

# VISO SYSTEMS

## CALI-DT300 Reference Lamp

User Manual

Revision: 2024-04



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*Congratulations on purchasing your new Viso Systems product. Before using this product, please read the Safety Information.*

*This manual contains descriptions and troubleshooting necessary to install and operate your new Viso Systems product. Please review this manual thoroughly to ensure proper installation and operation.*

*For news, Q&A and support at Viso Systems, visit our website at [www.visosystems.com](http://www.visosystems.com)*

*Other manuals in this series (the latest version can be downloaded from [www.visosystem.com](http://www.visosystem.com)).*

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# Introduction

## About this document

These guidelines describe how to use the CALI-DT300 as a reference light source and how to do custom calibrations on Viso Systems goniometer products.

## Safety information



**Warning! This product is not for household use.**

Read this manual before installing and operating the Cali DT300, follow the safety warnings listed below, and study all the cautions in the manual.

## Preventing electric shocks

Make sure the power supply is always grounded.

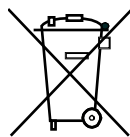
Use a source of AC power that complies with the local building and electrical codes, that has both overload and ground-fault protection.

If the controller or the power supply are in any way damaged, defective, wet, or show signs of overheating, disconnect the power supply from the AC power and contact Viso Service for assistance.

Do not install or use the device outdoors. Do not spray with or immerse in water or any other liquid.

Do not remove any covers or attempt to repair the controller or the power supply. Refer any service to Viso.

## Disposing of this product



Viso products are supplied in compliance with Directive 2002/96/EC of the European Parliament and of the Council of the European Union on WEEE (Waste Electrical and Electronic Equipment), as amended by Directive 2003/108/EC, where applicable.



Help preserve the environment! Ensure that this product is recycled at the end of its lifetime. Your supplier can give details of local arrangements for the disposal of Viso products.

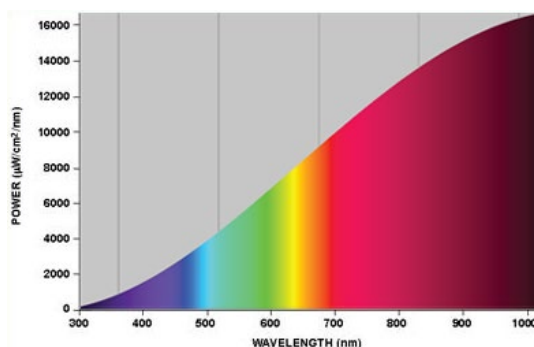
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## About Calibration and Light Sources

All Viso systems are delivered pre-calibrated but it is possible to make a custom calibration of the photo spectrometer if desired. This could be necessary if the system is to be certified by an official agency, which will perform its own calibration and afterwards issue certification documents.

To make custom calibrations a calibration source must be used, and the spectrum and the intensity in a point at a certain distance must be known. Such a spectrum is usually specified as power in  $\mu\text{W}/\text{cm}^2/\text{nm}$  as shown below.



Calibration sources can be obtained from a number of suppliers. This manual describes calibration procedures for the CALI-DT300 from Viso Systems which contains two lamps: A deuterium lamp and tungsten irradiance lamp. The combined spectrum of the calibration source is usually provided in a .Imp file (lamp file).

All CALI-DT300 light sources are traceable to Viso's factory calibration lamps.

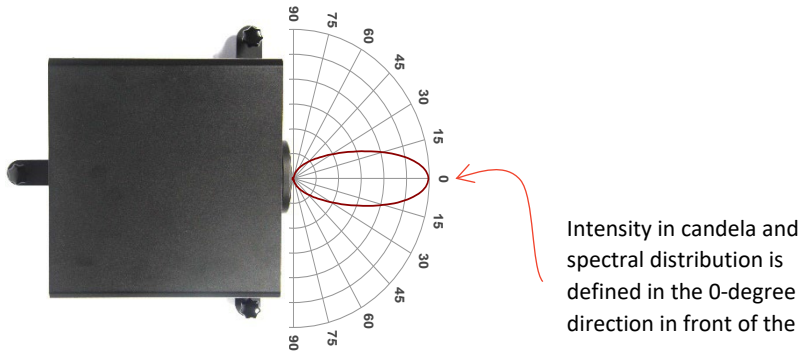
**Important:**

Calibrations must be made in a dark environment with non-reflective surfaces.

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### About the CALI-DT300

The CALI-DT300 is an irradiance reference lamp, which means it is a directional lamp with intensity and spectra defined in one point in front of the lamp as shown below.



### Dimensions

Outer dimensions of the light source

Height 110 mm x Width 340 mm x Length 316 mm

Shipping Packages	Shipping Dimensions	Shipping Volume	Weight
1. CALI-DT300	200 x 500 x 500 mm	0.05 m <sup>3</sup>	6 kg

Total shipping weight: 6 kg  
The shipment is done in a total of 1 package.

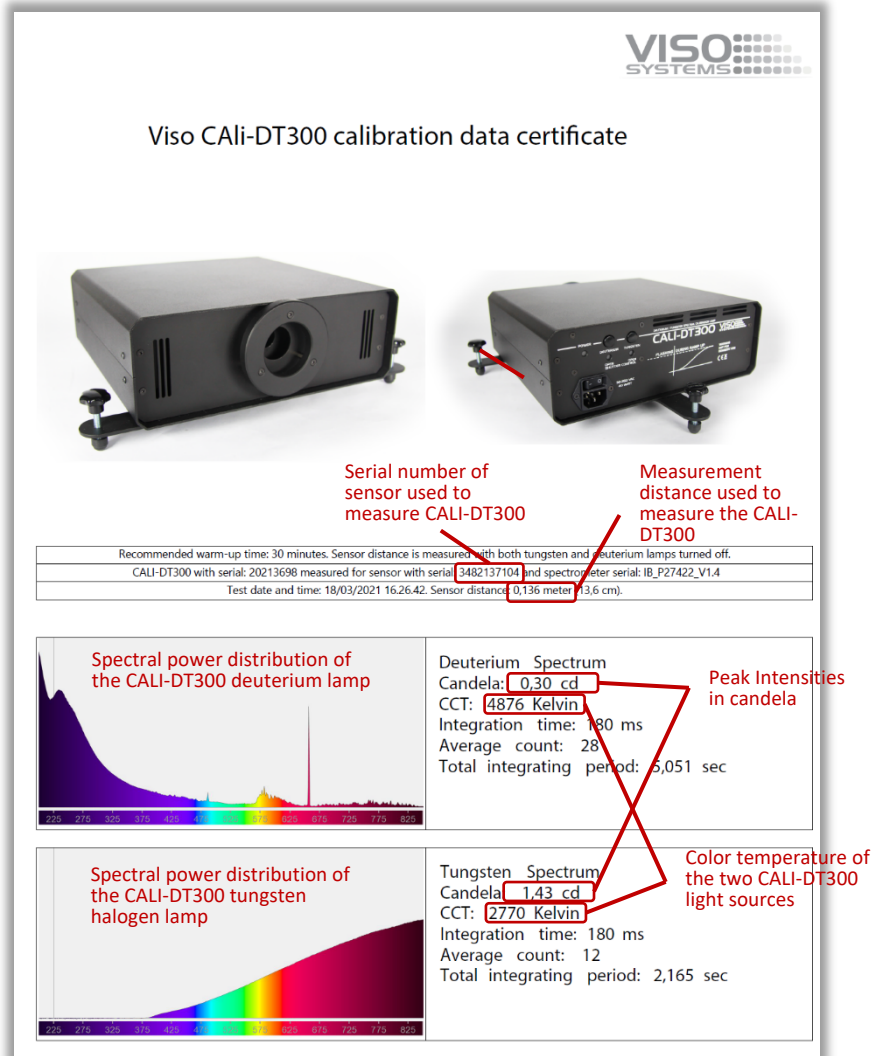
### CALI-DT300 Package Contents



- CALI-DT300
- Mains Power Supply Cable
- Black acrylic sensor base (for leveling sensor and CAL-DT300)
- Test Certificate

## The Test Certificate

The CALI-DT300 comes with a test certificate as shown below.



## Source lifetime

The source calibration lifetime is about 30 hours. Remember to turn off the light source as soon as possible to preserve the lamp.

If for any reason this time exceeded, the source can be re-traced to Viso's original calibration light sourced. Please contact your local distributor or Viso Systems product support.

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## Controls



1. Power Inlet
2. Power Switch
3. Power LED Indicator
4. Deuterium Lamp Shutter Control
5. Tungsten Lamp Shutter Control
6. Deuterium Status LED
7. Tungsten Status LED

### Deuterium Status LED

Blue Flash = Ramp Up  
Blue Constant = Shutter Open  
Red Constant = Shutter Closed  
Red Flash = Error

### Tungsten Status LED

Yellow Flash = Ramp Up  
Yellow Constant = Shutter Open  
Red Constant = Shutter Closed  
Red Flash = Error



## Turning on and stabilizing

1 hour before calibration start:

- Turn on the system and the software, to make sure that the sensor is stabilized.
- Ascertain that the Lab ambient temperature is stable at 25 deg.

Connect the power cable to the CALI-DT300 and turn on the power:



The deuterium and tungsten indication LED's will start flashing blue and yellow respectively.

This indicates that both of the calibration the light sources are ramping up.



When both light sources are stabilized the LED's will become red.

If there is a problem with one of the light sources the respective LED will flash in red.



### Switching between light sources



To enable the deuterium light output, press the deuterium shutter control button once.



The deuterium indication LED will turn blue, indicating that the shutter is open.

To turn the deuterium output off again, press the button once.

To enable the tungsten light output, press the tungsten shutter control button once.



The tungsten indication LED will turn yellow, indicating that the shutter is open. To turn the tungsten output of again, press the button once.

**REMEMBER!!!**

It is possible to open both shutters at once, so remember turn of the output that is not needed, before calibration.

After use, close all shutters to prevent dust from entering.

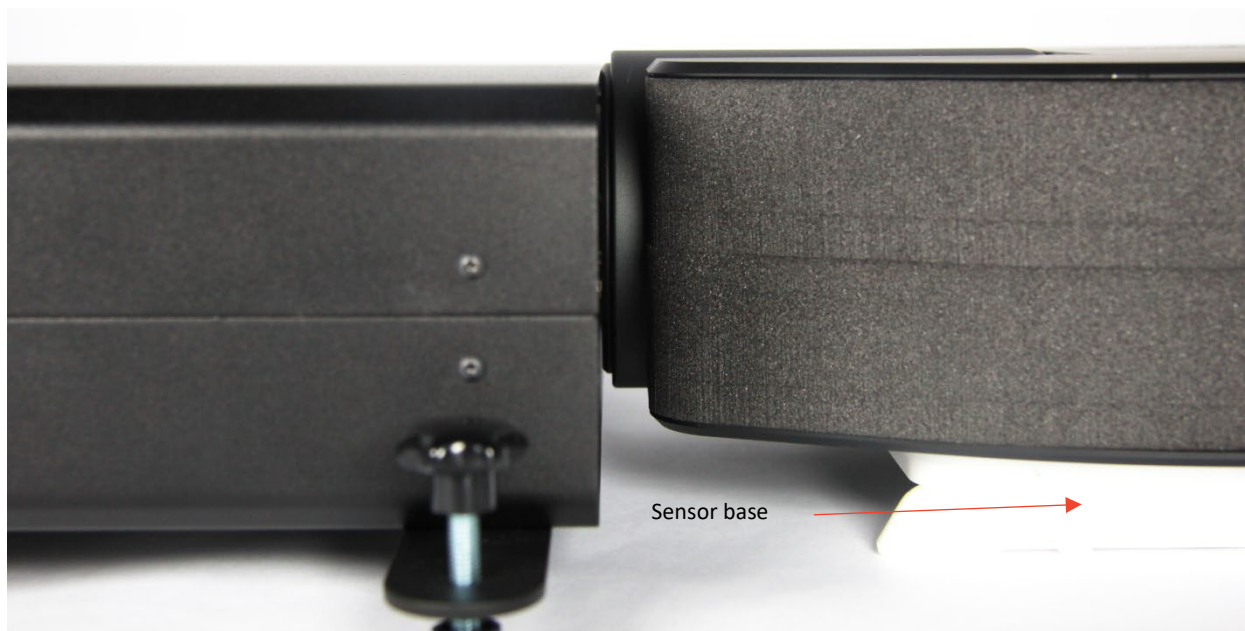
## LabSensor Model 2 UV-VIS Calibration

First, arrange the CALI-DT300 and the sensor together – the sensor is put on the intermediate sensor base (black or white acrylic)

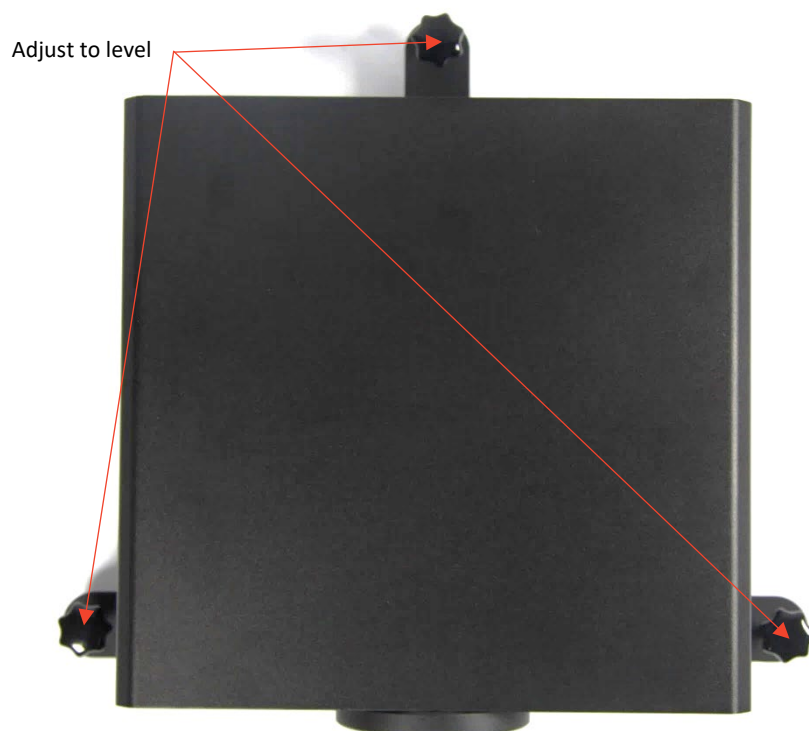


Sensor base

## Aligning the sensor



Adjust the feet on the cali-DT300 lamp so the lamp and the sensor lens are levelled.



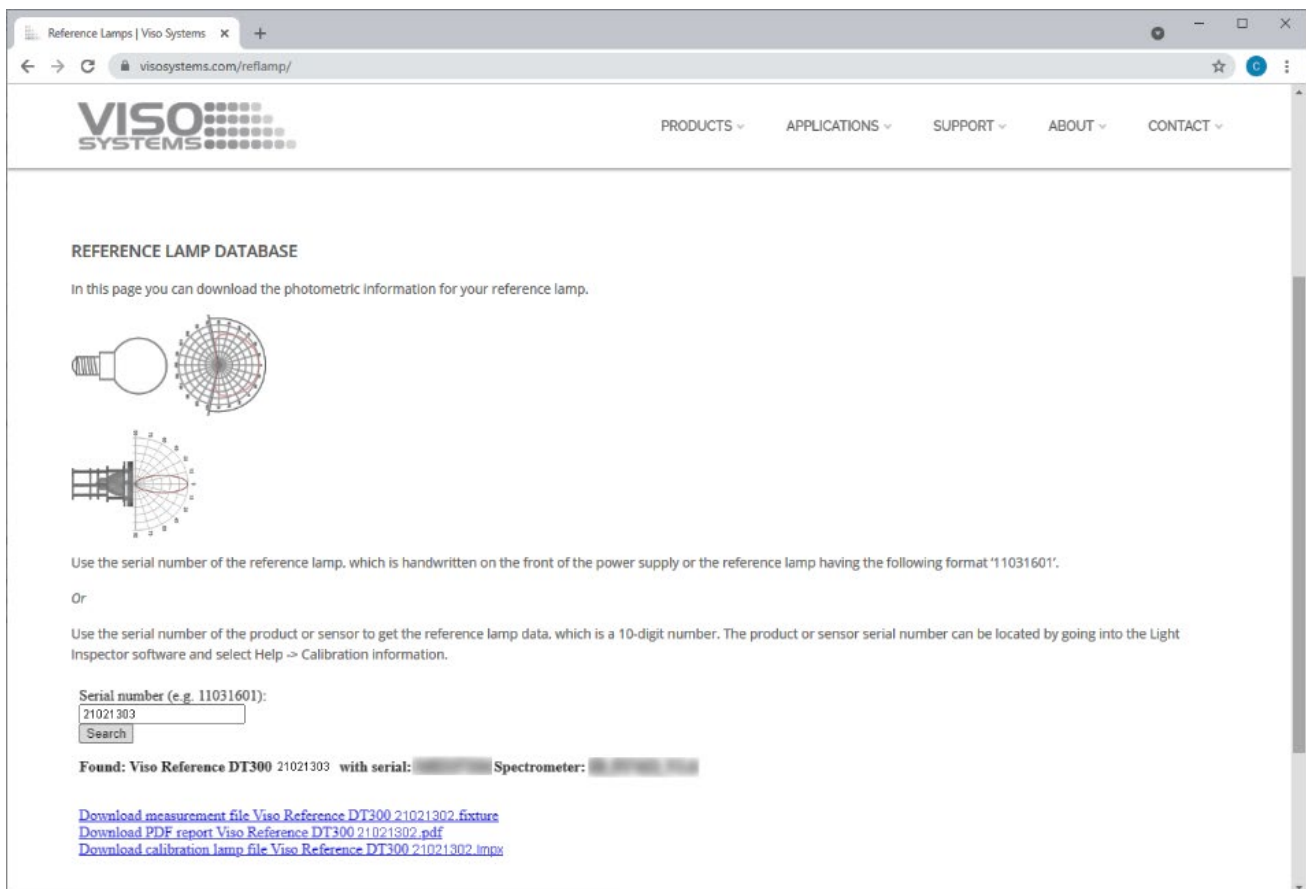


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## Calibration process


To calibrate the sensor using the DT300 you first need to download the .lmpx file. Normally, a calibration lamp has a standard .lmp file but as the DT300 has two calibration sources - a tungsten and deuterium lamp - an extended .lmpx lamp file must be used. The .lmpx-file contains spectral data for both lamps.

You can download the .lmpx file by going to [www.visosystems.com/reflamp](http://www.visosystems.com/reflamp) and type in the serial number of the DT300 lamp, for example like 21011807.



Before the calibration can be made, make sure the DT300 is placed close to the sensor as shown in previous chapter “LabSensor Model 2 UV-VIS Calibration”.

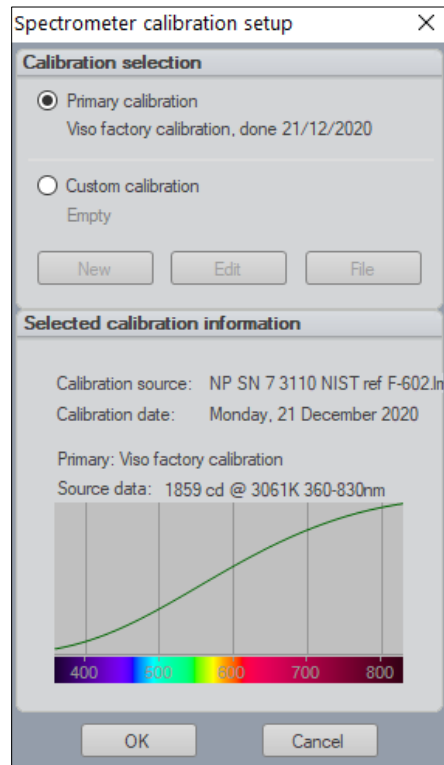
Then turn on the DT300 and wait for at least 30 minutes before making the calibration so that the light output from the tungsten and deuterium lamp has stabilized.

While stabilizing, the light output can be monitored by opening the Viso Light Inspector software and turning on the spectrometer with the  -button. You can use the buttons on back of the DT300 to open the shutter for the tungsten or deuterium to verify that they are running smoothly.

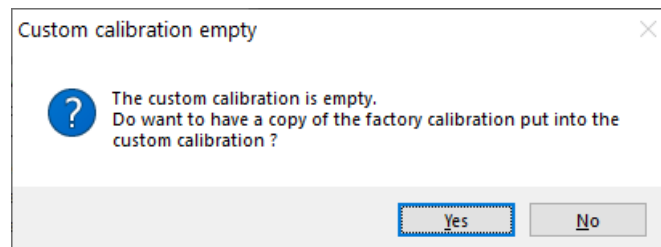
Before starting the calibration procedure, you should first measure the distance to the DT300. Please make sure both the tungsten and deuterium shutters are closed

so both indicators are red. Then press the distance measurement button on back of the sensor and make sure the distance is measured.

You can now start the calibration process by clicking on *Setup* → *Calibration*.

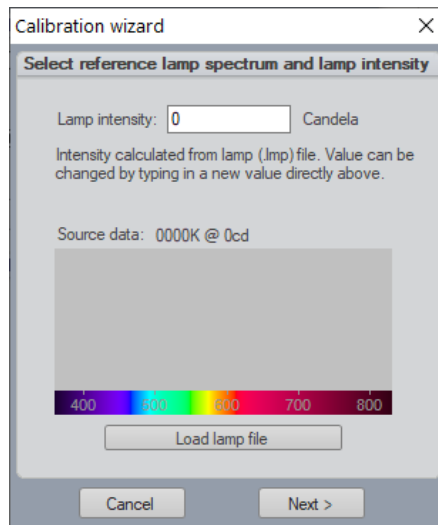


Select "Custom calibration".

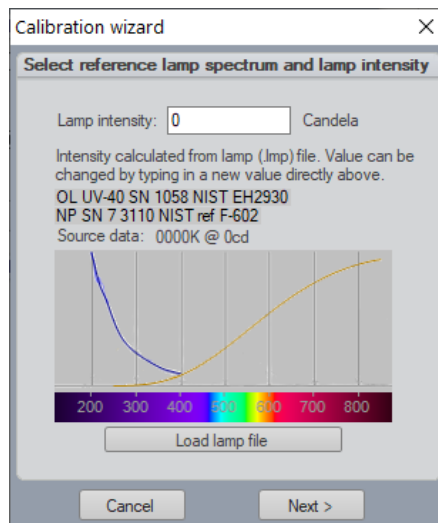


When asked if you want to make a copy of the factory calibration you can choose either yes or no. It is not of importance as we will make a new calibration.

Then click on the button "New".

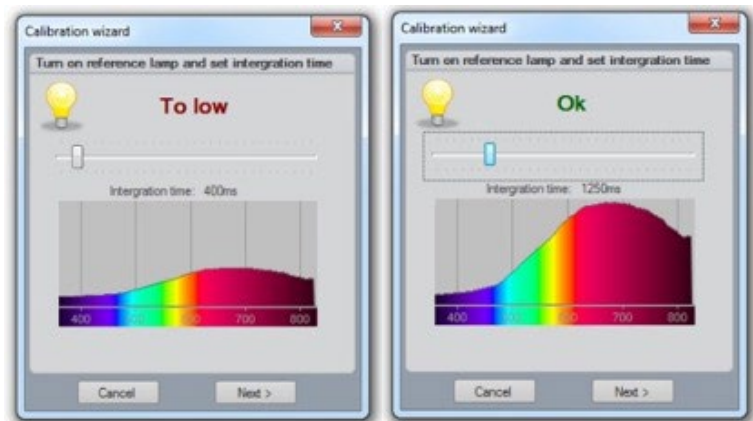


You can now click on the “Load lamp file” and select the .Impx file that you downloaded from the Viso website.



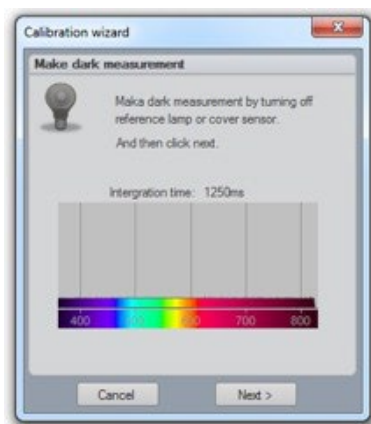
Now click on the “Next >” button.

Then open the shutter to the tungsten lamp by clicking on the tungsten button on the DT300 and then set the integration until you get an ok level:



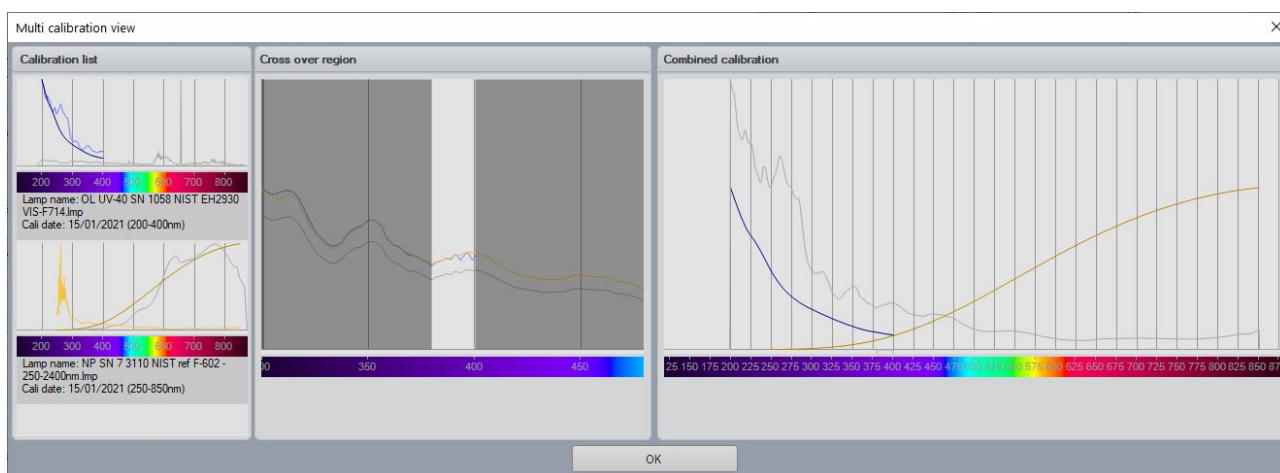


Then click “Next >” and wait for the calibration of the tungsten to finish. When asked by the software close the shutter for the tungsten lamp and open the shutter for the deuterium lamp, repeat the process for the deuterium lamp.

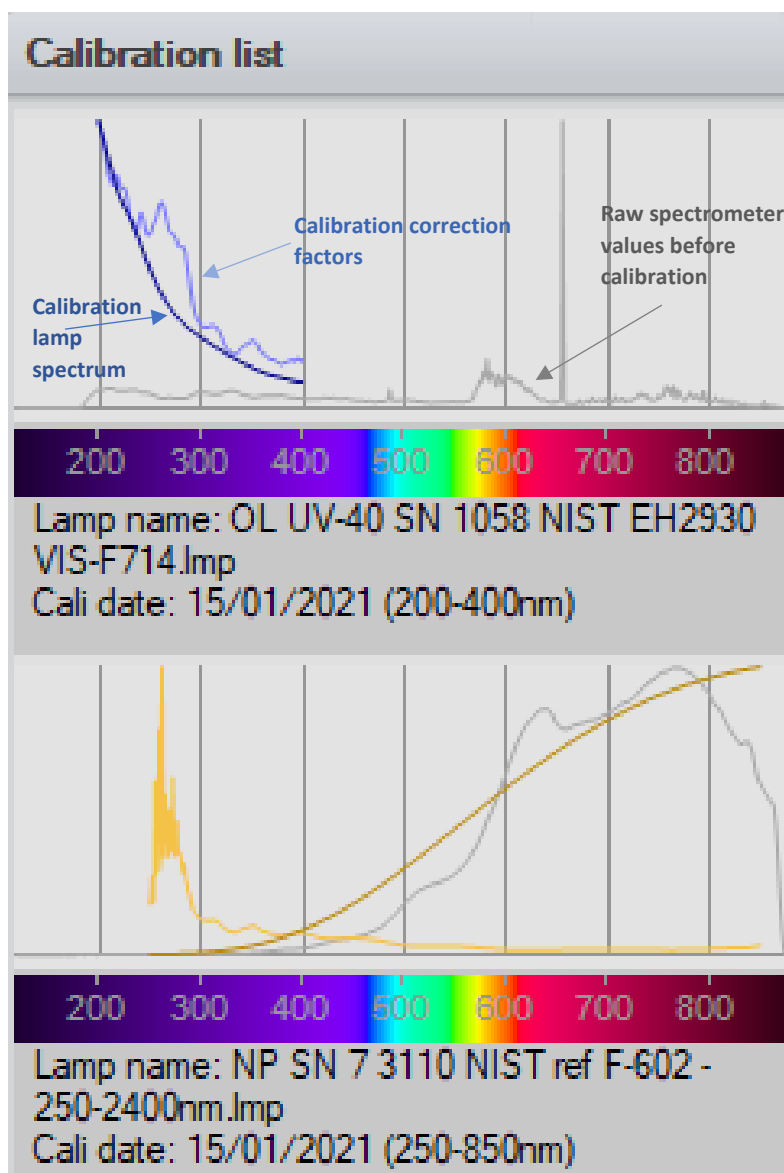


Now make the dark calibration by making sure both shutters are closed and the DT300 is power off, so the sensor is not exposed to any light. If you want to leave the DT300 on to be used to re-check your calibration later, you can also move the sensor away from the DT300 and cover the sensor entry in a way that ensures that no light enters the sensor. Then click “Next >”

Once the calibration has finished you will get a complete summary of your calibration as shown below.



The summary shows both the tungsten and deuterium calibrations.



Both lamp curves and raw spectrometer values are shown for both the tungsten and deuterium calibrations giving a complete overview of the finished calibrations.

You can now click ok. It is recommended to save the calibration to a file just to have a backup in the unlikely event calibration is not saved probably to the sensor.

When closing the calibration window, you will be asked to save the calibration to the memory of the sensor. Please select yes.

The factory calibration will always stay intact, so you can revert any time to the factory calibration if you desire.

Restart the software and make sure your calibration is stored by clicking Setup -> Calibration

## Intensity verification using REF800

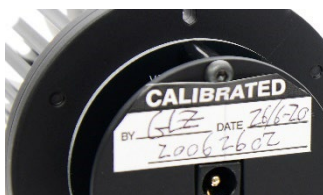
After the spectral calibration has been done and stored to sensor, it is advised to make a verification of the calibration using a third source. The best source for this is the REF800 led source as it gives a very stable intensity.

Since CALI-DT300 stands very close to the sensor during the first calibrations step, it is hard to get the intensity right. Just a millimeter will make a big difference since the signal to the sensor drops with the distance squared.

So, for CALI-DT300 the first step is to be regarded as a spectral calibration (combined with a rough intensity calibration), whereas the next step including REF-800 is the final intensity calibration.



Before starting, please make sure you have downloaded the calibration paper of the REF800 by going to [www.visosystems.com/reflamp](http://www.visosystems.com/reflamp) and typing in the serial number of the REF800. The serial number can be found on the power supply or on back of the REF800 lamp itself.



Please follow these steps to measure the REF800 with your newly calibrated sensor.

1. Make sure that your software and firmware is up-to-date – go to the Help menu and check. We recommend installing the latest beta version.
2. Perform reference measurements in a completely dark space with black surfaces. Making the measurement in a space that does not live up to these requirements may affect the precision.
3. Start your software and connect everything including the sensor at least one hour in advance. Mount or turn on the REF-800 at this stage. Make sure that the laboratory ambient temperature is 25 deg.
4. Lock the gonio base.
5. Put the gonio arm in a vertical position.
6. Push the whole tower back or forth to align the front of the arm with the rotational center of the gonio base.

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7. Move the sensor tripod to adjust to a distance of 200 cm measured to the gonio arm. Align the sensor as carefully as possible by using the mirror alignment procedure in the LabSpion user manual page 18 ff [https://data.visosystems.com/content/manuals/labspion\\_user\\_manual.pdf](https://data.visosystems.com/content/manuals/labspion_user_manual.pdf)
  8. Remove the alignment mirror.
  9. Place the Reference 800 with the indicator (the oblong hole in the base) upwards directly in middle hole in the gonimeter arm.
  10. Push the tower slightly back to center the light source (yellow COB area) in the gonio vertical rotation axis.
  11. Measure the distance with the sensor laser
  12. Connect REF-800 to the built-in mains outlet on the gonio base. Do not turn it on.
  13. Do not preheat the light source before measurement.
  14. Unlock the base.
  15. Start a one-plane measurement.
  16. In the stabilization window, choose "1,0% in 15 min." and let the measurement finish by itself.
  17. Check your results against the certificate values.

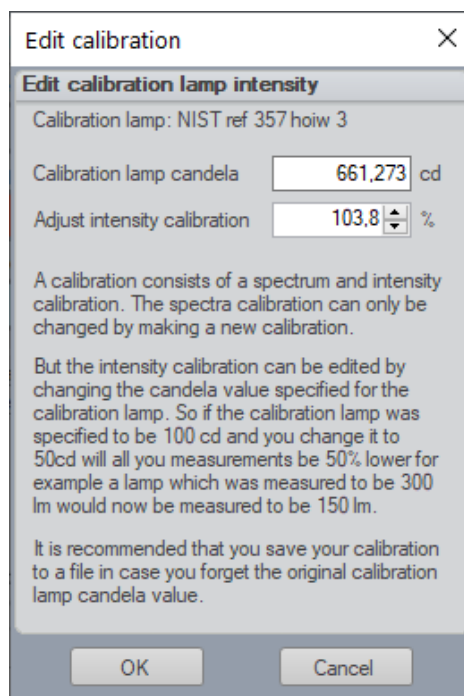
When the measurement is finished you can compare the measured result with that of the calibration document. Please check that the color temperature is within +/- 35K and then check the lumen value. Also check the shape of the spectral power distribution.

It is possible there can be a substantial lumen variation when compared to the calibration document. This is because the calibration which was just done with the DT300 was done at a very close distance to the calibration source and small distance errors measured to DT300 in the millimeter range can have a substantial impact.

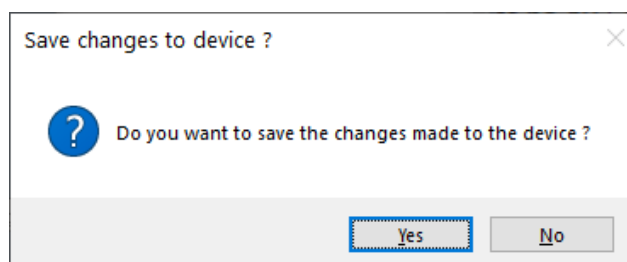
The lumen value measured using the REF800 is on the other hand very accurate as it is done at a good far distance.

To correct this mismatch, please adjust the intensity of the new calibration to match the REF800. Remember we are only adjusting the intensity not the spectral distribution so we will not damage the DT300 calibration. If not already done, it is recommended to save the calibration to file as a backup.

Before we can adjust the intensity of our calibration, we first need to calculate the correction in percent. For example, if we measured 780 lm but it should have been 810 lm we can calculate correction where a 100% is no change to:  $810/780=103.8\%$ . Click *Setup* → *Calibration* and then click "Edit" on our calibration.



And then click "Ok".



And when closing the calibration window, click 'yes' to saving the changes to sensor.

Please re-start the software and re-measure the REF800 lamp and the values should now match up. If not, the intensity correction process can be repeated until the results match within +/- 1%.

The calibration is now done and stored in the custom calibration memory section of the sensor.

## Viso calibration services

If you are not comfortable making your own recalibrations you always have the option of letting Viso Systems help. Such a calibration will be stored in your sensor as a new factory calibration. Just send your sensor, your CALI-DT300 and your original Viso DT800 reference lamp to Copenhagen for recalibration. Expect 2 weeks lead time including UPS freight. Send your service request directly to Viso headquarters (info@visosystems.com) or to your local distributor.



**Light measurement made easy**

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