

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 ( $\phi 3$  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 $\phi 3$ 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 A16963-01 (core diameter: 600  $\mu$ m, NA: 0.22)

\*2: Excluding protrusions of optical input parts and the like

**➤ Absolute maximum ratings**

Parameter	Symbol	Condition	Value	Unit
Operating temperature	T <sub>opr</sub>	No dew condensation*3	+5 to +50	°C
Storage temperature	T <sub>stg</sub>	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	$\lambda$		-	1100 to 2500	-	nm
Spectral resolution (FWHM)*4	-	$\lambda=1533$ nm	-	5.7	8	nm
Wavelength reproducibility*5	$\lambda_r$	$\lambda=1533$ nm	-	-	0.5	nm
Wavelength temperature dependence	$\lambda T_d$		-0.06	-	+0.06	nm/°C
Signal-to-noise ratio*6 *7	S/N		10000	-	-	-

\*4: Wavenumber resolution (FWHM) equivalent to 25 cm<sup>-1</sup>

\*5: Variation (3σ) of spectral peak values when  $\lambda=1533$  nm laser light is measured 50 times in succession

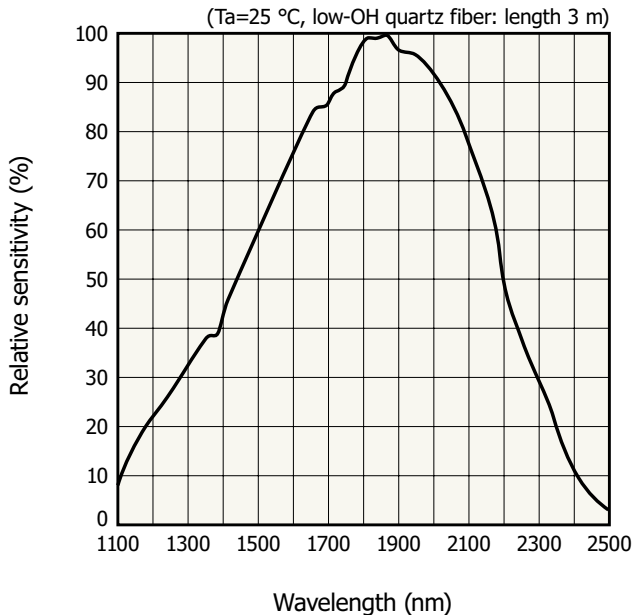
\*6: Ratio of the peak value of the spectrum data when light is incident to the root mean square (rms) of noise in the dark state

\*7: Incident light level 40000 counts p-p min., integration count 512, gain setting 1 to 4

**➤ Electrical characteristics**

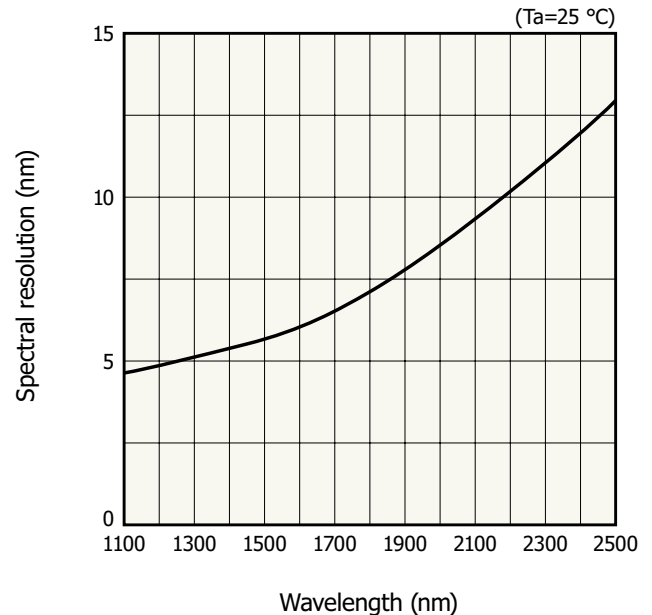
Parameter	Min.	Typ.	Max.	Unit
A/D conversion	-	16	-	bit
Drive frequency	225	275	325	Hz
USB bus power current consumption	-	450	500	mA

**➤ Spectral response (typical example)**



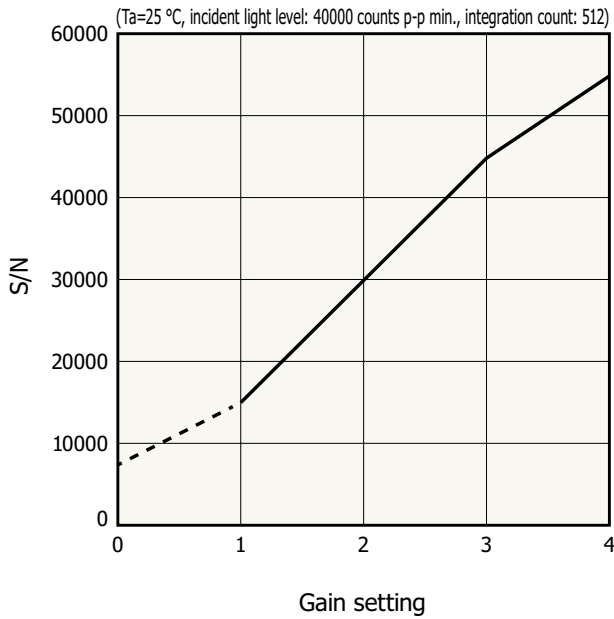
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**➤ Spectral resolution vs. wavelength (typical example)**



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**S/N vs. gain setting (typical example)**



KACCB0620EA

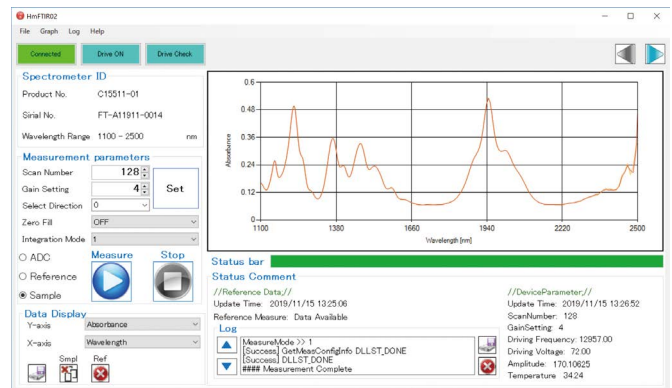
**Evaluation software (accessory)**

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)

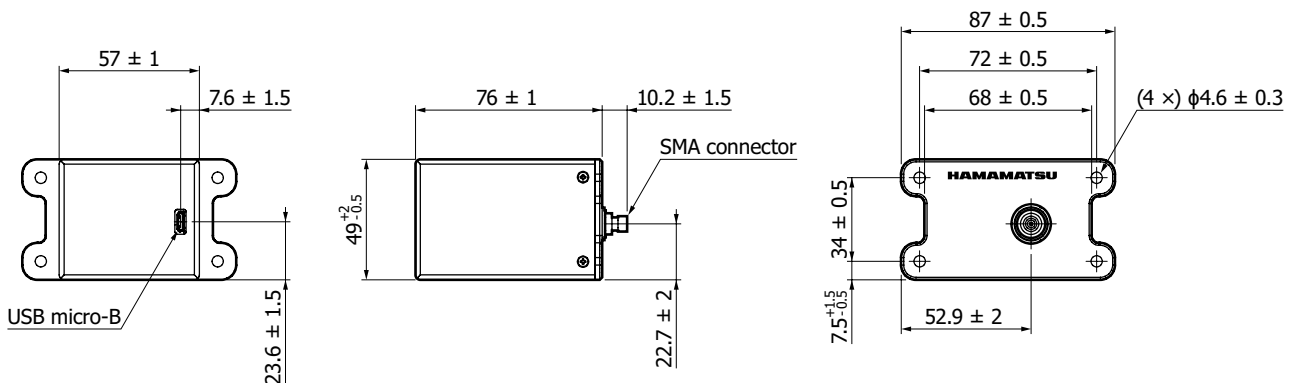
Note: Up to eight FTIR engines can be connected to a single PC and used.

Compatible OS: Microsoft® Windows® 10 (64-bit)



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**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)

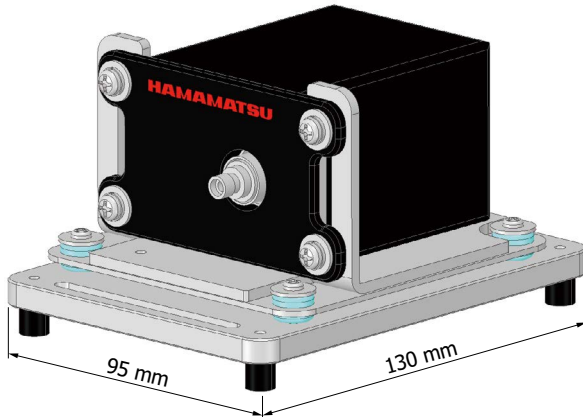
### Options (sold separately)

- Input optical fiber A16963-01

Type no.	Product name	Core diameter (μm)	Specifications
A16963-01	Fiber for visible/near infrared range	φ600	NA=0.22, length=1.5 m With SMA905D connector on each end

- Vibration isolation table A15835-01

- Vibration isolation table equipped with FTIR engine



KACCC1025EA

### Related information

[www.hamamatsu.com/sp/ssd/doc\\_en.html](http://www.hamamatsu.com/sp/ssd/doc_en.html)

- Precautions
- Disclaimer

Information described in this material is current as of April 2024.

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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HAMAMATSU PHOTONICS K.K., Solid State Division

1126-1 Ichino-cho, Chuo-ku, Hamamatsu City, 435-8558 Japan, Telephone: (81)53-434-3311, Fax: (81)53-434-5184

U.S.A.: HAMAMATSU CORPORATION: 360 Foothill Road, Bridgewater, NJ 08807, U.S.A., Telephone: (1)908-231-0960, Fax: (1)908-231-1218

Germany: HAMAMATSU PHOTONICS DEUTSCHLAND GMBH: Arzbergerstr. 10, 82211 Herrsching am Ammersee, Germany, Telephone: (49)8152-375-0, Fax: (49)8152-265-8 E-mail: [info@hamamatsu.de](mailto:info@hamamatsu.de)

France: HAMAMATSU PHOTONICS FRANCE S.A.R.L.: 19 Rue du Saule Trapu, Parc du Moulin de Massy, 91882 Massy Cedex, France, Telephone: (33)1 69 53 71 00, Fax: (33)1 69 53 71 10 E-mail: [infos@hamamatsu.fr](mailto:infos@hamamatsu.fr)

United Kingdom: HAMAMATSU PHOTONICS UK LIMITED: 2 Howard Court, 10 Tewin Road, Welwyn Garden City, Hertfordshire, AL7 1BW, UK, Telephone: (44)1707-294888, Fax: (44)1707-325777 E-mail: [info@hamamatsu.co.uk](mailto:info@hamamatsu.co.uk)

North Europe: HAMAMATSU PHOTONICS NORDEN AB: Torshamnsgatan 35, 16440 Kista, Sweden, Telephone: (46)8-509-031-00, Fax: (46)8-509-031-01 E-mail: [info@hamamatsu.se](mailto:info@hamamatsu.se)

Italy: HAMAMATSU PHOTONICS ITALIA S.R.L.: Strada della Moia, 1 int. 6 20044 Arese (Milano), Italy, Telephone: (39)02-93 58 17 33, Fax: (39)02-93 58 17 41 E-mail: [info@hamamatsu.it](mailto:info@hamamatsu.it)

China: HAMAMATSU PHOTONICS (CHINA) CO., LTD.: 1201, Tower B, Jianning Center, 27 Dongsanhuan Beilu, Chaoyang District, 100020 Beijing, P.R. China, Telephone: (86)10-6586-6006, Fax: (86)10-6586-2866 E-mail: [hpc@hamamatsu.com.cn](mailto:hpc@hamamatsu.com.cn)

Taiwan: HAMAMATSU PHOTONICS TAIWAN CO., LTD.: 13F-1, No.101, Section 2, Gongdao 5th Road, East Dist., Hsinchu City, 300046, Taiwan(R.O.C) Telephone: (886)3-659-0080, Fax: (886)3-659-0081 E-mail: [info@hamamatsu.com.tw](mailto:info@hamamatsu.com.tw)