THORLABS CCS Series Spectrometer User Manual

CCS Series Spectrometer
User Manual

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Contents

CCS Series Spectrometer

We aim to develop and produce the best solution for your application in the field of optical measurement technique. To help us to live up to your expectations and improve our products permanently we need your ideas and suggestions. Therefore, please let us know about possible criticism or ideas. We and our international partners are looking forward to hearing from you.

Warning
Sections marked by this symbol explain dangers that might result in personal injury or death. Always read the associated information carefully, before performing the indicated procedure.

Attention
Paragraphs preceded by this symbol explain hazards that could damage the instrument and the connected equipment or may cause loss of data.

Note
This manual also contains "NOTES" and "HINTS" written in this form.
Please read these advices carefully!

General Information

Thorlabs' fiber-based, compact, Czerny-Turner CCD spectrometers are available in three models.
Two are sub-nanometer accuracy models that provide detection in the 350 – 700 nm (CCS110x) or 500 – 1000 nm (CCS175x) range. The CCS200 offers a wide 200 – 1000 nm spectral range with better than 2 nm accuracy. With the small footprint (122 mm x 79 mm x 29.5 mm), all units share features with larger, more expensive spectrometers such as the ability to be synchronized via a TTL trigger input (up to 100 Hz) and to automatically compensate for noise created by dark current.
The CCS Series Spectrometer is designed for general laboratory use. Integrated routines allow averaging, smoothing, peak indexing, as well as saving and recalling data sets.

Application software OSA-SW
OSA-SW is an acronym for "Optical Spectrum Analyzer Software". This software acquires direct, transmittance and absorbance measurements in conjunction with Thorlabs' optical spectrum analyzers and CCD spectrometers.
Attention
Do not connect the CCS Series Spectrometer to a PC prior to installing the OSA-SW Application! The installation package includes CCS Series Spectrometer specific drivers and software that must be installed before the CCS Series Spectrometer is connected to the PC for the first time.
After the installation, the software communicates with all Thorlabs CCD based CCS Series Spectrometers and OSA20x Optical Spectrum Analyzers. Additionally, a number of virtual devices are included to demonstrate the functionality of OSA-SW: five for OSA20x Analyzers and one for CCS spectrometers.

1.1 Safety
Attention
The safety of any system incorporating the equipment is the responsibility of the assembler of the system.

All statements regarding safety of operation and technical data in this instruction manual will only apply when the unit is operated correctly as it was designed for.

The CCS Series Spectrometer must not be operated in explosion endangered environments!

Do not obstruct the air ventilation slots in the housing!

Do not remove covers!

Do not open the cabinet. There are no parts serviceable by the operator inside!

This precision device is only serviceable if properly packed into the complete original packaging including the plastic foam sleeves. If necessary, ask for replacement packaging.

Refer servicing to qualified personnel!

Only with written consent from Thorlabs may changes to single components be made or components not supplied by Thorlabs be used.

Attention

The following statement applies to the products covered in this manual, unless otherwisspecified herein. The statement for other products will appear in the accompanyindocumentation.

Note This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications.

Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense. Users that change or modify the product described in this manual in a way not expressly approved by Thorlabs (party responsible for compliance) could void the user's authority to operate the equipment. Thorlabs is not responsible for any radio television interference caused by modifications of this equipment or the substitution or attachment of connecting cables and equipment other than those specified by Thorlabs. The correction of interference caused by such unauthorized modification, substitution or attachment will be the responsibility of the user.

The use of shielded I/O cables is required when connecting this equipment to any and all optional peripheral or host devices. Failure to do so may violate FCC and ICES rules.

Attention

Mobile telephones, cellular phones or other radio transmitters are not to be used within the range of three meters of this unit since the electromagnetic field intensity may then exceed the maximum allowed disturbance values according to IEC 61326-1.

This product has been tested and found to comply with the limits according to IEC 61326-1 for using connection cables shorter than 3 meters (9.8 feet).

Ordering Codes and Accessories

Ordering code	Short description
CCS100(/M) 1	CCS spectrometer, 350 – 700 nm
CCS175(/M) 1	CCS spectrometer, 500 – 1000 nm
CCS200(/M) 1	CCS spectrometer, 200 – 1000nm
M14L01	1 m SMA MMF Patch Cable, 50µm / 0.22 NA (to CCS100 and CCS175)
FG200UCC	1 m SMA MMF Patch cable, 200µm / 0.22 NA, High OH (to CCS200)
CVH100; CVH100/M	Cuvette holder (imperial and metric versions)

1CCSxxx = imperial version, mounting holes 1/4-20;
CCSxxx/M = metric version, mounting holes M6x1

Attention

Make sure to use your CCS spectrometer only with the included fiber (see above table). If using a different fiber, the Amplitude Correction Calibration will be affected!

1.3 Requirements
These are the requirements to the PC intended to be used for remote operation of the CCS Series Spectrometer.
Minimum Requirements

- Operating System: Windows® 7 SP1, Windows® 8, Windows® 10, or Windows® 11 (64 bit)
- Free USB 2.0 high speed port (Notice that a USB 1.1 port cannot be used)
- Processor: Intel Core i5™ or AMD Athlon II
- 8.0 GB RAM
- NET framework 4.7.2 or higher
- Monitor Resolution: 800 x 600 Pixel

Recommended Requirement

- Operating System: Windows® 11 (64 bit)
- Free USB 2.0 high speed port (Notice that a USB 1.1 port cannot be used)
- Processor: Intel™ Core i9 or AMD Athlon Ryzen
- 16.0 GB RAM
- NET framework 4.7.2 or higher
- Java Runtime 1.6 or higher

Note
An installer for .NET framework 4.7.2 is included in the full installer.
Please be aware that the OSA software requires a number of third party software installed on your system. The installer checks for these software components and, if necessary, will install them automatically. You will be notified accordingly.

Installation

Attention
Do not connect the CCS Series Spectrometer to a PC prior to install the OSA-SW Application!
The installation package includes CCS Series Spectrometer specific drivers and software that must be installed before the CCS Series Spectrometer is connected to the PC for the first time.

2.1 Parts List
Inspect the shipping container for damage. If the shipping container seems to be damaged, keep it until you have inspected the contents and you have inspected the CCS Series Spectrometer mechanically and electrically.
Verify that you have received the following items within the package:
1x CCS Series Spectrometer
1x This CCS Series Spectrometer Quick Reference
1x USB 2.0 A-B mini cable, 1.5 meters
1x Optical Fiber, SMA to SMA, 50µm/0.22 NA, 1 meter (CCS100, CCS175)
Quartz Fiber, SMA to SMA, 200µm/0.22 NA, 1 meter (CCS200)
1x Trigger Input cable SMB to BNC

Attention
Make sure to use your CCS spectrometer only with the included fiber (see above table). If using a different fiber, the Amplitude Correction Calibration will be affected.
CCS Spectrometer – Ports and Signal LEDs

1. USB port
2. Fiber input (SMA connector)
3. Status LED
4. **Trigger Input (SMB connector)**

2.2 Installing Software

Before installing OSA Software, please make sure that no CCS Series Spectrometer is connected. The OSA Software is available for download fromt he Thorlabs website.

Note Please be aware that the OSA software requires a number of third party software installed on your system. The installer checks for these software components and, if necessary, will install them automatically. You will be notified accordingly. Administrator privileges are required for installation. Please contact your system administrator if you get an error message. Installation steps are shown below in detail for an installation on a Windows 7 operating system. After selecting "Install Software", the installer checks your system and determines the software components that need to be installed.
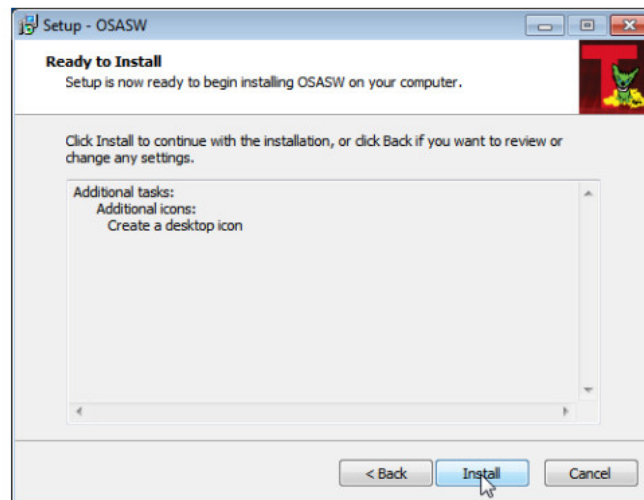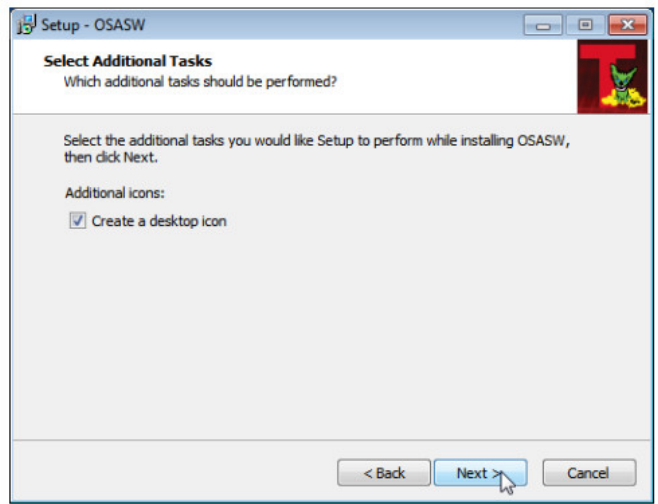
Click "Install" to continue. The necessary software components (NI VISA) are being installed, followed by installation of device driver software. The installation of all components is described below.

Depending on the set up security level, the Installation Wizard might ask to allow to install the driver software:
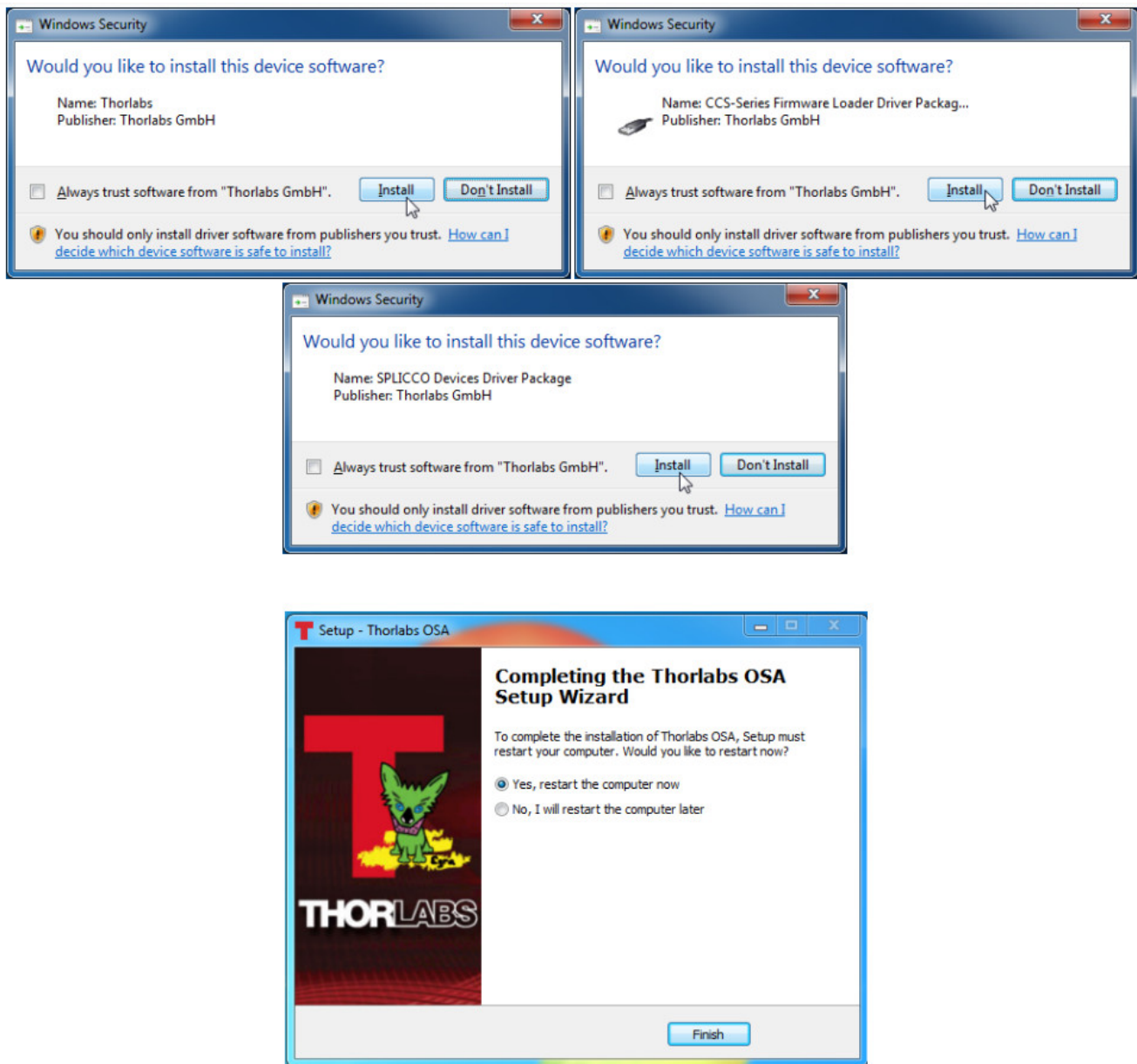
To finalize the OSA Software installation, the computer must be restarted. Click "Finish" to restart and complete installation.

Getting Started

Attention

Do not connect the CCS Series Spectrometer to a PC prior to installing the OSA-SW Application!

The installation package includes CCS Series Spectrometer specific drivers and software that must be installed before the CCS Series Spectrometer is connected the first time to the PC.

The initial setup is simple to complete. Following installation of the software, connect the CCS Series Spectrometer to a USB 2.0 port. The operating system recognizes the new hardware and installs the firmware loader and the driver:
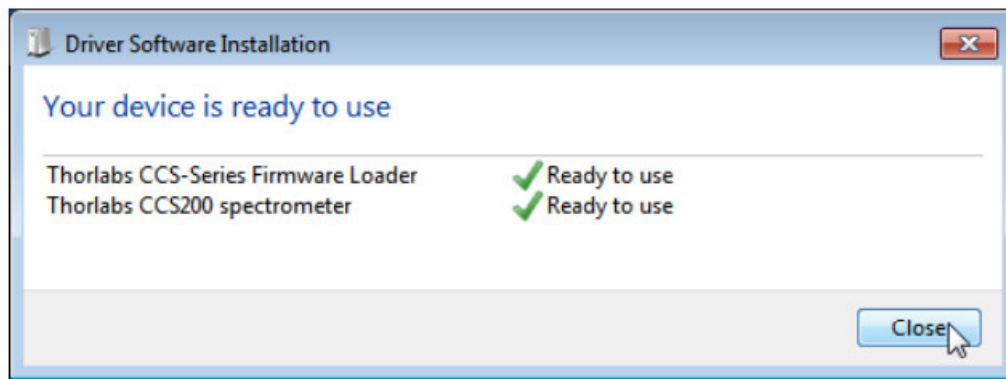
Then run the application software OSA-SW either from the desktop icon .
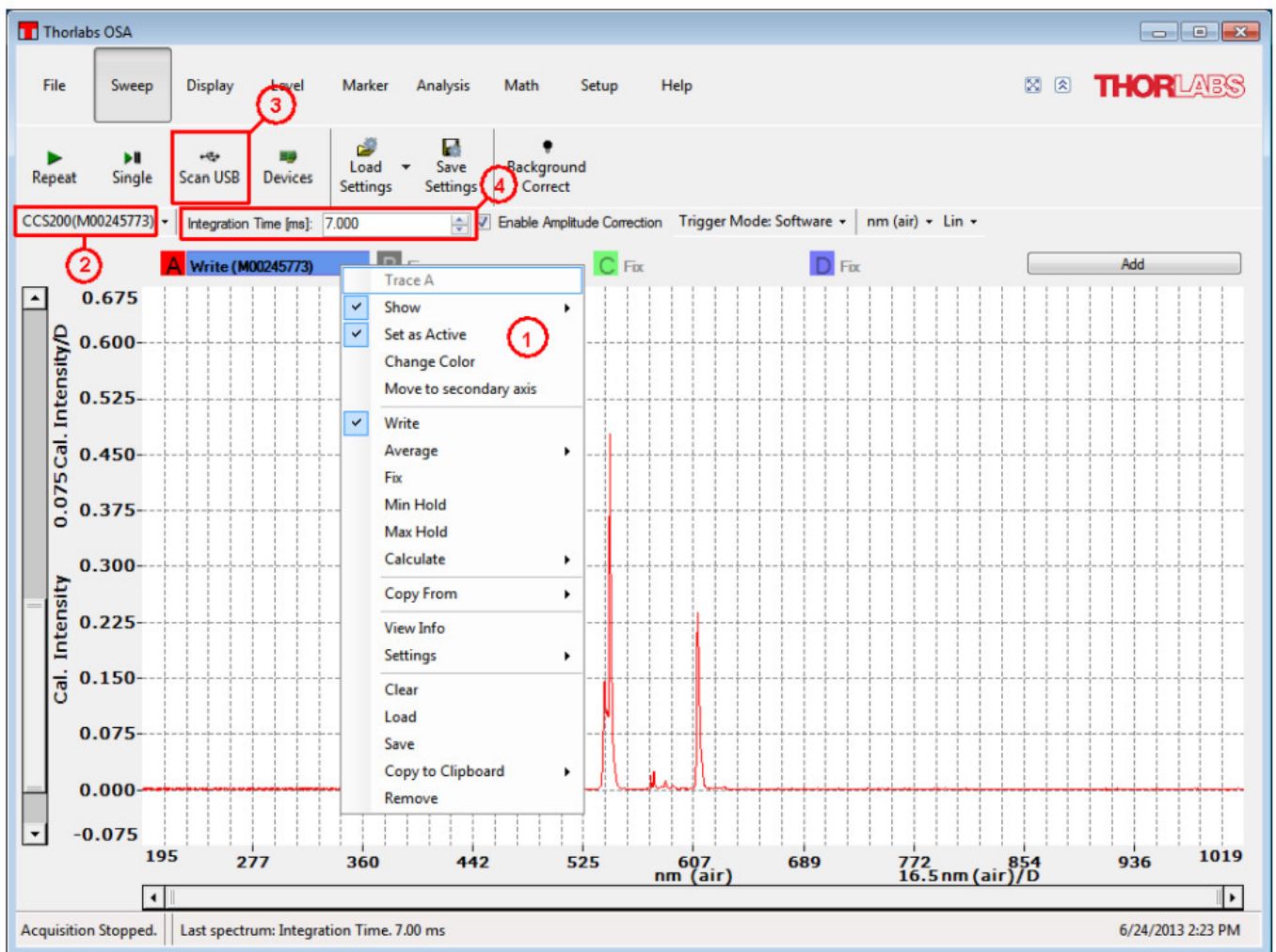
1. Click to trace A and make sure that the topics below are checked.

    • Show

    • Set as Active

    • Write

2. Check that the connected spectrometer is recognized. If not, click to "Scan USB"

3. Apply an optical input signal to the fiber input. Increase the integration time until the spectrum is displayed.

    A right click into the data display area zooms in the intensity axis to it's best fit to the spectrum.

Note

If you are using a CCS200 broadband spectrometer and a continuous spectrum (e.g. of a white light lamp) shall be measured, please note the following recommendation: Due to the eccentricity between the fiber core and the ferrule of the delivered FG200UCC MMF and the geometry of the input slit of the spectrometer, the displayed spectral intensity may vary when the SMA connector of the fiber is rotated within the input receptacle of the CCS200. Please find the maximum intensity by rotation and then fix the fiber connector with the lock bush. This ensures best measurement results. Please see details about the OSA software features, handling and CCS Series Spectrometer settings in the advanced user manual, provided with the data carrier. After the software has been installed, it can be found as well in the folder "All Programs – Thorlabs – Thorlabs OSA – CCS".

Appendix

4.1 Certifications and Compliances

EU Declaration of Conformity
in accordance with EN ISO 17050-1:2010

We: Thorlabs GmbH

Of: Münchner Weg 1, 85232 Bergkirchen, Deutschland

in accordance with the following Directive(s):

2014/30/EU   Electromagnetic Compatibility (EMC) Directive

2011/65/EU   Restriction of Use of Certain Hazardous Substances (RoHS)

hereby declare that:

Model: **CCSxxx(/M)**

Equipment: **CCS Spectrometer Series**

is/are in conformity with the applicable requirements of the following documents:

EN 61326-1	Electrical Equipment for Measurement, Control and Laboratory Use - EMC Requirements	2013
EN 61010-1	Safety requirements for electrical equipment for measurement, control and laboratory use	2019

and which, issued under the sole responsibility of Thorlabs, is/are in conformity with Directive 2011/65/EU of the European Parliament and of the Council of 8th June 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment, for the reason stated below:

does not contain substances in excess of the maximum concentration values tolerated by weight in homogenous materials as listed in Annex II of the Directive

I hereby declare that the equipment named has been designed to comply with the relevant sections of the above referenced specifications, and complies with all applicable Essential Requirements of the Directives.

Signed: On: 19 November 2019

Name: Bruno Gross

Position: General Manager   EDC - CCSxxx(/M) -2019-11-19

CE

4.2 Return of Devices

This precision device is only serviceable if returned and properly packed into the complete original packaging including the complete shipment plus the cardboard insert that holds the enclosed devices. If necessary, ask for replacement packaging. Refer servicing to qualified personnel.

4.3 Manufacturer/Importer Address

| Manufacturer Address Europe
Thorlabs GmbH
Münchner Weg 1
D-85232 Bergkirchen
Germany
Tel: +49-8131-5956-0
Fax: +49-8131-5956-99
www.thorlabs.de
Email: **europe@thorlabs.com** | EU-Importer Address
Thorlabs GmbH
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D-85232 Bergkirchen
Germany
Tel: +49-8131-5956-0
Fax: +49-8131-5956-99
www.thorlabs.de
Email: **europe@thorlabs.com** | UK-Importer Address
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Ely, CB6 3NX
UK
Tel: +44-1353-654440
Fax: +44 (0)1353-654444
www.thorlabs.com
Email: **techsupport.uk@th** |

4.4 Warranty

Thorlabs warrants material and production of the CCS Series Spectrometer for a period of 24 months starting with the date of shipment in accordance with and subject to the terms and conditions set forth in Thorlabs' General Terms and Conditionsof Sale which can be found at:

General Terms and Conditions:

https://www.thorlabs.com/Images/PDF/LG-PO-001_Thorlabs_terms_and_%20agreements.pdf
and
https://www.thorlabs.com/images/PDF/Terms%20and%20Conditions%20of%20Sales_ThorlabsGmbH_English.pdf

4.5 Copyright and Exclusion of Liability

Thorlabs has taken every possible care in preparing this document. We however assume no liability for the content, completeness or quality of the information contained therein. The content of this document is regularly updated and adapted to reflect the current status of the product. All rights reserved. This document may not be reproduced, transmitted or translated to another language, either as a whole or in parts, without the prior written permission of Thorlabs.

Copyright © Thorlabs 2022. All rights reserved. Please refer to the general terms and conditions linked under Warranty.

4.6 Thorlabs Worldwide Contacts

For technical support or sales inquiries, please visit us at
https://www.thorlabs.com/locations.cfm for our most up-to-date contact information.

USA, Canada, and South America Thorlabs, Inc. **sales@thorlabs.com** techsupport@thorlabs.com Europe Thorlabs GmbH **europe@thorlabs.com** France Thorlabs SAS **sales.fr@thorlabs.com** Japan Thorlabs Japan, Inc. **sales@thorlabs.jp**	UK and Ireland Thorlabs Ltd. **sales.uk@thorlabs.com** techsupport.uk@thorlabs.com Scandinavia Thorlabs Sweden AB **scandinavia@thorlabs.com** Brazil Thorlabs Vendas de Fotônicos Ltda. **brasil@thorlabs.com** China Thorlabs China **chinasales@thorlabs.com**

Thorlabs 'End of Life' Policy (WEEE)

Thorlabs verifies our compliance with the WEEE (Waste Electrical and Electronic Equipment) directive of the European Community and the corresponding national laws. Accordingly, all end users in the EC may return "end of life" Annex I category electrical and electronic equipment sold after August 13, 2005 to Thorlabs, without incurring disposal charges. Eligible units are marked with the crossed out "wheelie bin" logo (see right), were sold to and are currently owned by a company or institute within the EC, and are not dissembled or contaminated. Contact Thorlabs for more information. Waste treatment is your own responsibility. "End of life" units must be returned to Thorlabs or handed to a company specializing in waste recovery. Do not dispose of the unit in a litter bin or at a public waste disposal site. It is the users responsibility to delete all private data stored on the device prior to disposal.

www.thorlabs.com

Documents / Resources

[THORLABS CCS Series Spectrometer](#) [pdf] User Manual
CCS Series Spectrometer, CCS Series, Spectrometer

References

- **[Thorlabs, Inc. - Your Source for Fiber Optics, Laser Diodes, Optical Instrumentation and Polarization Measurement & Control](#)**
- **[thorlabs.de](#)**
- **[Thorlabs - Your Source for Fiber Optics, Laser Diodes, Optical Instrumentation and Polarization Measurement & Control.](#)**

[Manuals+](#),