MAVO**SPEC BASE Release Note**

Firmware V 1.3.5 Available from: 05.2024

Expansion of the measuring function for measuring plant lighting, updating the color rendering index TM-30-15 to the TM-30-20 version and timer for starting the measurement

Changes in this version

- **Updated color rendering index** TM-30-15 to **TM-30-20.**
- The measuring function for measuring **plant lighting PPFD** has been given its **own window** in which, in addition to the already implemented PPFD individual values, these **can be called up as a % of the PPFD total value** and the **spectrum in µmol/(m²s).**
- By long pressing the measurement button, a **timer** can now be started and the **start of the measurement will be delayed by 10 s**.
- **New EXCEL templates Auswertung V2.4** and **Datalogger V2.3** were created and support the new functionalities.

Firmware V 1.3.4 Available from: 08.2023

Bug fix for firmware version V 1.3.3.

Changes in this version

- In connection with the EXCEL TEMPLATE for data logging, the TM30, Flicker and PPFD values are now also transmitted.

Firmware V 1.3.3 Available from: 12.2022

Bug fix for firmware version V 1.3.2.

Changes in this version

- The device no longer starts with the Data button when it is connected to the USB and thus no longer unexpectedly enters the bootloader. A supposed hanging of the device is eliminated.

Firmware V 1.3.2 Available from: 12.2021

Small adjustments for distinguishing between MAVOSPEC BASE and MAVOSPEC LITE.

Changes in this version

- Minor organizational adjustments with no impact on functionality.

Firmware V 1.3.0 Available from: 02.2021

Extension of the measuring functions for measuring TLCI and implementation of an additional CDC interface for device control and data transmission.

Changes in this version

- New **measured value window for TLCI** (Television Lighting Consistency Index)
  - Presentation of spectrum and reference spectrum, display of CCT, radiator type, Normalized distance to normalized color temperature, TLCI
  - Colorist Advice Table - Sector, Lightness, Chroma, Hue
  - Qa Pie Chart – Presentation of TLCI values for specific Color Checker colors

- Additional **CDC interface** for device control and data transmission.

- **New EXCEL templates Auswertung V2.0** and **Datalogger V2.0** were created and support the new functionalities. The templates are now working under Office 64 Bit.

- **New SDK with new USB Interface Description V3.0**

Firmware V 1.2.5 Available from: 09.2020

Minor changes in display functions and switch-off behavior.

Changes in this version

- Spectrum display
  - low signals will be scaled now on full range
  - in reference mode both signals in delta screen will be scaled now with the same factor
- The switch-off behavior is improved, simultaneous key pressing will be recognized better

Firmware V 1.2.4 Available from: 05.2019

Bug fix for firmware version V 1.2.3.

Changes in this version

- The report is now displayed correctly even if all measured variables are activated.
- Occasional spectrum display issues have been resolved.
- The averaging function has been removed.

Firmware V 1.2.3 Available from: 11.2018

This version includes a significant extension of the measuring functions for measuring plant lighting. In addition, the flicker trend can now be saved and loaded.

Changes in this version

- The following **PPFD** (Photosynthetically Active Photon Flux Density) values were implemented for the measurement of **horticulture lighting** in the **PAR** (Photosynthetically Active Radiation) range of 400 ... 700 nm.

PPFD	(400-700nm)
PPFD_UV	(380-400nm)
PPFD_Blau	(400-500nm)
PPFD_Grün	(500-600nm)
PPFD_Rot	(600-700nm)
PPFD_FR	(Far-Red 700-780nm)

- The **flicker trend** can now be saved and loaded. The EXCEL templates for evaluation have been extended by a corresponding sheet.

- **New EXCEL templates Auswertung V1.12** and **Datalogger V1.3** were created and support the new functionalities.

Firmware V 1.2.2 Available from: xx.2018

Bug fix for firmware version V 1.2.1.

Changes in this version

- The **Report window** is now displayed correctly even with a large number of activated measured variables when the reference mode is activated.

Firmware V 1.2.1 Available from: 03.2018

Bug fix for firmware version V 1.2.0.

Changes in this version

- The flicker is now displayed correctly at values below 2.5%.
- The value for DomLambda is now stored correctly.
- The value for Purity is now not more than 100%.

Firmware V 1.2.0 Available from: 03.2018

This version includes a significant extension of the measurement functions and an optimization of display and operating functions. Significant innovations are the own measured value window for the flicker measurement with the associated graphics, the extension of the CIE measurement window by the zoom function around the Planckian curve and the implementation of the reference mode for comparative measurements.

Changes in this version

- The **flicker measurement** now has its own measured value window that can be switched on or off in the MENU display. With the ring controller up / down, you can toggle between three specific measurement windows, a display of the three **flicker values with a graph of the zoomed curve**, a **graph of the absolute curve (Lightscope)** and an **evaluation graph according to IEEE 1798**. The measured value flicker % is now displayed > 1.0% instead of > 2.5%.

- The **CIE measurement window** now only represents either CIE 1931 or CIE 1976, but has been extended by an **automatic zoom function around the Planckian curve**. With the ring controller up / down is zoomed in or out.

- The **reference mode** is turned on or off in the MENU Measurement in Referencemode. When the reference measurement function is turned on, a stored measurement can be loaded as a reference, which is retained even after the reference mode is turned off until the meter is turned off. Pressing the measurement key triggers a new measurement and compares it to the loaded reference. As soon as the reference mode is activated and a reference is loaded, only the measured value windows Spectrum, Report and CIE are available in modified form.

  In the **Spectrum window**, you can now use the ring controller up / down to switch over between the specific measurement windows
  - Spectrum Measure (measured values, colored spectrum measurement, spectral curve reference white)
  - Spectrum Reference (reference values, colored spectrum reference, spectral curve measurement blue)
  - Spectrum Delta (delta values, spectral curves reference white and measurement blue)

  In the **Report window**, the display changes to two-line structure with delta value, reference value and measured value for the measured variables activated in the MENU Presentation Report.

  The **CIE window** additionally displays the reference value as a triangle.

- When loading saved readings, the selected folder will be permanently retained until another folder is selected.

- The display of stored readings has been simplified with the **Quick Load function**. In the respective measured value window it is possible to switch between the stored measurements of the selected folder with the pushed DATA key and ring controller pressed up / down.

- In the MENU display report, the measured quantities x / y, u / v and u '/ v' now switch on and off in pairs.

- The Spectrum window now displays horizontal lines for 25%, 50%, and 75% of the max. measuring range displayed.

- Averaging now works correctly.

- Switching from TM30 windows works now even if CIE is not on all.

Firmware V 1.1.4 Available from: 10.2017

Bug fix for firmware version V 1.1.3.

Changes in this version

- The device now starts reliably when the battery was removed for a long time.
- After a measurement with automatic storage, the computer will now see the current measurement on the SD card.
- When loading measurements, CCT / duv are now loaded reliably.

Firmware V 1.1.3 Available from: 05.2017

Changes in this version

- Error during loading of CCT / Duv / tm30-chromashift corrected
- Optimization of flicker display, instead of „out of range“ the reason why the flicker could not be calculated is displayed now.
- Optimization of CCT display, instead of „-“ the reason why the CCT / Duv could not be calculated is displayed now.

Firmware V 1.1.2 Available from: 03.2017

Changes in this version

- Optimization of the flicker measurement

Firmware V 1.1.1 Available from: 03.2017

Bug fix for firmware version V1.1.0 .

Changes in this version

- In case of activating a lot of measuring values for the measurement window report, there might be displaying problems which are solved now.
- Adaption of several display texts.

Firmware V1.1.0 Available from: 02.2017

This version enhances essentially the measuring functionality. Additionally the display of measuring values, which are out of range or outside the specification of the standards, was clarified. Instead of a dash as measuring value, the related reason is displayed now.

Extended measuring functionalities

- Color rendering TM-30-15 according IES – Rf, Rg
- Color rendering Index Re (average R1…R15)
- Gamut Area Index GAI
- Irradiation Ee (W/m²) in range of 380…780 nm
- Luminous Efficacy of Radiation LER (lm/W) = Ev / Ee

Firmware V1.03 Available from: 12.2016

This firmware version optimizes several internal program functionalities and optimizes the flicker measurement.

Changes in this version

- Optimization of the flicker measurement

Firmware V1.01 First delivery

This firmware version was delivered with the first MAVOSPEC BASE deliveries.