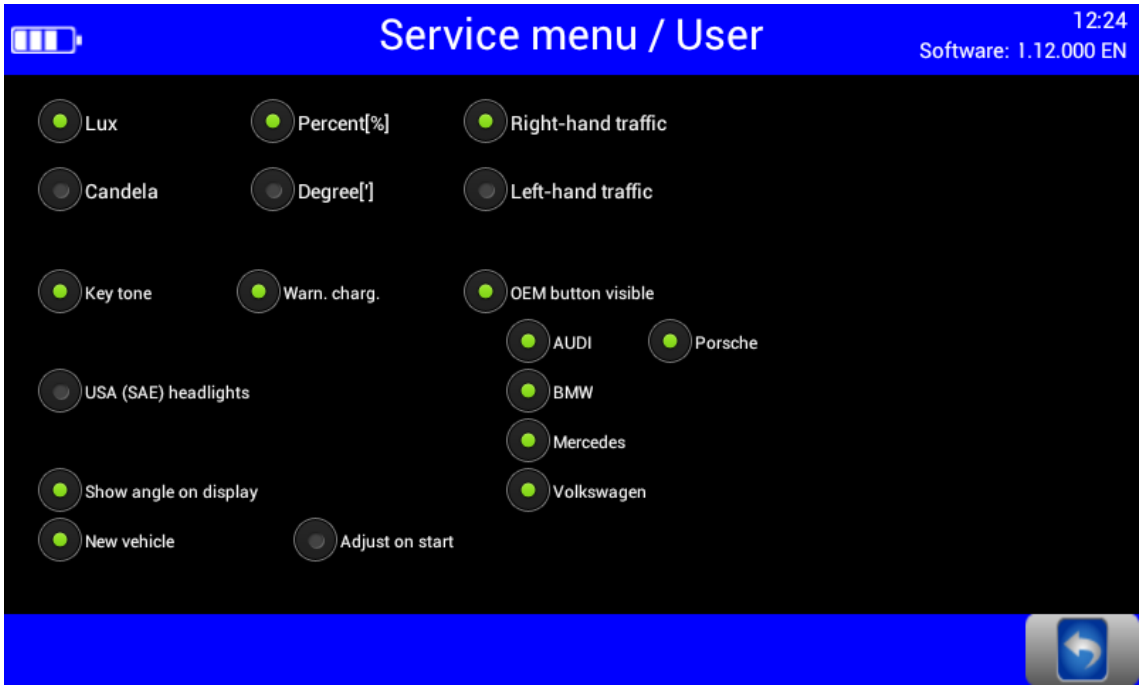
Limit values as well as user and customer variables can be set directly at the headlight tester.



Limit values, user and customer variables can be adjusted directly on the equipment.

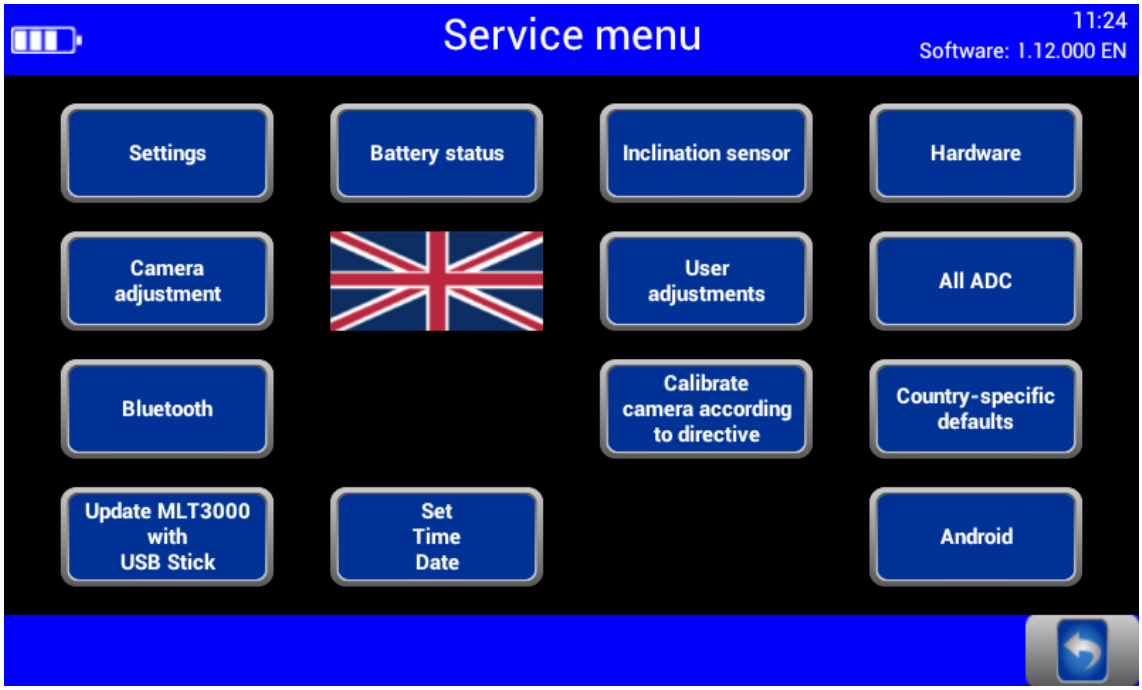
3.5.2 User Settings



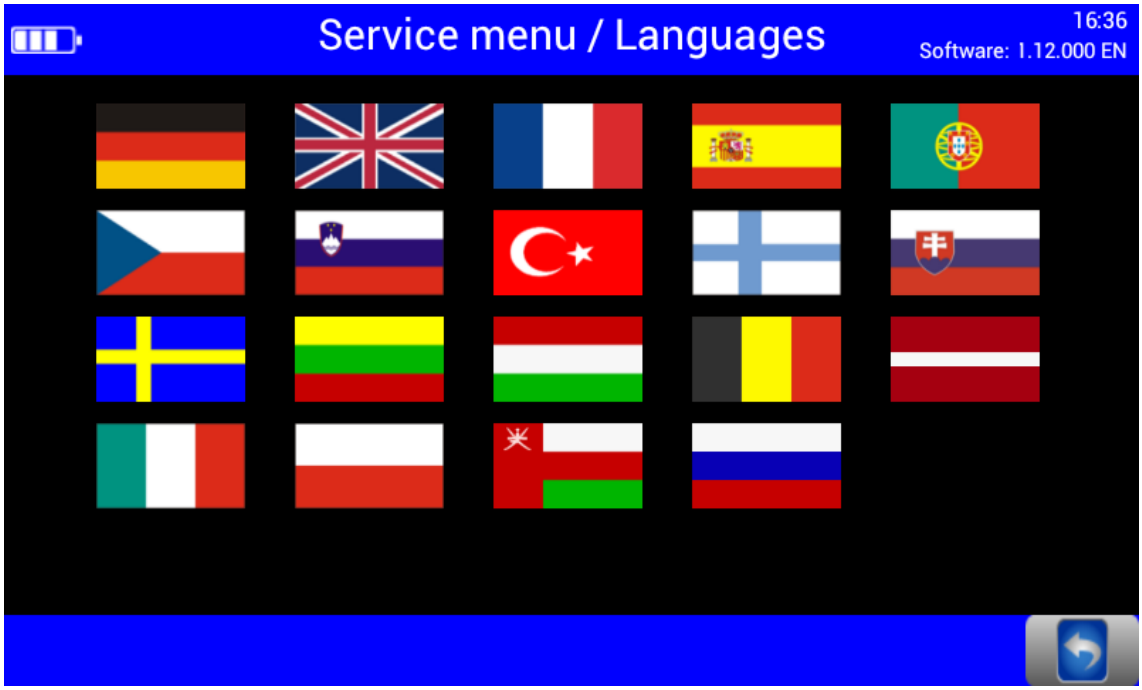


Quick access to all important settings.

3.5.3 Language

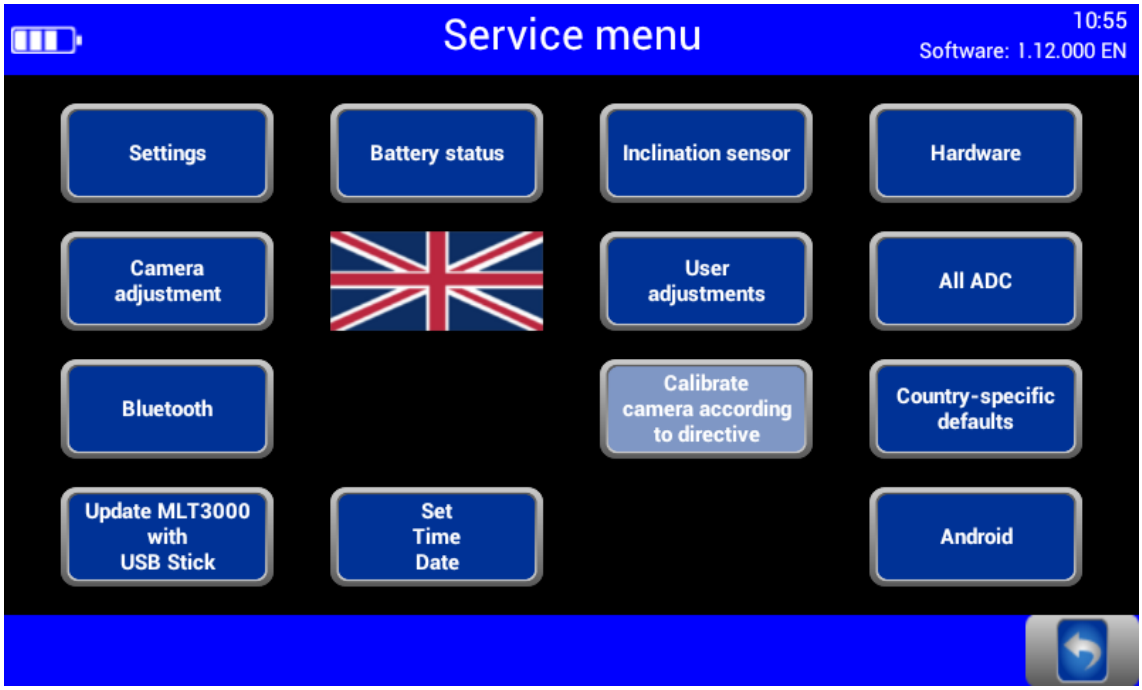


Use the flag button to open the language selection.



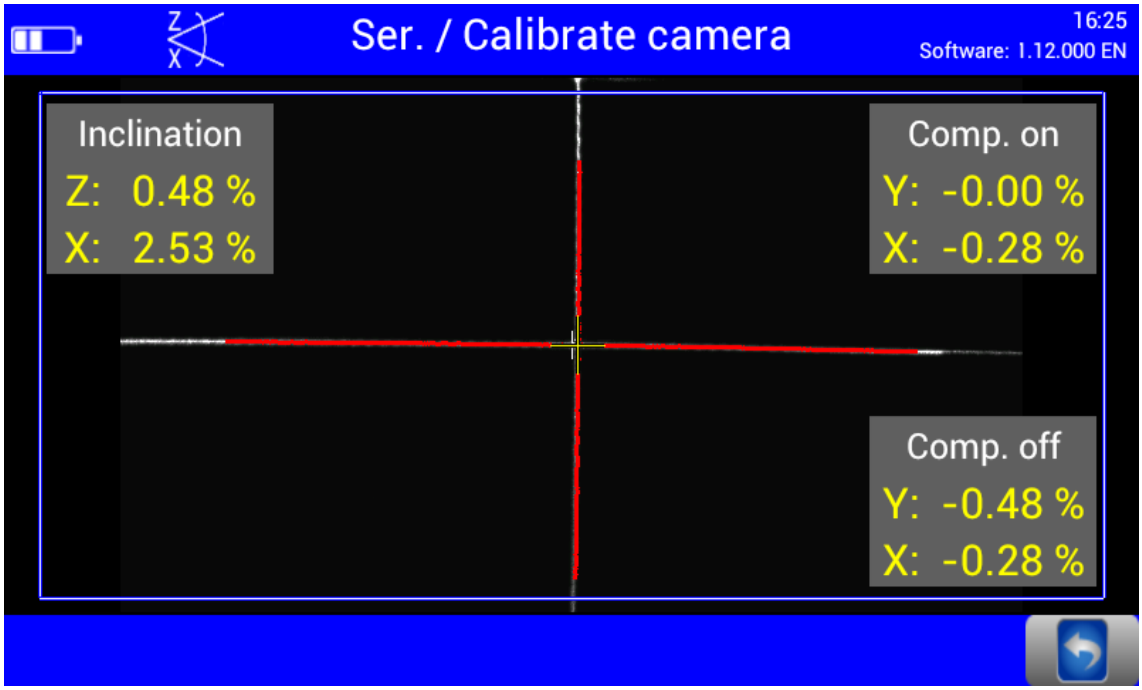
Choose the desired language.

3.5.4 Calibrating the Camera according to Directive

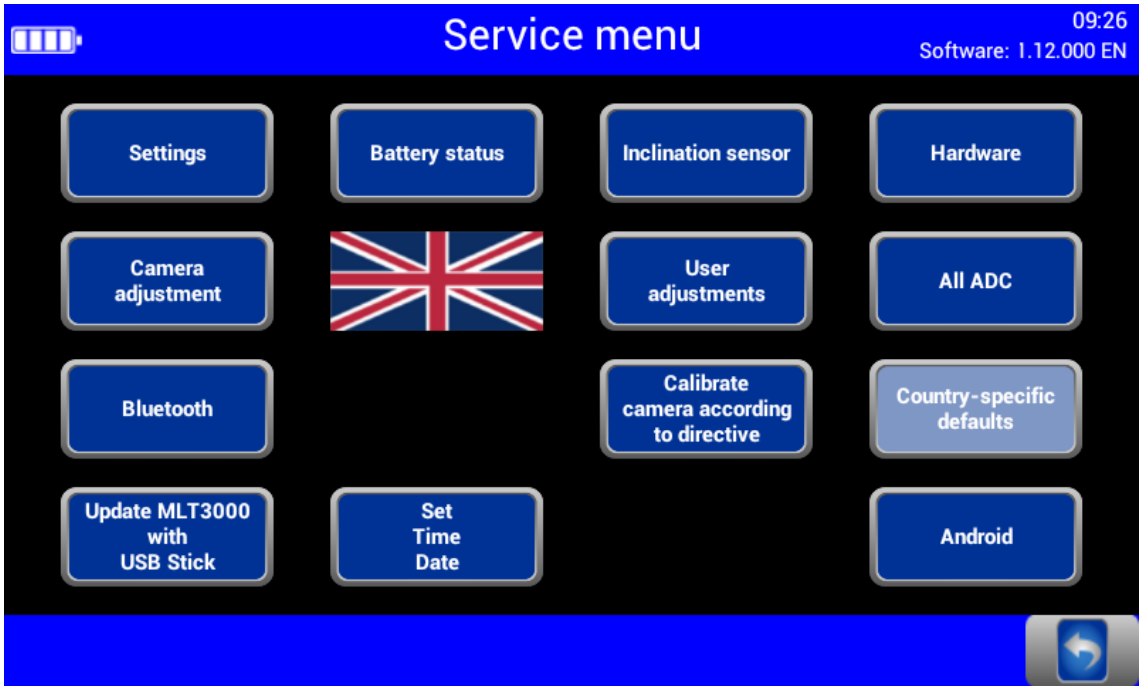


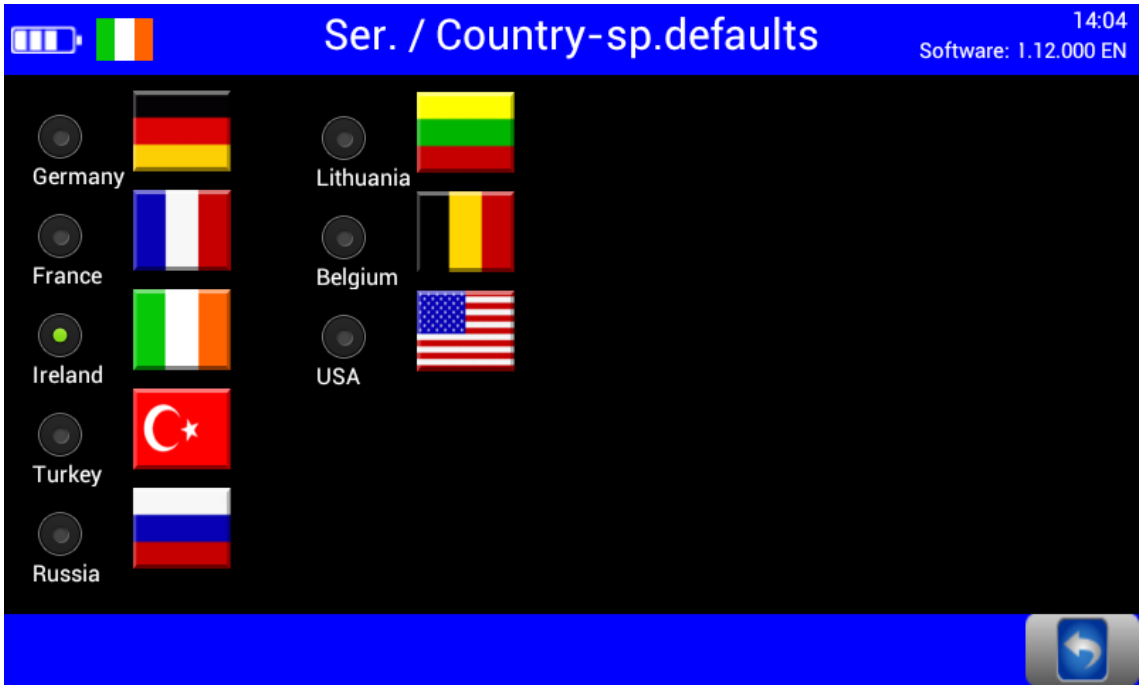
Compensation values can be checked using button “Calibrate camera according to directive”. No password required.

Choose between Cross hair / Spot laser.


Ser. / Calibrate camera
16:25
Software: 1.12.000 EN
Inclination
Z: 0.48 %
X: 2.53 %
Comp. on
Y: -0.00 %
X: -0.28 %
Comp. off
Y: -0.48 %
X: -0.28 %

3.5.5 Country Specifications

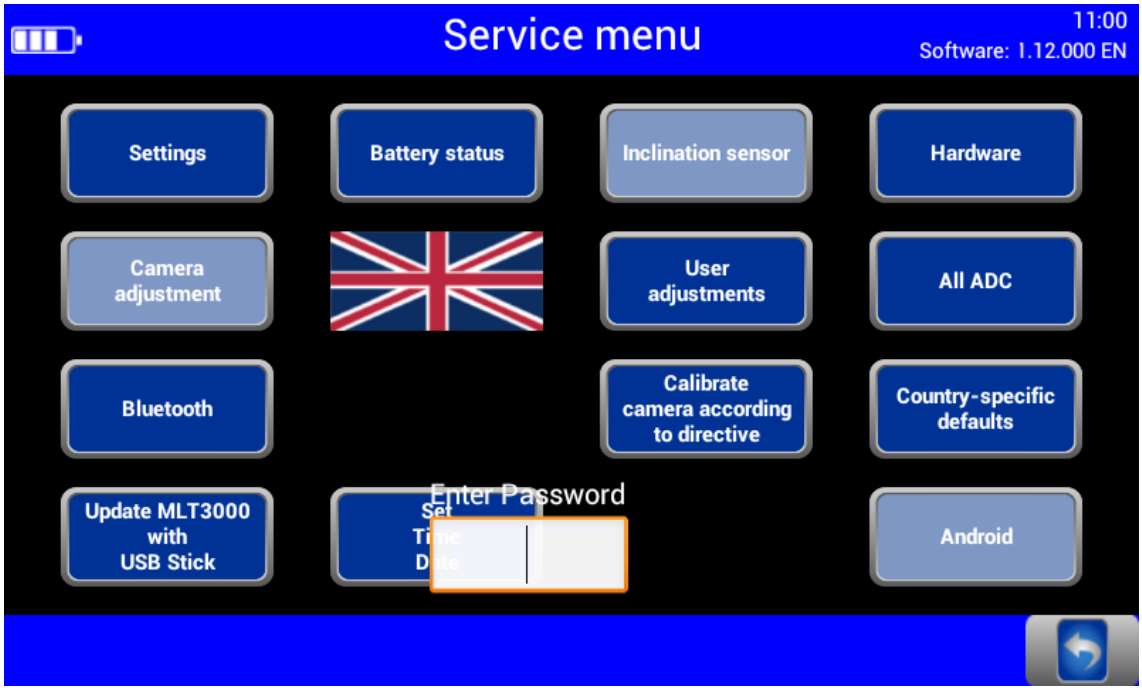




Statutory requirements, limit values and country-specific settings.

Switching back from some of the country-specific test procedures requires a password.

3.5.6 Settings with Password



The disabled (greyed out) menu items can be accessed only by entering a service technician password.

Adjustment of the headlight tester is permitted exclusively with the following calibration equipment approved by MAHA and must be performed by an authorised service technician.

VP 990175 Laser calibration device with spot laser, model LK1 (no longer available)

VP 990471 Laser calibration device with cross hair laser, model LK2

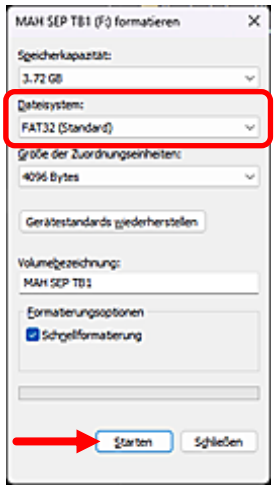
3.5.7 List of Variables (Extract)

No.	User variables	Default	Min	Max
3.0	Percentage 0 / Degrees 1	0	0	1
4.0	Lux 0 / Candela 1	0	0	1
6.0	Target value Pitch angle Car	11	0	50
6.1	Target value Pitch angle HGV	30	0	50
8.0	Switch-off time of display in minutes	10	2	1200
10.1	RHT/LHT button enabled 1 / disabled 0	0	0	1
11.0	OEM in main menu enabled	1	0	1
12.0.1	Output yaw/rolling angle on display	0	0	1
	Customer variables			
1.0	Customer header line 1		0	20
1.0	Customer header line 2		0	20

3.6 Software Update

Software updates are performed using a USB stick (FAT32 format).

1 Format the USB stick in FAT32:
Connect the USB stick to the PC, open the Windows Explorer, right-click the USB stick and choose “Format”. In the following window under File system: choose “FAT32 (Standard)” and “Start”.

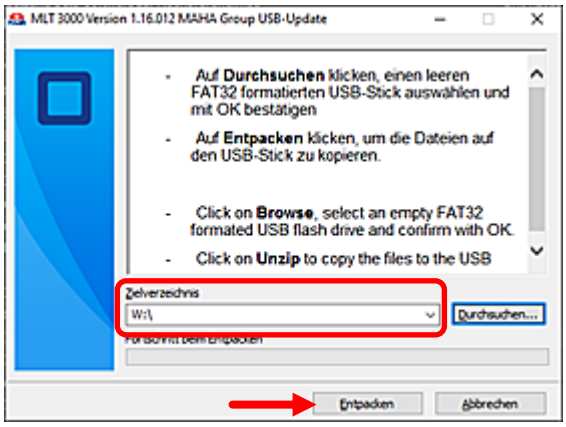


INFO
– Maximum data carrier size for FAT32 is 32 GB.
– Formatting permanently deletes all data on the USB stick. If necessary, carry out a data backup beforehand!

2 Download the software update to the PC from the MAHA homepage:
https://www.maha.de/en/software/downloads

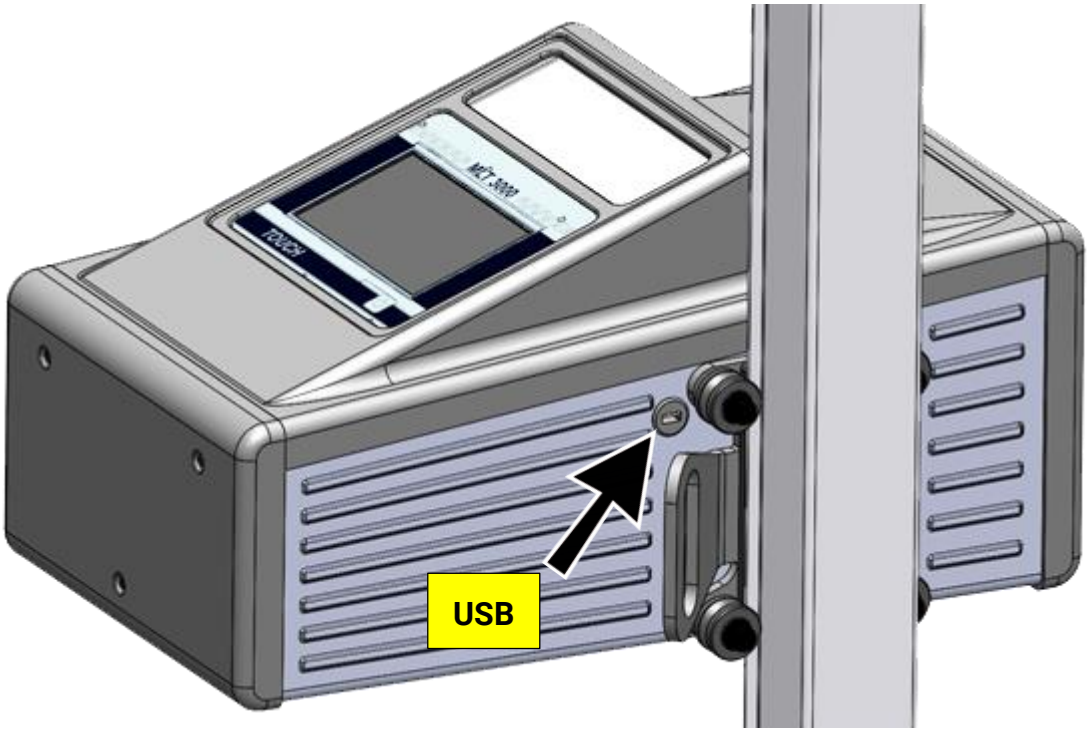
3 Execute the downloaded file by double-click. Click “Browse“ and choose the USB stick (e.g. W:\). Confirm with “OK“.

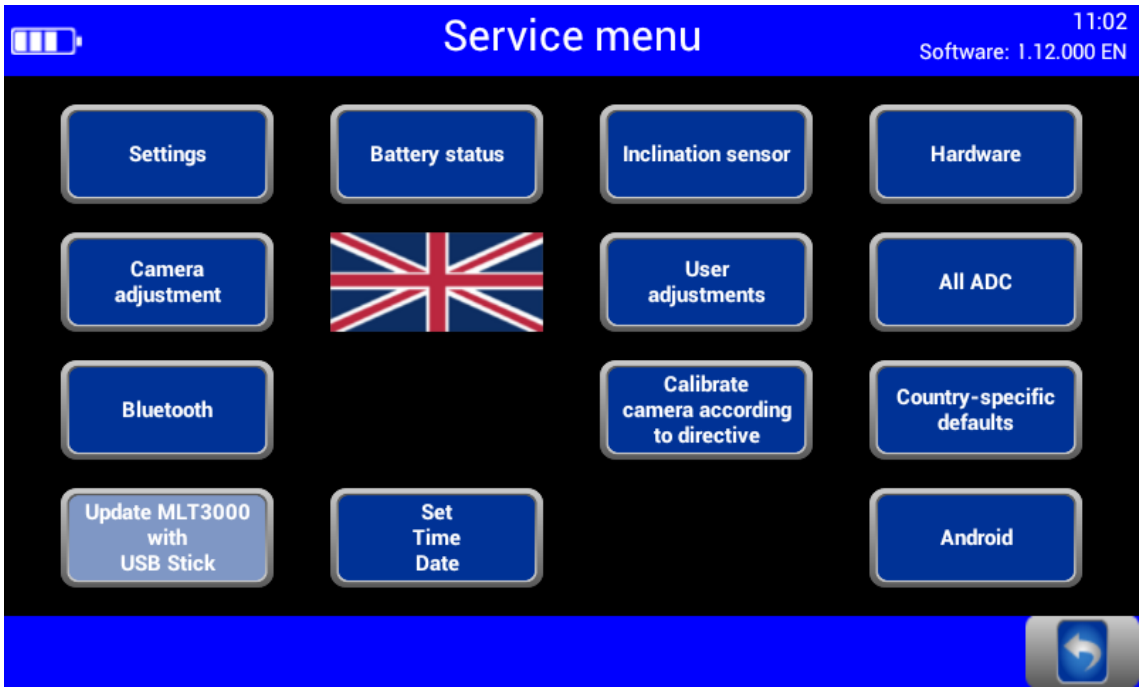
4 Click “Unzip“, then check if folder “maha“ is on the USB stick.

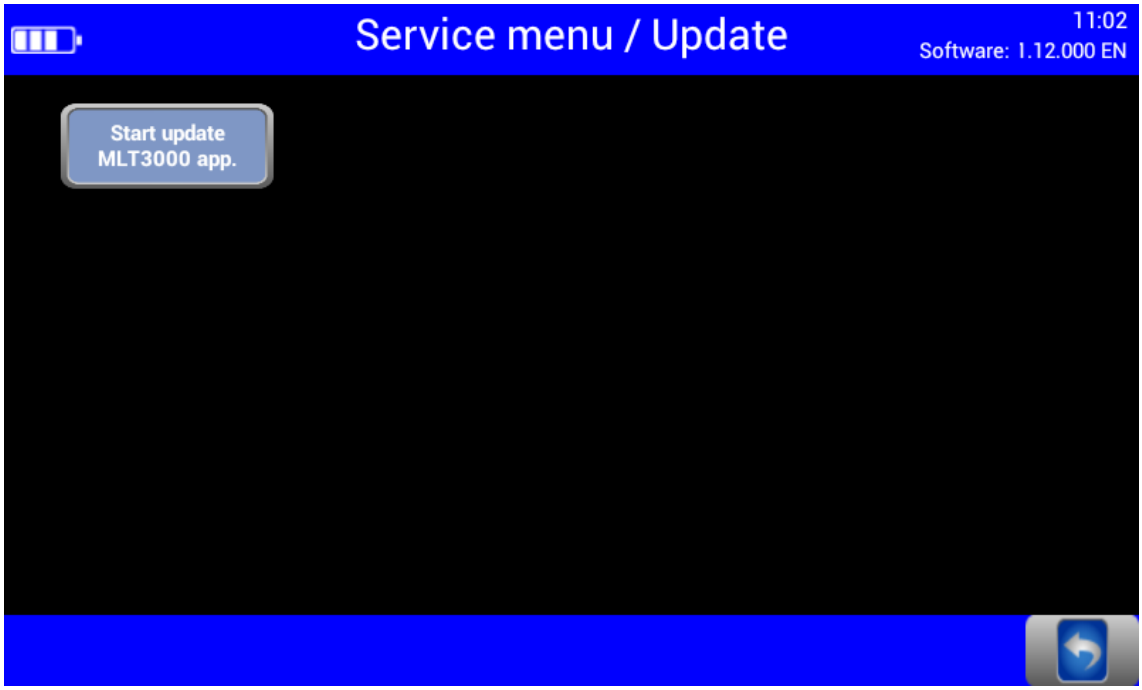


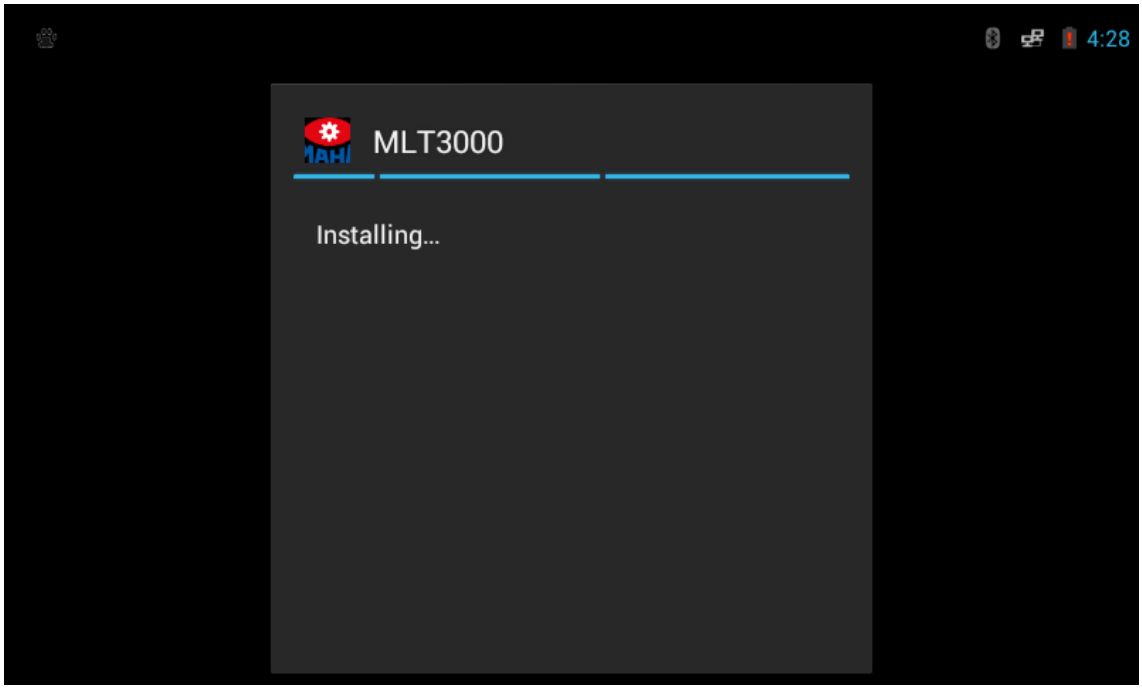
5 In the Windows Explorer, right-click the USB stick and choose “Eject”. Remove the USB stick from the PC.

6 Connect the USB stick to the USB-A port outside at the casing and start the update.


USB


Service menu
11:02
Software: 1.12.000 EN
Settings
Battery status
Inclination sensor
Hardware
Camera adjustment
User adjustments
All ADC
Bluetooth
Calibrate camera according to directive
Country-specific defaults
Update MLT3000 with USB Stick
Set Time Date
Android





Please wait until the software has been installed and restarted.

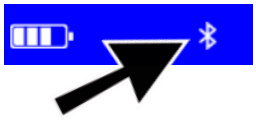
3.7 EUROSYSTEM

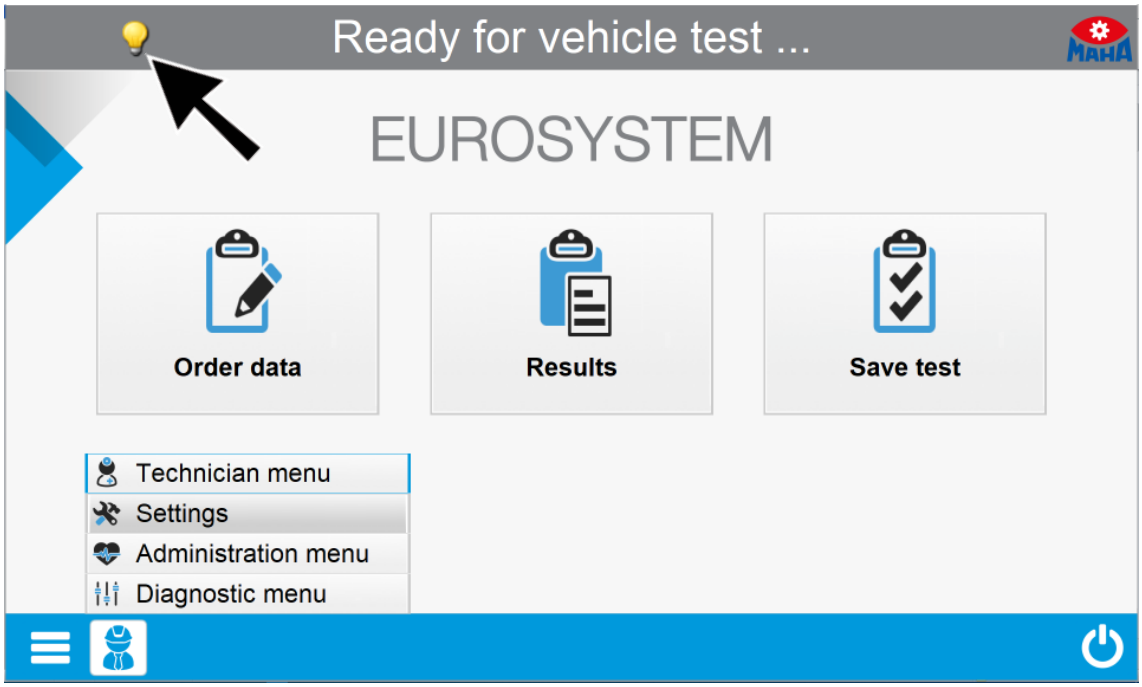
Interfaces for connecting a PC

- RS232 as cable connection (round connector, see section “Energy Management and Troubleshooting > Charging the Battery”)
- Wireless connection via Bluetooth, order number: VZ 990312

These interfaces can be used for establishing a connection to MAHA’s EUROSYSTEM software, which is included with the cable or Bluetooth module. Alternatively, the headlight tester can also be integrated into a EUROSYSTEM test lane.

After the connection has been established, the yellow indicator lamp is ON. A Bluetooth symbol appears in the info bar of the headlight tester.

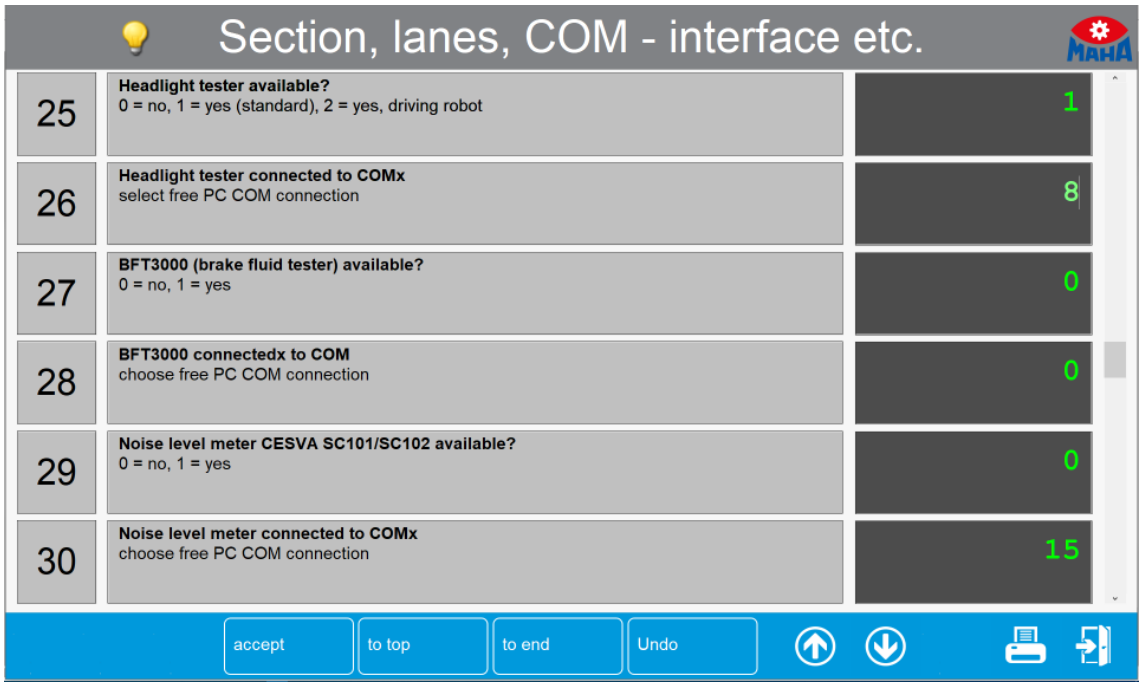




Set variables using “Settings / Section, Lanes, External Devices”:

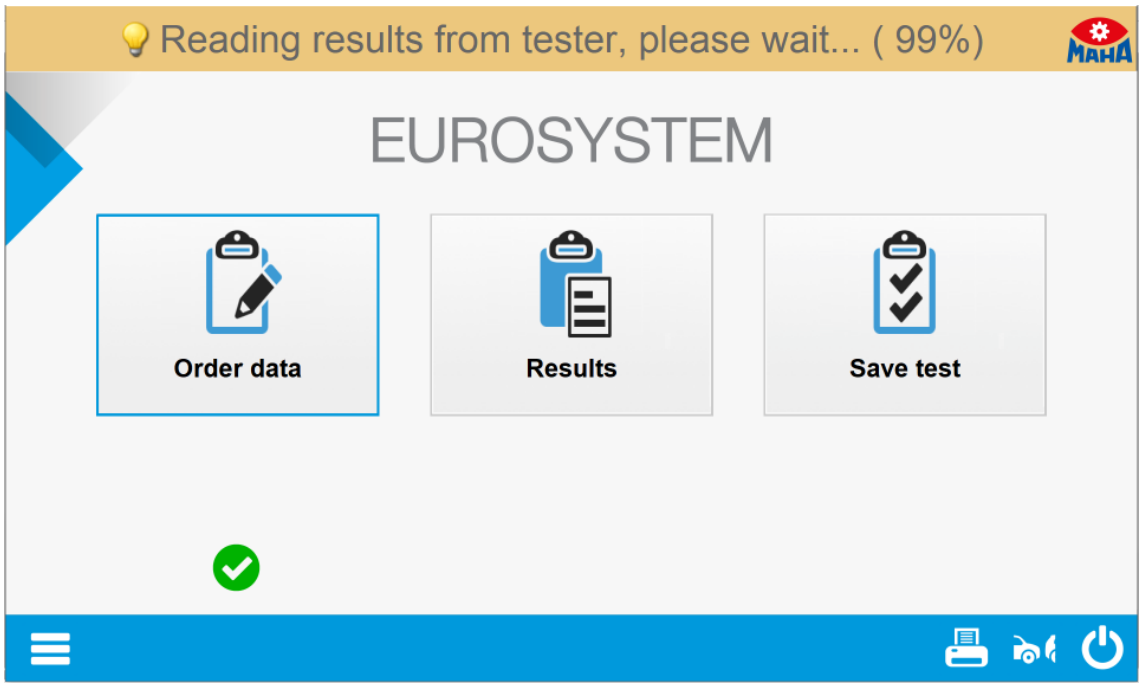
Variable 1 → 100 (standalone device only); Var. 25 → 1; Var. 26 → free COM port

Reboot EUROSYSTEM.

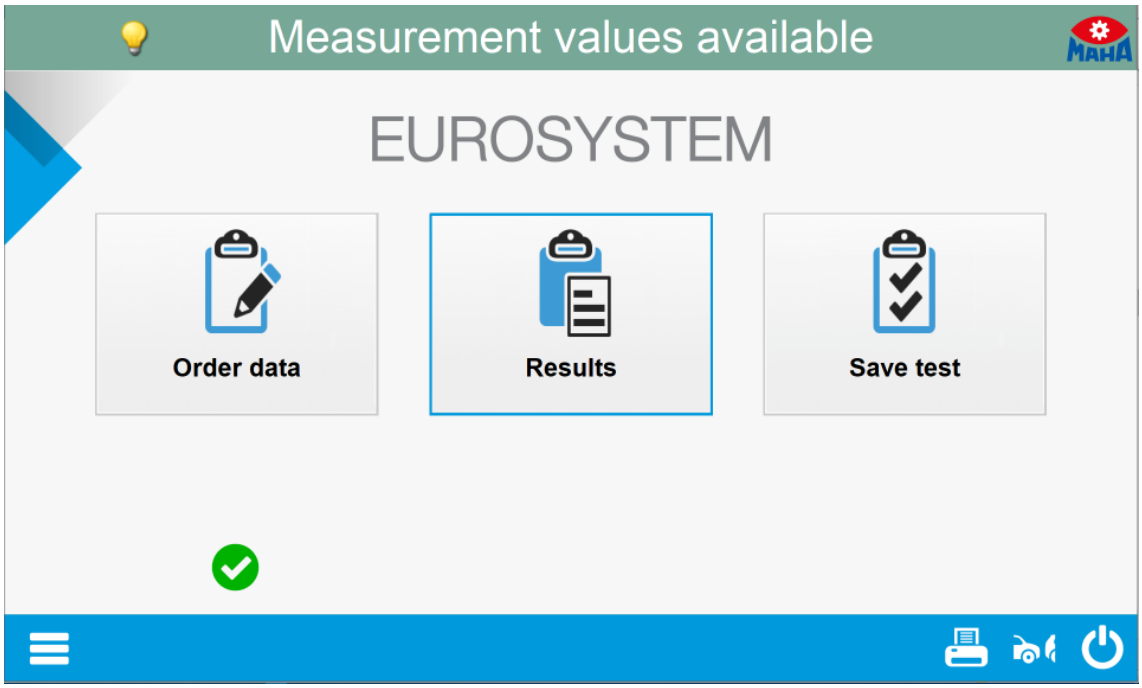


Test devices are connected automatically.

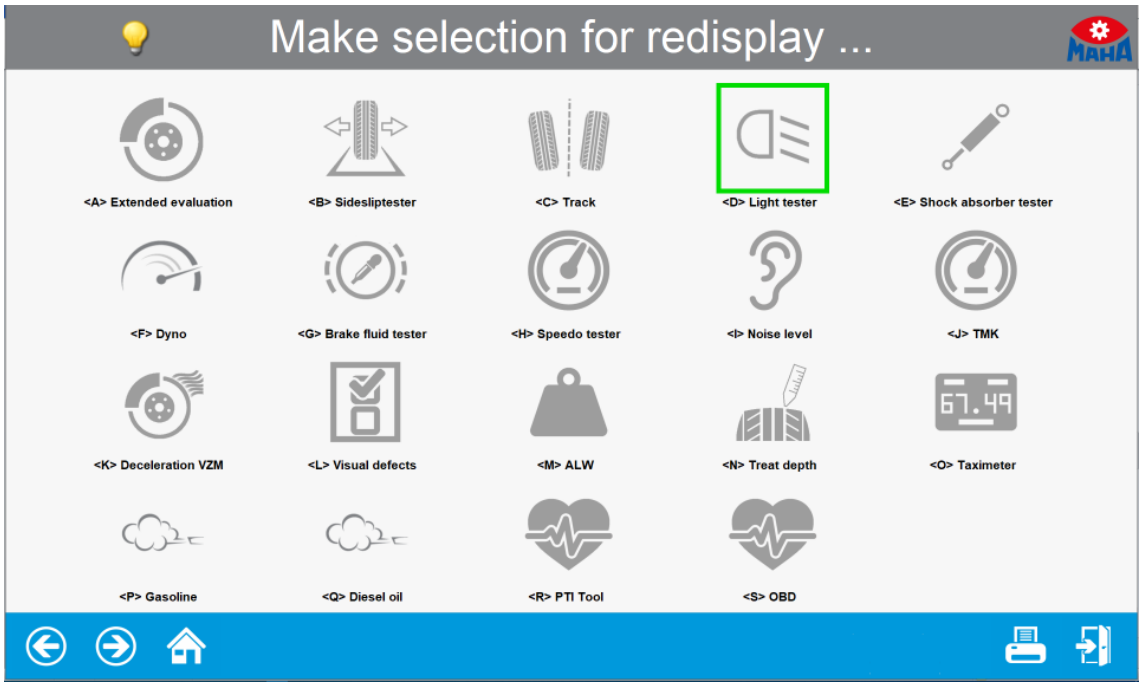
After the measurement has been started, all measurement values are transferred to EUROSYSTEM.
The connection to the MLT 3000 is retained until EUROSYSTEM is quit.



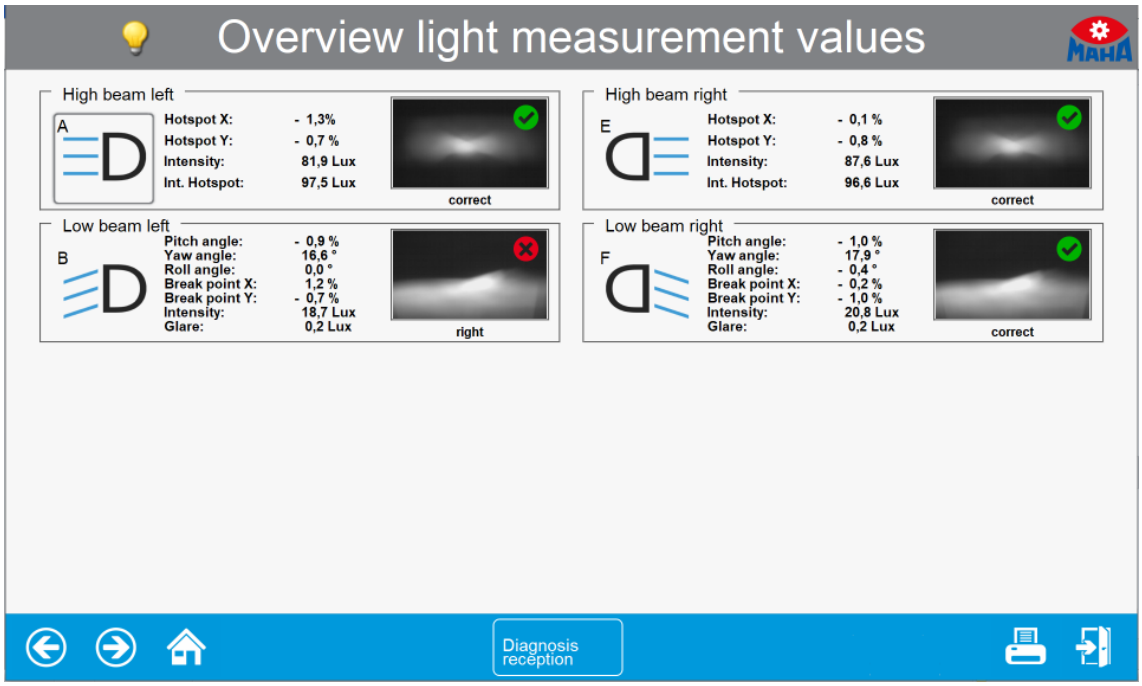
Select menu item <Results>.



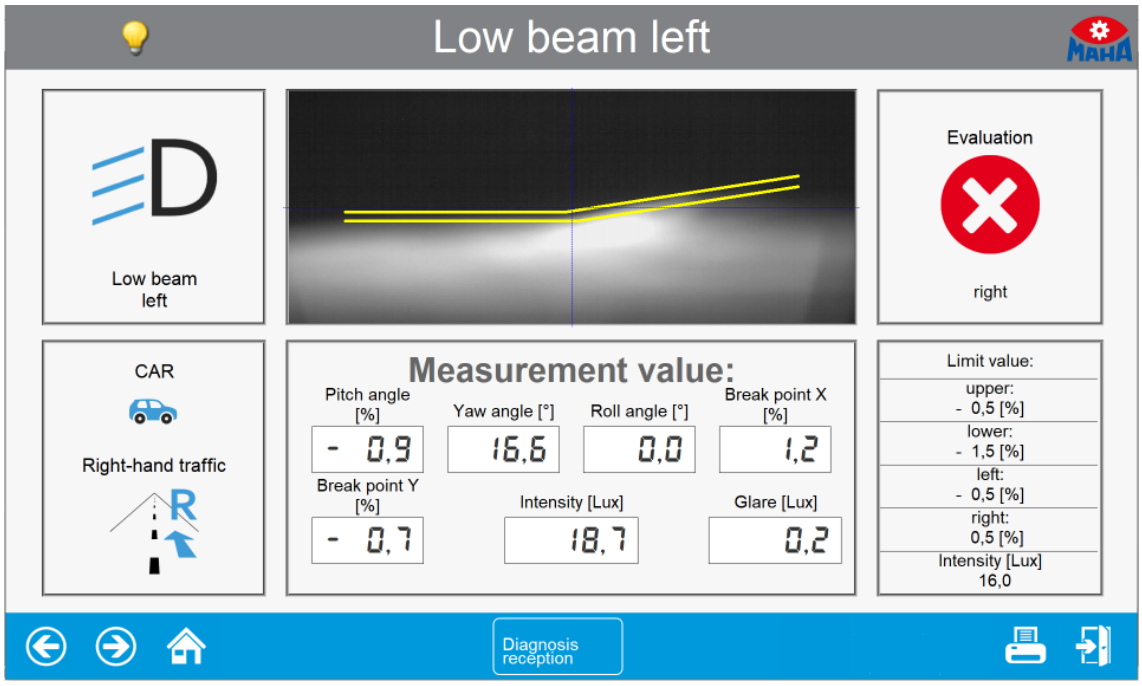
Select menu item <Light tester>.



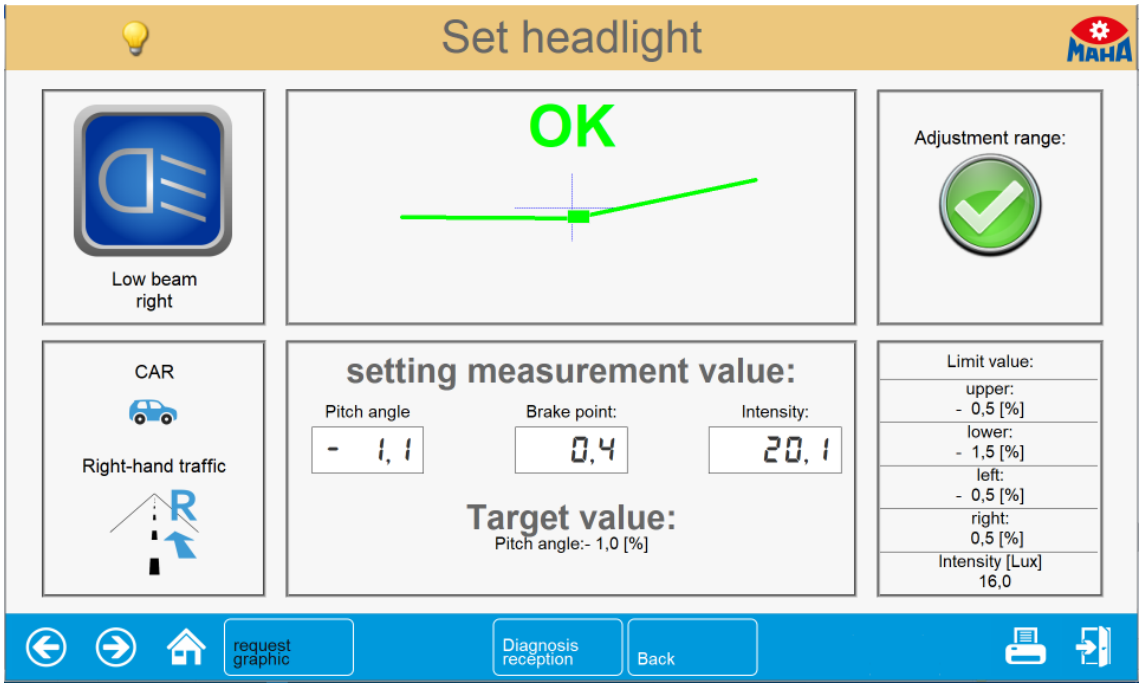
An overview of the measurement values appears. Select the desired measurement.



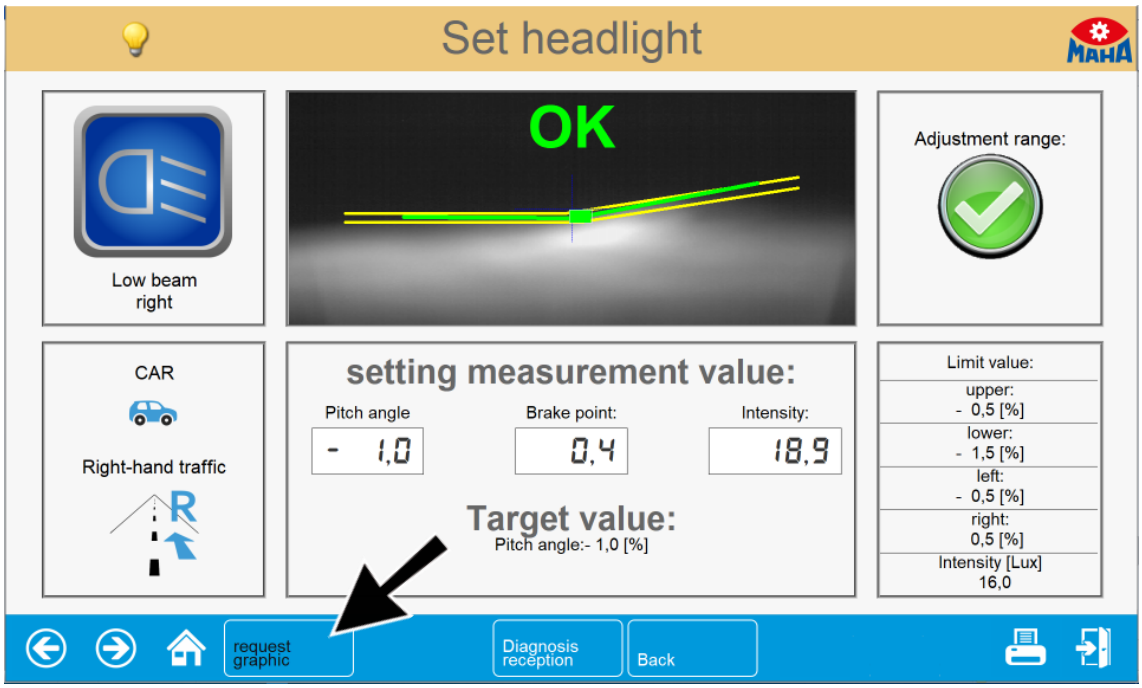
The selected measurement data is displayed in detail.



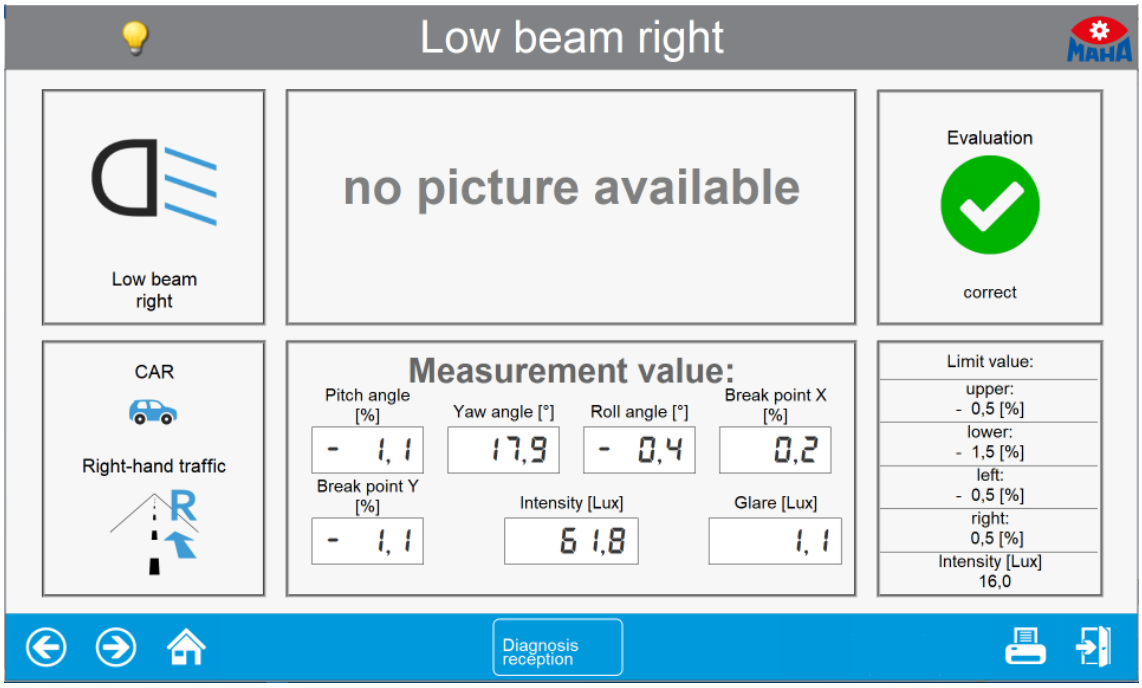
Use the camera button on the MLT 3000 display to switch over to headlight adjustment. EUROSYSTEM shows the coordinates, the measurement values and the headlight image in real time.



The headlight image graphic can be updated manually using the <Request graphic> button.



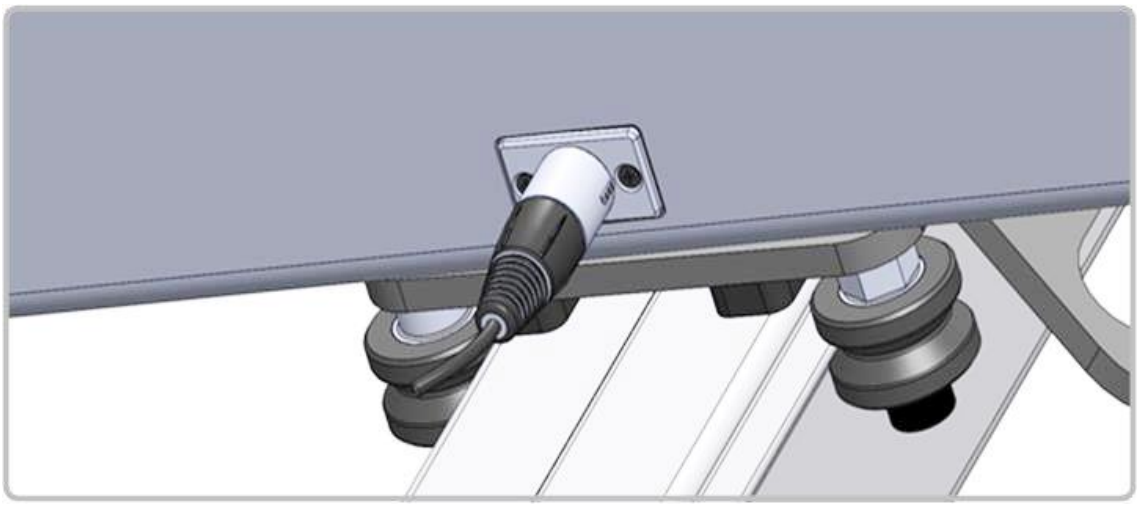
The image transmission can be completely disabled via soft DIP.



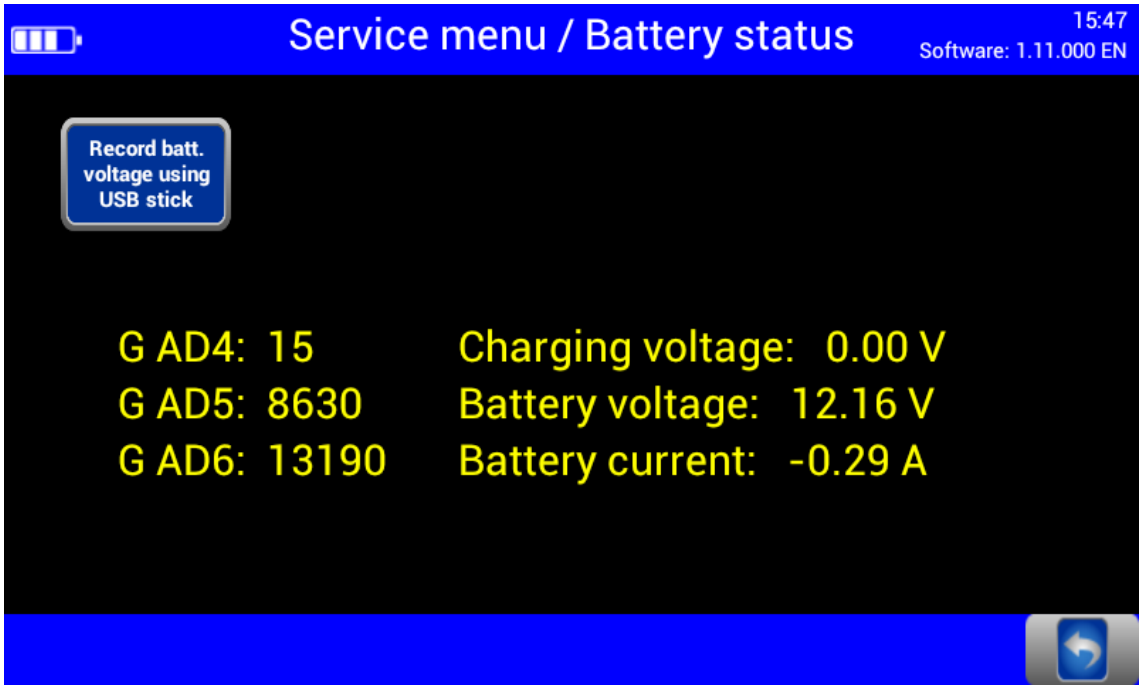
4 Energy Management and Troubleshooting

4.1 Charging the Battery

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



The charging process normally takes 11 hours. Full battery capacity is achieved when the battery voltage has exceeded 14.00 V during charging.



The battery indicator in the top left-hand corner of the touchscreen corresponds approximately to the actual charging level.

4.2 Battery Status

4.2.1 Battery Life

The battery has a rated capacity of 9500mAh and can provide up to 20 hours of continuous workshop operation at an optimum environmental temperature of 20°C.

4.2.2 Energy Saving Function

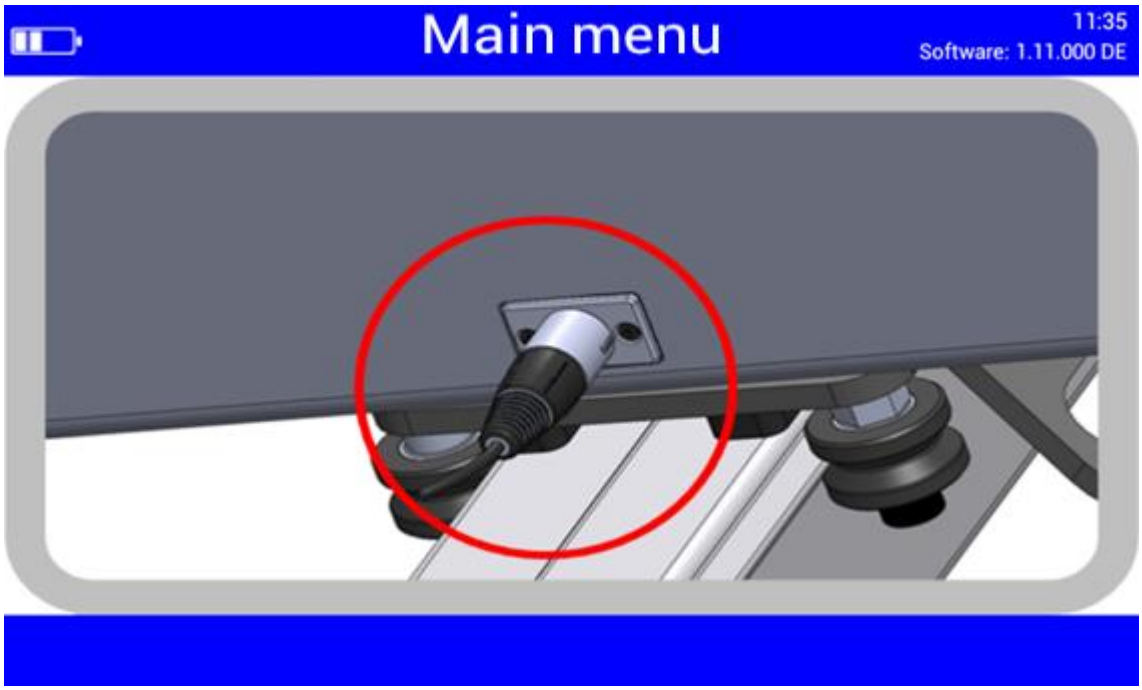
After 10 minutes of no activity, the display switches off. By tapping the touch-screen, the device is immediately ready for operation.
After 120 minutes of no activity, the unit switches off completely and then needs to be switched back on manually.
These standard settings can be customised in the user variables.

4.2.3 Protection against Deep Discharge

To protect the battery from deep discharge, the unit switches off beyond 10.8V battery voltage.

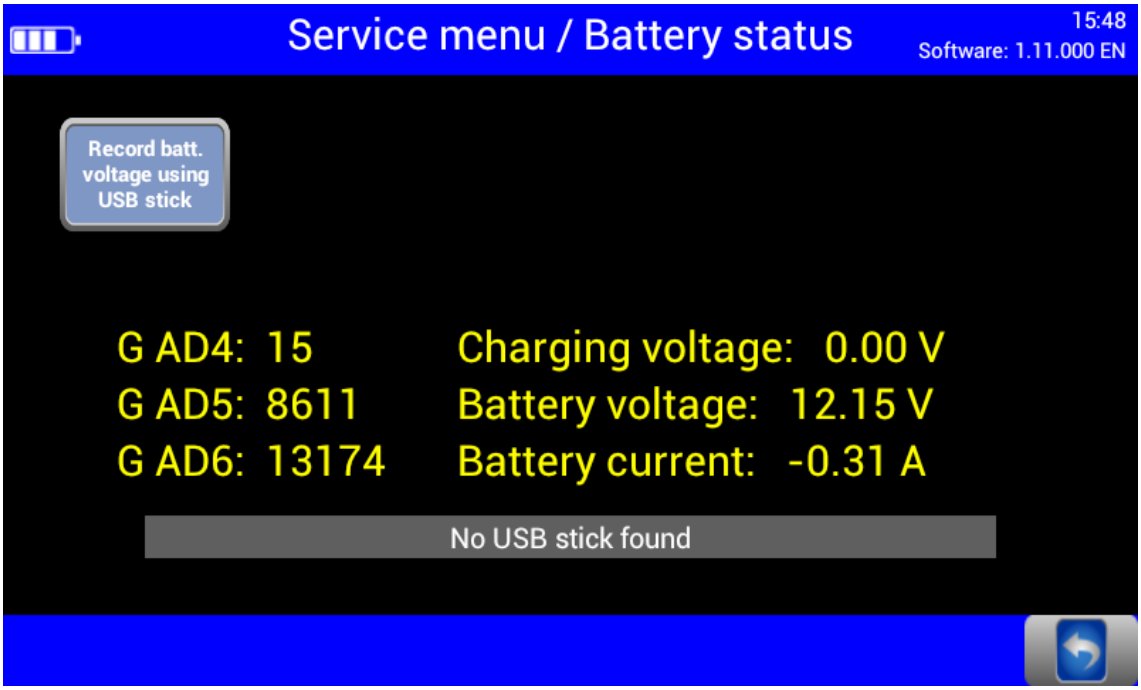
4.2.4 Protection against Mechanical Damage

In the event that the device is set into motion while the charger is connected, the following image is displayed and accompanied by an audible alert:
(Alert must be enabled, see section “Operation > Settings > User Settings”.)

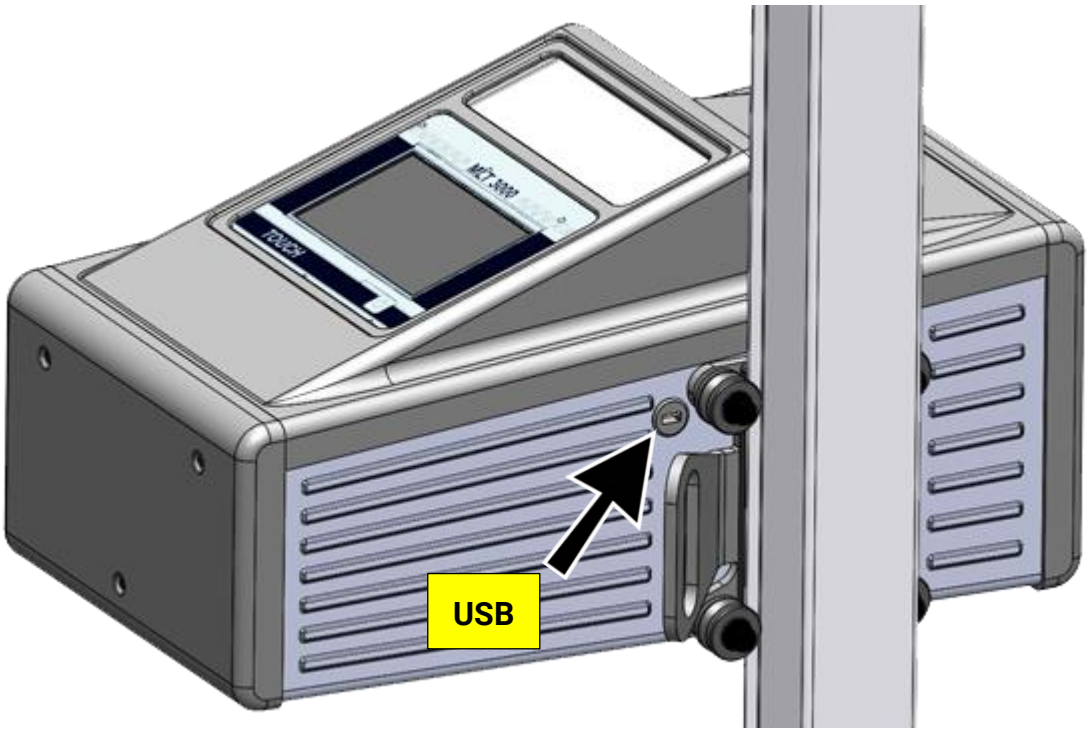


4.2.5 Data Recording for Error Analysis

The data records of the battery status allow for an optimum analysis in problem cases.



A USB stick is needed for data recording. Records with a duration of more than 2 h can be saved by setting variable 9.0 accordingly.



4.3 Troubleshooting

This message may appear after updating older software versions. Acknowledge with “Wait”.

5 Maintenance

5.1 Care Instructions

NOTICE

- The equipment must be periodically cleaned.
- Do not use high pressure and steam jet cleaners nor caustic cleaning agents.

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

5.2 Spare Parts

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

6 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: info@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.

7 Declaration of Conformity

See following page(s).

Original-EU-Konformitätserklärung
Original EU Declaration of Conformity

CE380701-de-en

MAHA Maschinenbau Haldenwang GmbH & Co. KG

erklärt hiermit als Hersteller in alleiniger Verantwortung, dass nachstehend bezeichnetes Produkt in Konzeption und Bauart den grundlegenden Sicherheits- und Gesundheitsanforderungen der hier genannten Richtlinien entspricht.
Bei Änderungen am Produkt, die nicht von oben genannter Firma genehmigt wurden, verliert diese Erklärung ihre Gültigkeit.

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

Typ | Model

MLT 3000

Serialnummer | Serial Number

Bezeichnung | Designation

Scheinwerfer-Einstell-Prüfgerät

Headlight Tester

Richtlinien | Directives

2014/30/EU
2014/35/EU

Normen | Standards

EN ISO 12100:2010
EN 60204-1:2018
EN IEC 61000-6-3:2021
EN IEC 61000-6-4:2019

Gesetze | Regulations

Produktsicherheitsgesetz ProdSG

Product Safety Act ProdSG

Bevollmächtigter für die Zusammenstellung der technischen Unterlagen
Person Authorised to Compile the Technical File

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

Haldenwang, 2024-03-01

Dr. Peter Geigle
Geschäftsführer | Managing Director

Notes

Notes