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NEW

Spectroscopic modules

C15712 C15713 C15714

Compact module with MEMS-FPI spectrum sensor and light source

This compact module has a built-in light source, control circuit, and MEMS-FPI spectrum sensor consisting of an InGaAs PIN photodiode and MEMS-FPI (Fabry-Perot Interferometer) tunable filter which can vary its transmission wavelength by changing the applied voltage. Spectrum and absorbance can be measured by connecting a PC via USB. The product includes evaluation software with functions for setting measurement conditions, acquiring and saving data, drawing graphs, and so on. Furthermore, the dynamic link library (DLL) function specifications are disclosed, so users can create their original measurement software programs.

Features

- **Compact, thin case**
- **MEMS-FPI spectrum sensor and light source are installed.**
- **Spectral response range**
  C15712: 1350 to 1650 nm
  C15713: 1550 to 1850 nm
  C15714: 1750 to 2150 nm
- **External power supply not necessary: USB 2.0 bus powered**
- **Transmission wavelength shift due to the ambient temperature change is corrected.**
- **High-speed measurement**

Applications

- **Moisture detection**
- **Food inspection**
- **Farm product inspection**
- **Plastic screening**
- **Fabric identification, etc.**

Structure

Parameter	C15712	C15713	C15714	Unit
Sensor	MEMS-FPI spectrum sensor			-
	C14272	C13272-03	C14273	
Light source	Tungsten lamp			-
Interface	USB 2.0 micro-B			-
Dimensions	74 × 32 × 16			mm
Weight	82			g

Absolute maximum ratings

Parameter	Symbol	Value	Unit
Operating temperature*1	Topr	-5 to +50	°C
Storage temperature*1	Tstg	-20 to +70	°C

*1: No dew condensation
When there is a temperature difference between a product and the surrounding area in high humidity environments, dew condensation may occur on the product surface. Dew condensation on the product may cause deterioration in characteristics and reliability.

Note: Exceeding the absolute maximum ratings even momentarily may cause a drop in product quality. Always be sure to use the product within the absolute maximum ratings.

Optical characteristics (Ta=25 °C unless otherwise noted)

Parameter	Symbol	C15712			C15713			C15714			Unit
		Min.	Typ.	Max.	Min.	Typ.	Max.	Min.	Typ.	Max.	
Spectral response range*2	λ	1350	-	1650	1550	-	1850	1750	-	2150	nm
Spectral resolution (FWHM)*3	-	-	-	18	-	-	20	-	-	22	nm
Wavelength reproducibility*4	λr	-	±2	-	-	±2	-	-	±2	-	nm
Wavelength temperature dependence*5	λTd	-0.1	-	+0.1	-0.1	-	+0.1	-0.1	-	+0.1	nm/°C

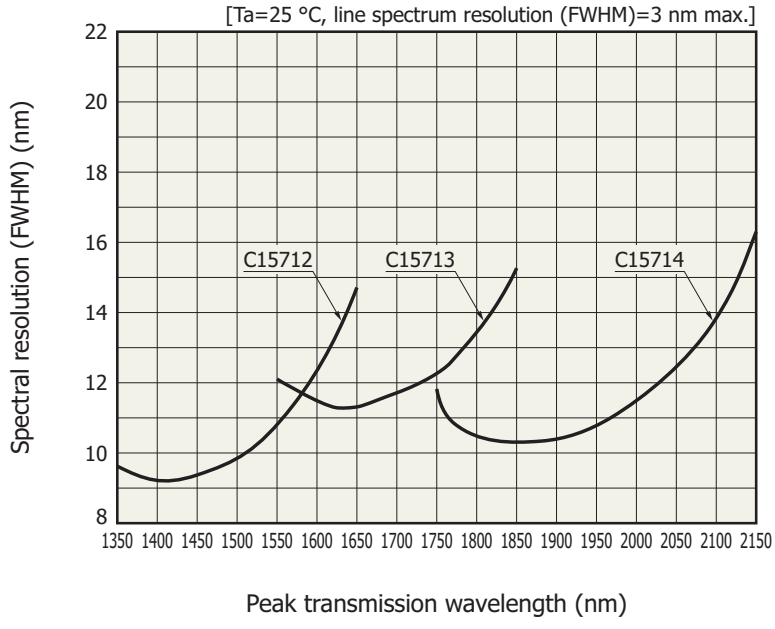
*2: Minimum step 0.1 nm, maximum 901 wavelength points can be set.
*3: When the light [line spectrum resolution (FWHM)=3 nm max.] is input from the optical fiber (core diameter=600 µm, NA=0.22) connected by the fiber adapter A15719.
*4: When the incident light condition and usage environment are constant
*5: Topr=-5 to +50 °C, C15712: λ=1500 nm, C15713: λ=1700 nm, C15714: λ=1950 nm

Electrical characteristics (Ta=25 °C unless otherwise noted)

Parameter		Specification	Unit
A/D conversion		16	bit
Gain*6	Low	1.05×10^6	Ω
	Middle	1.05×10^7	Ω
	High	2.23×10^7	Ω
USB bus power current consumption	Typ.	350	mA
	Max.	450	

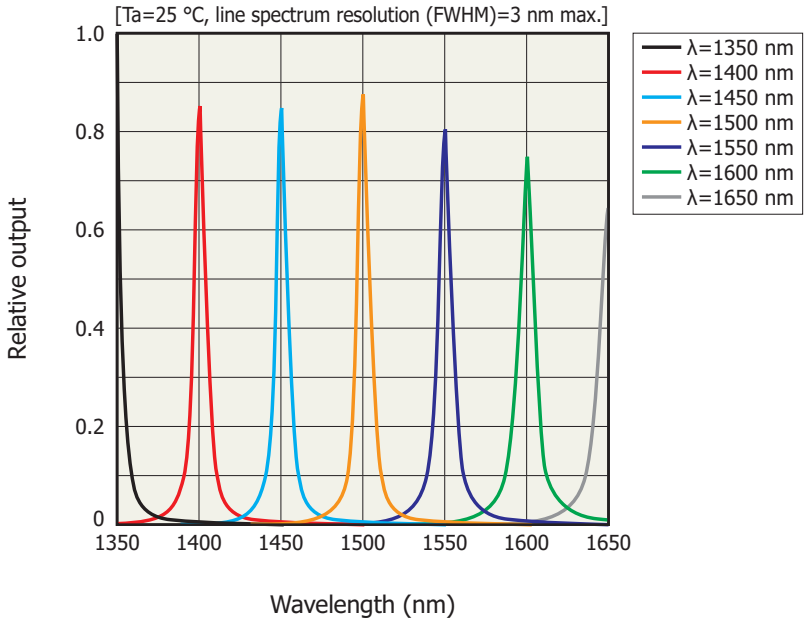
*6: Design value

Spectral resolution vs. peak transmission wavelength (typical example)



Spectral response (typical example)

C15712



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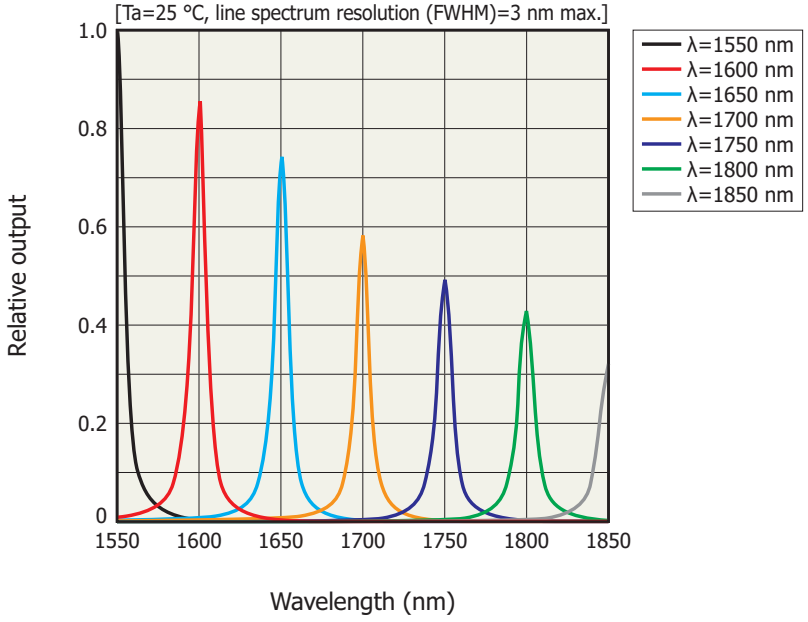
C15713



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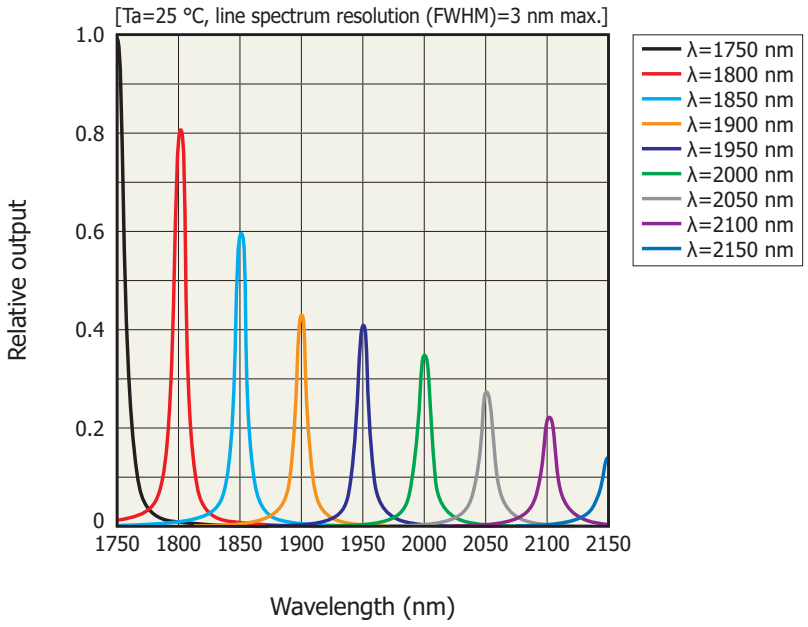
C15714



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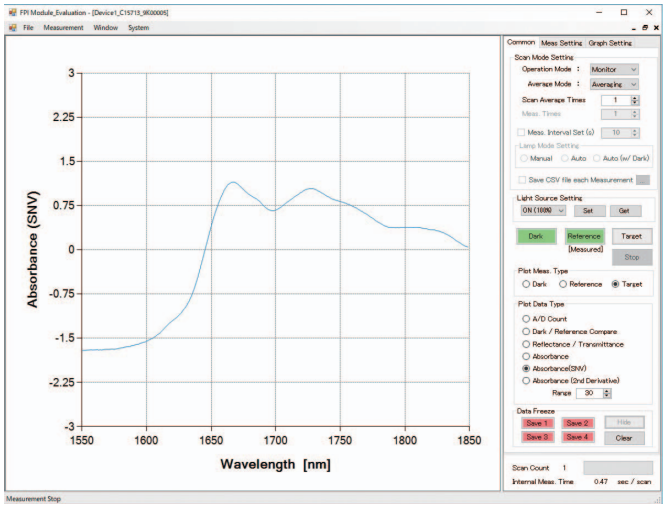
Evaluation software (accessory)

By installing the evaluation software (FPIModuleEvaluation.exe) into a PC, you can perform the following basic operations.

- Acquire, save measurement data
- Set measurement conditions
- Set built-in lamp
- Acquire module information
  (type number, serial number, spectral response range, etc.)
- Display graphs
- Calculation functions
  Comparison with the reference data (reflectance, absorbance, etc.)



Note: Up to eight spectroscopic modules can be connected to a single PC and used.
Compatible OS: Microsoft® Windows® 10 (32-bit, 64-bit)

A DLL for controlling the hardware is available.
The DLL and sample software is created in the following development environment, so users can develop original measurement programs.

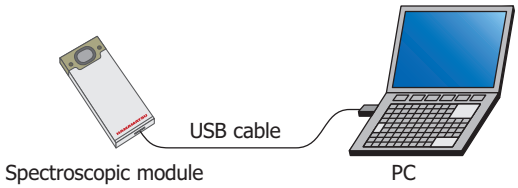
DLL: Microsoft Visual Studio® 2017 Visual C++®
Sample software: Microsoft Visual Studio 2017 Visual C#®

Note: Microsoft, Windows, Visual Studio, Visual C++, and Visual C# are registered trademarks of Microsoft Corporation in the United States and/or other countries.

Connection examples

Reflected light measurement

Place cloth, plastic, etc. on the window material of the spectroscopic module connected to a PC via USB. The light from the light source built into the spectroscopic module strikes the object, and the spectroscopic module measures the reflected light.



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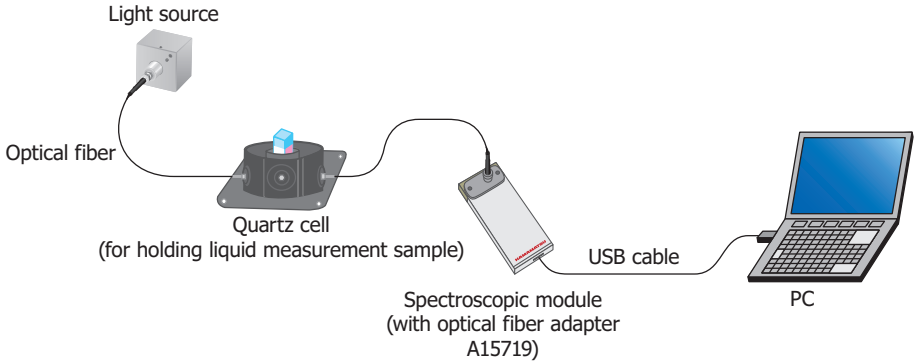
Transmitted light measurement

When measuring transmitted light, a light source must be prepared (the light source built into the spectroscopic module cannot be used).



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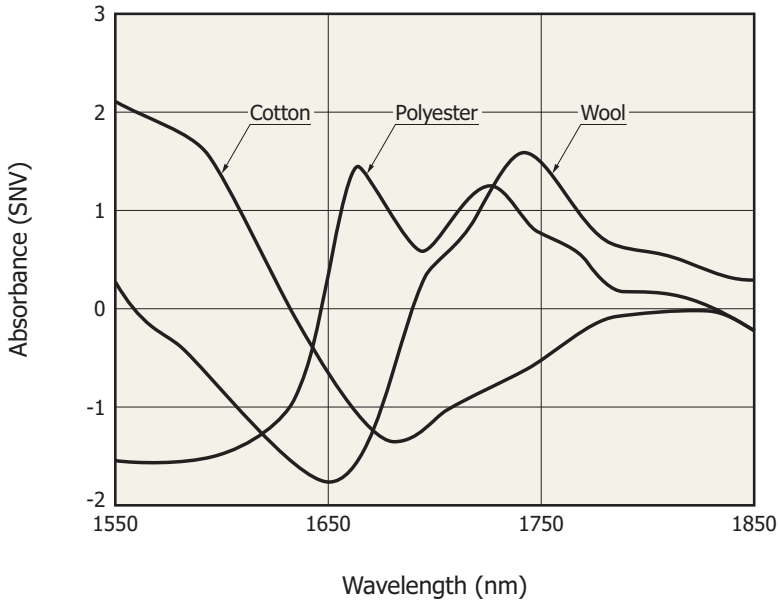
Measurement example (cloth)



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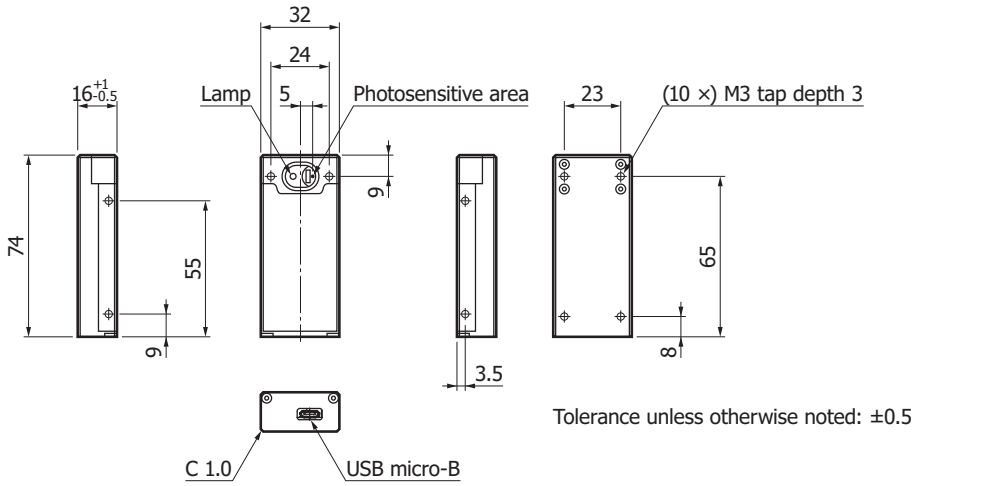
Dimensional outline (unit: mm)



Accessories

· CD-ROM (instruction manual, evaluation software, sample software, DLL, etc.)
· USB cable (USB 2.0 micro-B connector type)

Precautions

This product has a built-in high-voltage power supply. To avoid danger, do not disassemble.

Options (sold separately)

Optical fiber adapter A15719

This is an adapter for simply coupling an optical fiber with an SMA connector to the spectroscopic module (C15712, C15713, C15714). Fix it to the spectroscopic module using the screw (included).

Note: The optical fiber is not included.
Optical components such as a condenser lens are not installed.

Related information

www.hamamatsu.com/sp/ssd/doc_en.html

■ Precautions
· Disclaimer

■ Technical information
· MEMS-FPI spectrum sensors, spectroscopic modules

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