

LM 20 Luminance Meter

Application

The LM 20 Luminance Meter is a precision measurement instrument designed for laboratory application to measure the luminance of automotive license plates in a most convenient and time saving way.

It is installed in a fixed position 3.126 m from the test object, either on an automatic positioning unit or tripod, to target the reference field of 25 mm most accurately. It therefore conforms to the specifications of ECE R4 and corresponding SAE regulations. A patented LED targeting device that creates an image of the reference field on the sample plane is used for targeting the 25 mm measurement spot.

The unit is equipped with a DSP 10 preamplifier connected to the AMS control and display unit, indicating, and evaluation device and transmitting the measured data to the PC.

The LM 20 provides an automatic integrated solution for the completion of a photometry lab for measuring vehicle lamps.

Standard: DIN 5032-7, class L/A, CIE 69



LM 20 in automated application with automatic photometer positioning unit

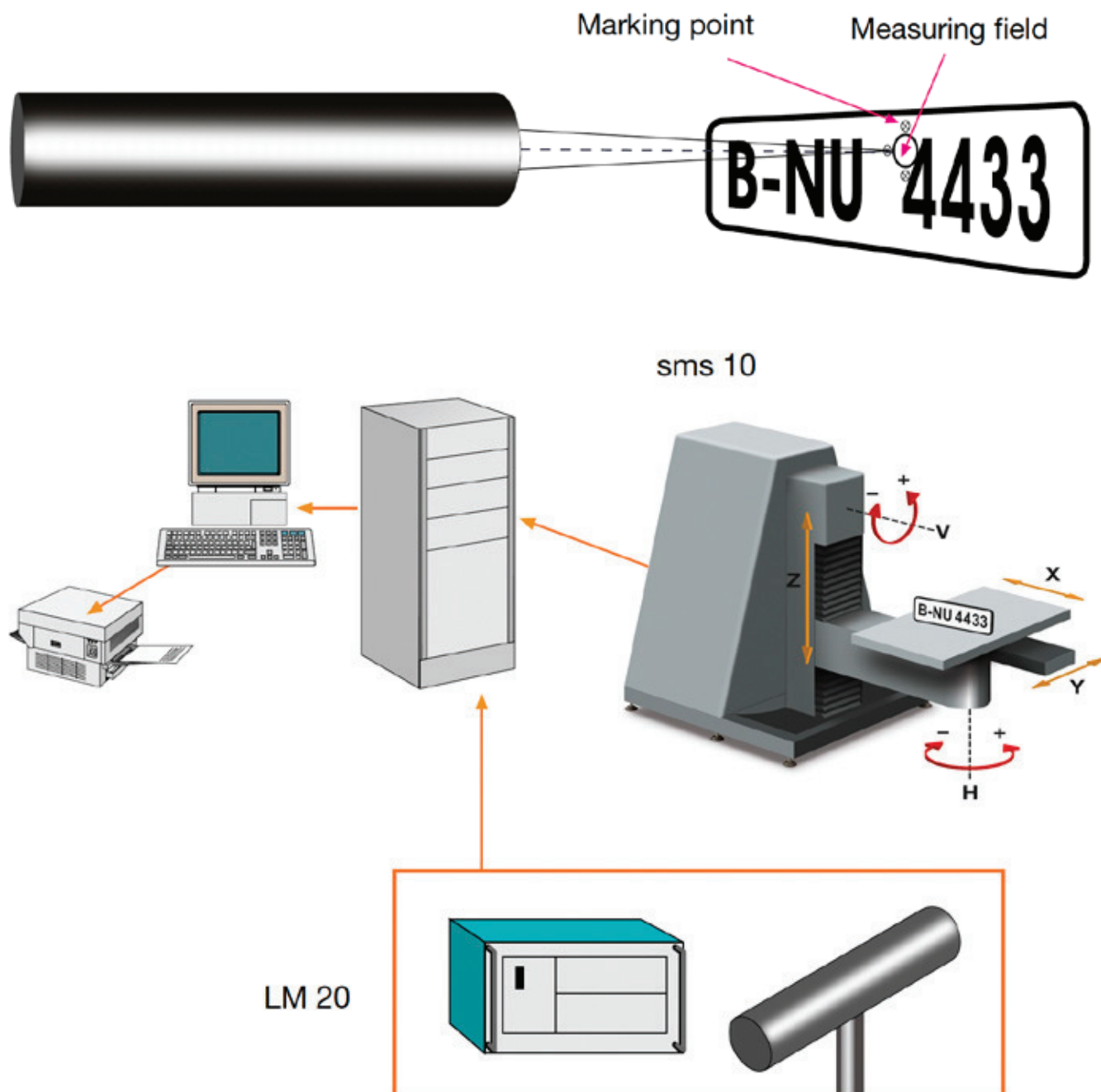


LM 20/CM 10 V(λ) 3.162 m in photometric lab

Characteristics

- Fixed angular observation field 0.45° (targeting of 25 mm reference field)
- Display range 0.02 cd/m² (last digit) to 1,000,000 cd/m²
- Measuring distance: 3.162 m
- Photometer head with Si-photoelement, superior V(λ)-approximation (typ. $f_1^1 < 1.5 - 2.0 \%$)
- Luminance meter classification: class A/L, DIN 5032-7
- Linearity < 0.2 % or better
- 4-digit display at AMS photometer display unit and the PC screen
- Connection via CAN bus and RS232C serial interface to AMS measuring system
- Auto Ranging
- Individual test report for V(λ)-approximation
- Calibration traceable to PTB standard with Optronik calibration certificate
- Power supply: 24 V DC
- Power rating: 0.5 A max.
- Dimensions : (L x Ø) 680 x 110 mm
- Weight: 3.3 kg (only LM 20 tube unit).

Example of application



Options

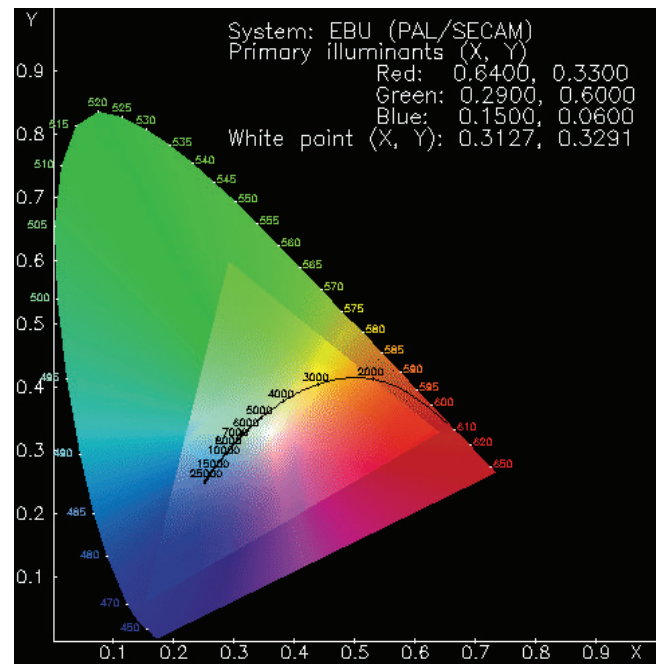
- License plate holder with fixtures for lamps and license plate dummies
- License plate dummies: ECE, SAE, Chinese and other sizes with reflectance standard
- Automatic photometer positioning unit
- Tripod
- TÜV or PTB certificate available.

Colorimetry

Colorimetry is based on the fact that observers can match colors with additive mixtures of three reference stimuli in amounts known as tristimulus values. Using reference stimuli at specified wavelengths, CIE has defined a standard set of tristimulus values to match each different wavelength of the spectrum. These data constitute the CIE 1931 standard colorimetric observer. The reference-color stimuli are radiations of wavelength 700 nm for the red stimulus (R), 546.1 nm for the green stimulus (G) and 435.8 nm for the blue stimulus (B).

The tristimulus values were chosen to match the typical white color. There is a great imbalance in the three amounts (the amount of green being the greatest and the amount of blue being much smaller). As white is a color that is not biased towards red, green, or blue, new relative units of R and B were chosen so that the amounts are equal to the amount of green.

Series of measurements have been carried out with the standard colorimetric observer to find the different tristimulus values for different colors. To make use of the huge resulting data file, CIE has worked up a specific “map” of colors. As three stimuli are assigned to each color, a three-dimensional coordinate system would have been needed to plot the actual coordinates. To simplify this representation (at the expense of losing the lightness information), coordinate transformation and some other calculations have been done, resulting in a two-dimensional chart called chromaticity diagram. In spite of this, the suitability of the diagram for all colorimetric measurements without the need of the related mathematical apparatus gives the chromaticity diagram an outstanding importance.



CIE Tristimulus Diagram

Luminous Color

Value	Symbol	Unit
Color temperature	T_{cp}	[K]
Color rendering index Color rendering group	R_a	[1]
Trichromatic values	X, Y, Z	[1]