









## Contents

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### 1 Asteria: luminance / illuminance & flicker measurement device

Admesy's Asteria light meter provides a CIE 1931 high speed luminance measurement function, targeting application for display and lighting industries. Asteria works like all Admesy products on USB and RS232 and can perform all complex calculations inside due to a high speed CPU and large internal memory. The Asteria is available with lens system or cosine corrector, for luminance or illuminance & luminous intensity measurements respectively. Besides, both lens and cosine corrector systems are suitable for response time and flicker measurements supporting the following standards.

- Contrast min/max
- Contrast RMS
- JEITA
- VESA
- Flicker percentage (IES)
- Flicker index (IES)



## 2 Highlights

- Absolute luminance and illuminance & luminous intensity measurement according to the human eye (CIE1931 luminosity function)
- All flicker measurement standards supported for display (Contrast, JEITA, VESA) and lighting (percentage, index)
- Measure high and low frequencies at the same time through a high sample rate and large memory size
- Trigger input and output for in line applications
- Windows, Linux, OSX and embedded systems compatible
- SCPI command interface for easy integration in other applications
- Supported in all major programming languages Labview / Labwindows / Visual Studio (C++, C#, VB)/ etc.
- USBTMC standard compliant
- Integrating- and sampling mode available
- 3 gain stages for every mode
- Autorange function
- User calibration function and pre-programmed calibration values
- Trigger in and output for inline applications
- USB and RS232 communication interface
- USBMTC standard compliant
- Windows, Linux and MAC OSX compatible
- Directly supported in Labview, Labwindows, Visual Studia via VISA library. Other programming languages that support VISA can be used



## **3** Asteria general specifications

| Interfaces       |   |
|------------------|---|
| USB 2.0          | USBMTC compliant, SCPI command set, full<br>speed device    |
| RS 232           | For PC and embedded purposes, using same command set as USB |
| Trigger in & out | 5V compliant  |

| - | Power ratings |         |         |         |         |
|---|---------------|---------|---------|---------|---------|
|   |               | Min     | Typical | Max     | Max     |
|   |               | voltage | voltage | voltage | current |
|   | USB powered   | 4.75V   | 5.00V   | 5.25V   | 220mA   |
|   |               |         |         |         |         |

|   | System information        |   |  |  |
|---|---------------------------|---|--|--|
|   | Photo detector            | Silicon photo diode   |  |  |
| - | Spectral response         | Approximates CIE 1931 luminosity curve,   |  |  |
|   |                           | ts value 8% typical   |  |  |
|   | Measurement<br>parameters | Luminance, illuminance & luminous intensity,<br>flicker (contrast, JEITA, VESA, Percentage, |  |  |
| _ |                           | Index), Response time.  |  |  |
|   | Optical systems           | 10mm lens system & cosine corrector   |  |  |
|   | Measurement speed in      | 180000 samples/second. Memory for 250000  |  |  |
| _ | sample mode               | samples. For samples/delay versus total   |  |  |
|   |                           | measurement time see table below.   |  |  |
|   | Operating Temperature     | 10-35°C (1)   |  |  |
|   |                           |   |  |  |

| Mechanical dimensions | 5  |
|-----------------------|--|
| Size (HxWxD)          | 69 x 31 x 93 mm                                      |
| Weight                | 320 gram   |
| Mounting              | 12 M3 threat holes spread over four sides of Asteria |

# 4 Typical spectral sensitivity of Asteria light meter



Fig 1 Spectral sensitivity of the Asteria light meter.





## 5 Asteria 10mm specifications

| Outlined anatom   |  |  |                                  |                            |                                |  |
|---|--|--|----------------------------------|----------------------------|--------------------------------|--|
| Optical system  |  |  |                                  |                            |                                |  |
| Optics  | 10mm lens  |  |                                  |                            |                                |  |
| Acceptance angle Acceptance angle 5° (+/- 2.5)                              |  |  |                                  |                            |                                |  |
| Measurement spot size 12mm at 50mm distance 15.5mm at 75mm distance 19mm at |  |  |                                  | n distance                 |                                |  |
| Sample mode signal frequency response                                       |  |  |                                  |                            |                                |  |
| Parameter   | f <sub>3db</sub> 1                               |  |                                  |                            |                                |  |
| Gain 1  | DC – 20kHz                                       |  |                                  |                            |                                |  |
| Gain 2  | DC – 50kHz                                       |  |                                  |                            |                                |  |
| Gain 3  | DC – 120kHz                                      |  |                                  |                            |                                |  |
| Measurement specifica   | tion   |  |                                  |                            |                                |  |
| Parameter   | Range  | Accuracy   | Light level (cd/m <sup>2</sup> ) | Repeatability <sup>2</sup> | Speed (samples/s) <sup>2</sup> |  |
| Luminance (Y)   | 0.005 - 15000cd/m <sup>2</sup>                   | +/- 4% of measured value.  | 0.1                              | +/- 0.20%                  | 4 - 10                         |  |
| (integrating mode)  | integration time                                 | Measured at white image of   | 1                                | +/- 0.10%                  | 10 - 20                        |  |
|   | between 1ms and 5s                               | LED LCD display.   | 5                                | +/- 0.05%                  | 20 - 100                       |  |
|   |  | Luminance ~150cd/m <sup>2</sup>                                    | >150                             | +/- 0.03%                  | 20 - 100                       |  |
| Luminance (Y)   | 1 – 15.000cd/m <sup>2</sup>                      | +/- 4% of measured value.  | 1                                | +/- 0.20%                  | 4 - 10                         |  |
| (sampling mode)   |  | Measured at white image of   | 5                                | +/- 0.10%                  | 10 - 20                        |  |
|   |  | LED LCD display.   | 20                               | +/- 0.05%                  | 20 - 100                       |  |
|   |  | Luminance ~150cd/m <sup>2</sup>                                    | >150                             | +/- 0.03%                  | 20 - 100                       |  |
| Flicker   | 1 – 15.000cd/m <sup>2</sup>                      | +/- 1%   |                                  |                            |                                |  |
| (Contrast Method)   |  | Flicker frequency: 30Hz AC/DC 10% sine wave at 10cd/m <sup>2</sup> |                                  |                            |                                |  |
| Flicker   | 1 – 15.000cd/m <sup>2</sup>                      | +/- 1dB  |                                  |                            |                                |  |
| (JEITA method)  |  | Flicker frequency: 30Hz AC/DC 10% sine wave at 10cd/m <sup>2</sup> |                                  |                            |                                |  |
| 1 Based on calculation of a sin   | 1 Based on calculation of a sinusoidal waveform. |  |                                  |                            |                                |  |

2 All measurements are performed 20 times on a LED LCD screen with sufficient signal noise ratio; value is based on 2 sigma. Luminance values are based on best performance possible, while measurement speed is determined by Admesy with a signal noise ratio which is still acceptable according Admesy. Sample speed depends on the measured sample as well: If the sample uses PWM it will take longer so use the lower rated values. Detailed measurement data is available upon request.





### 6 Asteria cosine corrector specifications

| Optical system        |                                       |   |                  |                            |                                |  |
|-----------------------|---------------------------------------|---|------------------|----------------------------|--------------------------------|--|
| Optics                | 1 cm <sup>2</sup> cosine corrector    |   |                  |                            |                                |  |
| Cosine response       | Lambertian                            |   |                  |                            |                                |  |
| Sample mode signal fr | Sample mode signal frequency response |   |                  |                            |                                |  |
| Parameter             | f <sub>3db</sub> <sup>1</sup>         |   |                  |                            |                                |  |
| Gain 1                | DC – 20kHz                            |   |                  |                            |                                |  |
| Gain 2                | DC – 50kHz                            |   |                  |                            |                                |  |
| Gain 3                | DC – 120kHz                           |   |                  |                            |                                |  |
| Measurement specifica | ation                                 |   |                  |                            |                                |  |
| Parameter             | Range                                 | Accuracy  | Light level (lx) | Repeatability <sup>2</sup> | Speed (samples/s) <sup>2</sup> |  |
| Illuminance (Y)       | 0.05 - 150000lx                       | +/- 4% of measured value.<br>Measured on halogen light                | 1                | ±0.20%                     | 4 - 10                         |  |
| (integrating mode)    | integration time                      |   | 10               | ±0.10%                     | 10 - 20                        |  |
|                       | between 1ms and 5s source with        | 50  | ±0.05%           | 20 - 100                   |                                |  |
|                       |                                       | illuminance level ~1800lx   | >1500            | ±0.03%                     | 20 - 100                       |  |
| Illuminance (Y)       | 10 – 150000lx                         | +/- 4% of measured value.   | 10               | ±0.20%                     | 4 - 10                         |  |
| (sampling mode)       |                                       | Measured on halogen light<br>source with<br>illuminance level ~1800lx | 50               | ±0.10%                     | 10 - 20                        |  |
|                       |                                       |   | 200              | ±0.05%                     | 20 - 100                       |  |
|                       |                                       |   | >1500            | ±0.03%                     | 20 - 100                       |  |
| Percentage flicker    | 10 – 150000lx                         | +/- 1%  |                  |                            |                                |  |
| -                     |                                       | Flicker frequency: 100Hz AC/DC 10% sine wave at 100lx                 |                  |                            |                                |  |
| Flicker index         | 10 – 150000lx                         | +/- 0.01  |                  |                            |                                |  |
|                       |                                       | Flicker frequency: 100Hz AC/DC 10% sine wave at 100lx                 |                  |                            |                                |  |

1 Based on calculation of a sinusoidal waveform.

2 All measurements are performed 20 times on a halogen lamp with sufficient signal noise ratio; value is based on 2 sigma. Illuminance values are based on best performance possible, while measurement speed is determined by Admesy with a signal noise ratio which is still acceptable according Admesy. Sample speed depends on the measured sample as well: If the sample uses PWM it will take longer so use the lower rated values. Detailed measurement data is available upon request.





7 Asteria 10mm dimensions

### 8 Asteria cosine corrector dimensions







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