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FTIR engine

C15511-01

Compact FT-NIR spectroscopic module that can be incorporated into portable analytical instruments

The C15511-01 Fourier transform infrared spectrometer (FTIR) engine is compact enough to carry in just one hand. A Michelson optical interferometer and control circuit are built into a palm-sized enclosure. Spectrum and absorbance can be measured by connecting a PC via USB. It can be applied to real-time measurement performed on site without bringing the measurement sample into the analysis room as well as continuous monitoring.

The optical interferometer has a built-in light input section, beam splitter, fixed mirror, movable mirror (ϕ3 mm), and photodetector. The photodetector acquires light intensity signals that vary depending on the position of the movable mirror. The optical spectrum is obtained by processing (Fourier transform) these light intensity signals.

The FTIR engine has a built-in semiconductor laser (VCSEL: vertical cavity surface emitting laser) for monitoring the movable mirror position, which allows spectrum measurement with high wavelength accuracy.

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: palm size**
- **Optical fiber input type**
- **High S/N**
  Suitable for diffuse reflection measurements and absorbance measurements
- **Spectral response range: 1100 to 2500 nm**

Applications

- **Process analysis**
- **Material inspection**
- **Farm product inspection**
- **Plastic screening**
- **Concrete strength measurement**
- **Film thickness measurement**
- **Medical and healthcare equipment**

Structure

Parameter	Specification	Unit
Optical interferometer	Michelson interferometer (with a built-in ϕ3 mm movable mirror)	-
Photodetector	InGaAs PIN photodiode	-
Light input method	Optical fiber input type[1] (with SMA connector)	-
Interface	USB 2.0	-
Dimensional outline[2]	49 × 57 × 76 (excluding protrusions)	mm
Weight	Approx. 300	g

*1: Optical fiber A15363-01 (core diameter: 600 µm, NA: 0.22)
*2: Excluding protrusions of optical input parts and the like

Absolute maximum ratings

Parameter	Symbol	Condition	Value	Unit
Operating temperature	Topr	No dew condensation*3	+5 to +50	°C
Storage temperature	Tstg	No dew condensation*3	-20 to +70	°C

*3: When there is a temperature difference between a product and the surrounding area in high humidity environment, dew condensation may occur on the product. 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, light input through optical fiber (core diameter 600 µm, NA 0.22)]

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Spectral response range	λ		-	1100 to 2500	-	nm
Spectral resolution (FWHM)*4	-	λ=1533 nm	-	5.7	8	nm
Wavelength reproducibility	λr		-0.5	-	+0.5	nm
Wavelength temperature dependence	λTd		-0.06	-	+0.06	nm/°C
Signal-to-noise ratio*5*6	S/N		10000	-	-	-

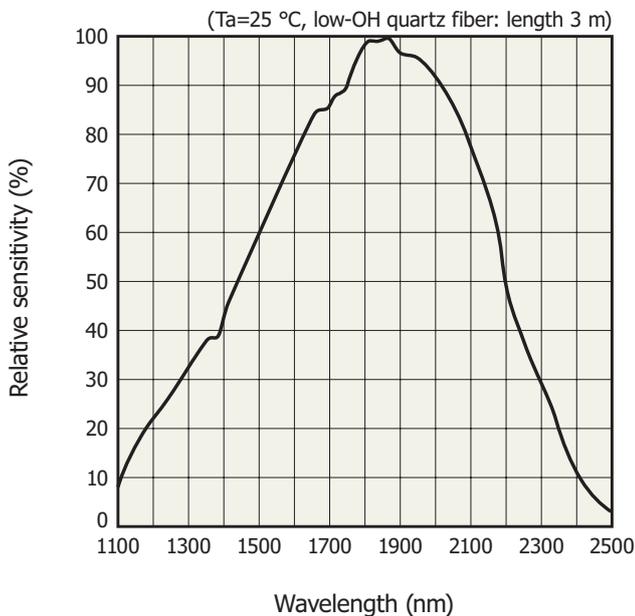*4: Wavenumber resolution (FWHM) equivalent to 25 cm^{-1}

*5: Ratio of the peak value of the spectrum data when light is incident to the root mean square (rms) of noise in the dark state

*6: Incident light level 40000 counts p-p min., integration count 512, gain setting 1 to 4
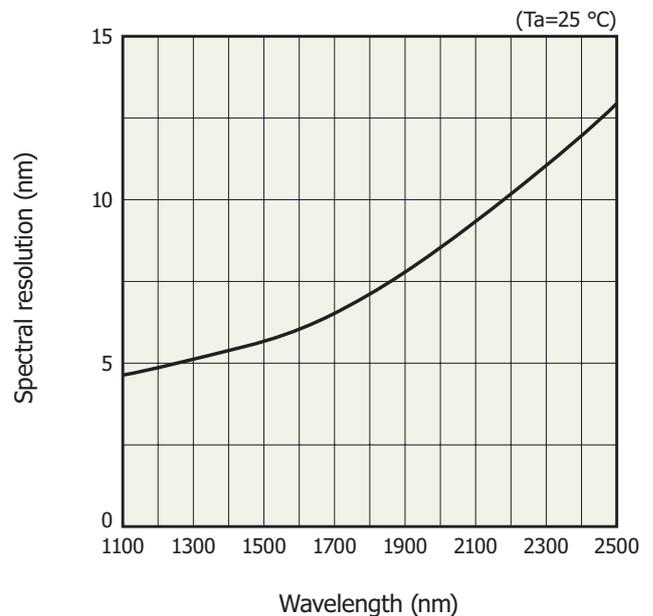
Electrical characteristics

Parameter	Min.	Typ.	Max.	Unit
A/D conversion	-	16	-	bit
Drive frequency	225	275	325	Hz
USB bus power current consumption	-	450	500	mA

Spectral response (typical example)

(Ta=25 °C, low-OH quartz fiber: length 3 m)

KACCB0619EA

Spectral resolution vs. wavelength (typical example)

(Ta=25 °C)

KACCB0602EA

S/N vs. gain setting (typical example)

(Ta=25 °C, incident light level: 40000 counts p-p min., integration count: 512)
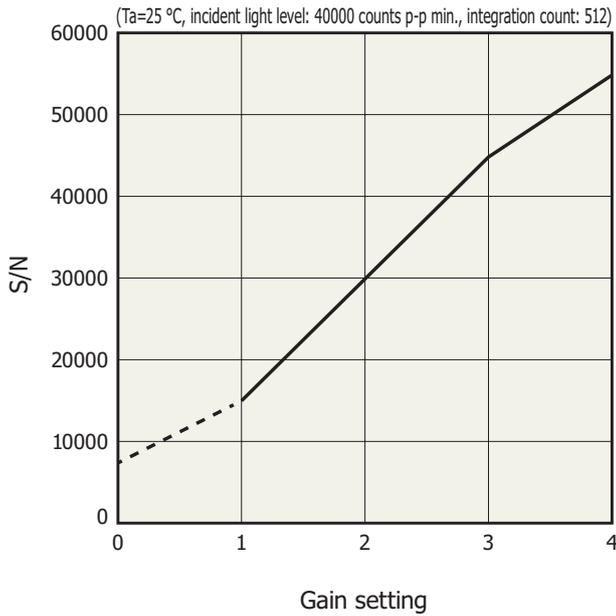
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Evaluation software (accessory)

By installing the evaluation software (HmFTIR02Main.exe) into a PC, you can perform the following basic operations.

· Acquire and save measured data
· Measurement condition setting
· Acquire module information (type no., serial number, spectral response range, etc.)
· Display graphs
· Arithmetic function
   Compare against reference data (absorbance and the like)

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

   Microsoft and Windows are registered trademarks of Microsoft Corporation in the United States and/or other countries.
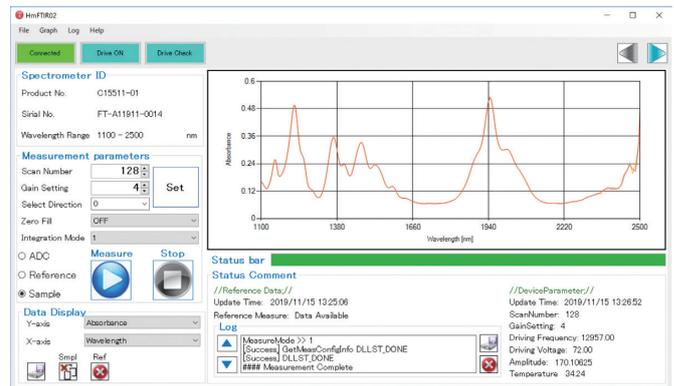
Dimensional outline (unit: mm)

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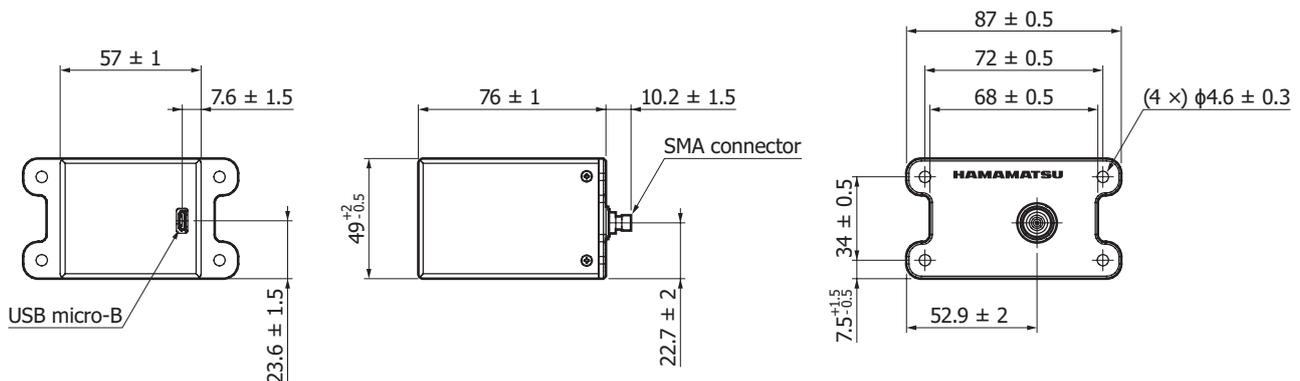
Precautions

· Do not apply excessive vibration or shock to the product. Excessive vibration or shock can misalign the internal optical components of the product.
· This product is classified as Class 1 under the laser standard IEC60825-1: 2014. Do not disassemble the product to prevent laser light from entering your eyes.

Accessories

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

Options (sold separately)

■ Input optical fiber A15363-01

Type no.	Product name	Core diameter (μm)	Specifications
A15363-01	Fiber for visible/near infrared range	φ600	NA=0.22, length=1.5 m, low cost With SMA905D connector on each end

■ Vibration isolation table A15835-01

· Vibration isolation table equipped with FTIR engine

95 mm   130 mm
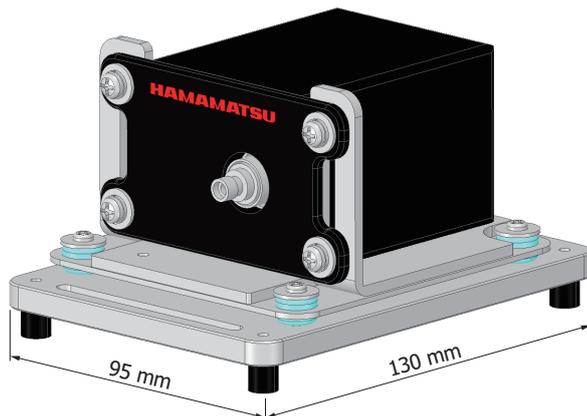
KACCC1025EA

Related information

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

■ Precautions
· Disclaimer

Information described in this material is current as of April 2021.

Product specifications are subject to change without prior notice due to improvements or other reasons. This document has been carefully prepared and the information contained is believed to be accurate. In rare cases, however, there may be inaccuracies such as text errors. Before using these products, always contact us for the delivery specification sheet to check the latest specifications.

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