Operating Instructions

JETI Spectroradiometer

spectraval 15x1

JETI Technische Instrumente GmbH
Göschwitzer Straße 48
D-07745 Jena
Tel.: +49 3641 23292 00
Fax: +49 3641 23292 01
E-mail: sales@jeti.com
Internet: www.jeti.com

Contents

1 Introduction

spectraval 1501 is an easy to use spectroradiometer for various applications. It miniaturized shape makes them suitable for laboratory as well as industrial use. The units can be used in the field in combination with a laptop.

They measure the spectral Radiance of light sources from 380 nm to 780 nm within an field of view of 1.8°. Additionally photometric, colorimetric (CCT, chromaticity, color purity, dominant wavelength, CRI, CQS, RGB) and application specific data (TLCI, PAR, circadian) are calculated from this spectrum. Therefore they are suited for the test of monitors as LCD, OLED and plasma type, for the measurement of projectors and of video walls as well as for scientific investigations. The indication of the measuring spot on the target is done with a pilot laser circle.

spectraval 15x1 can be used via Bluetooth or alternatively via USB.

spectraval 15x1 can also be equipped with an optional diffusor for spectral Irradiance measurements.

Acquisition and analysis of data is done by the PC-software *JETI LiVal*. It is also possible to create customer specific software using SDK (Software Development Kit: a package of spectrometric and radiometric DLLs) provided with the instrument. It is included on the supplied USB flash drive with detailed helping information. Furthermore, the instruments can be driven by their SCPI compatible firmware commands. The command list is also available on the USB flash drive.

PC Requirements:

- Processor (x86/x64) with 1GHz or higher, min. 2 GB RAM
- Graphic resolution: 1024×768, 32 bit color depth recommended
- Windows 8.1/10

Scope of Delivery:

- Basic device with protection cap
- Operating instructions
- Tripod
- Transport box
- USB flash drive with PC software *JETI LiVal*, DLLs, operating instructions and firmware command list
- USB cable
- Bluetooth dongle
- USB battery charger

2 Security Recommendations

Please read the following safety precautions before any operation to avoid a possible bodily injury and prevent the device from damage. In order to avoid any contingent danger, this device has only to be used within the ranges specified.

- The target pointer is a class 1 laser product[1], which has to be handled carefully. Being directed into human eyes, it can cause loss of eyesight. Do not look into the laser beam or direct the laser to another person!
- Avoid using liquid cleaners.
- Never spill liquids of any kind on the device.
- Never touch the glass window of the device, nor diffusers, glasses or filters contained in additional equipment.
- If any mechanical damages on the device are detected, please contact *JETI*.

The device must be disposed of in accordance with the applicable regulations. It contains one (spectraval 1501) or two (spectraval 1511) lithium ion batteries.

[1] Classification according to IEC 60825-1

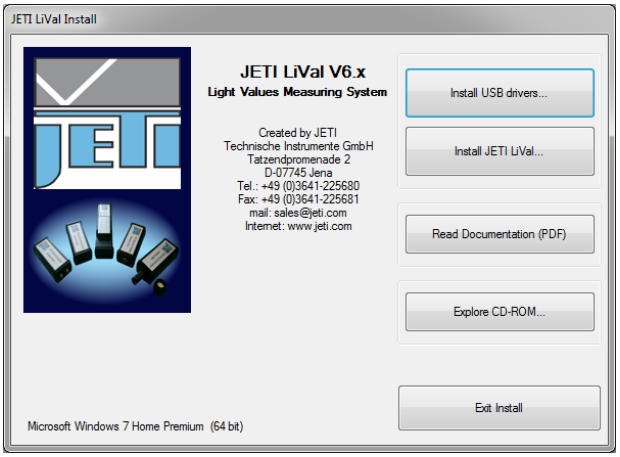
3 Drivers under Windows 8.1/ 10

3.1 How to Install

Do **not** connect the device during driver installation!

Note:	You must have administrator privileges to install the device driver.

- Insert the USB flash drive delivered with your device in an open USB slot on your computer.
- Run install.exe from the USB flash drive. The following window will appear:



- Click the Install USB drivers... button and follow the instructions to install the drivers.
- If a warning window appears that 'Windows can't verify the publisher of this software', click on Install Anyway.
- After finishing, connect your device to an USB-port. Windows completes the driver installation automatically.

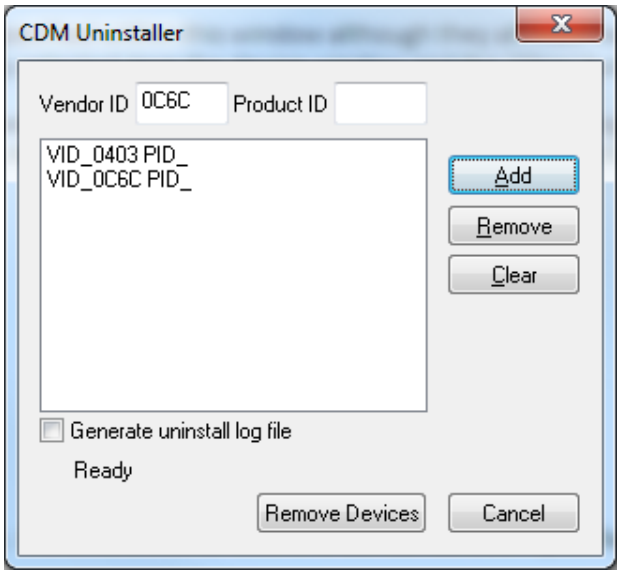
  If the driver could not be installed successfully, please uninstall the driver according to instructions from the next chapter, and try again.

3.2 How to Uninstall

This chapter describes how to uninstall old driver software.

Note:	You must have administrator privileges to uninstall the device driver.

- Run ‘CDMUninstallerGUI.exe’. You can find this program on your *JETI* USB flash drive in the directory `Tools ▸ CDMUninstaller`.



- Enter ‘0403’ in the Vendor ID text box. Leave the Product ID text box blank. Click on Add to add the list entry.
- Repeat the previous step and type ‘0C6C’ in the Vendor ID text box and add it to the list in the same way.
- Make sure that no *JETI* USB-device is connected to the computer and click Remove Devices.
- Please wait while the drivers are uninstalling. This may take some time.
- The system should now be cleaned from old drivers. Close the program by clicking on Cancel.

3.3 How to Determine Driver Version

Note:	For this procedure, the device, which was already installed, must be connected to the computer.

JETI USB driver consists of two parts, a device driver and a virtual COM-port driver. For the device to function correctly, the versions of the two drivers need to be the same.

To determine the version of the virtual COM-port driver:

- Open the ‘device manager’ (see next chapter on how to do this).
- Open the branch ‘Ports (COM & LPT)’ by clicking on the small plus-sign.
- Right-click the JETI specbos xxxx Port (or USB Serial Port) entry and choose Properties from the context menu.
- In the appearing property window open the tab Driver by clicking on it.
- On the appearing page you can find the driver version and the driver’s date.

To determine the version of the device driver:

- Open the ‘device manager’ (see next chapter on how to do this).
- Open the branch ‘Universal Serial Bus controllers’ by clicking the small plus-sign.
- Right-click the JETI specbos xxxx Device (or USB Serial Converter) entry and choose Properties from the context menu.
- In the appearing property window open the tab Driver by clicking on it.
- On the appearing page you can find the driver version and release date.

3.4 How to Open the Device Manager in Windows 8.1/ 10

The Windows *Device Manager* shows information about the devices installed on your computer.

There are several ways to open the *Device Manager*, depending on the Windows version and the settings of Windows. The easiest of them is:

- Press Win + Break on the keyboard.
- Click Device Manager on the left side of the appearing window.

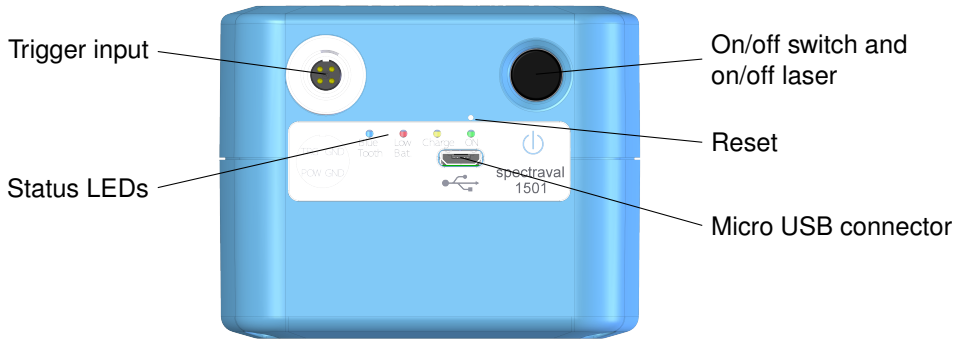
4 Installation of Hardware

4.1 Installation of USB Device

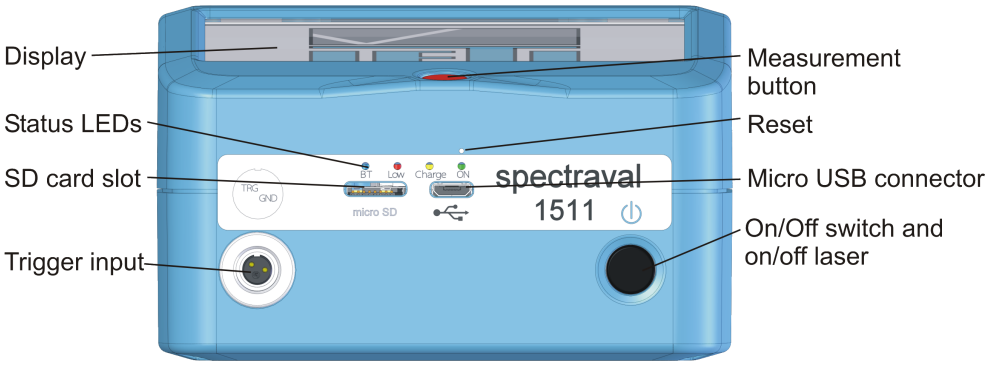
Unpack the spectroradiometer **spectraval 15x1** carefully and check the delivered parts.

Attention:	The USB driver must be installed at first without connected instrument.

The **spectraval** devices are powered by USB if operated via USB interface. Additionally, the battery will be charged during this time.



Control elements of **spectraval 1501**



Control elements of **spectraval 1511**

Connect the device to a USB interface of a PC or laptop using the enclosed USB cable. Shortly afterwards the device is ready for operation, e.g. by *JETI LiVal*.

Reset: Please take a little rod, e. g. of a paper chip and press the reset button through the hole in the device housing.

4.2 Installation of Bluetooth Device spectraval

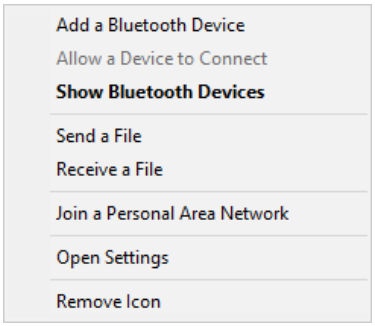
spectraval can be used via Bluetooth.

The Bluetooth interface is often integrated into modern computers. If your computer is not equipped with it, you need to use the Bluetooth dongle included in the delivery or any other one. Please connect it to the computer and switch on the **spectraval** device.

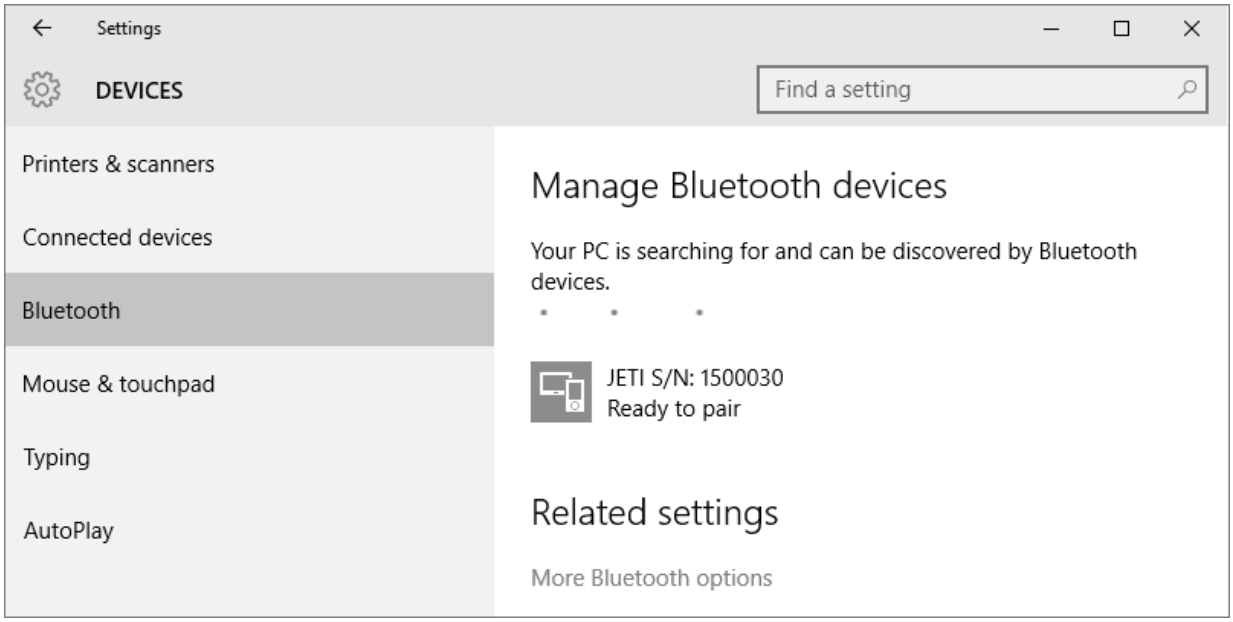
The software guides you through the installation.

- Click on the Bluetooth symbol.

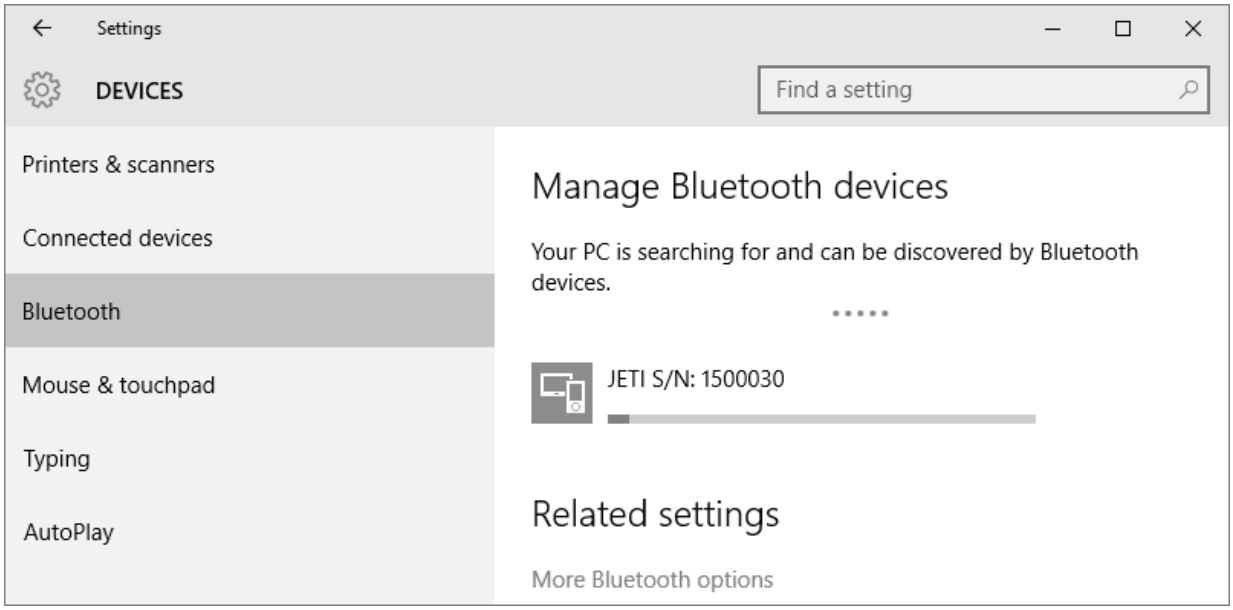
- Click Add a Bluetooth Device.



- After a short time the spectraval device will be recognized. Click Ready to pair.



- If you are asked for a pin number, use 0000.
- If the following screen appears, the installation is complete and the device is ready to use:



- Close the window.

4.3 Installation of LAN Device spectraval 1501

The **spectraval** device and the controlling PC have to use the same network address space, to communicate with the **spectraval-LAN** via a network connection.

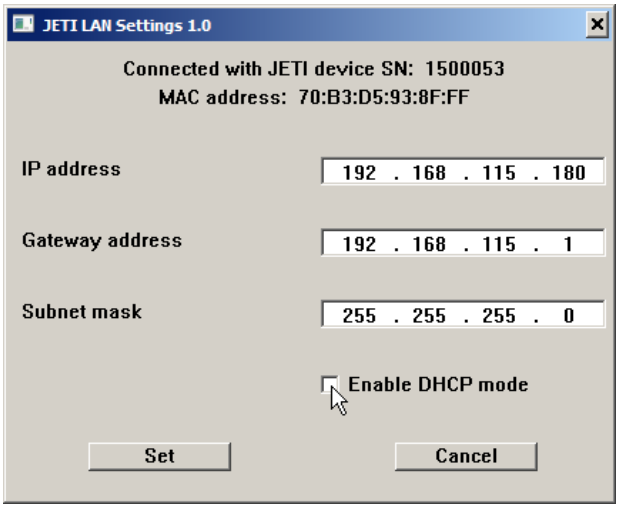
Remark:	The **spectraval 1501-LAN** needs a 5 V power supply if it is used via network or USB.

The default network setting of the **spectraval** device is set to DHCP (obtain network settings automatically). If a DHCP server is running in your network, the device will obtain an IP address from within the local network address space, and no further steps are required.

If no DHCP server is available (e.g. during a direct connection to a PC) or you want to give the device a fixed IP address for some other reasons, the network setting of the **spectraval** device has to be changed through a tool called 'JETI_LAN_settings.exe' (available on the installation USB flash drive).

Note:	You must have administrator privileges!

- Connect **spectraval 1501-LAN** via USB to computer.
- Start 'JETI_LAN_settings.exe' from `Tools`▸`JETI_LAN_Settings` to change LAN configurations.
- A window will appear where you can configure the network setting of the **spectraval** device.



- After clicking on Set button a message appears that device parameters have been changed successfully.

Remark:	The IP address of a PC can be found using 'cmd.exe' in the command line and then entering the command 'ipconfig'.

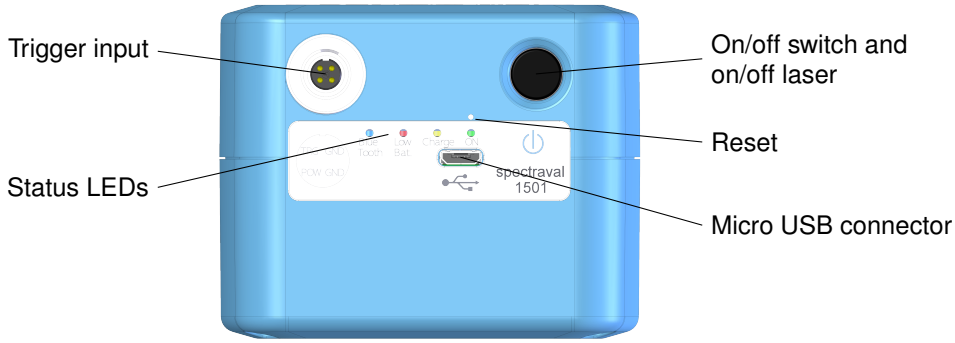
5 Operation of Device

5.1 spectraval 15x1

The instrument will be switched on automatically shortly after it was connected to a PC when the USB cable is used. This will be shown by the shining green LED.

Attention:	The USB driver must be installed at first without connected instrument (see chapter 3 ‘Drivers under Windows 8.1/ 10’, page 9).

If you communicate via Bluetooth, the device has to be switched on using the ‘On/ off’ switch on the rear side.



spectraval 1501

spectraval 1511

Remark:	Connect the device to your PC to charge the battery via USB.

If **spectraval** is connected to PC via Bluetooth and the connection is interrupted, **spectraval** is switched off immediately.

The battery status is shown by the yellow LED on the rear side of the device.

Status LEDs

Green:	Device is on	
Yellow:	On	Device is charging
	Off	Device is not charging
	Flashing	Charging error
Red:	Battery low. Device will be switched off shortly after this.	
Blue:	Active Bluetooth connection	

5.2 Battery charging

The battery can be charged using the USB battery charger or using the USB port of a PC. To use USB port for charging, plug in the USB device cable and make sure that the device is recognized by Windows correctly.

The battery will remain in the instrument, it is not exchangeable by the user.

If the device is operated by *JETI LiVal* software, battery status can be seen in the title bar of the window and through menu Info > Battery Status. If battery is low, corresponding warnings will be shown.

5.3 Trigger Function

5.3.1 Connectors

It is possible to trigger the measurement externally with a trigger female connector at the rear side of the device. It has the following pin out:

A suitable male connector is included in the device's delivery package.

5.3.2 External Control of the Measurement

A measurement can be initiated externally by a shortcut between the ground (GND) and trigger (TRG) pins. This can be done, e.g., by a foot push-button. Furthermore, it is possible to use a TTL signal (3 V to 5 V) to start a measurement. This is done with the falling edge of the signal.

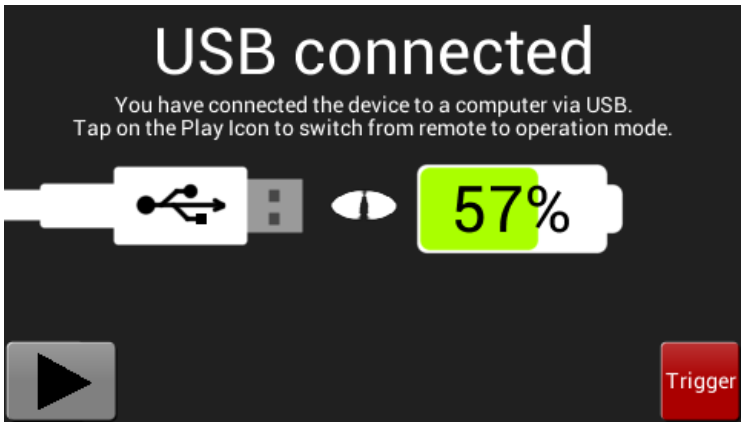
Both triggering versions act similarly as pressing the green Measurement button of the *JETI LiVal* software.

See the firmware description to change the settings.

6 Display Operation for spectraval 1511

6.1 Connection Through USB

Once a **spectraval 1511** is connected via USB, the following window is displayed:

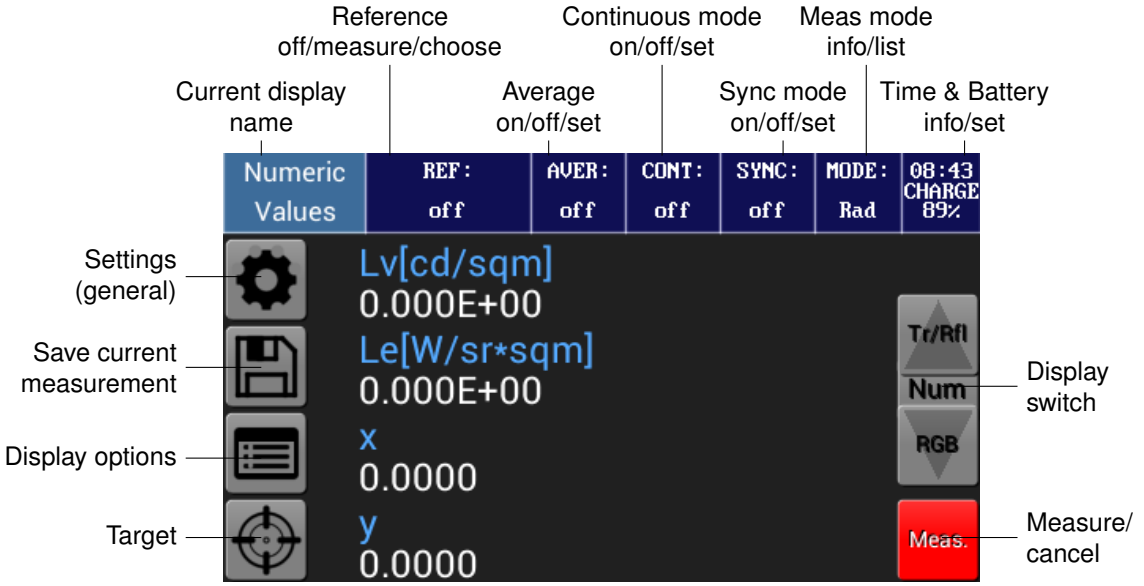


To use the **spectraval 1511** as a stand alone device through its display functionality, tap on the 'Play' button at the lower-left corner. To use it with *JETI LiVal*, tap on Trigger or press the hardware Measurement button on the device: this will cause *JETI LiVal* to initiate a measurement and receive data from the device.

6.2 Taking a Measurement

This section describes how to get started by taking a quick measurement. Note that some of the references to buttons and lights are describes in the previous sections.

- Turn on the **spectraval 1511** by pressing the 'On/Off' switch. The green status LED will illuminate.
- The **spectraval 1511** will initialize and show the main measuring interface:



- The measuring area can now be marked using the Target button or or by briefly pressing the ‘On/ off’ switch.
- Aim the laser point by pointing the measuring head on the front of the device in the direction of light. Press the Measurement button.
- The results will be instantly displayed on the screen.

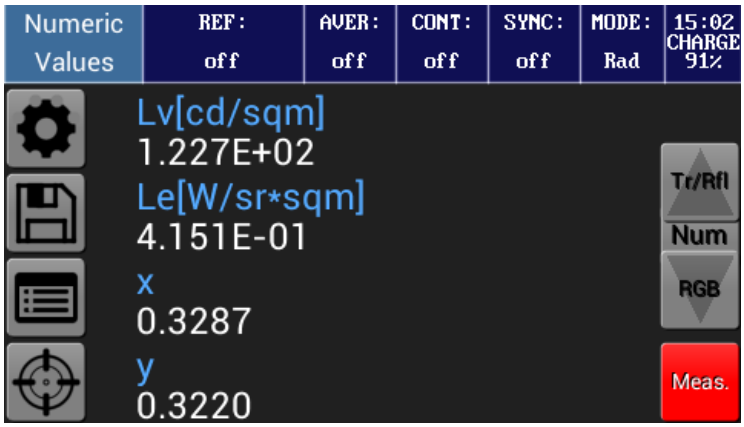
6.3 Display reset

With **spectraval 1511** it can happen that the display crashes and nothing works anymore.Then press the ‘On/Off’ swith and immediately after the measuring button. Wait a few seconds and calibrate the display.

6.4 Displaying of Results

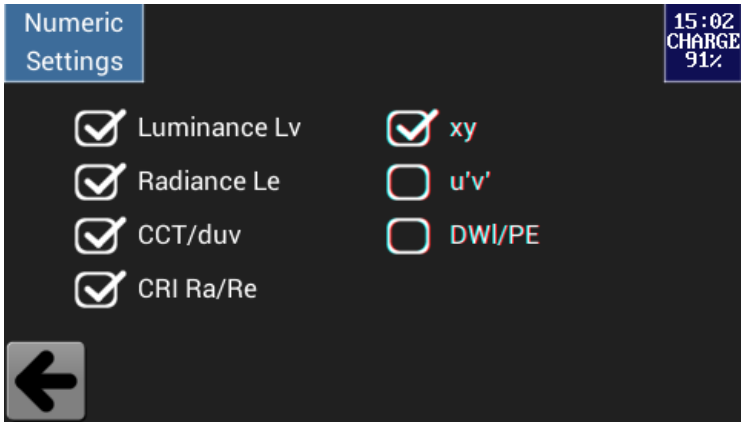
6.4.1 Numeric Values

This screen shows a list of measurements recorded after pressing the Measurement button as demonstrated in the previous section.



6.4.1.1 Numeric Values Display Options (List of Values)

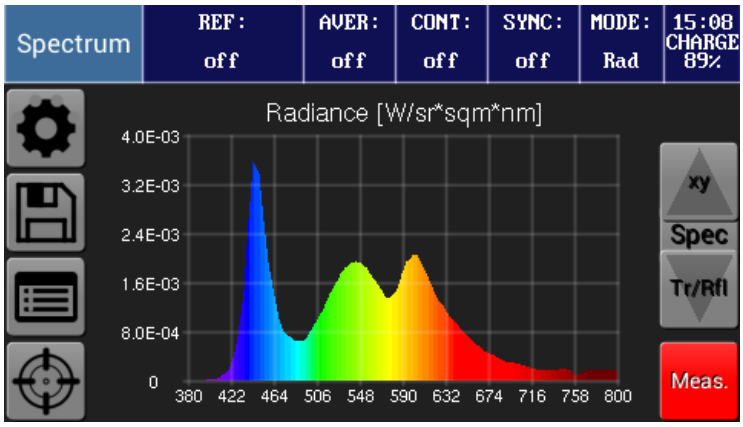
The Numeric Values list can be customized with different units of measure (e.g. Lv, xy, CCT) through the context-based ‘Display options’, accessed from the Numeric Values Screen.



Tap on the checkbox to select/deselect an item from the list and then return to the Numeric Values by tapping the Back icon. Now your new data-set is displayed.

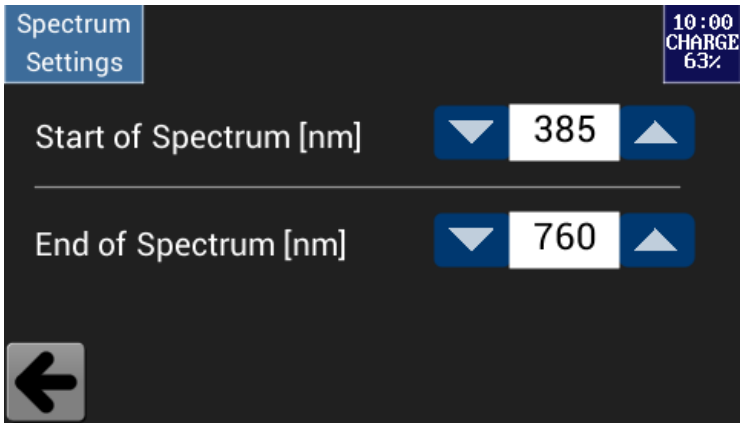
6.4.2 Spectrum

Light Spectrum of the latest measurement taken.



6.4.2.1 Spectrum Display Options (Wavelength Range)

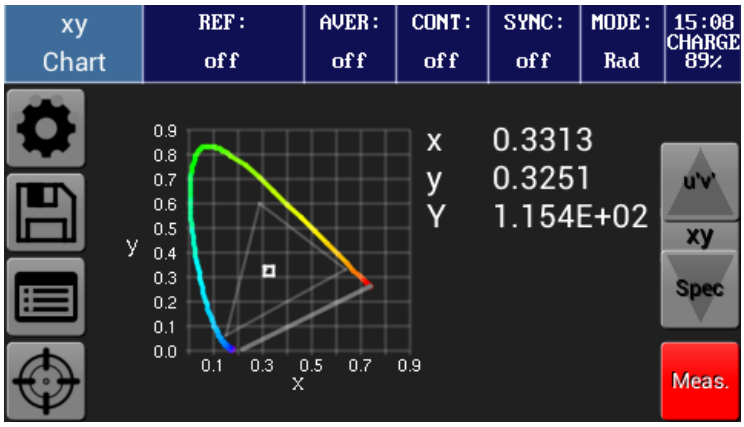
The start and the end of the displayed spectrum can be adjusted through the context-based ‘Display options’, accessed from the Spectrum Screen.



This setting is common with the setting for the transmission/reflectance diagram.

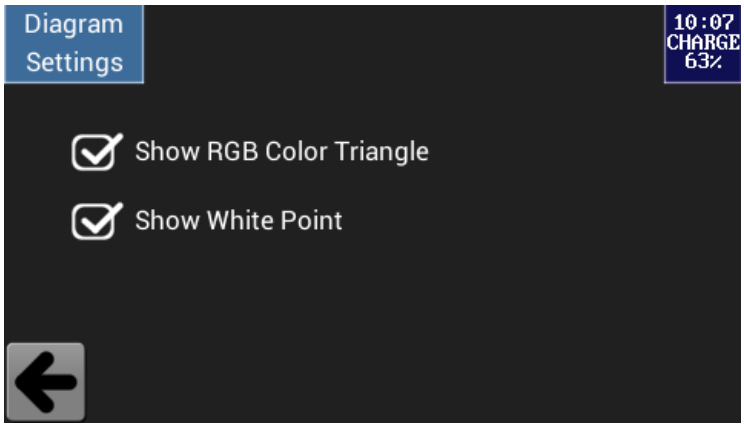
6.4.3 xy Diagram

The CIE1931 chromaticity x, y values of the latest measurement taken.



6.4.3.1 xy Diagram Display Options (Color Space & White Point)

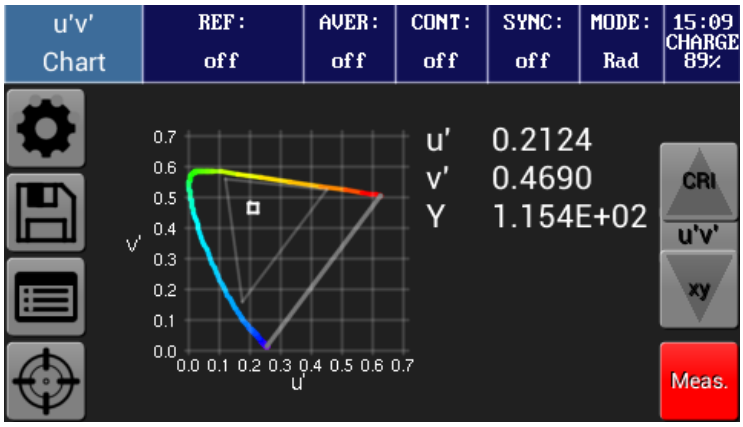
By tapping the checkbox you can display the RGB color triangle and the white point of the chosen RGB color Space, through the context-based ‘Display options’.



These settings are common with the settings of the u’v’ diagram.

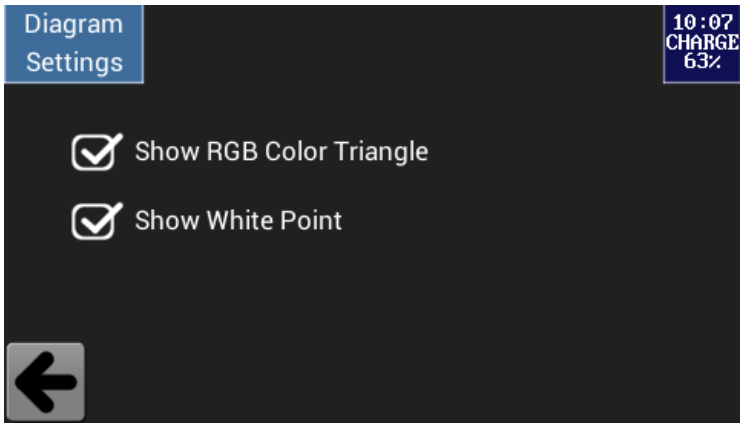
6.4.4 u'v' Diagram

The CIE1976 chromaticity u', v' values of the latest measurement taken.



6.4.4.1 u'v' Diagram Display Options (Color Space & White Point)

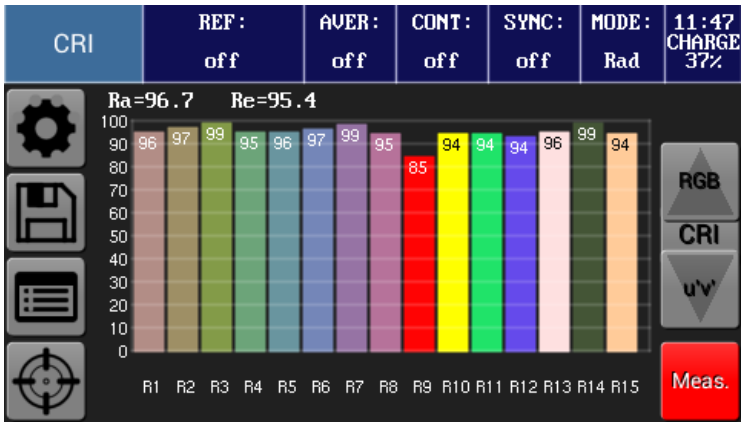
By tapping the check box you can display the RGB color triangle and the white point of the chosen RGB color Space, through the context-based 'Display options'.



These settings are common with the settings of the xy diagram.

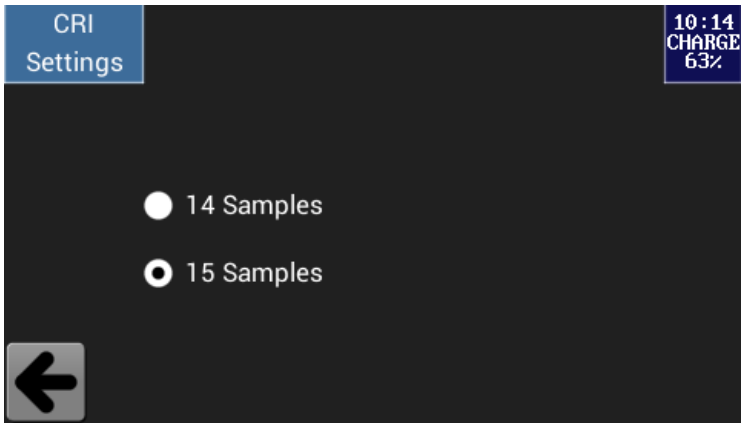
6.4.5 CRI

The CRI R_1–R_{15} values of the latest measurement taken.



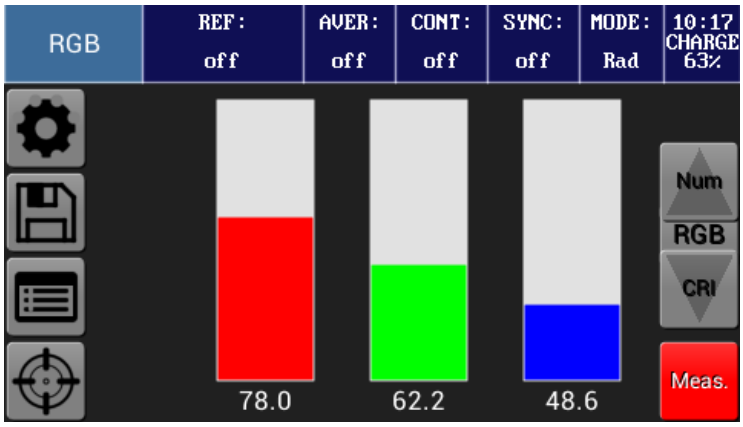
6.4.5.1 CRI Diagram Display Options (15th Color Sample)

By tapping the checkbox you can select whether the 15th CRI color sample ('Asian skin color') is used, through the context-based 'Display options'.



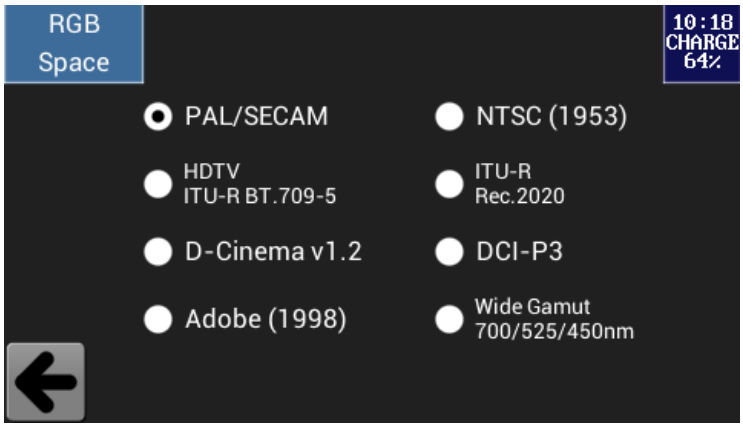
6.4.6 RGB

The RGB values of the latest measurement taken.



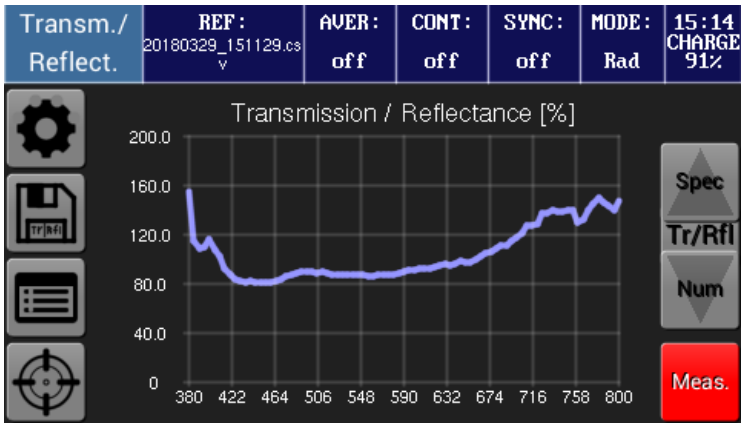
6.4.6.1 RGB Display Options (RGB Color Space)

The required RGB color space can be selected (e.g. PAL, NTSC, HDTV) through the context-based ‘Display options’, accessed from the RGB Screen.



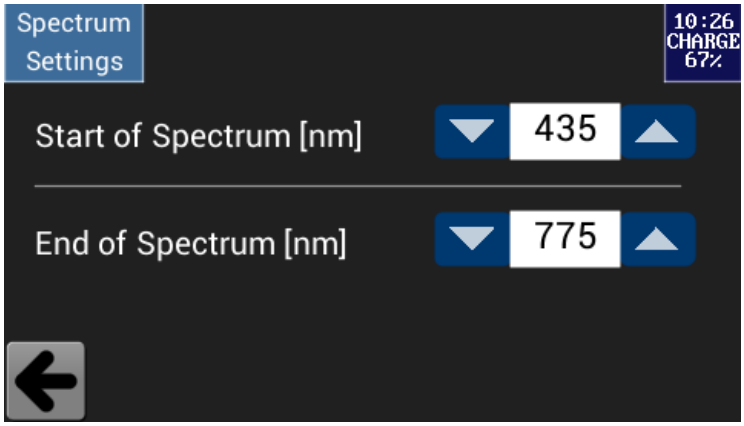
6.4.7 Transmission / Reflectance

Transmission / Reflectance curve. A reference must be measured or chosen (see chapter 6.6 ‘Reference Measurement’, page 29).



6.4.7.1 Transm./Reflect. Display Options (Wavelength Range)

The start and the end of the displayed spectral data can be adjusted through the context-based ‘Display options’, accessed from the Transm./Reflect. Screen. This is the same wavelength range which is used by Spectrum Screen.



This setting is common with the setting for the spectrum diagram.

6.5 SD Card

spectraval 1511 can store measuring data on SD cards (only support 1 GB up to 32 GB Fat32).

6.5.1 Saving of Data and File Management

6.5.1.1 General information

spectraval 1511 supports two file formats: '.csv' for all usual measurements and for reference files and '.tr' for transmission/reflectance data.

Every measurement can be saved by tapping on the Save button from the main window. If you are in Transmission/Reflectance mode, a '.tr' file will be produced. In all other cases a '.csv' file will be produced.

The Save button in the Transmission/Reflectance mode is specially marked to avoid ambiguity:

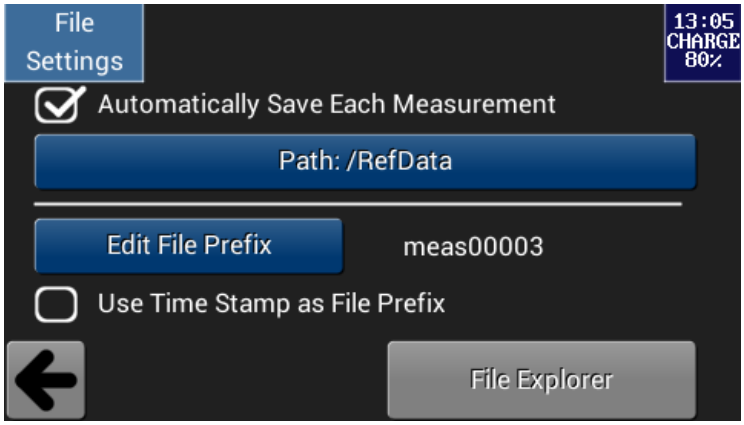
6.5.1.2 Settings

Go to File Settings in the Main Settings window (alternatively long tap on the Save icon in the main window).

Use the long button beneath the 'Automatically Save Each Measurements' checkbox to select a directory your measurements should be saved to.

Names are given to files automatically according to some pattern. There are two options: if the checkbox 'Use Time Stamp as File Prefix' is set, time stamp is used as file names; if this checkbox is not set, some user specified (under Edit File Prefix) prefix with a number is used.

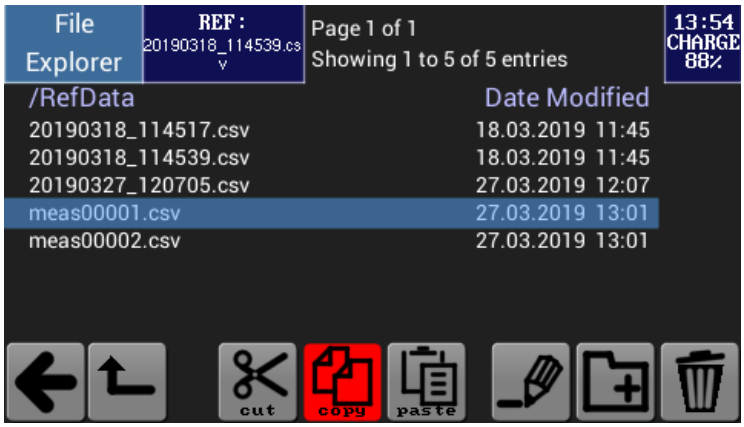
'Automatic Save' feature allows to write every measurement with a name specified by a certain pattern as described above onto the SD card automatically. If automatic saving is on, Save button in the main window is marked red.



6.5.2 File Explorer

spectraval 1511 has a simple file explorer which allows to perform some basic file operations: cut, copy, paste, rename, create a new directory, delete.

To find it: go to Main Settings / File Settings (or long-tap on Save button in the main window) and then tap on File Explorer.



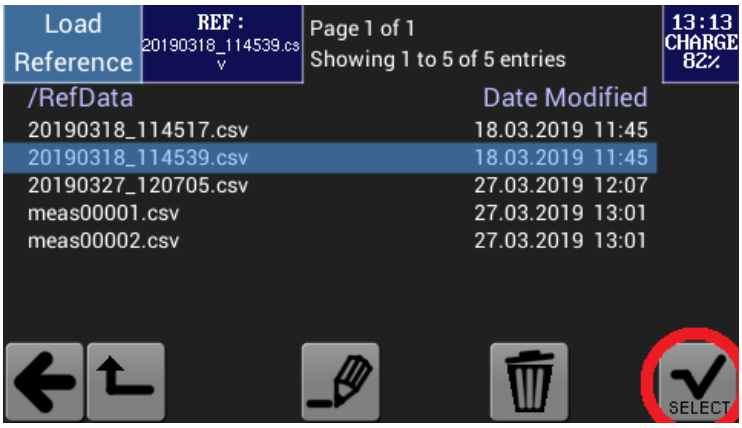
6.6 Reference Measurement

The Reference item allows you to compare two measurement side by side: the current measurement against historical data from SD card.

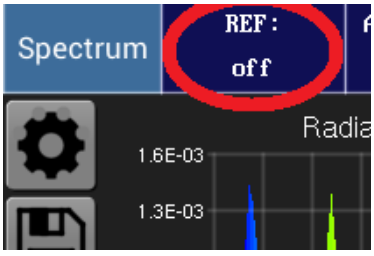
If you selected or measured reference in any way described below, reference data will appear (see also chapter 6.7.3.3 ‘Show Reference as’, page 39) and Transmission/Reflectance curve will become available.

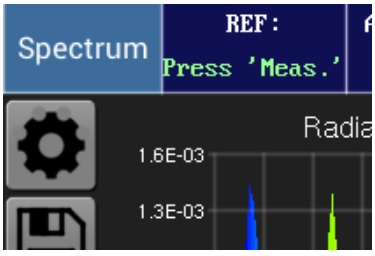
Generally there are two options:

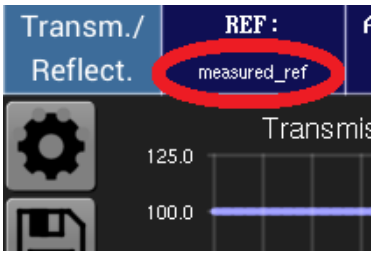
- If you want to use some file you already have saved on the SD card as reference, long-tap on the REF-field in the top line and select a ‘.csv’ file. Confirm your choice with the Select button.



- If you don’t intend a long-term usage of the references and want to renew it before every measuring session, short tap on the REF-field in the top line. ‘Press ’Meas.’’ text appears. If you do a measurement now, it will be saved automatically to a hidden temporary file and it will be set as reference.



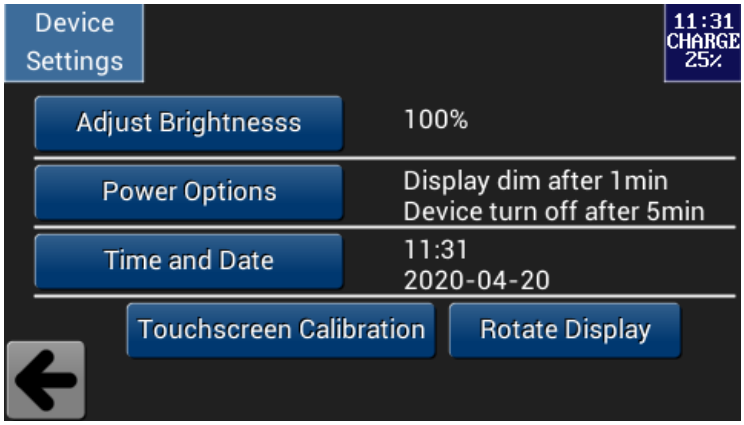




6.7 Settings

For a better understanding of the possible settings some important terms and measurement parameters are explained below. The different adjustment possibilities are divided into Device Settings, Measurement Settings and View Settings.

6.7.1 Device Settings

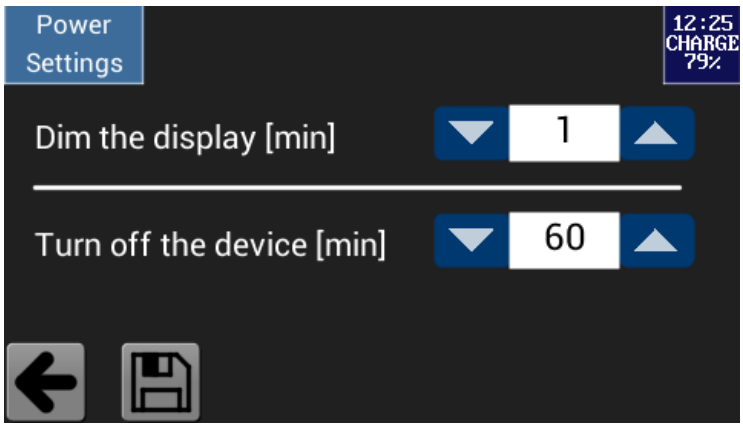


6.7.1.1 Adjust brightness

The brightness of the display can be changed under option Adjust brightness. Just click on the bar (full control corresponds to 100 % brightness)

6.7.1.2 Power Options

The Power Setting Options allow you to set different actions to take when the device is left idle for a certain amount of time.

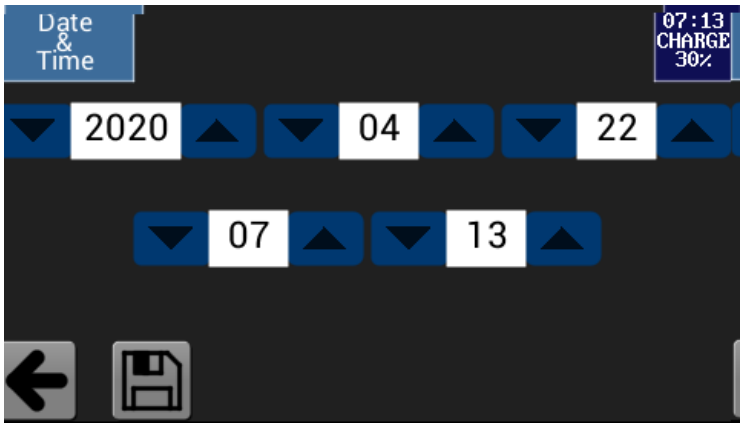


Do not forgot to click Save button.

If the device will turn off after a specific time, any setting will be lost!

6.7.1.3 Time and date

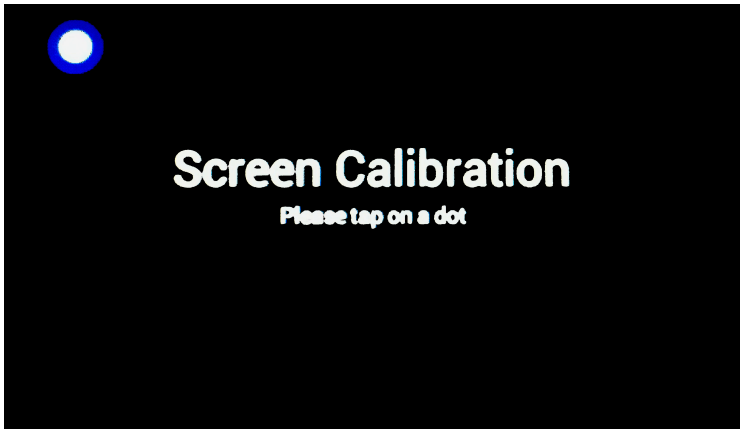
When the device is delivered, the CET is set. In this menu you can adjust the time.



Do not forgot to click Save button.

6.7.1.4 Touchscreen Calibration

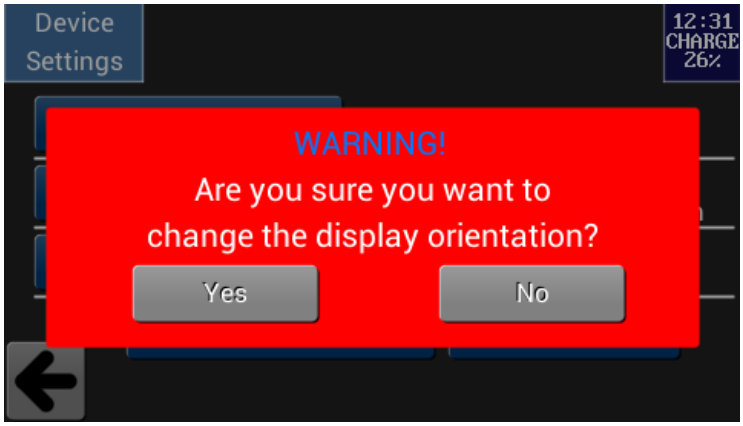
Touchscreen Calibration opens a window in which you can recalibrate the touchscreen (realign) should it react imprecisely to touch. At first you are ask, if you really want to calibrate.

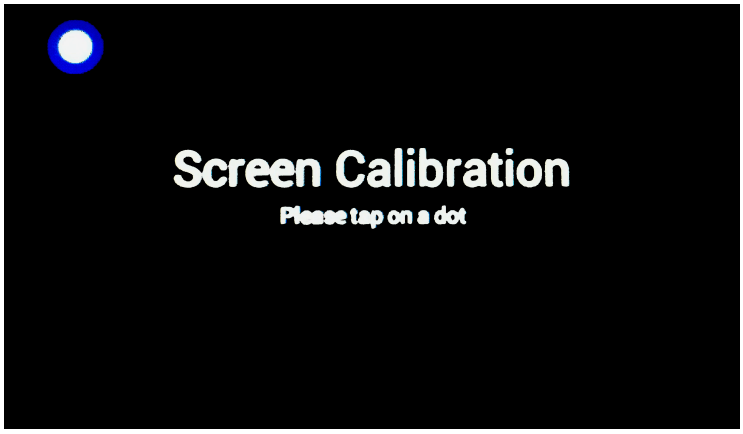


What you need to do is to touch consequently 3 points that will be displayed.

6.7.1.5 Rotate display

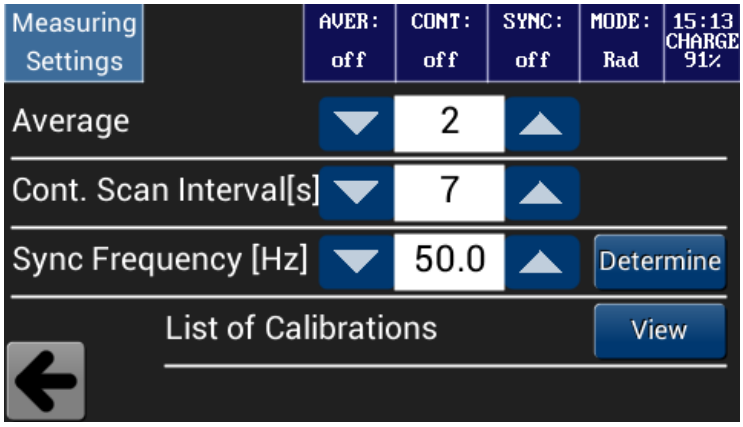
Rotate display allows a 180° rotation of the display. At first you are ask, if you really want to rotate.





What you need to do is to touch consequently 3 points that will be displayed.
Please calibrate the display after changed the alignment.

6.7.2 Measurement Settings



6.7.2.1 Average

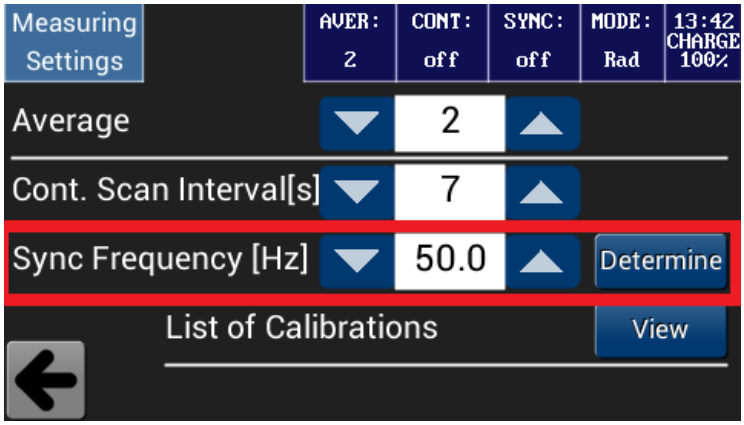
The Average setting can be used to obtain the spectrum as the mean value from up to 254 successive measurements.

6.7.2.2 Continuous Scan Interval

If you want to measure continuously, you can select the interval in the range of 0 s to 65 535 s. Note that you can begin a measurement session by tapping the Measurement button in the different Mode View and stop the session by pressing the button again.

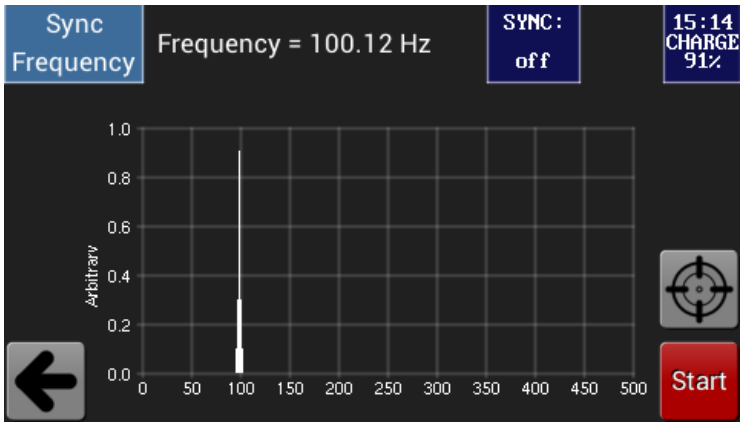
6.7.2.3 Sync Frequency

If you want to measure modulated light sources (typical examples are TV monitors and PWM modulated LED's), it is necessary to synchronize your device to the repetition rate, because **spectraval** devices are very sensitive. Otherwise the results, especially of bright sources, will fluctuate significantly. If the repetition rate of the display lies in the order of magnitude of the measuring time of the instrument, the repeatability of the measurement will be poor.



To do this, go to Measuring Settings via Settings-icon of the main screen, or just long-tap on the SYNC-field in the top line. There you have two options: it is possible to

set the frequency manually between 16 Hz and approximately 2000 Hz or to let the device to determine it. If latter use the button Determine.



If the sync measurement fails, it can have the following reasons:

- The instrument is positioned too far from the light source.
- The influence of the surrounding light or other light sources is too significant.
- The source is not modulated (note that some monitors do not fluctuate in intensity if their brightness control is set to maximum).

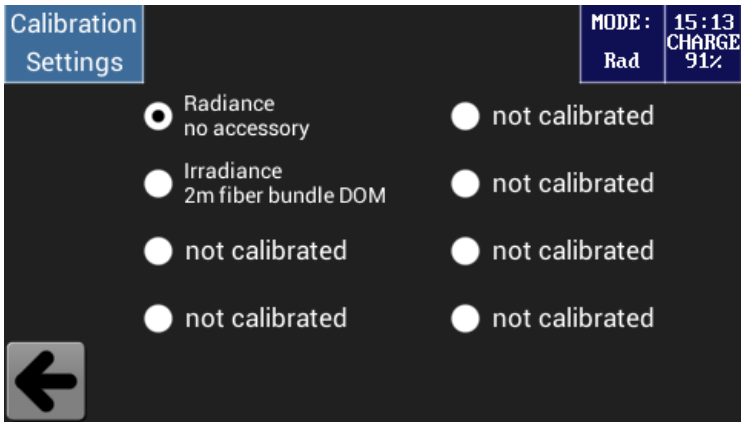
6.7.2.4 Change Calibration

Additional accessories are recognized by the device automatically via I^2C interface. The software will use automatically the appropriate calibration file if the attached accessory is compatible with the device. By default, the first position is reserved for the Luminance mode measurement without an accessory.

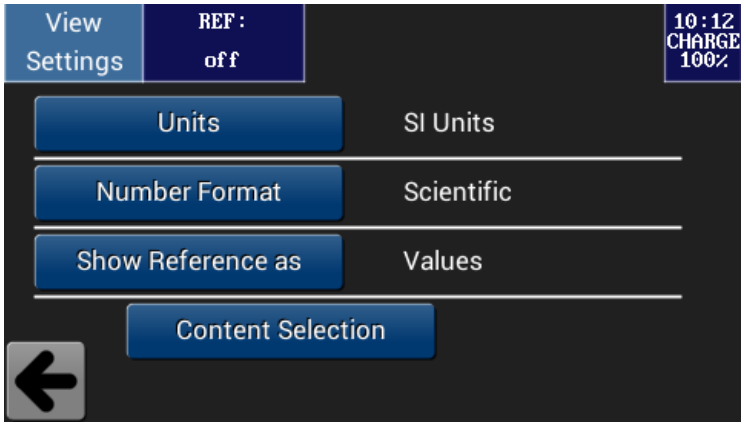
Remark:	Always make sure that the measuring mode shown in the MODE-field corresponds the attached accessory. Otherwise the device will use a wrong calibration file and the measuring results may be confusing.

JETI spectraval 15x1 are delivered in a calibrated status. The calibration data are saved in the device. A separate file exists for each measuring mode and each accessory.

The list of all calibrations saved in the device is available through the View button right from ‘List of Calibrations’ under Measuring Settings. Or just long-tap on the MODE-field in the main screen.

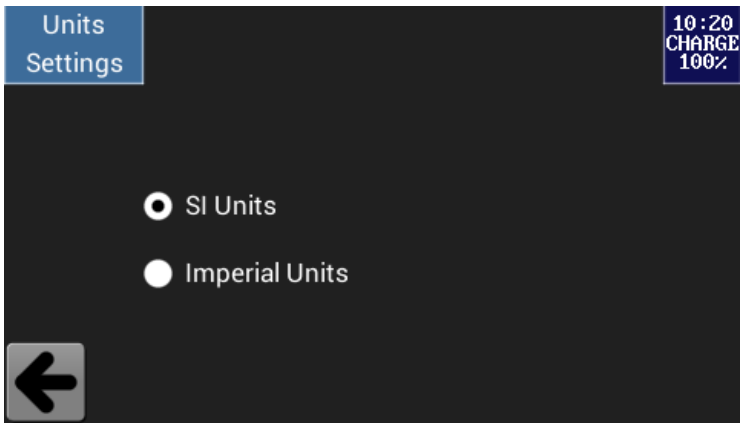


6.7.3 View Settings



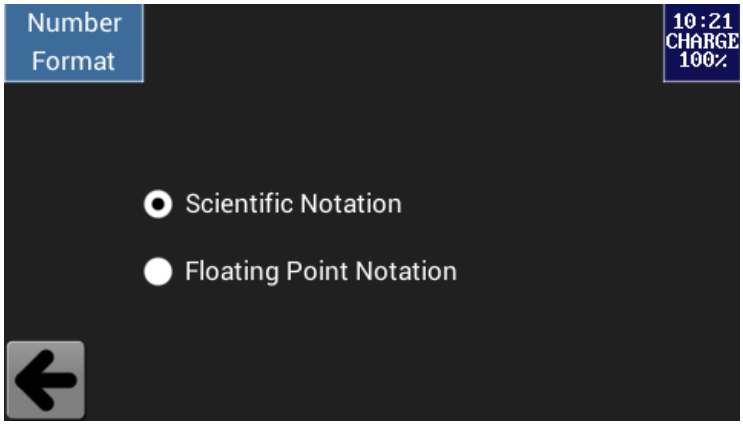
6.7.3.1 Units

Lets to switch between SI and imperial units. In case of imperial units, Luminance units are footlamberts (*fL*) and Illuminance units are footcandle (*fc*).



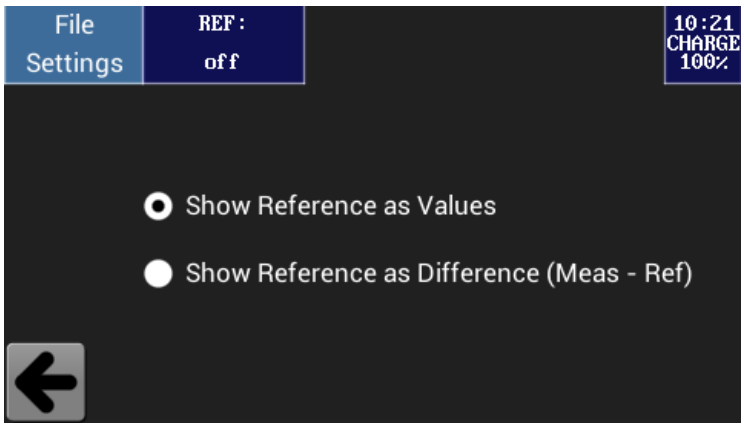
6.7.3.2 Number Format

Allows the user to switch between scientific and floating point notation.



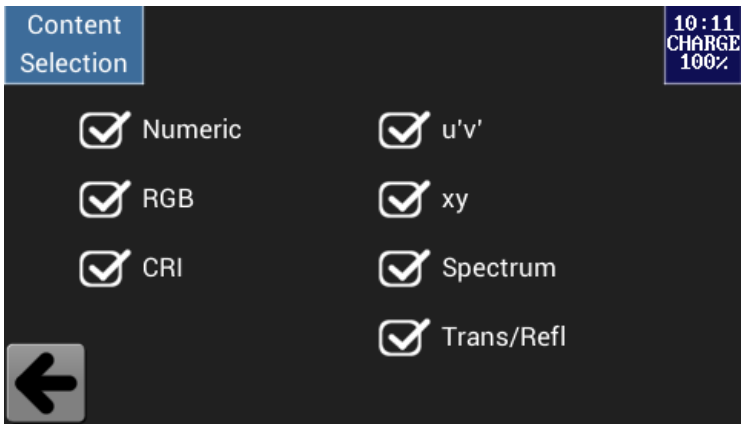
6.7.3.3 Show Reference as

Lets to choose the appearance of reference values: as absolute values or as differences between measured values and reference values.



6.7.3.4 Content Selection

If you want to make a selection that is different to the default, select/deselect a mode view from the list. Now only the selected modes will be displayed.



7 Technical Data

Spectral range	380 nm to 780 nm
Optical resolution (FWHM)	4.5 nm
Wavelength accuracy	± 0.5 nm
Calculated wavelength step	1 nm
Digital electronic resolution	16 bit ADC
Measuring values	Spectral Radiance, integral Luminance and Radiance, Chromaticity x, y; u', v'; Correlated color temperature; Dominant wavelength, color purity; Color rendering index CRI; circadian metrics; RGB; CQS; TLCI; etc
Measuring range Luminance	0.2 cd/m^2 to 180 000 cd/m^2 (CIE source A) typical 0.2 cd/m^2 to 140 000 cd/m^2 (typical warm white LED)
Viewing angle	1.8°
Measuring distance/ diameter in luminance mode	20 cm - ∅ 6 mm; 100 cm - ∅ 31 mm
Luminance accuracy	± 4.4 % (CIE source A @ 100 cd/m^2, k=2)
Luminance repeatability	± 1 % (CIE source A)
Color chromaticity accuracy	± 0.002 x, y (CIE source A, k=2)
Color reproducibility	± 0.0005 x, y (CIE source A)
CCT reproducibility	± 20 K (CIE source A)
Integration time range	10 µs . . . 60 s
Dispersive element	Diffraction grating
Light receiving element	CCD line array with 2048 pixels
Operating conditions	Temperature 10 °C to 40 °C Humidity <85 % relative humidity at 35 °C
Power supply	USB powered 5 V power supply (LAN-version only)
Pilot laser	Laser Class 1, λ= 645 . . . 660 nm (classific. accord. to EN60825-1/Oct. 2003)

PC interface

1501	USB 2.0 fullspeed (12 Mbit/s); Bluetooth optional LAN
1511	USB 2.0 fullspeed (12 Mbit/s); Bluetooth

Dimensions

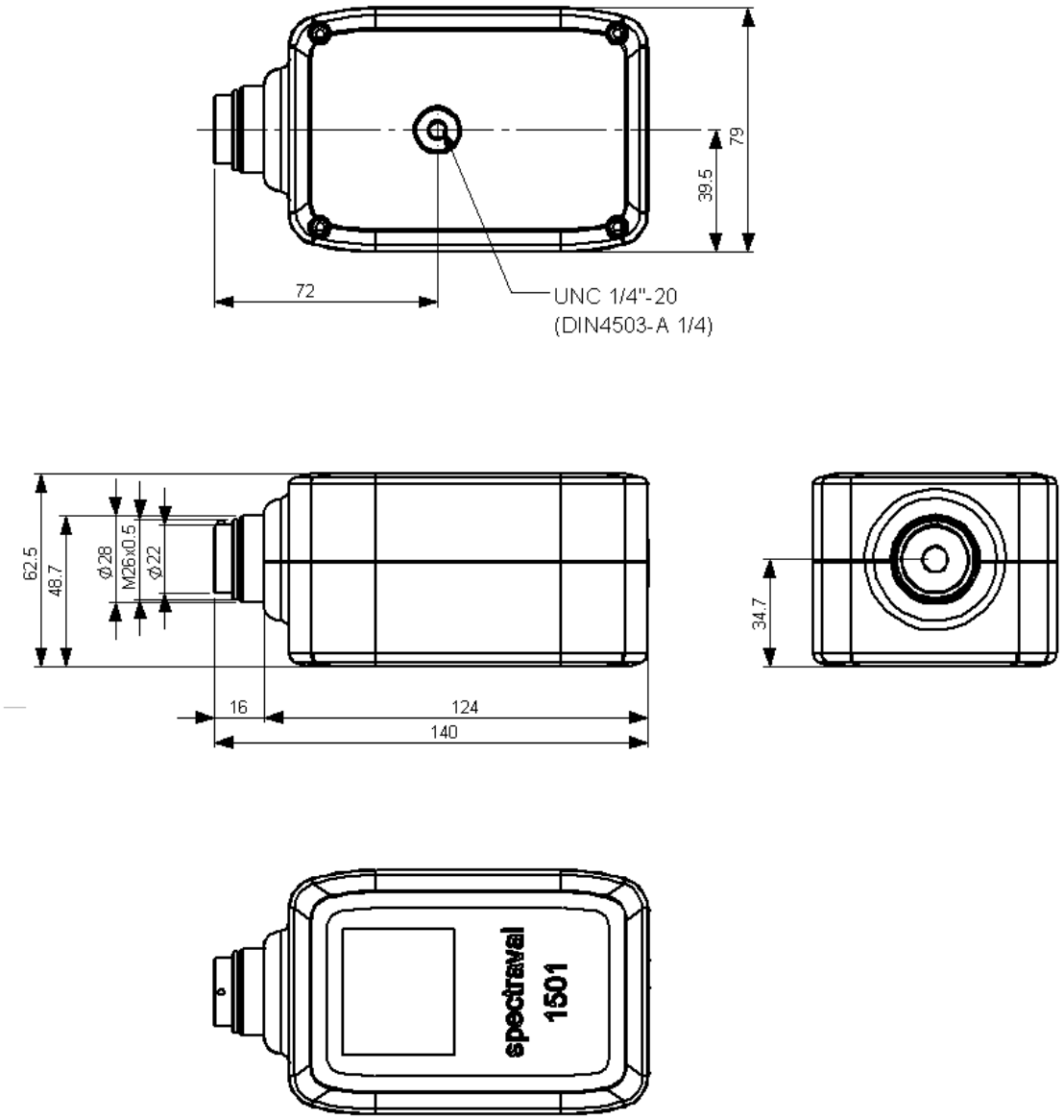
spectraval 1501	140×80×70mm
spectraval 1511	140×115×70mm

Weight

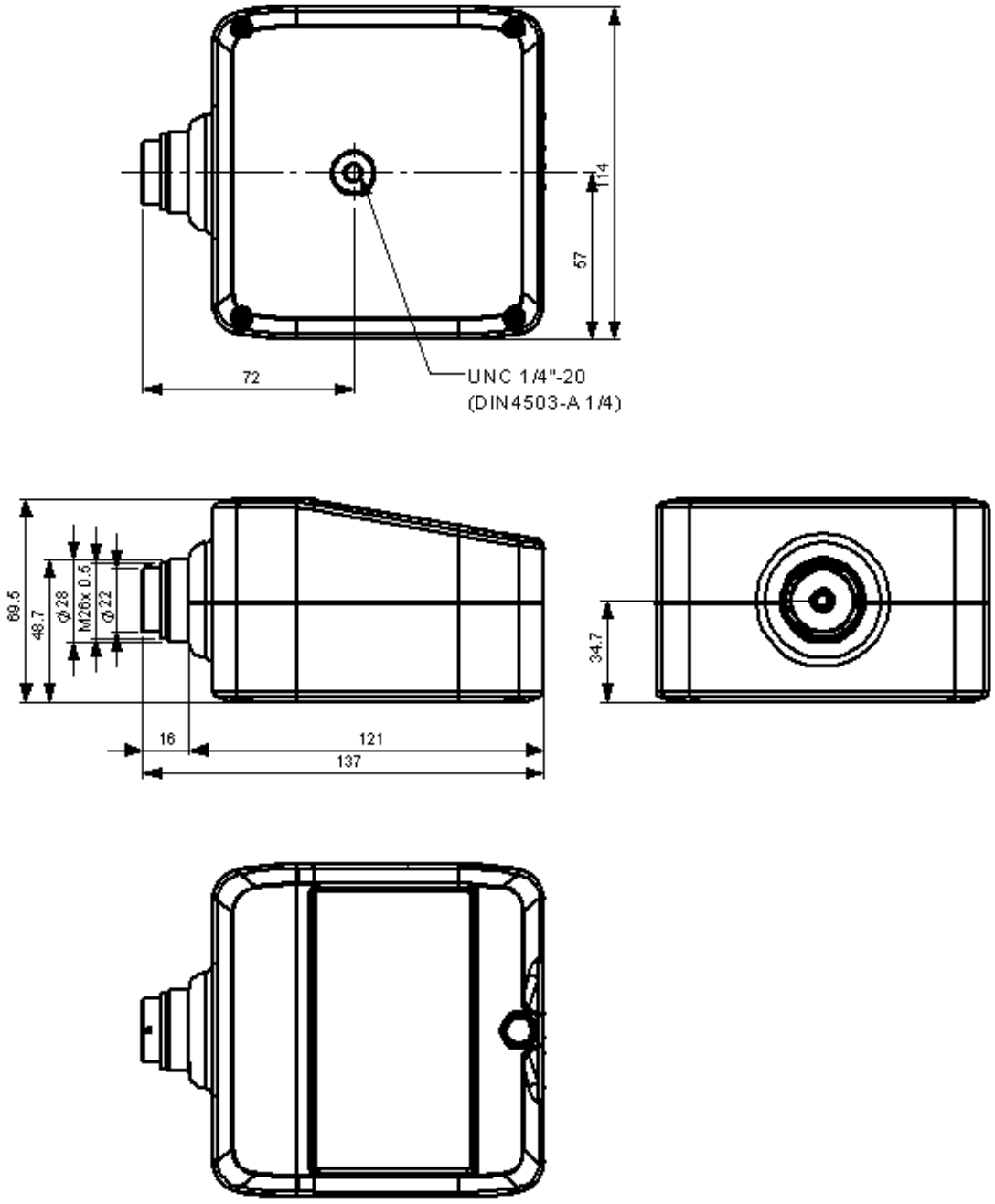
spectraval 1501	400 g
spectraval 1511	500 g

7.1 Mechanical Dimensions

The following drawings show the position of the thread downside the device and the general dimensions of the instrument.



spectraval 1501



spectraval 1511

8 Declarations

8.1 Certificate of Warranty

Certificate of warranty for

Model: **Spectroradiometer**
Type: **spectraval 15x1**

JETI Technische Instrumente GmbH (referred to as *JETI*) hereby warrants this equipment as follows:

If any part of this unit (except as described below) fails due to poor workmanship or material (determined by *JETI*) within TWO (2) years from date of delivery, that part will be exchanged at no charge.

This warranty is valid only when the unit is installed and adjusted according to factory specifications and serviced by competent authorized personnel.

JETI does not assume responsibility for any of the following, all of which are excluded from the coverage of this warranty:

- damage due to ordinary wear and tear, abusive use, or lack of proper maintenance;
- damage due to harsh mechanical shock, e.g. falling to the floor;
- loss or damage due to adverse environmental conditions or acts of God;
- loss of wages or income due to repair, replacement, malfunction or damage.

Warranty becomes void if serial number is removed or defaced, or the instrument was opened by the customer.

If a defect appears which the customer feel is covered by this warranty, a written notice describing the defect must be sent to *JETI*'s office at the current address of record.

Upon receipt of customers written report of a defect if the defective items are covered by this warranty, *JETI* will repair or replace it at no charge to the customer, within 30 days after receipt of the returned unit (provided there are no labour problems or materials shortages to cause delays). The choice between repair and replacement is to be made by *JETI* based on actual conditions or circumstances. *JETI* reserves the right to substitute new and improved equipment or parts at any time. The obligation to replace defective parts does not require replacement of the complete unit.

NO OTHER WARRANTY EXPRESSED OR IMPLIED IS APPLICABLE TO THIS UNIT.

This warranty is in effect for a period of 24 months, beginning one week after the date of delivery.

8.2 CE – Declaration of Conformity

No: **1605J1029V1.0**
We:

JETI Technische Instrumente GmbH
Göschwitzer Straße 48
07745 Jena
GERMANY

declare that the product series

JETI spectroradiometer
spectraval 15x1

to which this declaration relates is in conformity with the requirements of following documents:

- EU Electromagnetic Compatibility (EMC) Directive 2014/30/EU

EU Harmonised standards:

- EN 61326-1 (2018-09)
- EN 55011 (2017-03)
- EN 61000-4-2 (2009-12); EN 61000-4-3 (2011-04)
- EN 61000-4-8 (2010-11)

The CE sign confirms the conformity of the product with the standards and directives mentioned above.

JETI
Technische Instrumente GmbH
Göschwitzer Straße 48, D-07745 Jena
Tel.: +49 (0)3641 232 92 00
Fax: +49 (0)3641 232 92 01

Jena, December 2019

8.3 Declaration of UKCA Conformity

We:

JETI Technische Instrumente GmbH
Göschwitzer Straße 48
07745 Jena
GERMANY

hereby declares that the product series

JETI spectroradiometer
spectraval 15x1

placed on the market by the Company and its subsidiaries are compliant with Electromagnetic Compatibility Regulations 2016 (S:I: 2016/1091) and following documents.

EU Harmonised standards:

- EN 61326-1 (2018-09)
- EN 55011 (2017-03)
- EN 61000-4-2 (2009-12); EN 61000-4-3 (2011-04)
- EN 61000-4-4 (2013-04); EN 61000-4-6 (2014-08)
- EN 61010-1 (2020-03)

The conformity of the product with the standards and directives mentioned above, is confirmed by the UKCA sign.

JETI
Technische Instrumente GmbH
Göschwitzer Straße 48, D-07745 Jena
Tel.: +49 (0)3641 232 92 00
Fax: +49 (0)3641 232 92 01

Jena, December 2021

8.4 License Agreement

License Agreement for JETI Technische Instrumente GmbH Software Products
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The software is in 'use' on the computer when it is loaded into temporary memory (i.e. RAM) or installed into permanent memory (e.g. hard disk, CD-ROM, or other storage device) of the computer. However, installation on a network server for the sole purpose of distribution to one or more other computer(s) is not constitute 'use' for which a separate license is required, provided you have separate license for each computer to which the software is distributed.

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This limited warranty gives you specific legal rights.

Your remedies:
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- to replace your defective media; or
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9 Service

Please contact in case of any question or technical problem:

JETI Technische Instrumente GmbH
Göschwitzer Straße 48
D-07745 Jena
GERMANY
Tel.: +49 3641 23292 00
Fax: +49 3641 23292 01
E-mail: support@jeti.com
Internet: www.jeti.com

December 9, 2021