All depends on the correct setting

Workshop Equipment for Headlight Adjustment by Hella Gutmann

Seeing and being seen

The first Adaptive High Beam was used in a passenger car as early as 2010. With the arrival of LED technology, Adaptive Headlights have become commonplace in many car brands all over the world. Their legalization in the U.S. will increase driving safety and comfort here as well, but will also bring changes for workshop processes.

THE SITUATION – THE CHALLENGE

Seeing and being seen is the traditional claim for vehicle lighting. This leads to a conflict of objectives: the wider and better the illumination of the road, the higher the risk of glare and thus the safety risk for all road users. For this reason, intelligent Adaptive Headlight- Systems have already become established in various countries.
The Investment and Job Act (H.R. 3684) has prompted revisions to Standard 108 ("Lamps, Reflective Devices, and Associated Equipment") within the Federal Motor Vehicle Safety Standards (FMVSS).

This amendment permits the use of adaptive headlights in the U.S. Many vehicles in the country already have adaptive driving beam (ADB) headlights installed. We anticipate the software updates to activate these headlights will be available soon, and several automakers have already announced new vehicles equipped with active ADB headlights.

PERFECTLY ADJUSTED HEADLIGHTS: OUR COMMON GOAL.

Repair and adjustment routines have changed and differ from one manufacturer to manufacturer. On some vehicles, replaced headlights require specific coding to be recognized by the vehicle. When adjusting headlights, technicians are confronted with a variety of conditions where many factors must be taken into consideration – like aligning the SEG with the correct master

LED of the Matrix LED headlight. And due to the interconnection of various vehicle sensors, the best alignment is ineffective if a single step such as learning the new position in the control unit is omitted. In this case, the control unit will simply adjust the headlight back to the old position. Thus, headlight adjustment does not only require great care and sound technological know-how but also the diagnostic tool.

GROWING DEMAND FOR CALIBRATION AND ADJUSTMENT

Apart from the technical challenges, there is a growing demand for headlight adjustment in connection with intelligent lighting and assistance systems. For instance, if a ride height sensor or the electrical center is replaced, the adaptive light system must also be calibrated. This is because a glare-free high beam assistant depends on the information provided by the vehicle's own high-tech sensors to correctly detect and hide objects.

In the following, you will learn how your headlight adjustment can profit from the know-how of the lighting expert HELLA and the workshop experience of the diagnostics specialist Hella Gutmann.

Let us meet the challenges of future together!

Innovative, digital and fit for the future – the SEG V from Hella Gutmann

Digitalization is the driving force of progress. Many processes become faster, simpler, and moreover, they can be documented. This also applies to our digital beamsetter SEG V. And there is more: The SEG V combines innovative technologies like the CMOS camera, level sensor technology and performant data processing with the wealth of data from diagnostics and lighting specialists.

INTUITIVE OPERATION VIA TOUCHSCREEN

At the same time, operating the device couldn't be easier. All functions are selected on the touchscreen in the well-arranged menu. In the background, customized algorithms ensure process optimization and reliable results. The intelligent support already starts with the correct selection of the vehicle and the lighting system. This reduces the risk of pre-selecting the wrong vehicle which is the most common source of errors when testing and adjusting modern headlight systems with glare-free high beam.

WHY GO DIGITAL?

Contrary to analog beamsetters, the image is automatically digitalized by the CMOS camera of the SEG V. The software then compares it with the stored target data. In almost real time, the user sees the light distribution on his screen with the auxiliary and tolerance lines and the corresponding results via signals in red, yellow and green. If the headlight needs adjusting, the user is guided interactively until the headlight setting is correct (depicted in green). The adjustment can be documented in the test report and saved in the memory of the SEG V. Thanks to a combination of clever features, modern lighting systems can be calibrated easily and efficiently.

Hybrid sight for exact alignment in front of the vehicle. Redundancy thanks to an analog sight and a laser sight

Laser module with electronic timer. The light-intensive laser is clearly visible – even in bright surroundings and on dark car paint

Sight arm height-adjustable and directed towards the front. Solid metal structure for lasting accuracy and user comfort

Stainless steel column. Stable, high-quality profile for minimal divergences. Rotating and lockable for easy use

8.4" touchscreen TFT inclined towards the user

Fresnel lens with special structure for optimal quality of the light distribution image

With their special profile, the large **wheels** (160 mm) allow for smooth movement on the workshop floor and on rails

Column operated via guide stud and cast bushing. For max. stability and durability

Wheel-mounted base made from polymer concrete designed for extreme loads. The low center of gravity guarantees great stability and tilt resistance

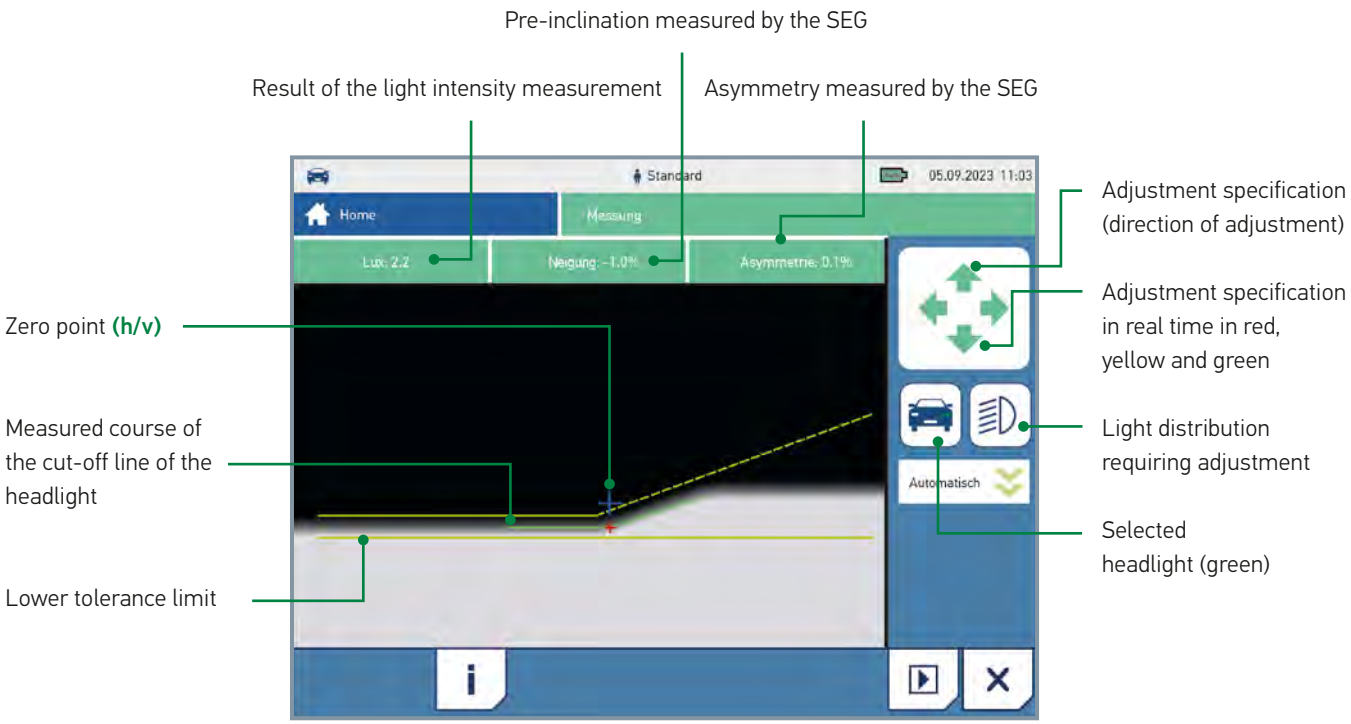
LARGE TOUCHSCREEN
with high-contrast user interface. For a clear presentation of the information.

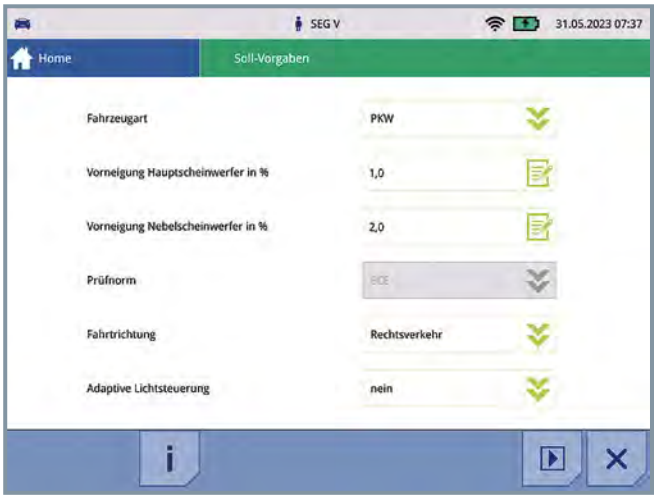
HIGH FLEXIBILITY
in the workplace. With its standard wheels, the SEG V can be moved freely on the floor or alternatively on a rail system

COLUMN LOCK
for locking the rotating column. Thus, the beamsetter box cannot be turned out of position unintentionally.

Everything in view – real-time measurements including comparison of target and actual values for optimal results

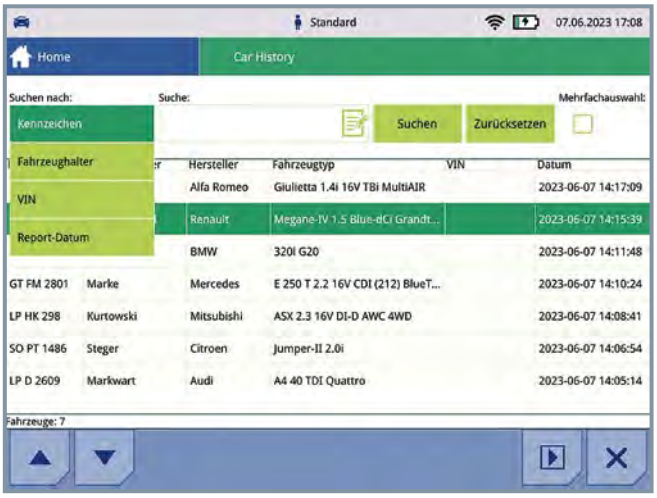
A picture is worth a thousand words. When turning the adjustment screws as directed, the depicted light distribution shifts until it aligns with the auxiliary and tolerance lines. When this occurs, the adjustment was successful.





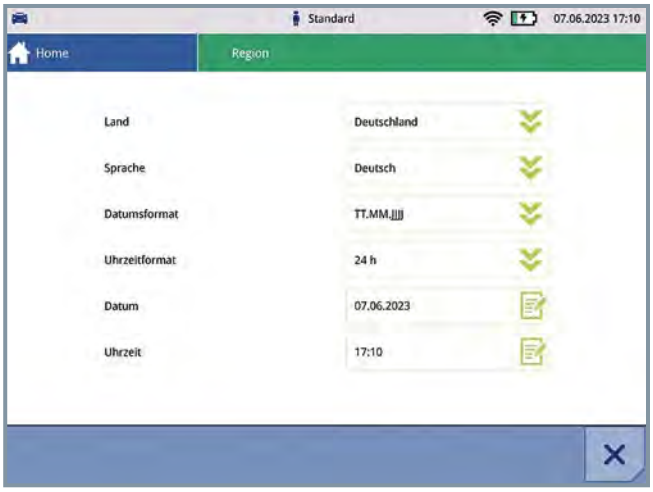
USER-FRIENDLY NAVIGATION

Clear, uncluttered content presentation for intuitive operation. The logical menu structure makes the process fast and efficient.



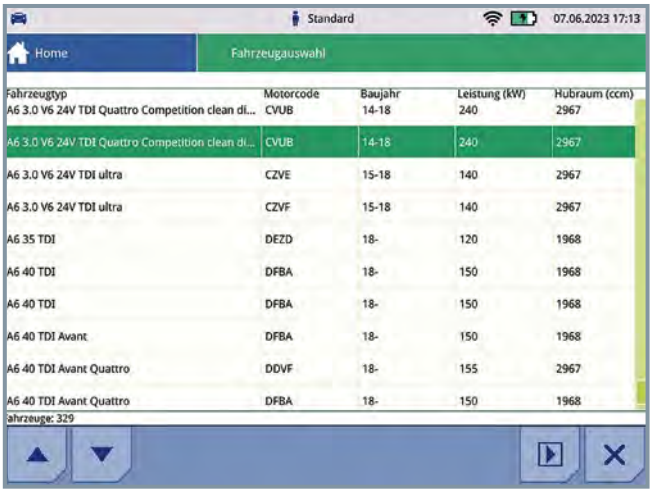
CAR HISTORY

The results of the measurements and the performed adjustments are saved in a data base. A practical side effect is that the vehicle is quickly identified when the measurement is carried out again in the future.



INDIVIDUAL DEVICE SETTINGS

The device can be adapted to individual requirements which makes working with the SEG V so efficient and comfortable.



VEHICLE DATABASE

Elimination of errors thanks to fast and reliable identification of the vehicle and the lighting system. All necessary algorithms (including those for glare-free high-beam assistance systems) are stored with the relevant model.

Efficient support for headlight systems with intelligent light functions

Naturally, the most modern intelligent headlight systems like glare-free high beam can also calibrated and adjusted with the SEG V. You just select the vehicle in the data base. The SEG then selects the correct algorithm for the light distribution automatically. Alternatively, a selection of algorithms is shown. Fast and efficient!

Vehicle and model-specific algorithms are stored in the SEG V, for example for:

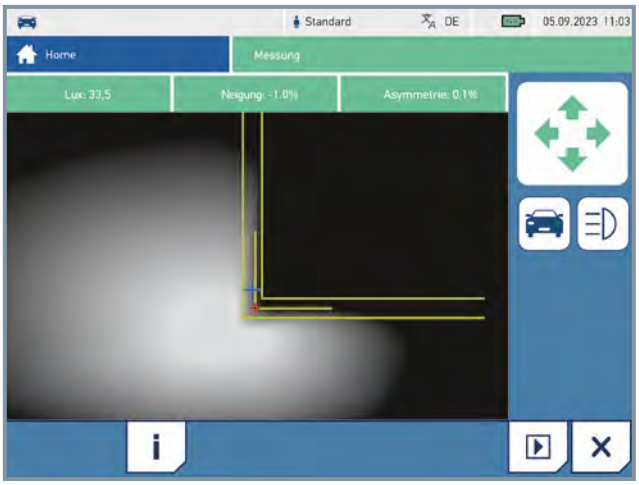
- Audi Matrix LED
- Audi HD Matrix LED
- BMW Spot Light
- Ford ILS (Intelligent Light System)
- Ford Matrix
- Mercedes ILS (Intelligent Light System)
- Tesla LED Headlight
- VW DLA (Dynamic Light Assist)
- VW Matrix LED

See also picture 9

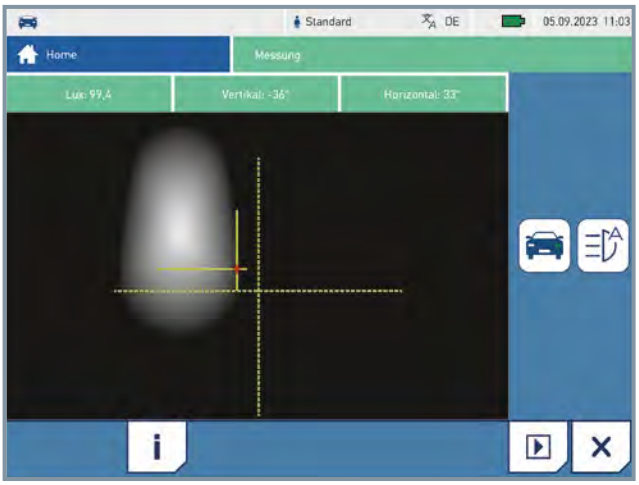
In several updates per year, this data is continually updated with new vehicle models and headlight types.

BASIC SETTINGS WITH SEG V AND DIAGNOSTIC TOOL

In most cases, a diagnostic tool is also required for exchanging data with the control units of intelligent headlight systems. The SEG V provides you with the numeric values and target positions of the light distribution you need for the basic setting of a particular lighting system. As shown in the following examples, the procedures vary depending on the manufacturer.



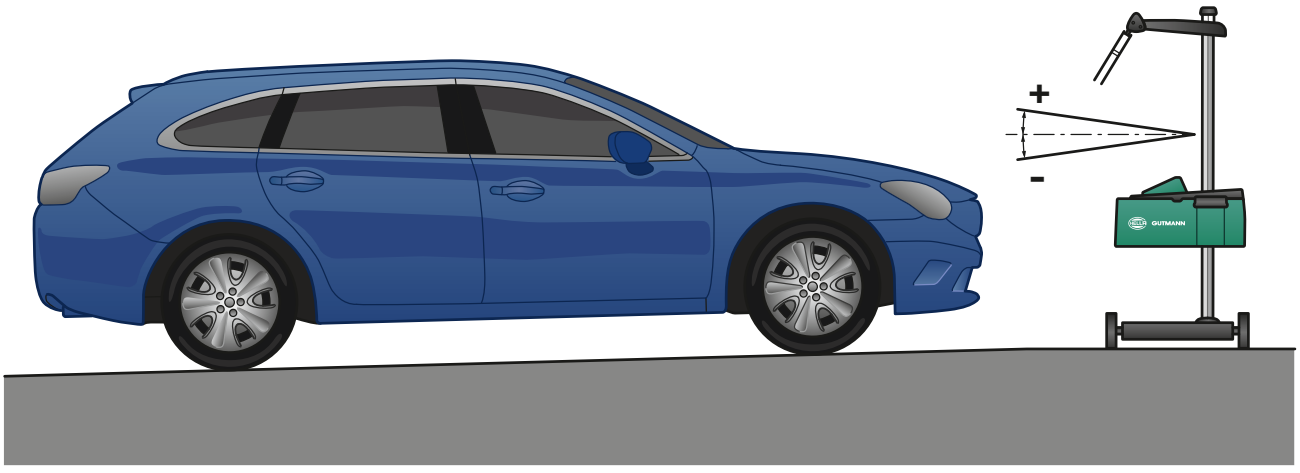
Example VW: Vehicles equipped with DLA (Dynamic Light Assist) exhibit the lighting characteristics described above. The correct adjustment is made mechanically with the corresponding adjustment screw. The basic setting is completed with the diagnostic tool.



Example Audi Q8: a special type of light distribution is generated via the master LED. The horizontal position of the “inner vertical cut-off line” of the light distribution is the benchmark. Its distance to the y-axis of the coordinate system is given in minutes of arc. This value is saved in the relevant control unit with the diagnostic tool.

ELECTRONIC LEVEL SENSOR

for automatically compensating any uneven or inclining ground in the area the SEG or the vehicle are standing on. Uneven or inclining ground of up to 2% laterally and longitudinally are accurately recorded and factored in as correction values when calculating the measurement results. In addition, uneven and inclining ground, which may exist at different workstations, can be compensated via the function “Manual compensation”. To do this, you enter the values of the x-axis and the y-axis in the SEG manually. These values are then calculated by the device in relation to the zero position to ensure optimal results at every workstation.



TEST PROTOCOL:
CLEARLY DOCUMENTED MEASUREMENT RESULTS

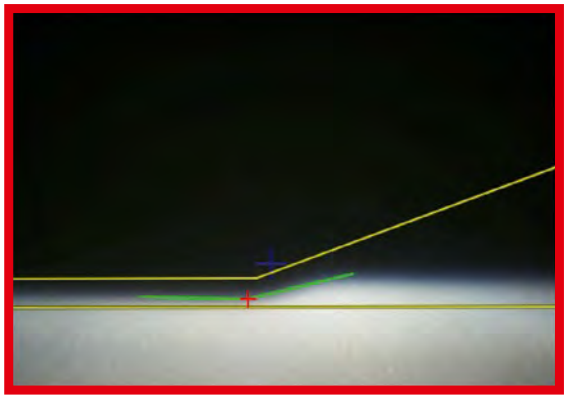
The measurement results of the light distributions are documented by the SEG V in the final report. The comparison between “before” and “after” with the relevant tolerance values provide a clear documentation. Thanks to the large data storage capacity, the measurement results can be stored on the device and retrieved even years later.

With the provided graphs showing the light diffusions, the technical elements can be explained to customers in a simple and accessible manner. This creates a maximum of transparency and trust.

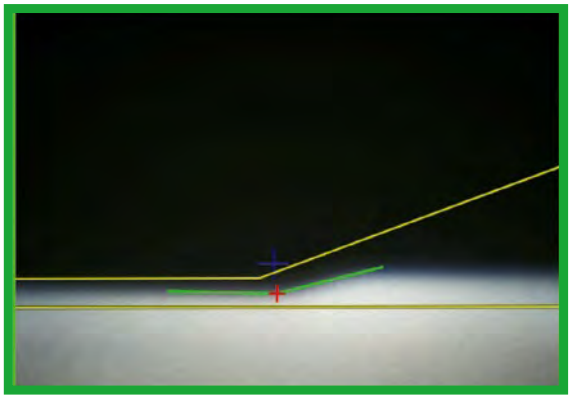
MEASUREMENT RESULTS LOW BEAM

Test standard: ECE **Inclination**: -1.0 ± 0.5 % **Asymmetry:** 0 ± 0.5 %

Headlight (left)

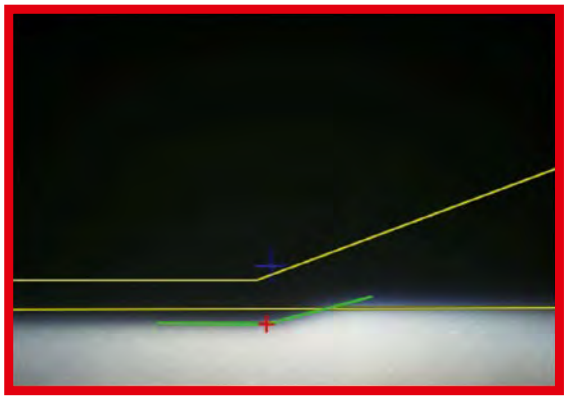


Real values	**Before**
Asymmetry:	-0.80 %
Inclination:	-1.21 %
Glare value:	2.45 Lux

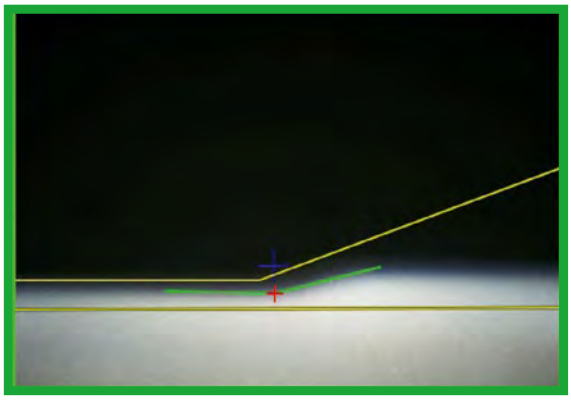


Real values	**After**	**Result**
Asymmetry:	+0.13 %	OK
Inclination:	-1.00 %	OK
Glare value:	1.81 Lux	

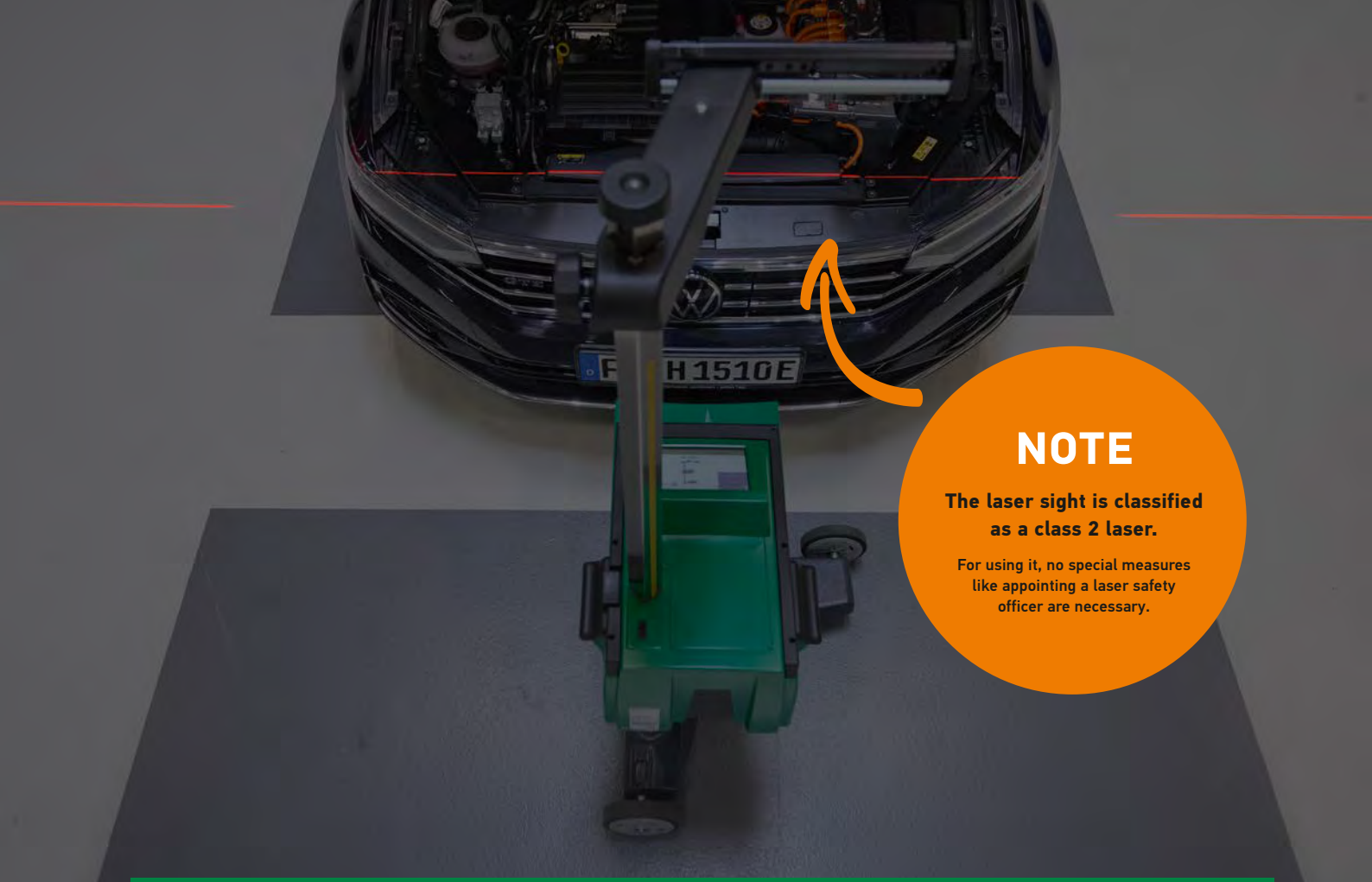
Headlight (right)



Real values	**Before**
Asymmetry:	-0.14 %
Inclination:	-2.04 %
Glare value:	1.65 Lux



Real values	**After**	**Result**
Asymmetry:	+0.02 %	OK
Inclination:	-0.98 %	OK
Glare value:	1.81 Lux	



NOTE

The laser sight is classified as a class 2 laser.

For using it, no special measures like appointing a laser safety officer are necessary.

MAIN FEATURES OF THE BEAMSETTER SEG V

- Made in Germany, design approval according to the guidelines of the German road traffic licensing regulations
- Adjustment of all light sources (Bilux, Halogen, Xenon, LED, Laser)
- Suitable for all vehicle types (two-wheelers, trikes, passenger cars and commercial vehicles)
- Suitable for all headlights (low beam, high beam, fog lights and additional headlights)
- Suitable for high-beam assistance systems with vertical cut-off line (Audi, BMW, Daimler, Ford, Skoda, VW, etc.) On certain models of the Volkswagen Group, the correction values are given in minutes of arc (e.g. with the Matrix Beam)
- High-quality Fresnel lens, exact image of the light distribution without distortions
- Wheel-mounted base from polymer concrete for extreme loads, low center of gravity and high tilt resistance
- Large wheels with special profile for universal use with or without a rail system (both with the same set of wheels)
- Hybrid sight consisting of a laser sight and an analog crosshair sight ensures that the device is always 100 % operational
- Electronic level sensor for compensating uneven or inclining ground the SEG or the vehicle are standing on
- Precise and fast image processing. Nature and characteristics of the light distribution remain intact. Clear identification of the cut-off line without color blurs
- The high computing power of the CPU with its short response times enables working in almost real time
- USB and Wi-Fi interface for updates and optional external storage of the measurement results. The measurement reports can be sent via Wi-Fi to any e-mail address
- asanetwork function
- Multilingual menu – choose between 16 languages
- Enter vehicles manually. This way, the measurements of vehicles which are not in the integrated data base can also be stored, e.g. commercial vehicles, vans, special-purpose vehicles, etc.
- The measurement report includes the measurement results with images of the light distributions before and after the intervention. Valuable help for explaining the work to the customer and proof of quality

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