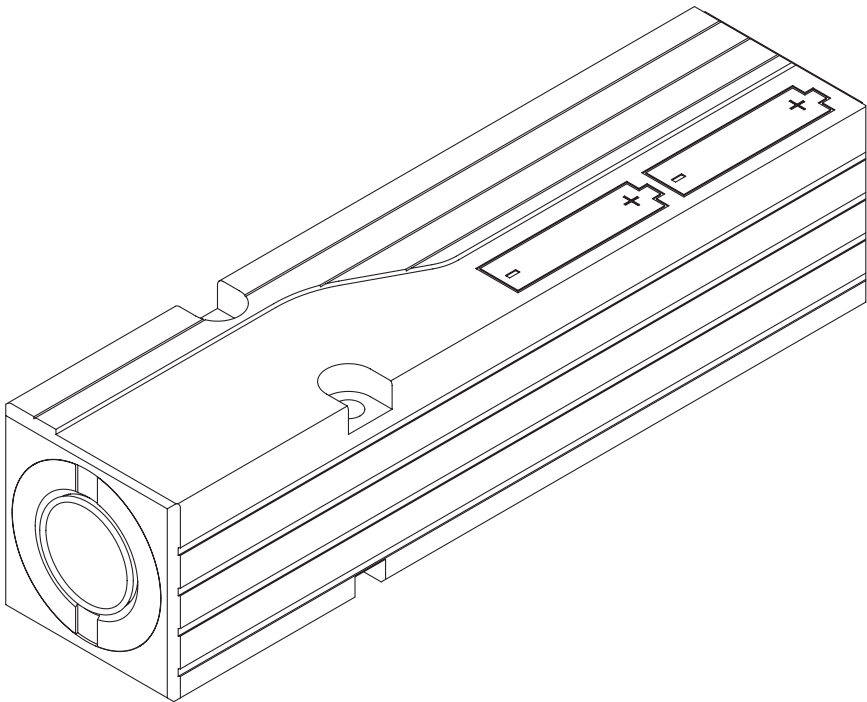




# Line Laser Module LLM01

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— Systeme.

## User Manual



## Dear User

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You are advised to carefully read this User Manual before you start working with the LLM01 Line Laser Module. This is necessary to help you make full use of the capabilities which your new Line Laser Module offers.

This technology is subject to continuously ongoing development.

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### Note

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# Table of contents

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1	General	5
2	Safety Notes	7
2.1	Basic Information	7
3	Technical Specifications	9
3.1	Laser	9
3.2	Features	9
3.3	Drawing	10
4	Operation & Startup	11
5	Service & Maintenance	13

# Table of contents

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# 1 General

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The LLM01 Line Laser Module provides a beam emission source to project a vertical or horizontal red line (at 635 nm wavelength) onto a target of appropriate features (target board, etc.).

The LLM01 Line Laser Module is intended for combined use with no other mechanical interface than VAS 6350/3 from VOLKSWAGEN AG.

For operation, the module needs to be fixed to a mechanical holder base of the type as specified above, after proper adjustment of that holder. The beam will be projected onto a target board with an angle accuracy that depends on how accurately the holder's support faces, which mechanically mate with the LLM01's reference faces and define the module's position, have been placed in a level position (One should make sure that the relevant mechanical interfacing components are exactly vertical or horizontal. Please note that the mechanical interface is not included in delivery of the LLM01 Line Laser Module).

If the LLM01 Line Laser Module is mounted onto a vertically aligned mechanical interface, the projected red laser line will create an image of adequate accuracy.

Conversion from vertical to horizontal line mode can easily be achieved by tilting the LLM01 Line Laser Module by 90 degrees.

Particular features are:

- Working temperature range from -10 °C to +40 °C.
- Maximum distance for projection onto fixed targets: 10 m (depending on target reflectance and ambient brightness).
- The module's projection planes are adjusted to be orthogonal to or parallel with its fixed reference faces for mechanical attachment.

Advisory notes for working with the LLM01 Line Laser Module:

For projection, even vertical surfaces such as building walls or other face panels specially installed for projection should be selected as targets.

There must be no persons or objects in the beam-path space between the LLM01 Line Laser Module and the target face of projection, because this might induce error portions and failure to achieve a correct line image.

The module works with a laser emitting visible red light at the wavelength of 635 nm (laser class 2).

The LLM01 Line Laser Module is shipped in a stable cardboard container with

## General

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suitably padding. The container can also be used for safe transportation.

Scope of delivery: LLM01 Line Laser Module

Sighting goggles

User Manual

Batteries (accumulators), a mechanical interface and fixing screws are not included in delivery.

## 2 Safety Notes

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### 2.1 Basic Information

Safety notes and operating advice must be read carefully and followed at any time during practical use of the LLM01.



**Laser radiation**  
**Do not look into the beam!**  
**Visible laser of class 2**

The LLM01 Line Laser Module is a class 2 laser projection device under DINEN 60825-1:2001-11 / IEC 825-1. It also qualifies as a class II product under FDA21 CFR.

In the event of accidental short-time beam exposure, the human eye is normally protected by its own lid-closing reflex and preventive reaction.

The natural lid-closing reflex may however be impaired by the influence of medication, alcohol or drugs.

For this reason, the following rules should always be observed:

- Prevent direct eye exposure to the beam
- Do not deliberately direct the laser beam at people or animals, notably not at their eyes
- Refrain from opening the laser.

**These safety notes and operating advice must be read carefully and followed at any time during practical use of the LLM01.**

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## 3 Technical Specifications

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### 3.1 Laser

Laser:	Laser diode (wavelength of 635 nm)
Laser class:	Visible red light, 635 nm, laser class 2, in compliance with IEC825-1 / EN60825 standard, class II under FDA21 CFR

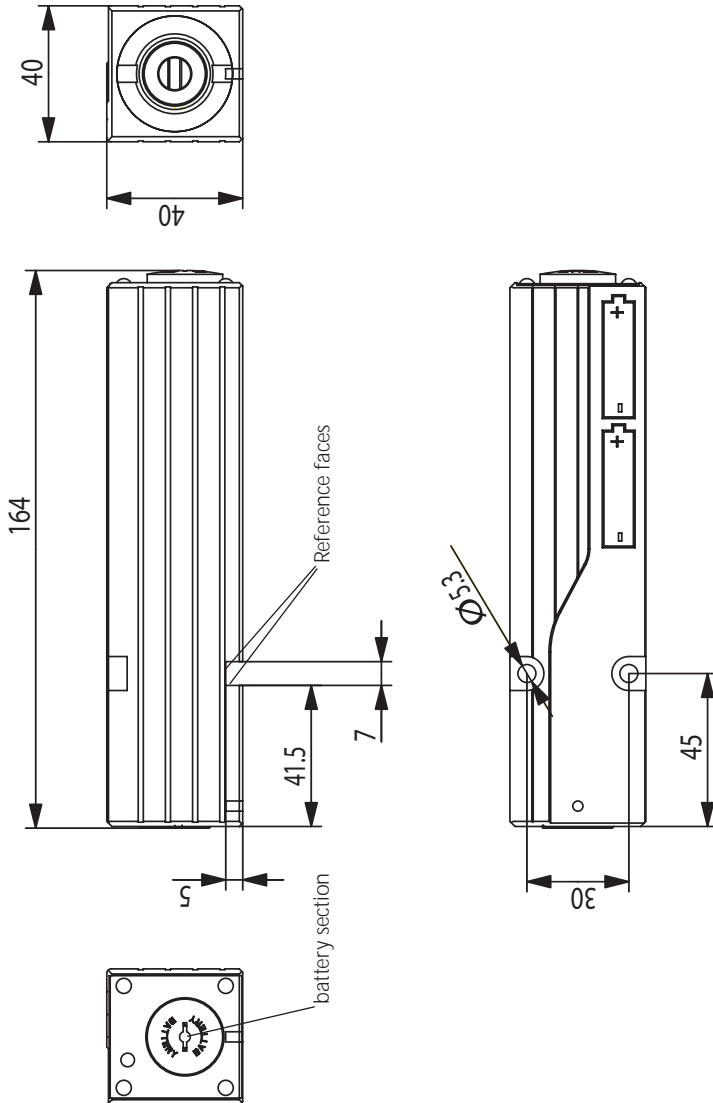
### 3.2 Features

Applications:	Projection of a visible red laser line, laser line adjusted to be parallel or orthogonal to reference faces
Laser beam:	1 mm line width for 2 m working distance
	Horizontal and vertical variance < 1 mm at working distance of 2 m
Laser aperture angle:	120°
Reach:	Up to 10 m (depending on target reflectance and ambient brightness)
Current consumption:	< 60 mA
Working temperature:	-10 °C to +40 °C
Power supply:	Two AA primary cells (alkali-manganese or rechargeable NiMH)
Operating time per battery set/charge	Approximately 20 hours if supplied by alkali-manganese battery, and approximately 16 hours for operation with accumulators
Automatic shut-down:	After a maximum of 8 minutes
Internal protection:	IP60 (with battery casing off)
Phys. dimensions:	165 x 40 x 40 mm
Weight:	425 g (without batteries)
Radio suppression:	Noise immunity according to DIN EN61000-6-2
	Emitted interference according to DIN EN61000-6-3
	FCCPart15ClassAA21 CFR

# Technical Specifications

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## 3.3 Drawing



## 4 Operation & Startup

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Make sure that the LLM01 Line Laser Module is firmly attached to its support base (VAS 6350/3 mechanical interface from VOLKSWAGEN AG, not included in delivery) with two screws (M5 x 35 mm Allen type) before you proceed to initial startup.

Open the battery section on the module's back face and insert the two batteries or accumulators (as shown in the pictogram on top of the module) before you turn power on. Check for correct polarity of battery supply! Use a coin to turn the battery section lid out for this purpose (bayonet lock). Having placed the two batteries or accumulators, turn the lid in until firmly locked again.

Required batteries or accumulators are commercially available. They are not included in the standard delivery scope of the module.

Allowed power cells:      Two AA type alkali-manganese primary cell batteries  
or  
two accumulators of rechargeable NiMH primary cell type.

### 4.1 Startup & Operation

To turn power on or off, press the red button at the back (face wall) of the LLM01 Line Laser Module.

If the module had been in operation for a longer time and the intensity of its laser line is found to create a weaker image on the projection target faces, both batteries of AA primary cell type (alkali-manganese) must be replaced, or a refill must be performed if you work with rechargeable NiMH power sources.

For greater distinctness of the projected laser line, a pair of special laser goggles is available (included in delivery).



**Important:**

For repair work, the module may not be opened by anyone other than Manufacturer personnel.

**Note:**

Changes of any kind which are made in the mount of the optical window on the module's front face will result in misadjustment of the Line Laser Module.

Faulty readings as a consequence of such changes will automatically void any claims for warranty.

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## 5 Service & Maintenance

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In the event of necessary repair or maintenance work, you are requested to carefully pack and reship the LLM01 Line Laser Module to the Manufacturer, stating the particular conditions under which the module has operated (types of application, power supply specs, ambient conditions), at this address:

**JENOPTIK Laser, Optik, Systeme GmbH**  
Sensor Systems Business Unit  
Pruessingstrasse 41  
07745 Jena  
Germany

or contact us by phone or via fax in advance at the following extension numbers:

Phone: 03641 65-3314  
Fax: 03641 65-3657  
E-Mail: [sensor.sales@jenoptik.com](mailto:sensor.sales@jenoptik.com)  
Internet: [www.jenoptik-los.com](http://www.jenoptik-los.com)

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