



NEW

# Spectroscopic module

C17552 C17553 C17554

## 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 C17552: 1350 to 1650 nm C17553: 1550 to 1920 nm C17554: 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.

#### - Applications

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

#### Structure

Parameter	C17552	C17553	C17554	Unit		
Sensor	MEMS-FPI spectrum sensors					
Light source	tungsten lamp					
Interface	USB 2.0 micro-B					
Dimensions	74 × 32 × 16					
Weight	63					

#### Absolute maximum ratings

Parameter	Symbol	Value	Unit
Operating temperature <sup>*1</sup>	Topr	-5 to +50	°C
Storage temperature <sup>*1</sup>	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	C17552		C17553			C17554			1.1	
		Min.	Тур.	Max.	Min.	Тур.	Max.	Min.	Тур.	Max.	Unit
Spectral response range*2	λ	1350	-	1650	1550	-	1920	1750	-	2150	nm
Spectral resolution (FWHM)*3	-	-	-	18	-	-	21	-	-	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= $\phi$ 600 µm, NA=0.22) connected by the fiber adapter A17587

\*4: When incident light condition and usage environment are constant

\*5: Topr=-5 to +50 °C, C17552: λ=1500 nm, C17553: λ=1700 nm, C17554: λ=1950 nm

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

Parameter		Specification	Unit	
A/D conversion		16	bit	
	Low	$1.05 \times 10^{6}$	Ω	
Gain* <sup>6</sup>	Middle	$1.05 \times 10^{7}$	Ω	
	High	$2.23 \times 10^{7}$	Ω	
USB bus power current consumption	Тур.	350	mA	
	Max.	450		

\*6: Design value

#### Spectral resolution vs. peak transmission wavelength (typical example)



Peak transmission wavelength (nm)

KACCB0764EA





#### Line spectrum measurement results (typical example)



KACCB0765EA

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Wavelength (nm)

KACCB0627FA

#### Evaluation software (accessory)

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

- · Acquire, save measurement data
- $\cdot$  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 for use. Compatible OS: Microsoft<sup>®</sup> Windows<sup>®</sup> 10 (64-bit)

Microsoft<sup>®</sup> Windows<sup>®</sup> 11

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<sup>®</sup> 2017 Visual C++<sup>®</sup>

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 example



#### Reflected light measurement example (cloth, C17553)



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#### Dimensional outline (unit: mm)



### - Accessories

 $\cdot$  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 A17587

This is an adapter for simply coupling an optical fiber with an SMA connector to the spectroscopic module (C17552, C17553, C17554). It has a built-in lens, and the window part of the spectroscopic module is replaced with this adapter for use.

Note) The optical fiber is not included.

Optical fiber cable A17630-015

Connector	Specification
SMA on both	600 μm core, NA=0.22, Low-OH optical fiber, Length=1500 mm
ends	Metal covering, with CPS (Cladding Power Stripper)





#### Related information

www.hamamatsu.com/sp/ssd/doc\_en.html

- Precaution
- Disclaimer
- Catalogs
- · Technical note / Spectroscopic modules
- · Selection guide / Mini-spectrometers

The content of this document is current as of April 2025.

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