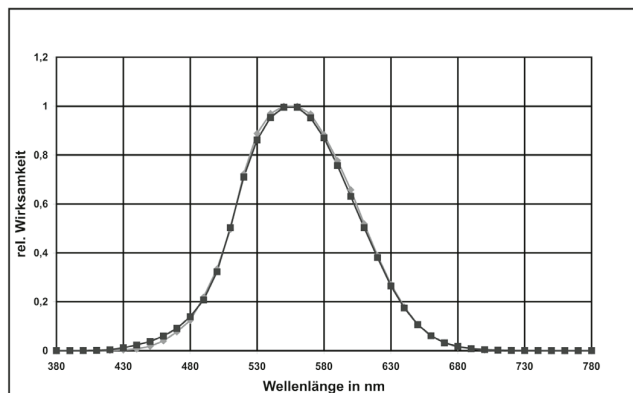


**Digital measuring head for illuminance (V-Lambda) FLAD 03-VL1 with ALMEMO® D6 connector**



**V- lambda radiation**

The spectral range of the visible light is referred to as V-lambda radiation and corresponds to the sensitivity of the human eye. The measured value is a measure for the perceived brightness. The wavelength range extends from the end of the UV spectrum at 400 nm to the beginning of the IR range at 720 nm with a maximum at 555 nm. The determined illuminance in “LUX” can directly be converted into the irradiance “W/ m²”. Measurements in this particular range have a great importance for the workplace design and lighting projects.

**V- lambda radiation sensor FLAD 03 VL1**

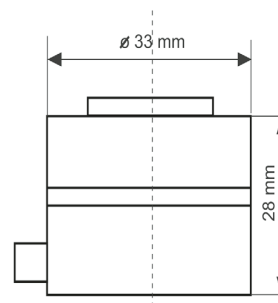
V- lambda sensors are used in the field of medical and/or biological research, for weather information and forecasting systems, for climate research, for agriculture, and for the automobile industry respectively for measuring artificial lighting. The spectral sensitivity of the receiver is extremely well adapted to the sensitivity of the human eye and complies with the device class B as per DIN 5032. The measuring head FLAD 03 VL1 has a black, anodized aluminum housing. The measurement is cos corrected. The measuring head is only suitable for indoor usage.

Digital measuring head with ALMEMO® D6 connector  
The measuring head works with its own AD converter. Used extension cables and the measuring device have no influence on the accuracy of the measurement.

The entire measuring range is divided into 4 measuring ranges, so that, among other things, the smallest illuminances can be measured with a very high resolution.

**Technical data**

Measuring range V-lambda	1 lx to 200 klx
ALMEMO® measuring ranges	up to 650.00 lx up to 6500.0 lx up to 65000 lx up to 200.00 klx
Minimum resolution	0.02 lx
Sensor system	Si / interf. filter
Spectral sensitivity	380 nm to 720 nm
Maximum spectral sensitivity	555 nm
Diffuser	PTFE
V-Lambda adaption	<3%
Cos-correction	error f2 < 2.0%
Linearity	< 1 %
Absolute error	< 5 %
Nominal temperature	23 °C ±3 K
Operating temperature	-20°C to +60°C
Switch-on time (Duty cycle)	< 1 s
Switch-off time	< 1 s
Dimensions	diameter 33 mm, height approx. 29 mm
Mounting	2 screws M2
Weight	approx. 50 g
ALMEMO® connection cable permanently connected cable 1.5 m with ALMEMO® D6 connector	
ALMEMO® D6 connector	
Refreshrate	1.5 s for all channels
Stabilization time	3 s (For data logger operation in sleep mode, a sleep delay of 3 s must be programmed)
Supply voltage	up to 6 V from the ALMEMO® device
Current consumption	approx. 4 mA



10/2021 • We reserve the right to make technical changes.

**Variants** (incl. works test certificate)

Digital measuring head for illuminance, fixed cable, length 1.5 m, with ALMEMO® D6 connector

**Order no.**

**FLAD03VL1**

## Radiation probe FLA 623 x



- Probes for various spectral ranges:
- Illuminance ( $V_{\lambda}$ ), UVA, UVB, UVC, global radiation, IR, quantum (photosynthesis)
- Sturdy aluminum housing
- ALMEMO® connecting cable, plug-in
- For indoor applications

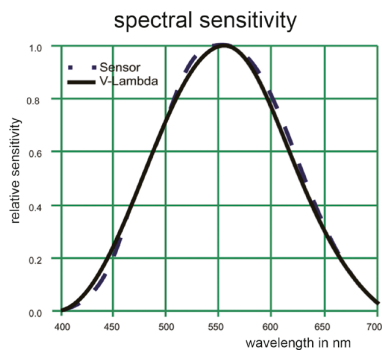
10/2021 • We reserve the right to make technical changes.

### Common technical data

Diffuser	PTFE
Cosine correction	Error f2 <3 %
Linearity	<1 %
Absolute error	<10 % (<5 % for FLA623VL)
$V_{\lambda}$ adapter	<3 % (for FLA623VL only)
Nominal temperature	22 °C ±2 K
Operating temperature	-20 to +60 °C
Signal output	0 to +2 V
Duty cycle	<1 second
Power supply	via ALMEMO® connector (5 to 15 VDC)

Electrical connection	Mountable male connector, lateral
Connecting cable	PVC cable, plug-in, with ALMEMO® connector
Housing	Aluminum, black anodized
Fixture	2 screws M2 in base plate
Dimensions	Diameter 33 mm, height approx. 29 mm
Weight	approx. 50 g (without cable)

## Probe for measuring illuminance FLA 623 VL



- This measures the  $V_{\lambda}$  radiation (visible light, equivalent to sensitivity of the human eye).
- For evaluating lighting conditions, e.g. in the workplace
- The sensor complies with device class B as per DIN 5032.

### Technical data:

Measuring range $V_{\lambda}$	0.05 to approx. 170 klx
Measuring channels	1st channel up to approx. 20,000 lx 2nd channel up to approx. 170.00 klx
Spectral sensitivity	380 to 720 nm, max. at 555 nm

Common technical data and image see page 14.05

### Variants (including factory test certificate)

Illuminance probe with ALMEMO® connecting cable, length = 2 meters

### Options

ALMEMO® connecting cable, length = 5 meters  
ALMEMO® connecting cable, length = 10 meters

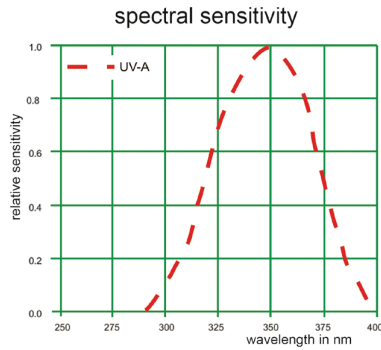
### Order no.

FLA623VL

OA9623L05

OA9623L10

## Probe for UVA radiation FLA 623 UVA



- This measures long-wave UV radiation (bronzing effect on human skin).
- Its spectral sensitivity is weighted towards global solar radiation.

### Technical data:

Measuring range	0.03 to approx. 100 W/m <sup>2</sup>
Spectral sensitivity	310 to 400 nm, maximum at 355 nm

Common technical data and image see page 14.05

### Variants (including factory test certificate)

UVA probe with ALMEMO® connecting cable, length = 2 meters

#### Options:

ALMEMO® connecting cable, length = 5 meters

ALMEMO® connecting cable, length = 10 meters

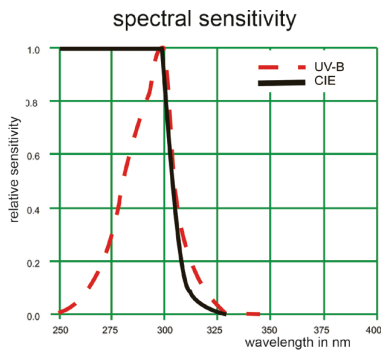
### Order no.

FLA623UVA

OA9623L05

OA9623L10

## Probe for UVB radiation FLA 623 UVB



- This measures short-wave UVB radiation.
- Its spectral sensitivity is weighted towards global solar radiation likely to cause erythema (sunburn) as per CIE recommendation (Commission Internationale de l'Éclairage). The UV index can be calculated.

### Technical data:

Measuring range	0.002 to approx. 5 W/m <sup>2</sup>
Spectral sensitivity	265 to 315 nm, maximum at 297 nm

Common technical data and image see page 14.05

### Variants (including factory test certificate)

UVB probe with ALMEMO® connecting cable, length = 2 meters

#### Options

ALMEMO® connecting cable, length = 5 meters

ALMEMO® connecting cable, length = 10 meters

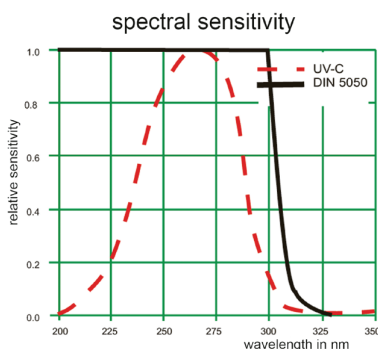
### Order no.

FLA623UVB

OA9623L05

OA9623L10

## Probe for UVC radiation FLA 623 UVC



- This measures UVC radiation, e.g. Hg line at 256 nm.
- This probe can be used inter alia in water disinfection units.

### Technical data:

Measuring range	1 to approx. 1990 mW/m <sup>2</sup>
Spectral sensitivity	220 to 280 nm, maximum at 265 nm

Common technical data and image see page 14.05

### Variants (including factory test certificate)

UVC probe with ALMEMO® connecting cable, length = 2 meters

#### Options:

ALMEMO® connecting cable, length = 5 meters

ALMEMO® connecting cable, length = 10 meters

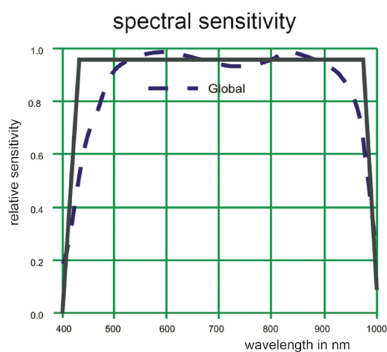
### Order no.

FLA623UVC

OA9623L05

OA9623L10

## Probe for global radiation FLA 623 GS



- This measures the solar spectrum in the visible range and in the short-wave IR range.
- Global radiation comprises both direct and diffused solar radiation.

### Technical data:

Measuring range	0.4 to approx. 1300 W/m <sup>2</sup>
Spectral sensitivity	400 to 1100 nm, maximum at 780 nm

Common technical data and image see page 14.05

### Variants (including factory test certificate)

Global radiation probe with ALMEMO® connecting cable, length = 2 meters

#### Options:

ALMEMO® connecting cable, length = 5 meters

ALMEMO® connecting cable, length = 10 meters

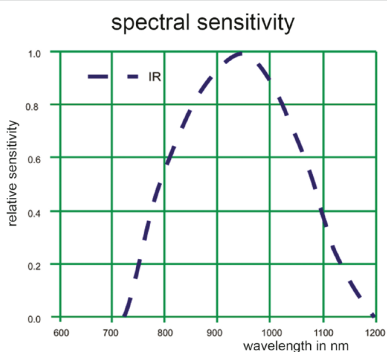
### Order no.

FLA623GS

OA9623L05

OA9623L10

## Probe for infra-red radiation FLA 623 IR



- This measures the solar spectrum in the short-wave IR range (excluding the visible range).

### Technical data:

Measuring range	0.1 to approx. 400 W/m <sup>2</sup>
Spectral sensitivity	800 to 1100 nm, maximum at 950 nm

Common technical data and image see page 14.05

### Variants (including factory test certificate)

IR probe with ALMEMO® connecting cable, length = 2 meters

#### Options:

ALMEMO® connecting cable, length = 5 meters

ALMEMO® connecting cable, length = 10 meters

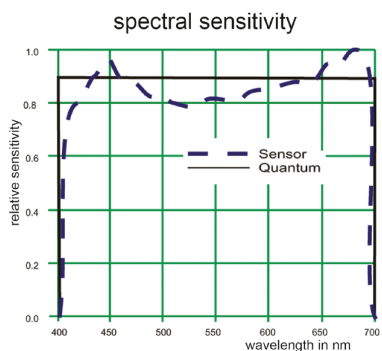
### Order no.

FLA623IR

OA9623L05

OA9623L10

## Probe for quantum radiation FLA 623 PS



- This measures the visible light absorbed by the chlorophyll in plants during photosynthesis.
- It determines the level of quantum radiation in the spectral range specified.
- It is used to assess the conditions in which plants develop in open field and greenhouse cultivation.

### Technical data:

Measuring range	1 to approx. 3000 μmol/m <sup>2</sup> s
Spectral sensitivity	380 to 720 nm, maximum at 420 and 700 nm

Common technical data and image see page 14.05

### Variants (including factory test certificate)

Quantum probe with ALMEMO® connecting cable, length = 2 meters

#### Options:

ALMEMO® connecting cable, length = 5 meters

ALMEMO® connecting cable, length = 10 meters

### Order no.

FLA623PS

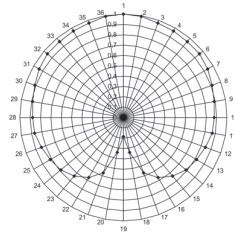
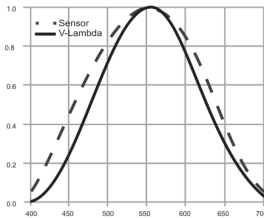
OA9623L05

OA9623L10

## Illuminance measuring head FLA 613 VLK



- Measuring independent of direction - thanks to the probe head's spherical characteristics
- Weather-proof aluminum housing, with plastic globe
- Suitable for universal use, inter alia for measuring in photostability tests according to various international standards and ICH guidelines (International Conference on Harmonization)
- Spectral range of the probe head corresponds to the sensitivity of the human eye (V-lambda radiation).



### Technical data:

Measuring range	0.02 to 50 klux
Spectral sensitivity	360 to 760 nm
Maximum spectral sensitivity	555 nm
Signal output	0 to 2 V
Duty cycle	<1 second
Power supply	via ALMEMO® connector +5 to +15 V
Fastening	2 screws, M4, in base plate
Cable passage	at side
Housing	anodized aluminum
Diffuser	Plastic
Ball	Plastic
Directional characteristic	see diagram
Linearity	<1%
Absolute error	<10%
Nominal temperature	22 ± 2 °C
Operating temperature	-20 to +60 °C
Dimensions	Ball diameter : 40 mm Overall height : 76 mm
Weight	approx. 100 grams

### Type (including test protocol)

Lux probe head for measuring illuminance, with spherical characteristic, including 1.5-meter cable and ALMEMO® connector

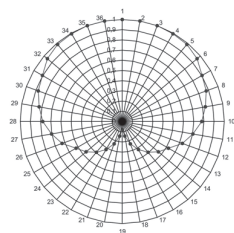
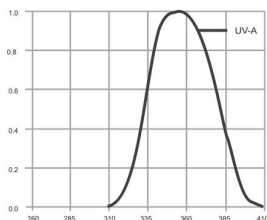
### Order no.

FLA613VLK

## UVA probe head FLA 613 UVAK



- Measuring independent of direction - thanks to the probe head's spherical characteristics
- Weather-proof aluminum housing, with plastic globe
- Suitable for universal use, inter alia for measuring in photostability tests according to various international standards and ICH guidelines (International Conference on Harmonization)
- Measuring head for measuring the UVA



### Technical data:

Measuring range	0.02 to approx. 50 W/m <sup>2</sup>
Spectral sensitivity	310 to 400 nm
Maximum spectral sensitivity	355 nm
Signal output	0 to 2 V
Duty cycle	<1 second
Power supply	via ALMEMO® connector +5 to +15 V
Fastening	2 screws M4, in base plate
Cable passage	at side
Housing	anodized aluminum
Diffuser	PMMA (polymethyl methacrylate, acrylic)
Ball	PMMA (transparent to UV)
Directional characteristic	see diagram
Linearity	< 1%
Absolute error	< 10%
Nominal temperature	22 ± 2 °C
Operating temperature	-20 to +60 °C
Dimensions	Ball diameter : 40 mm Overall height: 76 mm
Weight	approx. 100 grams

### Type (including test protocol)

UVA probe head, with spherical characteristic, including 1.5-meter cable and ALMEMO® connector

### Order no.

FLA613UVAK

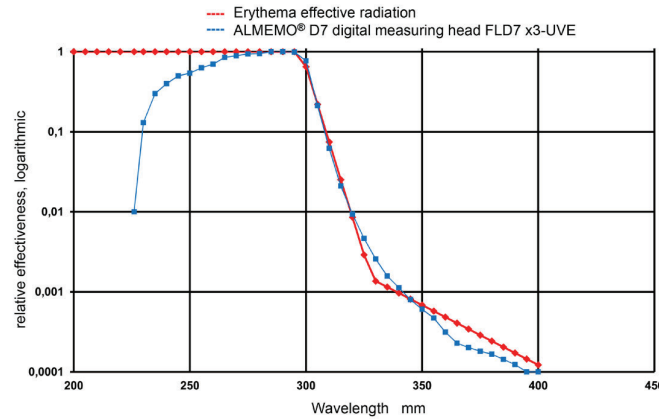
Factory calibration KL90xx radiation for sensor (see chapter Calibration certificates)

**Digital measuring head for erythema effective UV radiation (UVE) FLD7 03-UVE with ALMEMO® D7-connector**

**Monitoring of UVE-radiation hazardous for human skin. Mobile measurements in meteorological, medical and biological applications. For connection to current measuring instruments ALMEMO® V7 : ALMEMO® 500, 710, 809, 202, 204**



ALMEMO® UVE-measuring head



10/2021 • We reserve the right to make technical changes.

**Erythema effective UV radiation**

The natural UV radiation of the sun or the UV radiation of artificial sources has different effects to human skin dependant on the wavelength range.

- The long-wave UV radiation (more than 313 nm, UVA) tans the skin and supports the human immune system.
- The short-wave UV radiation (less than 313 nm, UVB/UVE) may cause irreversible damage.

In the recommendation of the CIE ( Commission Internationale de l'Eclairage) all spectral effect functions which can have a negative effect on the human skin are summarized. This recommendation is described in the DIN 5050 resp. ISO/CIE 17166 and valued as a directive.

**UVE-measuring head FLD7 03-UVE**

The measuring head records the erythema effective UV radiation. The spectral sensitivity of the measuring head complies with the standards DIN 5050 and ISO/CIE 17166 and the Ordinance on Protection against the Harmful Effects of Artificial Ultraviolet Radiation (UV-Schutz-Verordnung - UVSV, published in the Federal Law Gazette 2011 Part I No. 37). The measurement results provide direct information about medically and biologically relevant correlations in this radiation range. DIN 5050 specifies four different skin types: Skin type I to IV. The UV Protection Ordinance - UVSV extends by two further skin types: skin type V and VI. The guideline for these six skin types are taken into account in the calculation of the various parameters. The measuring head is used in areas of medical and biological research, for the measurement of

UV radiation equipment (for cosmetic purposes, medical treatments or other human applications), in weather information and forecasting systems, in climate research and for general popula-

tion information.. A popular measure of „sunburn sensitivity“ is the UV index „UVI“, which is determined by the German Weather Service.

The measuring head FLD7 03-UVE has a black anodized aluminum housing. The measurement is cos - corrected. The measuring head is suitable for measurements in dry environments.

**Digital measuring head with ALMEMO® D7-connector**

The measuring head works with its own AD converter. Extension cables and the ALMEMO® measuring instrument/data logger have no influence on the accuracy of the measurement..From the measured irradiance, all relevant measured variables are calculated and output to the ALMEMO® instrument. Different measuring channels can be selected and the measured variables can be displayed :

- UV-index: relative irradiance related to 25 mW/m<sup>2</sup>
- UVE irradiance (erythema-effective) in mW/m<sup>2</sup>.
- Dose (erythema effective irradiation) in J/m<sup>2</sup>: sum of irradiance over the irradiation period (energy).
- Relative minimum erythema-effective dose (MED): Dose related to 1 MED (= erythema-effective threshold irradiation) of the set skin type according to DIN 5050 and UVSV. Example: 1 MED for skin type 2 (light-skinned European skin type) = 250 J/m<sup>2</sup>.
- Remaining time of irradiation in minutes until the dose 1 MED of the selected skin type is reached.
- Current, predicted maximum irradiation time in minutes until the dose 1 MED of the selected skin type is reached.
- Relative standard erythema effective dose (SED): Dose related to 1 SED (100 mW/m<sup>2</sup>) according to ISO 17166.

## Technische Daten

Measuring range UVE:	0,1 ... 300 mW/m <sup>2</sup>
Resolution:	0,1 mW/m <sup>2</sup>
Sensor system:	SiC / interference filter
Spectral sensitivity:	230 ... 400 nm
Erythema effective spectral range:	250 ... 298 ... 328 nm
Max. spectral sensitivity:	295 nm
Diffuser:	PTFE
Cos-correction:	error f2 < 3 %
Linearity:	better 1 %
Absolute error:	< 7 %
Nominal temperature:	23 °C ±3 K
Operating temperature:	-30 ... +60°C
Switch-on time:	< 1 s
Switch-off time:	< 1 s

Dimensions:	
diameter	33 mm,
height	ca. 29 mm
Mounting:	2 screws M2
Weight (without cable)	approx. 50 g
ALMEMO® connecting cable: fixed attached cable, 1,5 m, with ALMEMO® D7-connector	
<b>ALMEMO® D7 connector</b>	
Refresh rate:	1 s for all channels
Settling time:	3 s (for data logger operation in sleep mode a sleep delay of 3 s has to be programmed)
Power supply voltage:	from 6 V from ALMEMO® instrument
Power consumption:	approx. 5 mA

Erythema effective radiation	0,3 W/m <sup>2</sup>	UV- Index	12	UV radiation exposure	<div style="display: flex; flex-direction: column; align-items: center;"> <div style="background-color: purple; width: 100%; height: 20px; margin-bottom: 5px;"></div> <div style="background-color: red; width: 100%; height: 20px; margin-bottom: 5px;"></div> <div style="background-color: orange; width: 100%; height: 20px; margin-bottom: 5px;"></div> <div style="background-color: yellow; width: 100%; height: 20px; margin-bottom: 5px;"></div> <div style="background-color: green; width: 100%; height: 20px;"></div> </div>	
			11			extreme
			10			very high
			9			
	0,2 W/m <sup>2</sup>		8			high
			7			
			6			medium
			5			
	0,1 W/m <sup>2</sup>		4			low
			3			
			2			
			1			

Intensity of Irradiation and UV-Index



Version in weatherproof housing for outdoor use  
FLD7 33-UVE  
Data sheet see chapter meteorology

### Versions (incl. works test certificate)

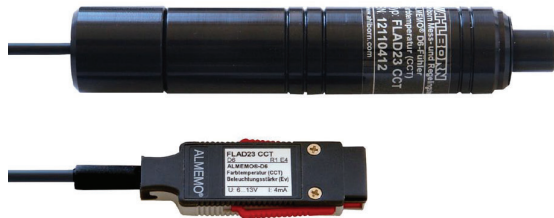
Digital measuring head for UVE radiation, for measurements in dry surroundings.  
Sensor with permanently attached cable, 1,5 m, with ALMEMO® D7-connector

**Order no.****FLD703UVE**

Digital measuring head for UVE radiation in a weatherproof housing for outdoor use.  
Sensor with built-in connector, incl. ALMEMO® connecting cable, 1,5 m, with ALMEMO® D7-connector.  
Data sheet see chapter meteorology.

**FLD733UVE**

**Digital sensor for color temperature and illuminance FLAD23CCT with ALMEMO® D6 plug**

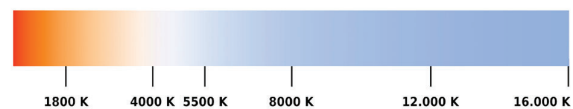


- Color temperature and illuminance are determined as a means to plot and evaluate lighting systems.
- Compact sensor, particularly suitable for mobile applications
- Continuous measuring and updating of measured values
- Digital color temperature sensor with „TrueColorSensorchip“ and integrated signal processor The TrueColorSensorchip (3 sensors on 1 chip) detects - separately - each of the three colors - red, green, blue (RGB). The respective sensitivities of these 3 color sensors are adapted to the standard spectral curves as per CIE and DIN. (see Figure) On the basis of these RGB values the computer calculates the color point within the RGB range in terms of coordinates X and Y and determines the correlated color temperature (CCT) in Kelvin.
- The display shows simultaneously both this color data and the illuminance in lux (lx) or kilolux (klx).
- Freely selectable measurable variables  
Two measuring channels are programmed (at our factory): Color temperature (CCT, K), Illuminance (Ev, lx)  
Other measurable variable can also be selected: Illuminance (Ev, klx), X-value, Y-value  
The configuration is performed on the ALMEMO® V7 measuring instrument or directly on the PC using the USB adapter cable ZA1919AKUV (see chapter “ALMEMO® Network technology”).

**Technical data:**

Spectral sensitivity	380 to 720 nm
Sensor system	TrueColor, 3 sensors on 1 chip
Measuring ranges	
Correlated color temperature (CCT)	54 to 30,000 K (at 120 lx to 170 klx)
Accuracy	< 10% in range 1600 to 17000 K
Coordinates resolution (dx, dy)	< 0.005
Illuminance (V-lambda)	10 to 65,000 lx (factory setting) or 0.05 to 170.00 klx
Accuracy	< 10% in range 120 lx to 170 klx
Cosine correction	8 mm diffuser plate
Cosine error	< 3%
Measuring duration	< 3 seconds
Nominal conditions	23 °C ± 3 K, 0 to 90 % RH (non-condensing)
Operating temperature	-10 to +40 °C
Dimensions	Diameter 25 mm, length 134 mm
ALMEMO® connecting cable	Fixed cable, 1.5 meters, with ALMEMO® D6 plug
ALMEMO® D6 plug	
Refresh rate	1.5 seconds for all channels
Setting time	3 seconds (In order to run the data logger in sleep mode a wakeup delay of 3 seconds must be programmed.)
Supply voltage	6 to 13 VDC
Current consumption	approx.. 4 mA

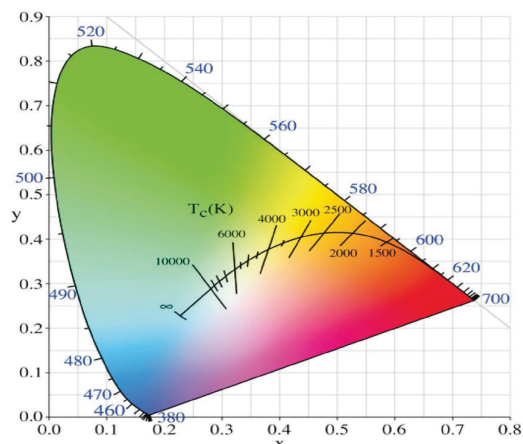
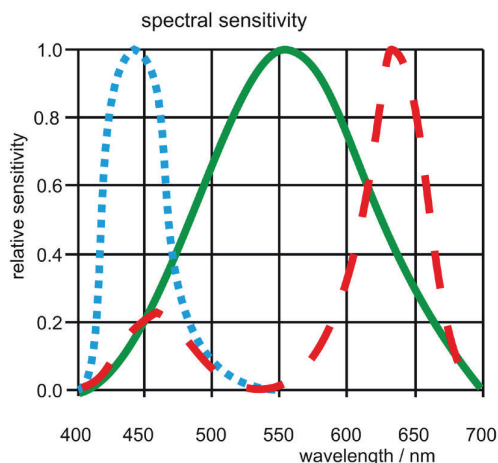
10/2021 • We reserve the right to make technical changes.



Color temperature sensor with ALMEMO® 2590-2 (example)

<b>Variants</b>	<b>Order no.</b>
Digital sensor for color temperature and illuminance, fitted cable, 1.5 meters with ALMEMO® D6 plug	FLAD23CCT





## Accessories

Ulbricht integrating sphere



- Ulbricht integrating sphere, for measuring total radiation from any light source
- Especially suitable for measuring operations on site for light sources that have already been installed. This minimizes interference from extraneous light in the environment.
- Dimensions
 

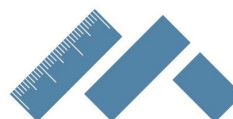
Measuring aperture	13.5 mm
Sphere diameter	40 mm
Housing diameter	44.5 mm, length 44 mm

### Accessories

An Ulbricht integrating sphere can be attached to color temperature sensor FLAD23CCT

**Order no.**

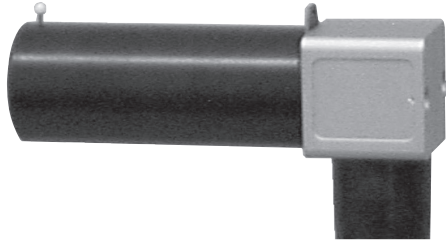
ZB9623KU



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## Luminance Probe Head FLA 603 LDM2



- Luminance measuring head, equipped with achromatically corrected, low stray light optics and high quality V(l) detector according to DIN class B.
- The external sighting device allows, at a working distance of 1m, to exactly locate the measuring point, therefore, it is particularly suitable for evaluating the luminance for service and constancy tests.
- Three measuring channels with different sensitivity.
- Typical applications: Luminescent surfaces such as colour monitors, alphanumeric displays, sign plates and light panels, and reflecting surfaces, such as walls and equipment at work places, projecting screens, traffic and sign plates, guided paths and roadway lines.

### Technical data:

Measuring range:	0.04 cd/m <sup>2</sup> to appr. 6400 cd/m <sup>2</sup>
Smallest resolution:	10 mcd/m <sup>2</sup>
Field of view:	1°
Sensitivity:	approx. 30 pA/(cd/m <sup>2</sup> )
Spectral adaptation:	approxim. to photometric valuat. function V(l) for photopic vision, class B, better than 6%
Field of view diameter :	approx. 30 mm at a distance of 0.5 m approx. 40 mm at a distance of 1 m approx. 120 mm at a distance of 5 m
Nominal temperature:	24°C ±2K
Operat./storage temperature:	0 to 60°C/-10 to +80°C
Humidity range:	10 to 90% (non-condensing)
Measuring surface:	21mm x 21mm at 1m operating distance
Meets standards:	IEC 61223-2-5, DIN 5032-T.7
Dimensions:	diameter 30mm, length 150 mm

### Variants

Luminance probe head with 1° field of view and external sighting device, DIN quality class B, with ALMEMO® connecting cable 1.5m long, incl. factory calibration certificate calibration in cd/m<sup>2</sup>

### Order no.

**FLA603LDM2**

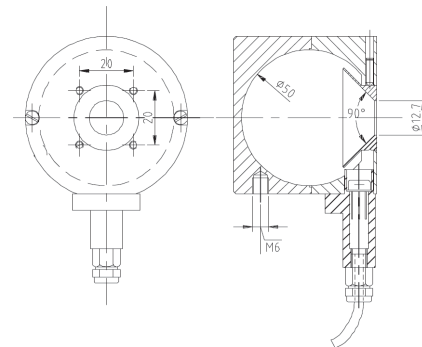
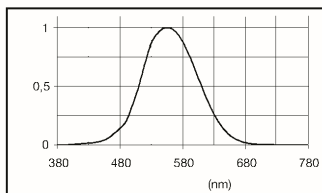
## Light Flux Probe Head FLA 603 LSM4



- High quality measuring head, DIN class B for light flux measurement with Ulbricht globe photometer.
- Perfect coating of the globe with BaSO<sub>4</sub> for diffuse reflectivity and spectrally neutral reflection quality.
- Suitable for cold light sources, and lamps with high colour temperature and almost monochromatic radiation (as in LEDs).
- Examples for applications: Endoscopes, fiber optic bunches, light emitting diodes.

### Technical data:

Measuring range:	0.0002 lm to appr. 38 lm
Smallest resolution:	0.001 lm
Sensitivity:	20nA/lm
Acceptance angle:	up to 90°
Accuracy:	DIN quality class B
Nominal temperature:	24°C ±2K
Humidity range:	10 to 90 % non-condensing
Operating temperature:	max. 100°C inside globe
Inner diameter of globe:	50mm
Test opening:	12,7 mm



### Type

Light flux probe head with ALMEMO® connecting cable 2m long and factory calibration certificate

### Order no.

**FLA603LSM4**

Factory calibration KL90xx radiation for sensor (see chapter Calibration certificates)