

MAVOLUX 5032C/B USB

Digital Luxmeter

15160

1/6.04

**MAVOLUX USB**

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1 Applications

The MAVOLUX 5032 illuminance and luminance meters are handy, easy to use and high precision measuring instruments. They allow the accurate measurement of the illuminance in lx or fc.

Combined with the Luminance Adapter, available as optional accessory, the Mavolux 5032 can also be used for measuring luminance in cd/m^2 or fL .

The light sensor is color corrected, i.e. its spectral responsivity has been matched to that of the human eye $V(\lambda)$. The accuracy of that $V(\lambda)$ matching is the main difference between the two types Mavolux 5032 C and Mavolux 5032 B.

The accuracy classes for illuminance meters have been defined in the Standard Specifications DIN 5032, Part 7. (CIE 69) Consequently, the Mavolux 5032 C complies with Class C, Mavolux 5032 B complies with Class B (CIE 69). Suitable cosine correction is integrated in the light sensor probe, so that oblique incident light will be measured accurately. Consequently, the MAVOLUX 5032 C complies with Class C, MAVOLUX 5032 B complies with Class B.

All the important types of light can be measured with high precision, without the necessity to apply any additional correction factors.

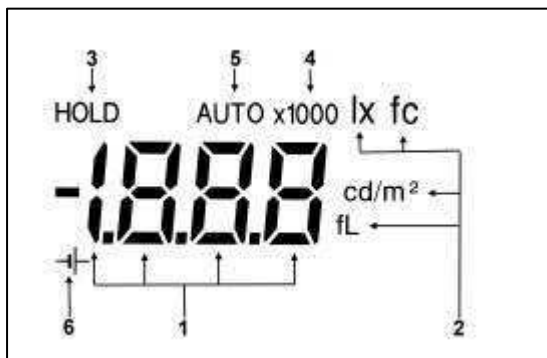
Both Mavolux types allow measuring very high intensity light (daylight, headlights) without additional accessories. Especially the MAVOLUX 5032 B having an initial sensitivity of 0.01 lx is ideally suited for measuring extremely low light intensities, such as emergency lighting.

The instruments are provided with a measurement data memory with 100 locations, which can be read and processed direct with the keys and the display but also through the integrated USB Port and the Standard Software supplied with the meters.

lx	=	Lux	1 lx	=	0.0929 fc
fc	=	footcandle	1 fc	=	10,76 lx
cd/m^2	=	Candela per square meter	1 cd/m^2	=	0,2919 fL
fL	=	footLambert	1 fL	=	3,426 cd/m^2

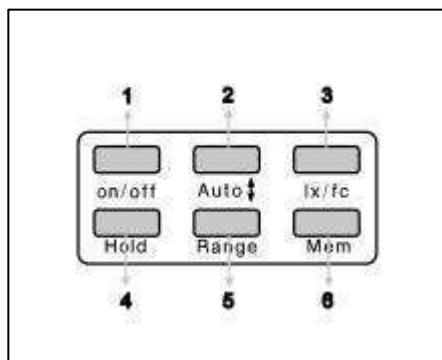
2 Display

2.1 Description of display



- 1 Display of measured value and Memory indication
- 2 Unit of Measurement
- 3 Display „HOLD,, indication
- 4 Auto ranging – automatic range selection
- 5 Multiplying factor for measurement value
- 6 Low Battery

2.2 Key pad



- 1 Switchinh On/off
- 2 Range key – Memory/Measuring range ↑
- 3 lx/fc – Select measurement unit
- 4 HOLD - Function
- 5 Range key – Memory/Measuring range ↓
- 6 MEM – Memory key

3 Functioning of the MAVOLUX

3.1 Preparation

First remove the snap-on cover and open the battery compartment at the back of the meter. Insert the battery included with the meter (1.5 V size AA, IEC LR6) in the battery compartment.

Care should be taken to place the battery correctly according to the polarity indications “+” and “-” in the battery compartment. When the battery warning symbol () appears in the display, the battery must be replaced.

The values in the measurement data memory and also the preset individual values will be maintained, even when the battery is changed.



3.2 Duration of Display – Continuous operation

If for approx. 4 minutes none of the keys of the MAVOLUX is pressed, the instrument will be turned off automatically. During the last 4 seconds before automatic switch off an acoustic signal will sound. By pressing any one of the keys, you can override the Automatic Switch Off.

When the instrument is switched off, the values stored in the data memory and also the preset individual values will be maintained.

You can override the automatic switch-off, when switching on the instrument and simultaneously keep the **HOLD** key depressed. The measuring unit „lx / fc“ in the display will blink and indicate that the Continuous Operation Mode is on.

4 Using the MAVOLUX

4.1 Switching on – Making Measurement

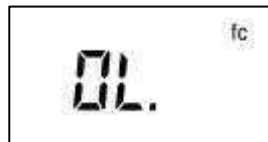
Press the **on/off** key and the MAVOLUX is in the measuring mode and immediately is measuring at the rate of 2 times per second. The instrument is in the function „AUTO“, i.e. the MAVOLUX will select the best suited measuring range for the existing light level. By pressing one of the range keys, one of the measuring ranges can be locked. Browsing up or down through additional measuring ranges is accomplished by briefly pressing one of the range keys. If both keys are pressed and held simultaneously, the instrument is returned to „AUTO RANGING“.

4.2 Selecting the desired measurement unit lx or fc – cd/m² or fL

Use the key **lx/fc** to select the desired unit for the read-out – lux or footcandle. With the additional Luminance Attachment (please refer to 6.2 – Optional accessories), this key also selects the measurement unit for luminance cd/m² or fL.

4.3 Overload Display

When exceeding one of the measuring ranges „OL“ (Overload) appears in the display.



4.4 Memory Functions

The MAVOLUX is provided in addition to the „Display Hold“ also with a memory for data up to 100 measurement values.

This function allows several measurement operations in the field and read-out at a later time. The data stored in the memory will be maintained, even when the instrument is turned off or the battery is changed.

4.4.1 „HOLD“ - Display Hold Function

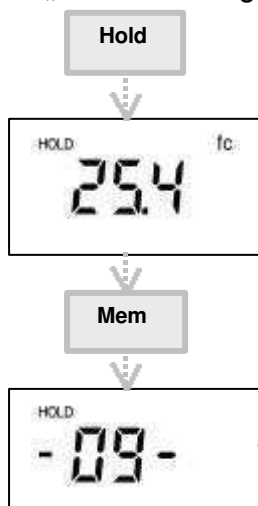
The display HOLD memory in the MAVOLUX allows you to measure at a certain time and hold a measuring value on the display by pressing the **Hold** key. For example at a very low light level it is difficult to read the display but by pressing the **Hold** key the indicated value is held on the display to be read later.

When pressing the key HOLD again, the function HOLD is cancelled.



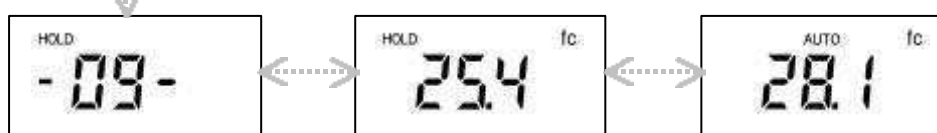
The function HOLD is the basic function for all the memory functions

4.4.2 „Mem“ – Storing measurement value in memory

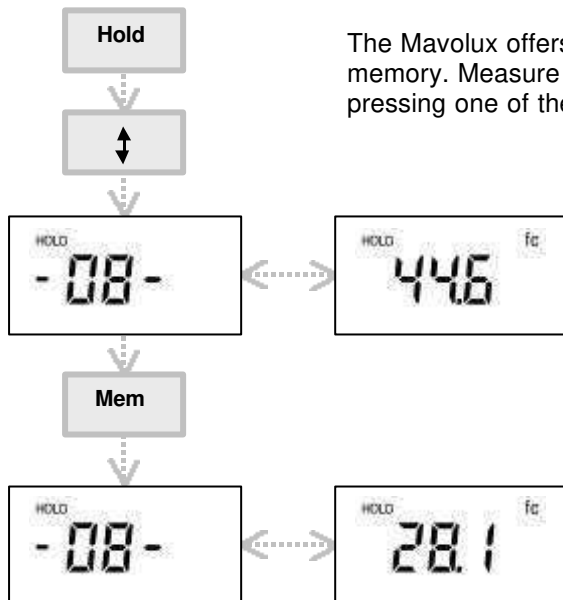


The measurement value to be memorized is locked by the **Hold** key in the display. By pressing the key **Mem** you will enter the value to be stored in the next free memory location.

The display indicates the stored measurement value alternating with the number of the memory location for a few seconds. Subsequently, the MAVOLUX will return to the measuring function. When the memory is completely filled, the display will show „FLL“.



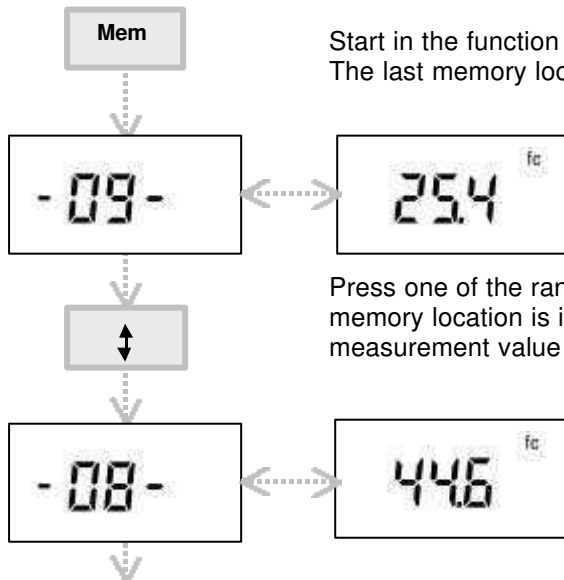
4.4.3 „Mem-Edit“ – Deleting a value in memory and entering a new value



The Mavolux offers the function „Mem Edit“ for correcting a stored value in the memory. Measure again, press the **Hold** key and the new value is locked. Then by pressing one of the range keys, you can browse through the memory.

At the memory location to be corrected press now the key **Mem**. In the display the measurement value stored is indicated for a few seconds alternating with the number of the memory location. Subsequently the MAVOLUX will return to measuring function.

4.4.4 „Mem Recall“ –Data memory Recall



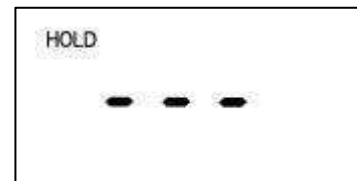
Start in the function „Measuring“ and press the key **Mem**. The last memory location filled will be indicated first.

Press one of the range keys to browse through the data memory. The current memory location is indicated as 01-02... in the display alternating with the measurement value stored in the memory.

To return to the measuring mode just press any one of the other keys or when for about ten seconds no further memory data will be recalled with the Range keys, the MAVOLUX will return to the measuring mode.

4.4.5 „Mem-Clear“ – Clear memory

The MAVOLUX must be in function „HOLD“. When pressing simultaneously the **Range** keys, you clear the complete measuring data memory. The cancelling is confirmed in the display by three dashes.



5 USB Port – Standard Software

The MAVOLUX is equipped with a USB Port which allows the meter to be connected to a PC with the USB cable (supplied).

The CD Rom supplied with the MAVOLUX contains, among other information, a Standard Software which allows you to start the PC operation immediately.

More details about the PC operational functions are also available on that CD-Rom.

6 Accessories

6.1 Standard Equipment

- Leather carrying case
- Battery
- Standard Software on CD-ROM
- USB-cable
- Instruction Manual

6.2 Optional Accessories

- Luminance Attachment cd/m^2 (ordering No. 5908V0120)
- Luminance Attachment fL (ordering No. Z481B)
These attachments allow measuring the reflected light, i.e. the luminance of a surface with a measuring angle $\epsilon^{1/10} = 20^\circ$. By installing the luminance attachment to the light measuring probe a micro switch is activated and the meter automatically changes the unit of measure in the upper right corner of the display and measures the luminance value. There are two different Luminance Attachment types available – one for reading cd/m^2 and another one for fL . So choose according to your requirements
- Calculator, calculating disk (ordering No. 5999V0380)
For converting the values measured with the MAVOLUX into photographic shutter speed/f-stop combinations based on the film speeds.

6.3 Calibration Certificate (Optional)

Calibration reference: Scientific Standard Lamps, type Wi 41G of the PTB (Physikalische Technische Bundesanstalt Braunschweig – National Standard Institute of Germany). Depending on how the instrument is being used we recommend a recalibration interval between 12 and 18 month.

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

7 Servicing and Repairs

No special maintenance is required, if the MAVOLUX is handled correctly.

Keep the outside surfaces clean. Use a slightly dampened cloth for cleaning. Do not use cleansers, abrasives or solvents.

Should the instrument nevertheless not work to your satisfaction or if you will require repeated calibration with Test Certificate, please send the MAVOLUX to:

GOSSEN Foto- und Lichtmesstechnik GmbH
Thomas-Mann-Strasse 16 – 20
D – 90471 Nürnberg

8 Technical Data

Light Sensor Silicon photo diode with V (λ) filter

Classification MAVOLUX 5032 USB – Class C according to DIN 5032, Part 7 (CIE 69)
MAVOLUX 5032 USB – Class B according to DIN 5032, Part 7 (CIE 69)

Measuring Rate 2 measurements per second

LCD display 50 mm x 25 mm
Read-out 7 segments, $3\frac{1}{2}$ digits, 13 mm
Overload signal „OL“ in the display

Memory for measurement values 100 memory locations, display indication „FLL“ = memory full
Port USB 1.1

Power Supply

Battery one 1.5 V AA alkaline – manganese cell Size AA (IEC LR 6) or suitable rechargeable battery
Battery life approx. 45 hours continuous operation with alkaline – manganese battery
Battery test Automatic display of „“ symbol, when battery voltage drops below 1.0 Volts
External When the MAVOLUX is connected to a PC, power will be supplied by the PC via the USB cable.

Weights and Dimensions

Housing Plastics
Dimensions Measuring instrument: 65 x 120 x 19 mm (2,56 x 4,73 x 75“) (without carrying case)
Measuring Probe: 31 x 105 x 30 mm
Weight Measuring instrument with measuring probe approx. 200 g – without battery

Light sensor Light sensitive surface of the diffuser: approx. 20 mm $\varnothing$
Length of cable approx. 1.5 m, available in 3 m, 5 m and 10 meters on special order.

Electromagnetic Compatibility (EMC)

The MAVOLUX meets the Specifications 89/336/EWG dt. 01.01.1996

Characteristics Mavolux 5032 C USB

Meas. Quantity	Measuring Range				Resolution in lx	Resolution in fc	
		in Lux (lx)		in footcandle (fc)			
Illumination	I	0.1...	199.9	0.01...	19.99	0.1	0.01
	II	1...	1 999	0.1...	199.9	1	0.1
	III	10...	19 900	1...	1 999	10	1
	IV	100...	199 000	10...	19 990	100	10
		in Candela/m ² (cd/m ²)		in footlambert (fL)		in cd/m ²	in fL
Luminance with luminance attachment for cd/m ² oder fL	I	1...	1 999	0.1...	199.9	1	0.1
	II	10...	19 990	1...	1 999	10	1
	III	100...	199 900	10...	19 990	100	10
	IV	1000...	1 999 000	100...	199 900	1000	100

Most Important Error Limits Mavolux 5032 C USB

Characteristics	Admissible Error per DIN 5032 Klasse C	Maximum Error Mavolux 5032 C USB
V(λ)-Matching (f_1)	9%	≤ 7.5%
True Cosine Evaluation (f_2)	6%	≤ 2.0%
Linearity (f_3)	5%	≤ 1.5%
¹⁶ Adjustment Error (f_{11})	2%	≤ 1.0%
Total Error (f_{ges})	20%	≤ 15%

Characteristics Mavolux 5032 B USB

Meas. Quantity	Measuring Range				Resolution in lx	Resolution in fc	
		in Lux (lx)		in footcandle (fc)			
Illumination	I	0.01...	19.99	0.001...	1 999	0.01	0.001
	II	0.1...	199.9	0.01...	19.99	0.1	0.01
	III	1...	1 999	0.1...	199.9	1	0.1
	IV	10...	19 900	1...	1 999	10	1
	V	100...	199 000	10...	19 990	100	10
		in Candela/m² (cd/m²)		in footlambert (fL)		in cd/m²	in fL
Luminance with luminance attachment for cd/m² oder fL	I	0.1...	199.9	0.01...	19.99	0.1	0.01
	II	1...	1 999	0.1...	199.9	1	0.1
	III	10...	19 990	1...	1 999	10	1
	IV	100...	199 900	10...	19 990	100	10
	V	1000...	1 999 000	100...	199 900	1000	100

Most Important Error Limits Mavolux 5032 B USB

Characteristics	Admissible Error per DIN 5032 Klasse B	Maximum Error Mavolux 5032 B USB
V(λ)-Matching (f_1)	6%	≤ 3.0%
True Cosine Evaluation (f_2)	3%	≤ 2.0%
Linearity (f_3)	2%	≤ 1.0%
Adjustment Error (f_{11})	1%	≤ 0.8%
Total Error (f_{ges})	10%	≤ 8.0%



EG - KONFORMITÄTSERKLÄRUNG DECLARATION OF CONFORMITY

GOSSEN

Dokument-Nr./ Document.No.:

Hersteller/ Manufacturer:

Anschrift / Address:

101/2004

GOSSEN Foto- und Lichtmesstechnik GmbH

Thomas-Mann-Str.16-20
90471 Nürnberg

Produktbezeichnung/ Product name:

Typ / Type:

Bestell-Nr / Order No.:

Beleuchtungsstärkemessgerät / Luxmeter / Footcandle meter

MAVOLUX 5032 C USB

M502G

Das bezeichnete Produkt stimmt mit den Vorschriften folgender Europäischer Richtlinien überein, nachgewiesen durch die vollständige Einhaltung folgender Normen:
The above mentioned product has been manufactured according to the regulations of the following European directives proven through complete compliance with the following standards:

Nr. / No.	Richtlinie	Directive
73/23/EWG 73/23/EEC	Elektrische Betriebsmittel zur Verwendung innerhalb bestimmter Spannungsgrenzen - Niederspannungsrichtlinie - Anbringung der CE-Kennzeichnung : 2003	Electrical equipment for use within certain voltage limits - Low Voltage Directive - Attachment of CE mark :2003
EN/Norm/Standard EN 61010-1 : 1993 EN 61557-3 : 1997	IEC/Deutsche Norm IEC 61010-1 : 1992 IEC 61557-3 : 1997	VDE-Klassifikation/Classification VDE 0411-1 : 1994 VDE 0413-3 : 1997
Nr. / No.	Richtlinie	Directive
89/336/EWG 89/336/EEC	Elektromagnetische Verträglichkeit - EMV - Richtlinie	Electromagnetic compatibility - EMC directive

Fachgrundform / Generic Standard: EN 61326 : 2002

Nürnberg, den 24. Juni 2004

Ort, Datum / Place, date:

Vorsitzender der Geschäftsführung

Diese Erklärung bescheinigt die Übereinstimmung mit den genannten Richtlinien, beinhaltet jedoch keine Zusage von Eigenschaften. Die Sicherheitshinweise der mitgelieferten Produktdokumentationen sind zu beachten.

This declaration certifies compliance with the above mentioned directives but does not include a property assurance. The safety notes given in the product documentations which are part of the supply, must be observed.

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17



EG – KONFORMITÄTSERKLÄRUNG DECLARATION OF CONFORMITY

GOSSEN

Dokument-Nr./ Document.No.:

Hersteller/ Manufacturer:

Anschrift / Address:

102/2004

GOSSEN Foto- und Lichtmesstechnik GmbH

Thomas-Mann-Str.16-20
90471 Nürnberg

Produktbezeichnung/ Product name:

Typ / Type:

Bestell-Nr / Order No.:

Beleuchtungsstärkemessgerät / Luxmeter / Footcandle meter

MAVOLUX 5032 B USB

M503G

Das bezeichnete Produkt stimmt mit den Vorschriften folgender Europäischer Richtlinien überein, nachgewiesen durch die vollständige Einhaltung folgender Normen:
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Nr. / No.	Richtlinie	Directive
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Fachgrundform / Generic Standard: EN 61326 : 2002

Nürnberg, den 24. Juni 2004

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Gossen Foto- und Lichtmesstechnik GmbH is also a leading provider for other interesting light measuring instruments:

-MAVO-MONITOR USB: High quality and precision instrument for measuring luminance, classified according to the Standard Specifications DIN 5032, Part 7, Class B and CIE 69. The measuring sensor to be placed for contact measurement directly on the luminous or backlighted surface, such as monitors, TV screens, light boxes, light panels, illuminated advertising boards, traffic sign etc.

-MAVO-SPOT (Attachment for the MAVO-MONITOR USB): For precision spot measuring of the luminance, from distance, non-contact, with measuring angle of 1 degree. The ambient light is being taken into consideration in the measurement. The light sensor is color corrected, i.e. its spectral responsivity is adapted to the photopic vision of the human eye $V(\lambda)$. According to DIN 5032,

Part 7, Class B. The MAVO-MONITOR with attached MAVO-SPOT is especially suited for inspecting and constancy testing of viewing monitors in medical imaging applications according to DIN 6868/57. Other applications: Projection screens, street surfaces and street lighting, illumination of tunnels and sport areas.

-MAVO-MAX: For monitoring the ambient light in the surroundings of monitors according to IEC 61223-2-5 (QS-RL dt. 20/11/2003). The use of the MAVO-MAX allows extending the required repeat test intervals of the „veil luminance“ and the „maximum contrast“ at medical imaging displays to six months.

GOSSEN Foto- und Lichtmesstechnik GmbH

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