GOSSEN

MAVO-MONITOR / MAVO-SPOT

Instrument Set for Contact or Distant Measurements of Luminances

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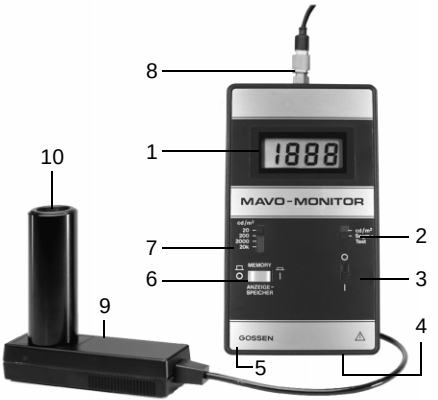

1 Display
2 Slider switch cd/m² – segment test
3 ON/OFF switch
4 Rechargeable battery socket
5 Socket for recorder output
6 Hold key
7 Selector slider switch
8 Socket for connection to meas. sensor
9 Measuring sensor
10 Sensor aperture

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1 Description of MAVO-MONITOR

The MAVO-MONITOR is an illumination level meter designed for easy and precise measurements in cd/m² on backlighted or luminous surfaces. The instrument is colour-corrected, i.e. the spectral response of the photo diode is adapted to that of the human eye V (λ).

The correction filters are incorporated in the sensor. They can thus measure all salient kinds of light without having to take correction factors into account.

The recorder output of the MAVO-MONITOR makes it particularly suitable for monitoring applications, checking technical acceptance conditions and wherever hardcopy results are required.

2 Applications

Contact Measurements

with the MAVO-MONITOR
placed directly on the surface to be measured.
Suitable for

- monitors
- television screens
- light boxes
- light displays

Measuring at a Distance

Using the MAVO-MONITOR plus
MAVO-SPOT attachment.
Suitable for measuring

- monitors taking the existing ambient light into consideration
- lighting of streets and airfield areas
- lighting of sports areas
- light contrasts at work stations
- lighting in museums
- uniform illumination of projection screens

3 Operating the MAVO-MONITOR

3.1 Inserting the Battery

The battery compartment is to be found at the back of the unit.
To open the compartment turn the screw through 90° using a coin so that the lid pops open.
Insert the included battery into the battery compartment.
Make sure you insert the batteries with the right polarity. Close the battery compartment.

Attention

Only use new batteries or rechargeable accus according to IEC 6 LF 22!

3.2 Preparing the Measurement

Connect the measuring sensor to the MAVO-MONITOR. Switch the instrument on using the ON/OFF switch and carry out a segment test.

Segment test

Move the slider switch to the position “Segm.-Test”. The display is working properly when the readout 1888 appears for 1.5 seconds (followed by an undefined readout).
If not, the instrument must be returned to our Service Department.

3.3 Contact Measurements

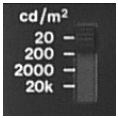
Move the slider switch to “cd/m²”.
Place the sensor flat on the surface to be measured. Select the desired measuring range using the selector slider switch.

Notes

– Strong ambient light can influence the measurement. This is particularly important when a glass pane is sandwiched between the actual screen surface and the sensor.
– Artificial light sources do not achieve full luminance until they have warmed up. It is therefore advisable to switch on 15 min. earlier.
– The luminance of light sources depends on the power supply i.e. check the voltage with a voltmeter where necessary.

3.4 Overflow

If the measuring range is exceeded the display merely shows a 1 on the left, the other digits will be blank. Move to the next higher range.

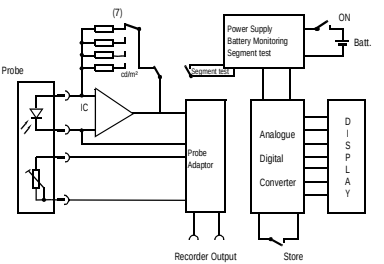


Display Hold

Pressing the display hold button will “freeze” the readout at that time. Pressing this button again will release the hold and normal measurements can be resumed.

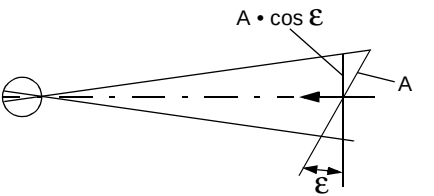
4 Functioning and Circuitry

The instrument essentially comprises the sensor containing the silicon photocell and the correction filters and the instrument itself. In an integrated (IC) operational amplifier the short-circuit current of the photocell, which is located directly at the input to the op amp, is measured. This kind of short-circuit current measurement has the advantage of low dependency on temperature and producing a linear result. Range selection is done by means of the selector slider switch. Sensors can be interchanged by means of the “sensor matching” circuit in conjunction with the potentiometer control in the sensor. This circuit also generates the voltage level for the recorder output.



5 What is Luminance?

This is the amount of light as registered by the eye. Luminance thus expresses the brightness of a surface. The luminance in a certain direction is the density of the illumination emitted from the light-source surface, i.e. the quotient of the illuminance J in the direction concerned and the illuminating surface area A • cos ε.



The unit of measurement of luminance is the candela per square centimeter = cd/cm²
or for very low luminance levels cd/m² (the former unit was: “Apostilb” (1 asb = 0.31831 cd/m²)).
Also used:
1 fL (footlambert) = 3.426 cd/m²
1 cd/ft² (candela per square foot) = 10.76 cd/m²

6 Technical Data

Meas. Ranges / Resolution	0.01...19.99 cd/m² (10 mcd/m²) 0.1...199.9 cd/m² (100 mcd/m²) 1...1999 cd/m² (1 cd/m²) 0.01...19.99 kcd/m²(10 cd/m²)
Accuracy	for incandescent bulb light (normal light A) ± (2.5% of rdg. + 4 digits) Additional error for other light sources (acc. to CIE TC - 2.2): max. ± 3% of rdg.
Recorder Output	0 ... 1.00 V for each range. Necessary input impedance of recorder at least ≥ 500 kΩ. The recorder output socket complies with safety class III requirements.
Meas. Sensor	
– Aperture	18.5 mm ∅
– Meas. Area	10 x 10 mm
Display	LCD 3½ digits
Digit Height	12.7 mm
Power Supply	9 V IEC 6 F 22 battery (e.g. Mallory MN 1604/Alkali or Varta Super 438) Accu IEC 6 LF 22 (e.g. Varta 4002)
Case	Plastic
Cable Length	1.5 m
Dimensions	
– Meas. Instrument	86 x 153 x 25 mm
– Meas. Sensor	32 x 105 x 95 mm
– Ever-Ready Case	approx. 140 x 200 x 40 mm
Weight	approx. 350 g without batteries
Included Accessories	Ever-ready case

Optional Accessories

MAVO-SPOT attachment
for measuring at a distance

7 Maintenance

7.1 Calibration Service

The instruments are calibrated at the light of a scientific standard lamp having a colour temperature of 2856 K, fully in accordance with the PTB standard.

Depending on how the instrument is being used we recommend a recalibration interval between 12 and 18 months.

For this purpose please contact our Calibration Service Department (telephone +49 911 8602 172).

7.2 Cleaning and Maintenance

Keep the instrument dry and clean, away from dust. Avoid exposing the sensor to unnecessary light.

Please use a slightly damp cloth only for cleaning the plastic surfaces; avoid the use of cleaning agents or other strong chemicals. The lenses should be cleaned with a special cloth or brushes as used for optics.

1 ON/OFF switch
2 Battery control
3 Lens with protective filter or close-up lenses
4 Ocular with eye-cup
5 Battery compartment
6 Connection cable

8 Description of MAVO-SPOT

The MAVO-SPOT is a very precise measuring instrument attached to the basic instrument MAVO-MONITOR with a measuring angle of 1°. This combined equipment set permits measuring the luminance at distances from 1 m to ∞ while including the existing ambient light.

That distance can be further reduced down to 34 cm when using the close-up lenses which are available as optional accessories.

The MAVO-SPOT is colour-corrected, i.e. the spectral response of the photo diode is adapted to that of the human eye V (λ) according to DIN 5032/T7 class B.

Measuring at a Distance

Using the MAVO-MONITOR plus MAVO-SPOT attachment.
Suitable for measuring

- monitors taking the existing ambient light into consideration
- lighting of streets and airfield areas
- lighting of sports areas
- light contrasts at work stations
- lighting in museums
- uniform illumination of projection screens

9 Operating the MAVO-SPOT

9.1 Inserting the Battery

The battery compartment is located at the front of the grip of the unit.
Slide the cover of the compartment downwards, insert the battery and attach the connector clips to the new battery.

Take care to get the polarity right.

Close the battery compartment.

Attention

Only use new batteries or rechargeable accus according to IEC 6 LF 22!

9.2 Battery Control

When the instrument is switched on the green LED on the right of the ON/OFF switch lights up. When the battery is exhausted the red LED to the left of the ON/OFF switch will light up. You should then immediately replace the battery.
A new alkaline-manganese battery will last for approx. 60 hours of continuous measuring.

9.3 Preparing the Measurement

Screw the protective filter supplied with the instrument or one of the close-up lenses on the ocular of the MAVO-SPOT. For measuring either the protective filter or one of the close-up lenses must be attached. Connect the MAVO-SPOT with the MAVO-MONITOR by means of the connection cable.
Select a suitable measuring range at the MAVO-MONITOR and switch both instruments on.

9.4 Measuring

View through the ocular of the SLR viewfinder of the MAVO-SPOT and direct the measuring circle you see in the viewfinder to the area to be measured. This area should be illuminated uniformly and be as large as possible as compared to the measuring circle.

After that press the memory switch of the MAVO-MONITOR and read the measuring value on the display. When the measuring range is exceeded, switch over to the next higher range and repeat the measurement.

10 Technical Data

Light Sensor	silicon photodiode with V(λ) adaptation approx. 4% acc. to DIN 5032/T7 class B
Meas. Angle	1°
Meas. Range	0.01 cd/m² to 20.000 cd/m² in 4 ranges
Meas. Accuracy	same as MAVO-MONITOR
Power Supply	9 V IEC 6 F 22 battery (e.g. Mallory MN 1604/Alkali or Varta Super 438) Accu IEC 6 LF (e.g. Varta 4002)
Operating Duration	approx. 60 hours of continuous measuring
EMC	Emission EN 50081-1: 1992 Immission EN 50082-1: 1992
Cable Length	approx.1 m
Dimensions	200 mm x 90 mm x 55 mm
Weight	375g (without battery)
Accessories Included	Protective filter Ever-ready case

Optional Accessories

– Close-up lens 1: Reducing the meas. distance down to approx. 51 cm to 1 m
Ordering No.: M496G

– Close-up lens 2: Reducing the meas. distance down to approx. 34 to 51 cm
Ordering No.: M497G

– Transport case Ordering No.: M495G

Close-up Lenses

The MAVO-SPOT with the included protective filter attached to the lens permits measuring from a distance of 1 m to ∞.

For shorter distances two different close-up lenses are available as optional accessories. The close-up lens 1 reduces the measuring distance to approx. 51 cm to 1 m. Lens no. 2 permits reducing the measuring distance to approx. 34 to 51 cm.

Please note that one of the close-up lenses or the protective filter must be mounted to the lens.

Ever-ready Case and Transport Case

An ever-ready case is included with the MAVO-SPOT where also the protective filter and one close-up lens can be placed.

As an optional accessory a sturdy transport and storage case for the combined set comprising both the MAVO-SPOT and the MAVO-MONITOR and also for two close-up lenses and two spare batteries is available.

11 Maintenance

11.1 Calibration Service

The instruments are calibrated at the light of a scientific standard lamp having a colour temperature of 2856 K, fully in accordance with the PTB standard.

Depending on how the instrument is being used we recommend a recalibration interval between 12 and 18 months.

For this purpose please contact our Calibration Service Department (telephone +49 911 8602 172).

11.2 Cleaning and Maintenance

Keep the instrument dry and clean, away from dust and with the protective cover placed on the lens.

Please use a slightly damp cloth only for cleaning the plastic surfaces; avoid the use of cleaning agents or other strong chemicals. The lenses should be cleaned either with a special cloth or brushes as used for optics.

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