FP-8000 Series
Spectrofluorometer

FP-8200
Spectrofluorometer

FP-8300
Spectrofluorometer

FP-8500
Spectrofluorometer

FP-8600
Spectrofluorometer

JASCO

Achieve the highest level of perform

FP-8200

Compact and suitable for routine measurement of liquid samples.

FP-8300

Capable of system expansion to phosphorescence measurement or to accommodate large sample accessories.

FP-8500

Research grade model enabling the highest sensitivity, highest scan speed and highest accuracy.

FP-8600

Covering the wavelength region from UV/VIS to NIR while maintaining a compact instrument size.

The FP-8000 series incorporates JASCO's latest technology to offer enhanced performance and functionality; realizing high sensitivity measurements, a wide dynamic range, an automatic cut filter to exclude higher order diffraction, the fastest scan speed for rapid 3-D measurements and high-speed data acquisition for phosphorescence measurements.

A wide range of accessories is available to offer capabilities for the needs of all operators and the JASCO Spectra Manager™ II software ensures an easy to use system.

The FP-8000 series includes 4 different models to meet user requirements from simple luminescence experiments to advanced materials applications.

FP-8200

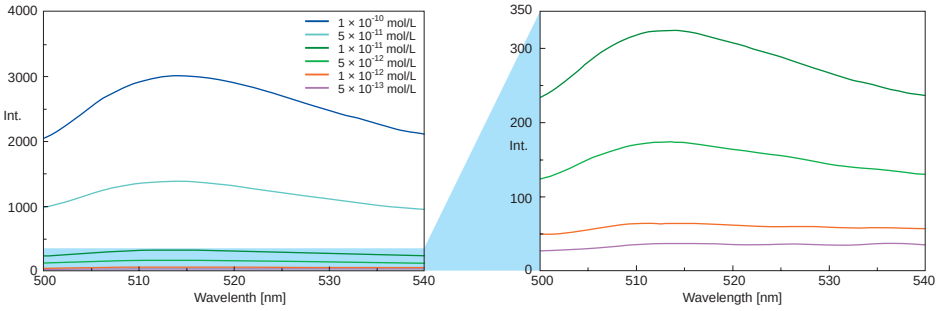
iRM-900
Intelligent remote module

FP-8500

Spectra Manager™ II

Highest S/N performance

The high S/N performance of 5,000:1or higher (RMS) for the FP-8500 is achieved by a high throughput optical system and low-noise signal processing.



Spectra of fluorescein solutions

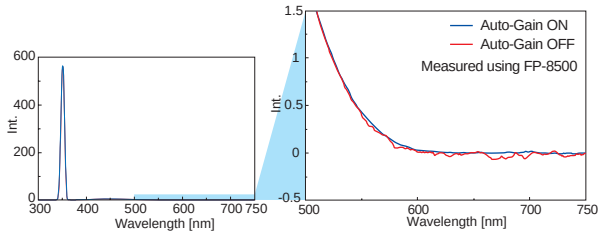
ance for luminescence measurements

Wide Dynamic Range; Auto-Gain and Auto-SCS functions

A wide dynamic range for luminescence measurements is obtained by using the Auto-Gain and Auto-SCS features, automatically adjusting the detector sensitivity for optimum measurements.

Auto-Gain

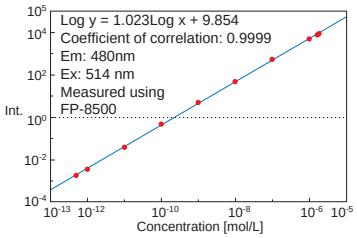
Data with an optimized S/N throughout the entire scan range can be obtained with ease for spectra or time course measurements by using the Auto-Gain function, automatically adjusting the gain due to fluorescence intensity.



Spectrum of quinine sulfate solution (Auto-Gain)

Auto-SCS

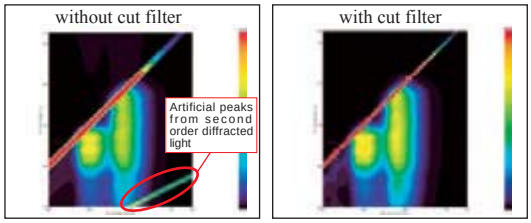
Effective for fixed wavelength measurements and quantitative analysis, The Auto-SCS function allows creation of a calibration curve for a wide concentration range without changing the instrument measurement parameters. (SCS: Sensitivity Control System)



Calibration curve of fluorescein solutions (Auto-SCS)

Automatic cut filter for higher-order diffraction

To remove the higher-order diffraction light caused by the excitation, a cut filter is required depending upon the excitation wavelength. For the FP-8300, 8500 and 8600, a cut filter assembly for higher-order diffraction is included as standard. For the FP-8200, this accessory is available as an option. This filter assembly allows the user to automatically obtain spectra without the peaks that originate from the higher-order diffracted light.



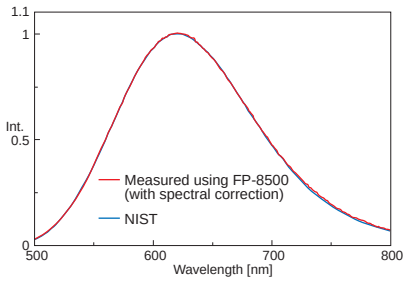
3D spectra of fluorescent orange color plate

Spectral correction

Accurate spectral correction is required to evaluate the efficiency of luminous materials, such as an LED. A calibrated halogen lamp and calibrated deuterium lamp are available for the FP-8000 series to provide spectral correction of the emission system, from the UV through the NIR region. Traditionally, Rhodamine B has been used for spectral correction of the excitation system, but now, a calibrated detector is available which can be used to perform the spectral correction of the excitation portion of the FP-8000 series instruments in a much wider wavelength range.

Spectra of NIST SRM 2940

A spectrum of the NIST SRM 2940 filter was measured using the FP-8500 with spectral correction. Both the measured and the calibrated spectrum data are found to be in good agreement with each other, demonstrating that spectral correction was properly performed.



Spectra of NIST SRM 2940

IQ accessories (Automatic accessory recognition function)

When a compliant accessory is placed into the instrument sample compartment, the software automatically recognizes the installed accessory. Previously used instrument parameters associated with the accessory are recalled and information such as the accessory name and serial number are recorded in the measurement data. The IQ Start system in conjunction with the IQ Accessory function allows rapid access to pre-defined analysis methods.

Automatic accessory recognition

Expandability

The FP-8000 series has excellent flexibility, with a wide range of optional accessories and programs available to allow the measurement of a range of samples with various shapes, sizes and measurement procedures.

Compact and suitable for routine measurement of liquid samples

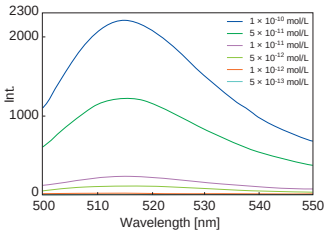
FP-8200 Spectrofluorometer

The FP-8200 is a general-purpose spectrofluorometer with excellent basic performance and functionalities suitable even for routine fluorescence analysis especially of liquid samples. The standard Auto-SCS and Auto-Gain features allow measurements in a wide dynamic range with six-digit linearity. The automatic cut filter for higher-order diffraction can be provided as an option for accurate spectra without artificial peaks from second order light. Two kinds of graphical user interfaces are available: the Spectra Manager™ II cross-platform spectroscopy software allowing full-system control and advanced data processing; and the iRM-900 intelligent remote module with a color LCD touch screen.

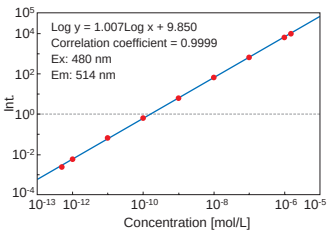
- **Six-digit dynamic range**
- **Auto-SCS and Auto-Gain functions**
- **High sensitivity S/N > 1,600 (RMS)**
- **High-speed scanning up to 20,000 nm/min**
- **Wavelength range, 200 to 750 nm (900 nm, option)**

Wide dynamic range

A wide dynamic range of over 6 orders of magnitude can be obtained by using the available Auto-Gain and Auto-SCS functions, automatically adjusting the detector sensitivity to allow sample measurements without user interaction with the instrument parameters.



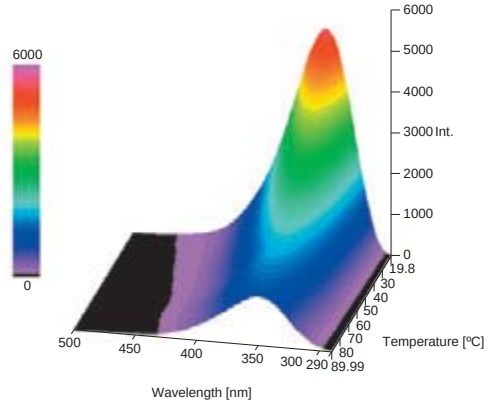
Spectra of fluorescein solutions



Calibration curve of fluorescein solutions

Temperature interval scan measurement

For the FP-8200, a full variety of optional accessories and programs are available, such as an optional program for collection of temperature dependent spectra and a 3-D display of the results (only Spectra Manager II).

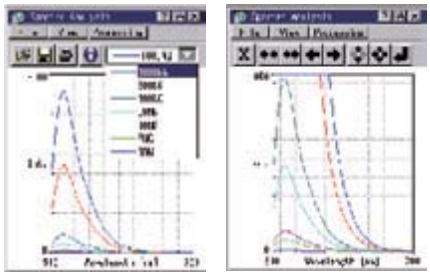


Temperature interval scan measurement of Lysozyme

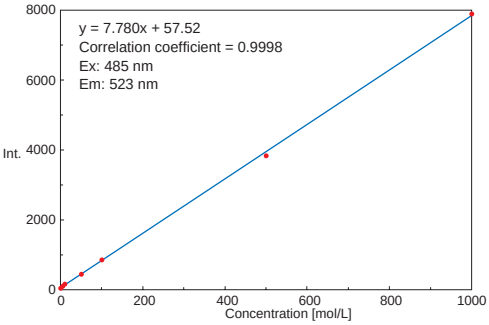
One-Drop fluorescence measurement

The SAF-850 (FP-8200) or SAF-851 (FP-8300/8500/8600) One-Drop measurement accessory offers quantitative analysis or simple spectrum measurement utilizing a minimum sample volume of 5 µL. Without using a rectangular cell, easy and accurate measurement can be done by only one drop of a sample using a pipette.

One-Drop measurement system



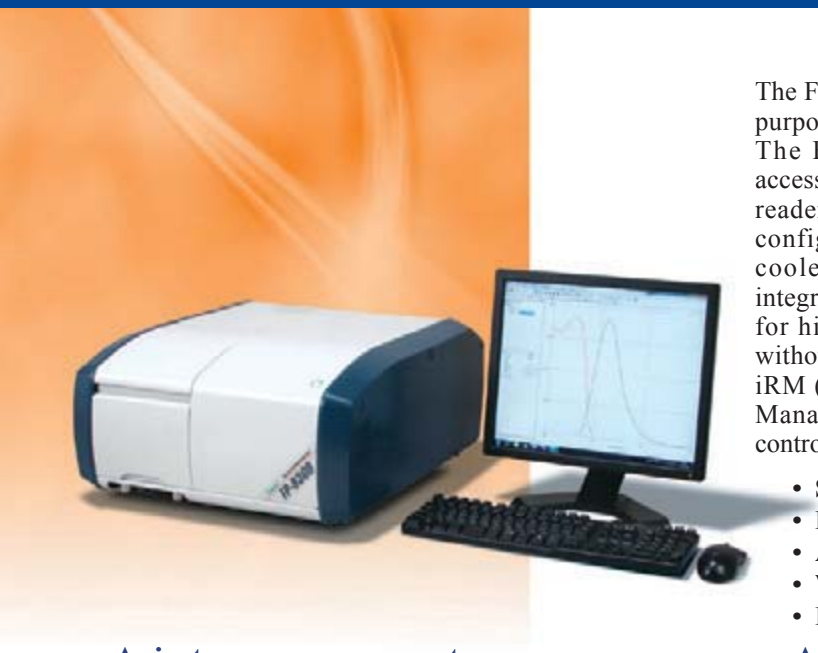
Spectra of λ DNA labeled with PicoGreen (iRM type display example)



Calibration curve of λ DNA labeled with PicoGreen

Capable of system expansion to phosphorescence measurement or system with large sized accessories

FP-8300 Spectrofluorometer

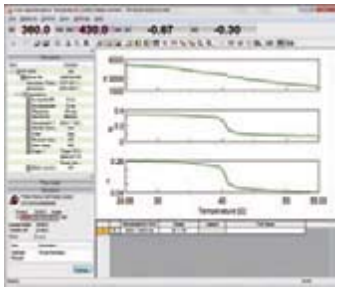


The FP-8300 is a user friendly spectrofluorometer for multiple purposes ranging from routine analysis to materials research. The FP-8300 can be expanded to accept any optional accessories such as the automatic titration unit or a microplate reader. Using the FP-8300, the most suitable system can be configured for phosphorescence measurements of samples cooled using liquid nitrogen or measurements using an integrating sphere accessory. The standard automatic cut filter for higher-order diffraction can be used to obtain spectra without the artifical peaks due to second order light. Both the iRM (intelligent remote module) and the expanded Spectra Manager™ II software system are available for instrument control and data analysis.

- **Support for multiple accessories**
- **Routine analysis to research studies**
- **Automatic cut filter for higher-order diffraction**
- **Wavelength range, 200 to 750 nm (900 nm, option)**
- **High resolution of 1.0 nm**

Anisotropy measurement

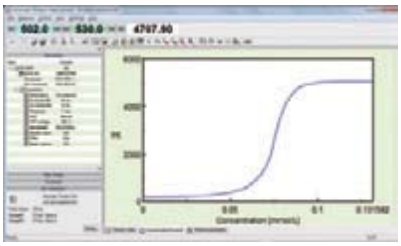
A fluorescent dye (DPH - Diphenhydramine) was added to a liposome (lipid bilayer) and the degree of polarization was measured by changing the temperature. Total fluorescence intensity (F), degree of polarization (P) and anisotropy (r) are determined by using the measured I (perendicular) and I (parallel). The change of degree of polarization and anisotropy due to the phase transition of the liposome were observed at around 40°C.



Measuring degree of polarization of liposome

Automatic titration measurement (only Spectra Manager™ II)

An NaOH solution was used to titrate a pH dependent fluorescent dye of BCECF (2',7'-BIS(carboxyethyl)-carboxyfluorescein acid) and the change in fluorescent intensity was measured. Utilizing the automatic titrator, phenomena such as the denaturation of proteins can be observed by measuring the change in fluorescent intensity.

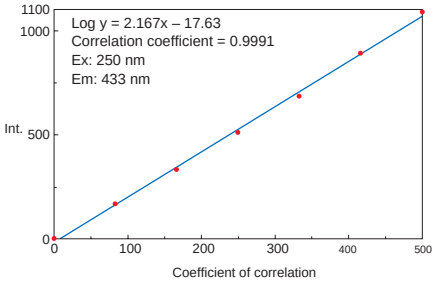


Automatic titration measurement program [Measurement screen]

ATS-827 Automatic titration unit

Quantitative analysis of Phosphorescence/ Phosphorescence lifetime

The Spectra Manager II software for the FP-8300 includes a phosphorescence Quantitative Analysis program as standard. This software program can be used to perform quantitative analysis of a sample labeled by a rare-earth complex with an approximate 1 millisecond phosphorescence lifetime. As a demonstration, a calibration curve using benzophenone in ethanol solution was created, obtaining a correlation coefficient of 0.9991.



Calibration curve of benzophenone in ethanol soution

Connecting with microplate reader

The FMP-825 Microplate reader accessory can be integrated with the FP-8300, using the Spectra Manager II software.
Four kinds of measurements (Spectrum Measurement, Quantitative Analysis, Time Course Measurement and Fixed Wavelength Measurement) are available. The quantitative analysis software can be used to create a calibration curve and measure unknown samples all in one microplate. The time course measurement software could also be used to perform parallel kinetics for the various microwell samples.

Microplate reader system

Quantitative measurement of the Microplate reader

Research grade model enabling the highest sensitivity, highest scan speed and highest accuracy

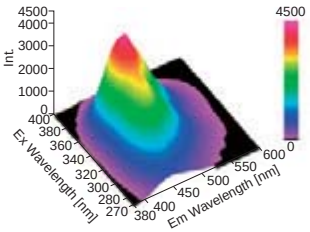
FP-8500 Spectrofluorometer

The FP-8500 is a high-performance spectrofluorometer covering the wavelength range of 200 to 850 nm (maximum). The instrument offers a signal-to-noise ratio of 5,000:1 (RMS) for fluorescence measurements and a wavelength scan speed of 60,000 nm/min. The high resolution spectra of 1.0 nm, the automatic filter for higher-order diffraction and accurate spectral correction assures exceptional capabilities for the evaluation of advanced materials. The high-speed data acquisition abilities of this instrument assures optimized measurement of 3-D spectra and phosphorescence samples.

- **High sensitivity S/N > 5,000 (RMS)**
- **Fast data acquisition**
- **High-speed scanning up to 60,000 nm/min**
- **Automatic cut filter for higher-order diffraction**
- **Wavelength range, 200 to 750 nm (850 nm, option)**
- **Validation accessory as standard**

Fast scan speed measurement

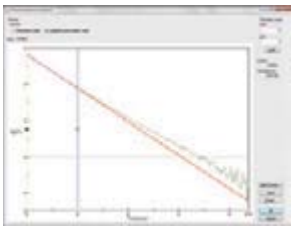
The FP-8500 can obtain spectra with a maximum scan speed of 60,000 nm/min, requiring only a short time for 3-D spectra measurements. The 45 spectra in the 3-D fluorescence figure for quinine sulfate were obtained in only one minute.



3-D fluorescence spectra of quinine sulfate

Phosphorescence lifetime of about 1 millisecond

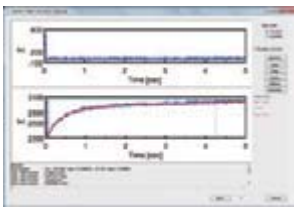
With a minimum data acquisition interval of 0.05 milliseconds, the FP-8500 can obtain phosphorescence lifetime data of about 1 millisecond, minimum. A lifetime value of 1.08 milliseconds was obtained for the Eu complex shown in the figure.



Phosphorescence lifetime of Eu complex

Stopped-flow

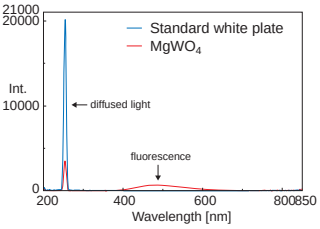
The fast data acquisition of the FP-8500 can be used to examine the short reaction times involved in stopped-flow experiments.
The denaturation unfolding process of Cytochrome C was measured by the fluorescence stopped-flow method. Approximately 1,000 data points were obtained in a 5 second measurement of the denaturation process. A standard reaction rate calculation program included with the software allowed a very good fitting result for the two-step reaction process.



Reaction velocity calculation result

Quantum yield calculation

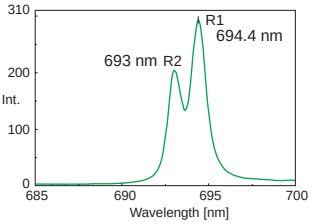
To obtain optimum fluorescence quantum yield data for samples, it is necessary to obtain spectral data with good S/N. Utilizing the Auto-Gain function and the cut filter for higher-order diffracted light, excellent data can be obtained for a sample that provides fluorescence less than the diffused light.
$MgWO_4$ was measured and an internal quantum yield value of 80.8% was calculated, which is in good agreement with the published valued of 81%.



The fluorescence spectrum of $MgWO_4$ and a standard reference plate

High resolution in longer wavelength range

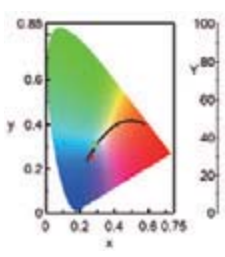
The FP-8500 can measure samples with sharp peaks due to the high resolution capabilities of the 1.0 nm spectral bandwidth. The emission spectrum of a Ruby's R lines were measured and the R1 and R2 peaks of 1.4 nm separation were clearly observed.



Emission spectrum of Ruby's R lines

Evaluation of luminous color

Luminescence spectra without any artificial peaks due to higher-order diffracted light also improves the accuracy of color calculations. The luminous color of three different white LEDs was measured and plotted on the chromaticity diagram in the figure. Color evaluation systems for fluorescent materials or LEDs can be configured using the luminous color analysis program, wavelength expansion up to 850 nm option and the fluorescence spectral correction function.



Luminescence color analysis result

Covering the wavelength region from UV-Vis to NIR with a compact instrument size

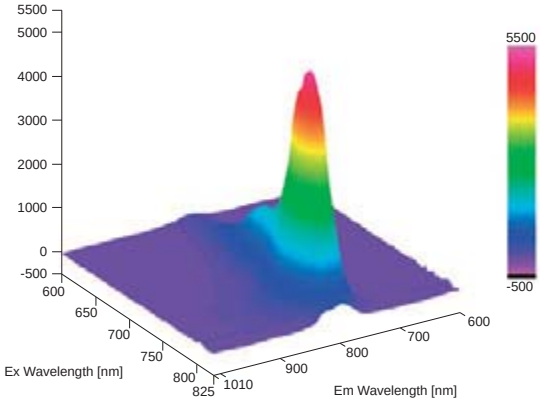
FP-8600 Spectrofluorometer

The FP-8600 is a spectrofluorometer utilizing a highly sensitive PMT to obtain data from the UV to the NIR region. The wavelength range of 200 to 850 nm for the Excitation (Ex) side and up to 1,010 nm for the Emission (Em) side allows measurement of materials which have specific absorption in the NIR region such as carbon nanotubes. The small instrument design incorporates excellent features including high-speed scanning and the higher order diffraction cut filter system so that the instrument can be applied to state-of-the-art research and applications for the development of advanced materials.

- **Wavelength range, 200 to 1,010 nm, Em (850 nm, Ex)**
- **High-speed scanning up to 120,000 nm/min (Em)**
- **Automatic cut filter for higher-order diffraction**
- **Validation accessory as standard**
- **Suitable for biological sample measurements using a NIR fluorescent reagent in order to prevent auto-fluorescence**

Fluorescence measurement in longer wavelength range

The 3-D spectra of Alexa Fluoro 790 dye was measured. The dye is used as a label of an oligonucleotide modified by proteins or amines with a fluorescence maximum at 814 nm.

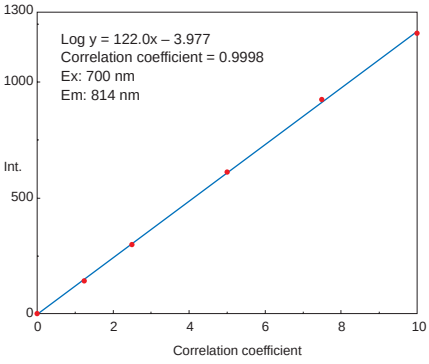


3D spectra of Alexa Fluoro 790

Fluorescent dye for longer wavelength range

A calibration curve for fluorescent dye Alexa Fluoro 790 was created using the SAF-851 One-Drop accessory with a minimum required sample volume of 5 µL. The SAF-851 One-Drop accessory is suitable for measuring proteins after labeling the proteins with a fluorescent dye.

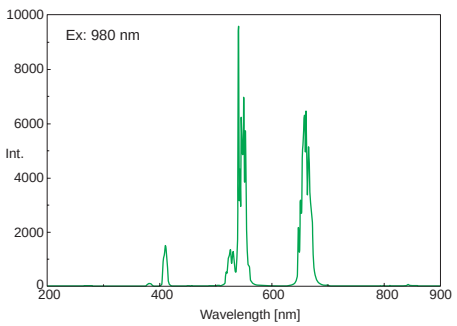
SAF-851
One-drop measurement unit



Calibration curve of Alexa Fluoro 790

Up-conversion phosphor measuring system

Generally, emission wavelengths are longer than the excitation wavelength, appearing towards the red end of the wavelength range. Up-conversion phosphors, however, are significant because the emission wavelength is shorter than the excitation wavelength, shifting towards the blue wavelengths.
The emission spectrum of an up-conversion phosphor was measured using the FP-8600 with a dedicated accessory mount for a 980 nm laser. In addition to the above, JASCO can provide many special measurement systems to meet specific customer requirements, such as a system with a NIR wavelength expansion up to 1,400 nm for measuring carbon nanotubes.



Emission spectrum of up-conversion phosphor

Irradiation of 980 nm laser light to up-conversion phosphor

Human eyes cannot detect the light of the 980 nm laser, but while the up-conversion phosphor is illuminated with this laser, the irradiated sample area can be observed as a green spot. This phenomenon can be explained as the luminescence from the up-conversion phosphor when it was excited by the 980 nm laser which produces emission in the visible range.

Up-conversion phosphor measuring system

User-friendly graphical interface

iRM-900 Intelligent Remote Module

The iRM-900 intelligent remote module incorporates a color LCD touch screen to easily access all functions, which can be used for both the FP-8200 and FP-8300. The iRM-900 conveniently guides the operator through routines encompassing data acquisition to data processing. The obtained data can be automatically printed to USB PictBridge printers, or saved to a CF memory card for further processing on a PC.

- **High quality color LCD display**
- **Operation using Touch Pen**
- **Enhanced quantitative analysis**
- **Equipped with instrument validation software**


iRM-900


Touch-sensitive screen

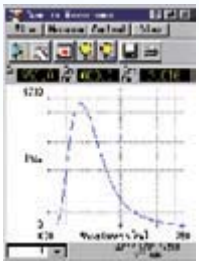

Easy data transfer to a PC


Print to a USB printer

Six standard measurement programs

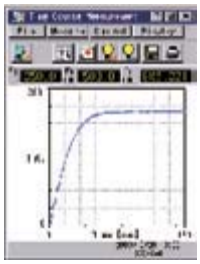
Programs for Spectra measurement, Time course measurement, Quantitative analysis, Fixed wavelength measurement, 3-D spectra measurement, and Abs measurement* are provided.
A peak maximum search function useful for analysis of an unknown sample is provided as a measurement support function.

● Spectra measurement program



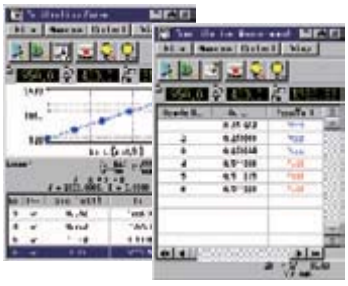
The FP-8000 series spectrofluorometer can measure five different types of luminescence spectra: fluorescence emission spectrum; fluorescence excitation spectrum; synchronous fluorescence spectrum; single beam emission spectrum and single beam excitation spectrum.

● Time course measurement program



The time course measurement program is intended for measuring temporal changes of fluorescence intensity of a sample at a fixed wavelength. Up to 4,000 hours (FP-8300) and 167 hours (FP-8200) of continuous measurement can be performed using a 60 minute and 60 second interval, respectively.

● Quantitative analysis program



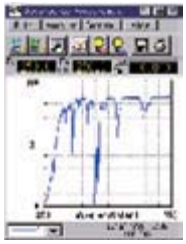
In the quantitative analysis software, optimal parameters from two photometric modes, emission and excitation, and three quantitation methods, no base (1 wavelength), one-point base (2 wavelength) and two-point base (3 wavelength) can be selected depending upon the application.

● Fixed wavelength measurement program

The fixed wavelength measurement program is intended for measurement of a sample's fluorescence intensity at fixed Ex and Em wavelengths with up to four wavelength settings for both the Ex and Em parameters.

● Abs Measurement

The Absorbance measurement program can be used to measure either the transmittance or absorbance spectrum by measuring the synchronous spectrum of a sample while maintaining the difference between the Ex and Em wavelength at 0 nm.

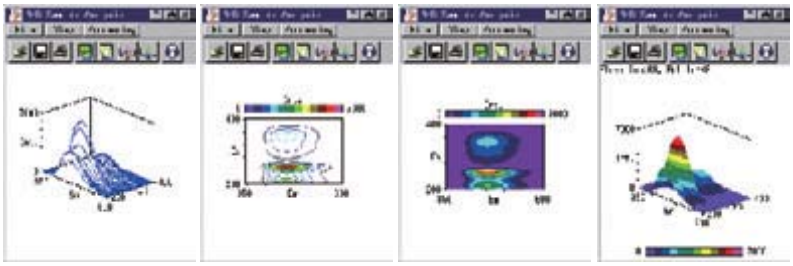



FUV-803

* The FUV-803 Absorbance measurement cell block is required separately for the absorbance and transmittance measurements.

● 3-D spectra measurement program

The 3-D spectra measurement program is very effective to rapidly characterize the fluorescence characteristics of a sample. This function is provided as standard and can be used to select the display mode or to display and save a cross-section view.


3-D spectra view　Contour view　Color contour view　Color 3-D view

IQ accessory and IQ Start

User-friendly features include the IQ Accessory function for automatic accessory recognition and IQ Start for immediate start of pre-registered programs when conducting routine measurements.

Spectral correction

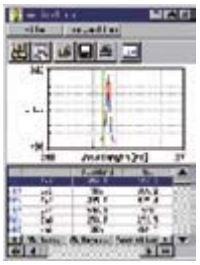
The spectral correction program which is neccessary to compare the measurement data obtained by using different instruments is provided as standard for all models.
When data for spectral correction is measured and registered in advance, the corrected spectrum can be obtained immediately after the measurement.

*Jigs for correction are required separately.

Validation

The validation program utilizes instrument inspection procedures in compliance with JIS (K 0120:2005) and JAIMAS (0004-2005). This program supports six inspection items including wavelength accuracy, wavelength repeatability, resolution, stray light, sensitivity and photometric stability. The test results can be saved and/or printed by the user.

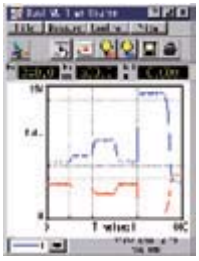
*Jigs for inspection are required separately.

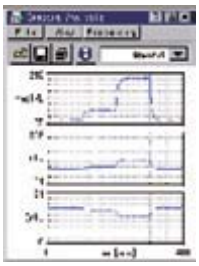


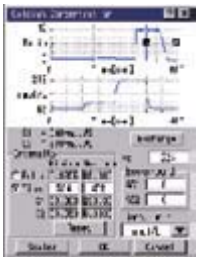
Optional programs for the iRM-900

FRTC-891 Dual-wavelength time course measurement program

The FRTC-891 dual-wavelength time course measurement program enables time course measurement of the ratio of the fluorescence intensity at two wavelengths (Ex and Em options). The Calcium concentration calculation function in the program can calculate the change in concentration of an intracellular ion such as Ca^{2+}.

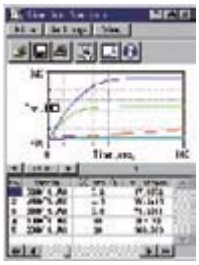


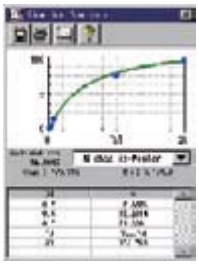


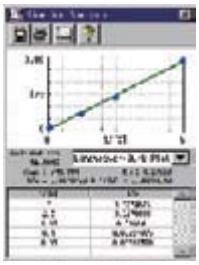


FRKN-893 Advanced kinetics analysis program

The FRKN-893 advanced kinetics analysis program enables the time course measurement of a sample, analysis of an enzyme solution added to various concentrations of a substrate, the plotting of graphs and the calculation of maximum reaction velocity (V_{max}) and Michaelis Menten constant (K_m). This program can also be used with cell changer accessories.







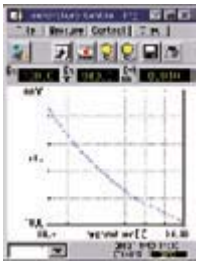
FRMC-895 Macro command program

The FRMC-895 Macro command program executes a sequence of pre-programmed operations automatically, including parameter setting, measurements, analysis and printing.

FRTP-892 Temperature control measurement program

The FRTP-892 temperature control measurement program allows DNA or protein melting measurement and analysis. The melting temperature, T_m, is calculated by the result of a time course measurement during temperature change. This program can also be used with cell changer accessories.

* Such accessories as the ETC-814/ETC-815 water-cooled Peltier thermostatted cell holder or the PCT-818 Water-cooled Peltier thermostatted 4-position automatic cell changer are required separately.

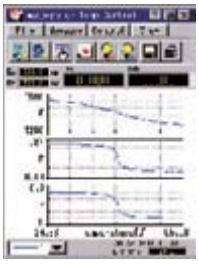


ETC-814

FRAP-894 Fluorescence polarization measurement program

Using the FRAP-894 fluorescence polarization measurement program, the total fluorescence intensity (F), fluorescence anisotropy (r) and degree of polarization (P) can be measured using the FDP-837 automatic polarizer unit, allowing auto-depolarization fixed wavelength and auto-depolarization time course measurements .
Auto-depolarization temperature control measurements can also be offered by connecting with a Peltier cell holder.

* Only for FP-8300.
* FDP-837 automatic polarizer unit is required separately.



FDP-837 Automatic polarizer

A unique, single platform software package for any JASCO spectroscopy system

Spectra Manager™ II and CFR Cross-

JASCO is the first manufacturer to develop a powerful, cross-platform software package, "Spectra Manager", for controlling a wide range of spectroscopic instrumentation. The Spectra Manager program is a comprehensive package for capturing and processing data, eliminating the need to learn multiple software packages and offering the user a shallower learning curve. Several types of measurement data files (UV-Vis/NIR, FT-IR, Fluorescence, etc.) can be viewed in a single window, and processed using a full range of data manipulation functions. The latest version, Spectra Manager™ II, includes several instrument measurement programs, a spectra analysis program, an instrument validation program and the JASCO Canvas program as standard. It is even possible to simultaneously analyze data during sample measurements.

Spectra Manager™ CFR provides features to support laboratories in compliance with 21 CFR Part 11. A choice of complete pull-down task menus, user-friendly icons, and easily accessible pop-up menus enables new users to manage security information, control user access, and record audit trails.

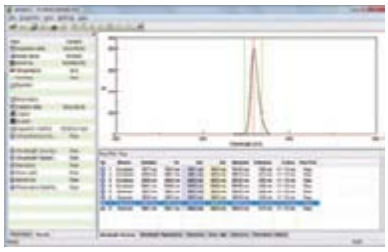
IQ Accessory and IQ Start

When an accessory supported by IQ Accessory is inserted into the sample chamber, Spectra Manager automatically recognizes the accessory, and the accessory's information such as model name and serial number are transferred to Spectra Manager. The IQ Start function automatically starts an assigned program with parameters previously declared by the user.

Validation

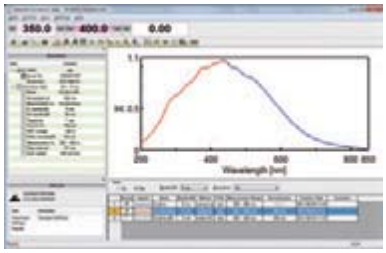
The validation program utilizes instrument inspection procedures in compliance with JIS (K 0120 2005) and JAIMAS (0004-2005). This program supports six inspection items including wavelength accuracy, wavelength repeatability, resolution, stray light, sensitivity and photometric stability. The test results and procedures can be saved and/or printed.

* The FP-8200/8300 requires additional jigs for the inspection procedures, which are available as an option.



Spectral correction

To easily compare measured spectral data from several different instruments or to determine the quantum yield efficiency, it is necessary to utilize a spectral correction program, provided as standard for all FP-8000 series main units.
Corrected spectra can be obtained immediately after measuring samples when the spectral correction data is measured and saved in advance.

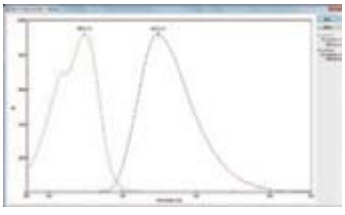


* The FP-8200/8300 requires optional jigs for the spectral correction procedures.

** Spectral correction using a Rhodamine B ethylene glycol solution is standard; additional jigs for spectral correction can be obtained separately.

Measurement support functions

Each measurement program is equipped with convenient measurement support functions.
Sample spectra can be seen on the Preview screen in each of the measurement programs, and is a convenient function to confirm samples or measurement parameters for fixed wavelength or quantitative analysis measurements.
The Peak Max. search function automatically determines the most suitable Ex and Em wavelength for unknown samples.

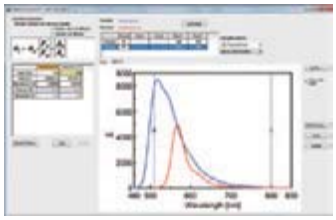


Peak max. search

Relative quantum yield

All FP-8000 series models are equipped with a relative quantum yield calculation program and an Absorbance measurement program as standard, offering the ability to obtain relative quantum yield using each model.

* The Model FUV-803 Absorbance measurement cell block is required separately to measure the absorbance of a liquid sample.



Relative quantum yield calculation result

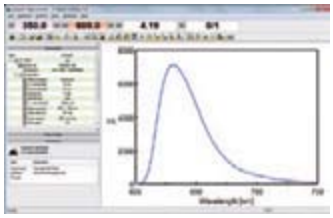
platform spectroscopy software package

Eight measurement programs

Programs for Spectra measurement, Time course measurement, Quantitative analysis, Fixed wavelength measurement, Phosphorescence lifetime measurement*, 3-D spectra measurement, Interval scan measurement and Abs measurement are provided.

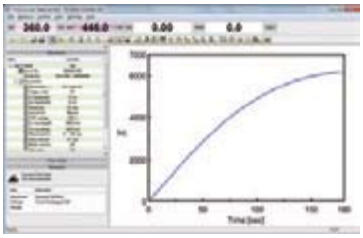
* Excluding the FP-8200

● Spectra measurement program



The spectra measurement program measures five types of spectra, emission spectra, excitation spectra, synchronous spectra, single-beam emission spectra and single-beam excitation spectra in two different measurement modes, fluorescence and phosphorescence mode (excluding the FP-8200).

● Time course measurement program



The time course measurement program is intended for measuring temporal changes of fluorescence/phosphorescence intensity of a sample at a fixed wavelength. For the FP-8300 /8500/8600, up to 4,000 hours of continuous measurement can be performed with a 0.05 millisecond to 60 minute interval in fluorescence mode and 0.1 to 60 second interval in phosphorescence mode. For the FP-8200, up to 167 hours of continuous measurement can be performed with a 0.01 to 60 second interval in fluorescence mode.

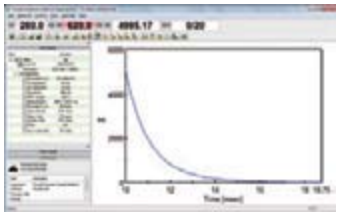
● Quantitative analysis program

In the quantitative analysis program, optical parameters from three photometric modes; fluorescence/phosphorescence and excitation, and three quantitation methods; no base (1 wavelength), one-point base (2 wavelength) and two-point base (3 wavelength) can be selected depending on the application. Other quantitative calibration curve methods can be selected such as logistic or spline functions.

● Fixed wavelength measurement program

The fixed wavelength measurement program is intended for measurement of a sample's fluorescence/phosphorescence intensity at fixed Ex and Em wavelengths with up to four wavelength settings for both the Ex and Em parameters.

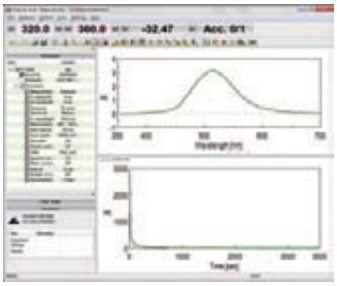
● Phosphorescence lifetime measurement program



The phosphorescence lifetime measurement program is intended for measurement of temporal changes of phosphorescence of a sample briefly irradiated by Ex light.

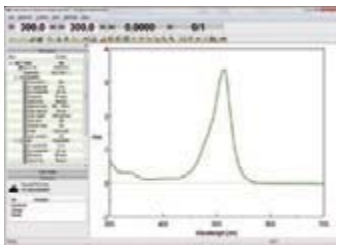
* Excluding the FP-8200

● Interval scan measurement program



The interval scan measurement program measures three types of spectra: fluorescence spectra, excitation spectra and synchronous spectra. The results can be displayed as 2-D and 3-D spectra as well as contour and color-coded maps.

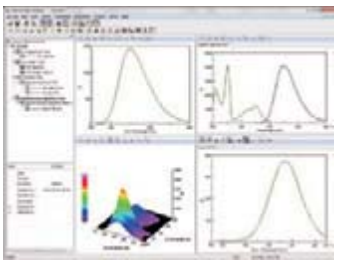
● Absorbance spectra measurement program



The Absorbance measurement program can be used to measure the transmittance, absorbance or reflectance spectrum by measuring the synchronous spectrum of a sample while maintaining the difference between the Ex and Em wavelength at 0 nm.

* The FUV-830 Absorbance measurement cell block is separately required for the absorbance and transmittance measurements. The reflectance measurement is available for the FP-8300/8500/8600 and also requires an integrating sphere.

● 3-D spectra measurements



3-D spectral analysis

The 3-D spectra measurement program is very effective to characterize the fluorescence characteristics of a sample.
Several different display functions are available such as Contour, Color 3-D, Color mapping, etc.
In addition, several different data display methods can be selected, allowing simultaneous display and saving of 2-D, 3-D and synchronous spectra, among others.

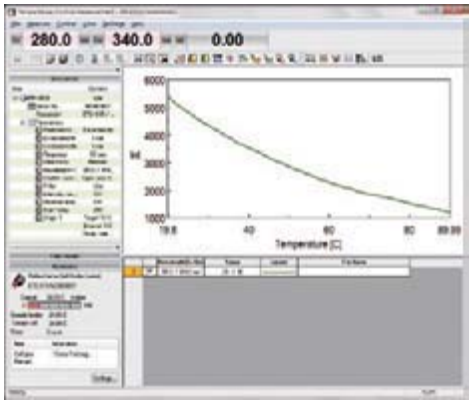
From data acquisition to data processing and analysis

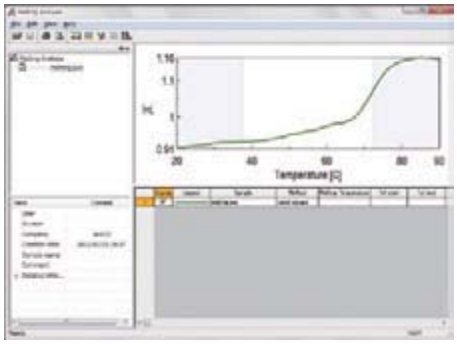
Optional Software Packages for Spe

FWTP-874 Temperature control measurement program

The FWTP-874 temperature control measurement program allows DNA or protein melting measurement and analysis. The melting temperature, T_m, is calculated from the results of a time course during temperature change. This program can also be used with cell changer accessories.

* Accessories such as the ETC-814/815 water-cooled Peltier thermostatted cell holder or the PCT-818 Water-cooled Peltier thermostatted 4-position automatic cell changer are required separately.



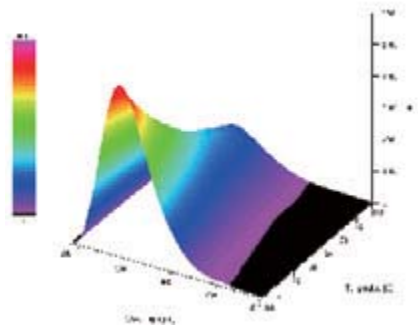


ETC-815

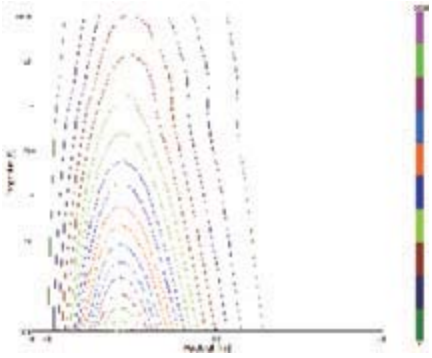
FWTS-872 Temperature interval scan measurement program

The FWTS-872 temperature interval scan measurement program enables Ex and Em spectra measurements automatically with a defined temperature interval. This program can also be used with cell changers and allows 3-D display of the measured data.

* Accessories such as the ETC-814/ETC-815 water-cooled Peltier thermostatted cell holder or the PCT-818 Water-cooled Peltier thermostatted 4-position automatic cell changer are required separately.



3-D spectral display

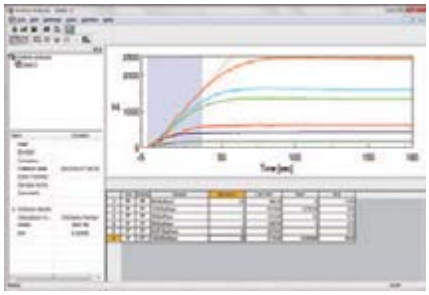


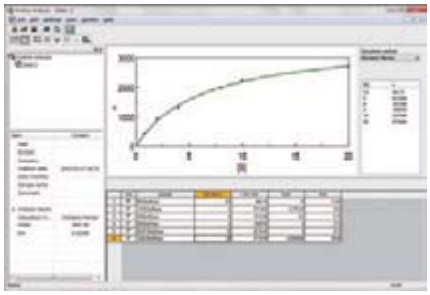
Contour map

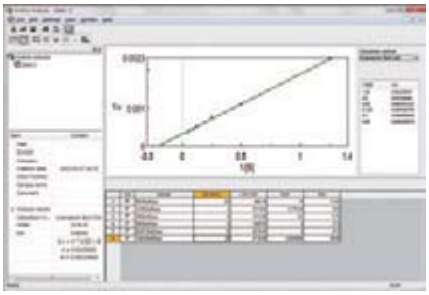
PCT-818

VWKN-772 Advanced kinetics analysis program

The VWKN-772 advanced kinetics analysis program provides a time course measurement of a sample, for example, the interaction of an enzyme solution added to various concentrations of substrate, with subsequent plotting of various graphs and calculation of the maximum reaction velocity (V_{max}), Michaelis Menten constant (K_m) and the Hill constant (n). This program can also be used with automated cell changer accessories.



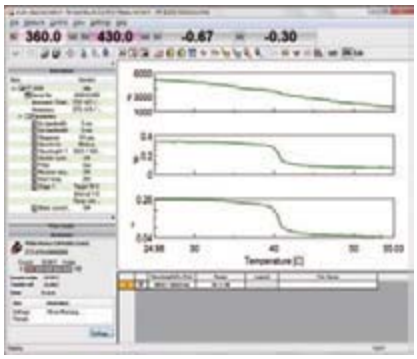




FWAP-875 Fluorescence polarization measurement program

Using the FWAP-875 fluorescence polarization measurement program, the total fluorescence intensity (F), fluorescence anisotropy (r) and degree of polarization (P) can be measured using the FDP-837 automatic polarizer unit, providing auto-depolarization fixed wavelength measurements or auto-depolarization time course measurements.
Auto-depolarization temperature control measurement can also be offered by using a Peltier cell holder accessory or auto-depolarization titration measurements can be obtained by interfacing an automatic titration accessory.

* The FDP-837 automatic polarizer unit is required separately.

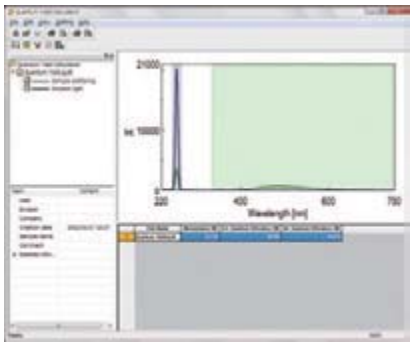


FDP-837

FWQE-880 Quantum yield calculation program

The FWQE-880 quantum yield calculation program calculates the quantum yield of a sample which is the ratio of the number of photons emitted from the sample to the number of photons absorbed, using the sample spectrum and a spectrum of a white reference standard.

* Excluding the FP-8200.
** Accessories such as the ISF-834 60 mm diameter integrating sphere, ILF-835 100 mm diameter integrating sphere or ILFC-847 cooled 100 mm diameter integrating sphere and the ESC-842 calibrated light source (WI) are required separately.



ISF-834

ESC-842

FWTC-873
Dual-wavelength time course measurement program

The FWTC-873 dual-wavelength time course measurement program enables time course measurement of the ratio of the fluorescence intensity at two different wavelengths (either Ex or Em). The calcium concentration calculation function in the program can calculate the change in concentration of an intracellular ion such as Ca^{2+}.

FWFC-878
Fluorescent object color measurement program

The FWFC-878 Fluorescent object color measurement program enables evaluation of fluorescent sample color (fluorescent objective color) based on ASTM-E2152.
This program calculates the fluorescent sample color using a desired light source when the spectra of the various light sources are pre-registered.

* Excluding the FP-8200.
** Accessories such as the ISF-834 60 mm diameter integrating sphere, ESC-842 calibrated light source (WI) and WRE-362 PMT for wavelength expansion are required separately. Spectral measurements are required in the range wider than 300 - 780 nm for Ex and 380 - 780 nm for Em.

FWLU-879 Luminous color measurement program

The FWLU-879 Luminous color measurement program allows the measurements of luminescence or emission spectra of light emitting samples, and data calculations including plotting the results in a colored chromaticity diagram and calculation of correlated color temperature and color rendering index.

* Accessories such as the ESC-842 Calibrated light source (WI) and the WRE-362 PMT for wavelength expansion are required separately.

FWMC-883 Macro command program

The VWMC-883 Macro command program executes a sequence of pre-programmed operations automatically, including parameter setting, measurements, analysis and printing.

FP-8000 Series Optional accessories

Accessories for measurement of very small amounts of sample

FMH-801 3 mm Micro cell jacket for FMM-100 3 mm Micro quartz cell
FMH-802 5 mm Micro cell jacket for FMM-200 5 mm Micro quartz cell

FMH-801 with FMM-100

FMH-802 with FMM-200

Specifications: All models

	FMH-801*	FMH-802**
Compatible cells:	Micro cell, 3 × 3 mm, 1 pc.	Micro cell, 5 × 5 mm, 1 pc.
Path length:	3 mm	5 mm
Path width:	3 mm	5 mm
Cell material:	Synthetic quartz	Synthetic quartz
Minimum sample volume:	50 µL	400 µL (with stirrer), 500 µL (without stirrer)
Options:	–	Teflon stirrer, cell cap

* FMM-100 3mm Micro quartz cell is required separately.
** FMM-200 5mm Micro quartz cell is required separately.

SAF-850 One-Drop measurement accessory FP-8200
SAF-851 One-Drop measurement accessory FP-8300 FP-8500 FP-8600

The SAF-850/851 One-Drop measurement accessory is a dedicated sample accessory for the FP-8000 series to measure micro-volume samples of protein and nucleic acid. The minimum sample volume is 5 µL for the 1 mm pathlength disk cell and one sample can be measured in approximately 15 seconds.

SAF-850

SAF-851

Cell blocks used at ambient temperature

FUV-803 Absorbance measurement cell block

Specifications: All models

Compatible cells:	Rectangular cell, 10 × 10 mm, 1 pc.
Wavelength range:	220 to 900 nm (depending upon model and configuration)
Diffusion plate material:	Spectralon

FHM-804 High sensitivity measurement cell block

All models

The FHM-804 includes a reflection mirror used to improve light collection efficiency to increase the sensitivity of the fluorescence measurement

Specifications:

Compatible cells:	Micro cell, 3 × 3 or 5 × 5 mm, rectangular cell, 10 × 10 mm, 1 pc.
Sensitivity:	Maximum 3 times higher than using standard cell holder (0.05 Abs or less, 10 mm cell)

FSA-805 30 degree incident angle cell block for triangle cell
FSA-806 30 degree incident angle cell block for rectangular cell

Specifications: All models

Compatible cells:	Rectangular cell, 10 × 10 mm, 1 pc. (FSA-806); triangular cell, 1 pc. (FSA-805)
Wavelength range:	220 to 900 nm (depending upon model and configuration)
Diffusion plate material:	Spectralon

FUV-803

FSA-805

FHM-804

Constant temperature cell block/holders/changers

STR-811

STR-812

FCT-816

FCT-816S

FCT-817

FCT-817S

CTH-807 Water thermostatted cell block

CTH-807

Specifications: All models

Compatible cells:	Micro cell, 3 × 3 or 5 × 5 mm, rectangular cell, 10 × 10 mm, 1 pc.
Temperature control:	Thermostatted water circulation
Operating temperature:	5 to 90 ºC

STR-811 Water thermostatted cell holder with stirrer FP-8200
STR-812 Water thermostatted cell holder with stirrer FP-8300 FP-8500 FP-8600

Specifications:

Compatible cells:	Micro cell, 3 × 3 or 5 × 5 mm, rectangular cell, 10 × 10 mm, 1 pc.
Temperature control:	Thermostatted water circulation
Stirring system:	Integrated variable speed magnetic stirrer
Operating temperature:	5 to 90 ºC

FCT-816 Water thermostatted automatic 4-position turret cell changer FP-8200
FCT-816S Water thermostatted automatic 4-position turret cell changer with stirrer FP-8200
FCT-817 Water thermostatted automatic 8-position turret cell changer FP-8300 FP-8500 FP-8600
FCT-817S Water thermostatted automatic 8-position turret cell changer with stirrer FP-8300 FP-8500 FP-8600

Specifications:

Model name:	FCT-816	FCT-817	FCT-816S	FCT-817S
Compatible cells:	Micro cell, 3 x 3 or 5 x 5 mm, rectangular cell, 10 × 10 mm, 1 pc.			
Temperature control:	Thermostatted water circulation			
Stirring system:	–		Integrated variable speed magnetic stirrer	
Operating temperature:	5 to 90 ºC			

All models ····· used with all models of the FP-8000 series
FP-8200 ····· used only with the FP-8200
FP-8300 ····· used only with the FP-8300
FP-8500 ····· used only with the FP-8500
FP-8600 ····· used only with the FP-8600
PC ····· must be used with Spectra Manager only
Purge ····· Purge capability is standard.

Peltier thermostatted cell holders/changer

EHC-813

ETC-814

ETC-815

EHC-813 Air-cooled Peltier thermostatted cell holder with stirrer

FP-8300 FP-8500 FP-8600 Purge

ETC-814 Water-cooled Peltier thermostatted cell holder with stirrer

FP-8200 Purge

ETC-815 Water-cooled Peltier thermostatted cell holder with stirrer

FP-8300 FP-8500 FP-8600 Purge

The EHC-813 cell holder utilizes an air-cooled Peltier system which does not require water circulation.
The ETC-814/815 cell holder utilizes a water-cooled Peltier system which provides a greater temperature range.
All the accessories include an in-cell sensor which can be used to monitor the sample temperature.

Specifications:

Model name:	EHC-813	ETC-814	ETC-815
Compatible cells:	Micro cell, 3 × 3 or 5 × 5 mm, rectangular cell, 10 × 10 mm, 1 pc		
Temperature control system:	Heating/cooling system utilizing Peltier effect		
Peltier heat radiation:	Air-cooled	Water-cooled	
Stirring system:	Integrated variable speed magnetic stirrer		
Temperature setting range:	5 to 70 °C	-10 to 110 °C	
Temperature control range:	10 to 60 °C (at 25 °C)	0 to 100 °C (at 25 °C)	0 to 100 °C (at 25 °C)
Temperature control accuracy:	± 0.1 °C (holder sensor)		
Temperature accuracy:	With cell holder sensor: ± 0.5 °C (20 to 40 °C), ± 1 °C (other temp. range) With in-cell sensor: ± 0.2 °C		
Standard accessory:	In-cell sensor		

PCT-818 Water-cooled Peltier thermostatted 4-position automatic cell changer with stirrer

FP-8300 FP-8500 FP-8600 Purge

The PCT-818 cell holder employs a water-cooled Peltier system which provides a wide temperature control range. The accessory also includes an in-cell sensor which can be used to monitor the sample temperature.

Specifications:

Compatible cells:	Micro cell, 3 × 3 or 5 × 5 mm, rectangular cell, 10 × 10 mm, 1 pc.
Temperature control system:	Heating/cooling system utilizing Peltier effect
Peltier heat radiation:	Water-cooled
Stirring system:	Integrated variable speed magnetic stirrer
Temperature setting range:	-10 to 110 °C
Temperature control range:	0 to 90 °C (at 25 °C)
Temperature control accuracy:	± 0.1 °C (holder sensor)
Temperature accuracy:	With cell holder sensor: ± 0.5 °C (20 to 40 °C), ± 1 °C (other temp. range) With in-cell sensor: ± 0.2 °C
Standard accessory:	In-cell sensor
Optional accessory:	In-cell sensor, 3 pcs.set (factory option)

PCT-818

CSP-828 Sample compartment lid with syringe port

FP-8200

CSP-829 Sample compartment lid with syringe port

FP-8300 FP-8500 FP-8600

CSP-829

The CSP-828/829 allows addition of reagent to the sample cell without opening the sample compartment lid. It can only be used with cell holders that include an integrated stirrer, such as the STR-811/812, EHC-813 or ETC-814/815 cell holders.
Compatible syringe needle: 2 inch (50 mm)

* 3 mm micro cell cannot be used.

MCB-100 Mini water circulation bath

MCB-100

Specifications: All models

Temperature control range:	10 °C below ambient temperature to 40 °C (IN and OUT connected)
Bath capacity:	Approx. 200 mL
Temperature sensor accuracy:	±0.2 °C (at 20 °C)
Cooling/heating capacity:	52 W
Dimensions:	160 (W) × 263 (H) × 225 (D) mm

FP-8000 Series Optional accessories

Autosampler, syringe pump and sippers

ASU-800 Autosampler unit

All models

The ASU-800 autosampler automates measurements of multiple liquid samples employing a sipper or syringe pump. Various racks are available to be used with test tubes and/or vials. The PC control software is included as standard.

Optional sample racks (must be specified)

Rack	Compatible test tube and vial	Max. number of samples
SRA-811 15 mm O.D. test tube rack	15 mm O.D. test tube, 15 mm (O.D.) ×105 mm (H), 10 mL, 100 pcs/set	100
SRA-812 13 mm O.D. test tube rack	13 mm O.D. test tube, 13 mm (O.D.) × 100 mm (H), 7 mL, 100 pcs/set	100
SRA-813 12 mm O.D. test tube rack	12 mm O.D. test tube, 12 mm (O.D.) × 105 mm (H), 5 mL, 100 pcs/set	150
SRA-814 10 mm O.D. test tube rack	10 mm O.D. test tube, 10 mm (O.D.) × 90 mm (H), 3 mL, 100 pcs/set	150
SRA-818 Vial rack	Screw top vial, 2 mL, 500 pcs./set	120
SRA-816 Microplate rack	96-well microplate, 250 µL	192
SRA-817 Constant temperature microplate rack	96-well amplification plate, 250 µL	192

QFS-821 Vacuum sipper

QFS-822 Vacuum sipper

FP-8200

FP-8300 FP-8500 FP-8600

QFS-821

QFS-822

Specifications:

Cell capacity:	120 µL
Cell material:	Synthetic quartz
Tubing material:	Teflon, SUS
Carryover:	Less than 2%
Minimum sample requirement:	700 µL

SHP-819 Peristaltic sipper

SHP-820 Peristaltic sipper

FP-8200

FP-8300 FP-8500 FP-8600

SHP-819

SHP-820

Specifications:

Cell capacity:	15 µL
Cell material:	Synthetic quartz
Tubing material:	PharMed, Teflon, SUS
Carryover:	Less than 2%
Minimum sample requirement:	700 µL

Option for QFS-821/822 and SHP-819/820

AWU-820 Washing unit

This is a washing unit specifically for the QFS-821/822 and SHP-819/820. The AWU-820 can automatically wash the ASU-800 autosampler system.

ASP-849 Syringe pump

All models

The ASP-849 can be used in conjunction with the ASU-800 and FSC-823/824 micro flow cell holder.

Specifications:

Reproducibility of volume delivery:	Within ±1%
Syringe capacity:	2.5 mL
Optional accessories:	1.0, 5.0, 10 mL syringe

Flow cell holders

FSC-823 Micro flow cell holder

FSC-824 Micro flow cell holder

FP-8200

FP-8300 FP-8500 FP-8600

Three different cell blocks are available as options, please specify.
- 15 µL flow cell block
- 30 µL flow cell block
- 100 µL flow cell block

FSC-823

FSC-824

Microplate reader

FMP-825 Microplate reader

FP-8300 FP-8500 FP-8600 PC

Specifications:

Compatible plate:	96-well and 384-well black microplate for fluorescence (SBS standard), 1pc.
Measurement time:	1 min./plate (96-wells, fixed wavelength measurement, specified condition)
Minimum sample requirement:	80 µL/well (96-well microplate)
Photometric reproducibility:	±3%
Photometric mode:	Spectrum measurement, quantitative measurement, time course measurement, fixed wavelength measurement
Optional accessories:	Constant temperature microplate holder
Temperature control system:	Heating system
Temperature control range:	Room temperature +10 to 50 °C

* The PC control software is included as standard.

All models ····· used with all models of the FP-8000 series
FP-8200 ····· used only with the FP-8200
FP-8300 ····· used only with the FP-8300
FP-8500 ····· used only with the FP-8500
FP-8600 ····· used only with the FP-8600
PC ····· must be used with Spectra Manager only
Purge ····· Purge capability is standard.

Titration/Stopped-flow accessories

ATS-826 Automatic titration unit
ATS-827 Automatic titration unit

FP-8200 PC
FP-8300 FP-8500 FP-8600 PC

Specifications:

Model:	ATS-826	ATS-827
Compatible cells:	Micro cell: 5 x 5 mm; rectangular cell: 10 x 10 mm	
Compatible accessories:	STR-811, ETC-814	STR-812, EHC-813, ETC-815
Number of syringes:	2	
Syringe volume:	1.0 mL	
Injection accuracy:	Greater than 99%	
Injection reproducibility:	Less than 1%	
Injection pitch:	0.1% of syringe volume	
Optional accessory:	2.5 mL syringe	

* The PC control software is included as standard.


ATS-826


ATS-827

SFS-852/853/854/852T/853T/854T Stopped-flow accessory

FP-8300 FP-8500 FP-8600 PC

Specifications:

Model:	SFS-852	SFS-853	SFS-854	SFS-852T	SFS-853T	SFS-854T
Number of syringes:	2 pcs.	3 pcs.	4 pcs.	2 pcs.	3 pcs.	4 pcs.
Syringe volume:	10 mL					
Mixing ratio:	1:1 to 1:20					
Dead time:	2.9 msec.					
Flow rate:	5 mL/sec. (10 mL syringe)					
Temperature control system:	–			Heating/cooling system utilizing Peltier effect		
Peltier heat radiation:	–			Water-cooled		
Temperature setting range:	–			Cell: 10 to 80 ºC Syringe: 10 to 60 ºC		
Temperature accuracy:	–			±0.5 ºC (cell)		
Optional accessory:	1.0 mL, 2.5 mL, 5.0 mL syringe, 50µL, 100 µL, 500 µL delay line					

* The PC control software is included as standard.


SFS-852

Solid sample blocks

FDA-808 Solid sample holding block / FLH-809 Film holding block / FPA-810 Powder sample cell block

All models

The FDA-808 is used for solid and powder samples, the FLH-809, film and solid samples, the FPA-810 is dedicated for powder sample measurement and can also be used for micro powder samples.

Specifications:

Model:		FDA-808	FLH-809	FPA-810
Incident angle:		30 deg.		
Solid sample:	Minimum sample size:	25 (H) × 25 (W) mm	12 (H) × 12 (W) mm	–
	Maximum sample size:	50 (H) × 50 (W) mm	50 (H) × 50 (W) mm	–
	Sample thickness:	10 mm or less	18 mm or less	–
Powder sample:	Standard cell:	FP-1061 Powder sample cell	–	PSH-101 Powder sample cell
	Cell holder size:	ϕ 20.5 mm, thickness 1 mm (with spacer)	–	ϕ 12 mm, thickness 0.5 - 4 mm


FDA-808


FP-1061 Powder sample cell

Optional filter for FDA-808, FLH-809, FPA-810

● Bandpass filter 250BP30

This bandpass filter can be mounted to the holder located on the excitation side of the solid sample block.

Specifications:

Center wavelength:	250 nm
Half bandwidth:	30 nm
Filter size:	ϕ 25 mm, thickness 5 mm

Optional cells for FPA-810

Specifications:

Model:	PSH-002	PSH-102	PSH-103
Cell size:	ϕ 16 mm	ϕ 8 mm	ϕ 5 mm
Thickness:	0.5 to 4 mm		


PSH-002 PSH-101 PSH-102 PSH-103


FLH-809


FPA-810

FP-8000 Series Optional accessories

Integrating spheres, Cooling/Heating units

ISF-834 60 mm dia. integrating sphere

FP-8300 FP-8500 FP-8600 PC

The ISF-834 is used for quantum efficiency measurements and color evaluation measurements of opaque solid or powder samples.

Specifications:

Inner dia. of integrating sphere:	60 mm
Minimum sample size:	20 (H) × 20 (W) × 0.5 (T) mm
Maximum sample size:	60 (H) × 50 (W) × 25 (T) mm
Standard cell:	PSH-004 Powder sample cell, ϕ 12 × 0.5 - 4 (T) mm
Optional cells:	PSH-002 Powder sample cell, ϕ 16 × 0.5 - 6(T) mm PSH-003 Micro powder sample cell, ϕ 5 × 0.5 - 4 (T) mm PSH-005 Powder sample cell, ϕ 8 × 0.5 - 4 (T) mm
Optional accessories for spectra correction:	ESC-842 Calibrated light source (WI) ESC-843 Calibrated light source (D_2)

* Spectra correction requires Rhodamine B Ethylene glycol solution, at a minimum.

ILF-835 100 mm dia. integrating sphere

FP-8300 FP-8500 FP-8600 PC Purge

The ILF-835 accessory can be used for quantum efficiency measurements of liquid samples or thin membrane samples on a transparent substrate as well as opaque solid or powder samples.

Specifications:

Inner dia. of integrating sphere:	100 mm
Minimum sample size:	20 (H) × 10 (W) × 0.5 (T) mm
Maximum sample size:	30 (H) × 20 (W) × 6 (T) mm
Optional cells:	1, 2 mm liquid cell 3 mm powder cell 10 mm rectangular cell KBr plate sample holder
Optional accessories for spectra correction:	ESC-842 Calibrated light source (WI) ESC-843 Calibrated light source (D_2)

* Spectra correction requires Rhodamine B Ethylene glycol solution, at a minimum.

ILFC-847 Cooled 100 mm dia. integrating sphere

FP-8300 FP-8500 FP-8600 PC

The ILFC-847 can be used to obtain the quantum efficiency measurement of a sample cooled by liquid nitrogen. It can also be used at ambient temperatures without the use of the sample dewar.

Specifications:

Inner dia. of integrating sphere:	100 mm
Cooling system:	Liquid nitrogen
Cooling temperature:	77 K (-196 ºC)
Optional cells (ambient temperature):	1, 2 mm liquid cell 3 mm powder cell 10 mm rectangular cell KBr plate sample holder
Optional cells (cooled):	LPH-140 Phosphorescence measurement cell kit for liquid sample PPH-150 Phosphorescence measurement cell kit for powder sample CPH-160 Phosphorescence measurement cell kit for solid sample
Optional accessories for spectra correction:	ESC-842 Calibrated light source (WI) ESC-843 Calibrated light source (D_2)

* Spectra correction requires Rhodamine B Ethylene glycol solution, at a minimum.

PMU-830 Liquid nitrogen cooling unit

FP-8300 FP-8500 FP-8600 PC

The PMU-830 can be used to measure a sample cooled using liquid nitrogen.

Specifications:

Cooling system:	Liquid nitrogen
Cooling temperature:	77 K (-196 ºC)
Optional cells (cooled):	LPH-140 Phosphorescence measurement cell kit for liquid sample PPH-150 Phosphorescence measurement cell kit for powder sample CPH-160 Phosphorescence measurement cell kit for solid sample

Optional accessories

● 1 mm liquid cell

Specifications:

Path length:	1 mm
Path width:	10 mm
Sample volume:	200 µL

● 2 mm liquid cell

Specifications:

Path length:	2 mm
Path width:	10 mm
Sample volume:	400 µL

● 3 mm powder cell

Specifications:

Cell size:	19 (H) × 10 (W) × 3 (T) mm

● 10 mm rectangular cell holder

This cell holder can be used to mount a 10 x 10 mm rectangular cell inside of the ILF-835/ILFC-847, integrating sphere.

● KBr plate sample holder

This holder accommodates a sample powder sandwiched between two KBr plates (5 × 5 × 1 mm), which are also used for micro FT-IR measurements.

● LPH-140 Phosphorescence measurement cell kit for liquid sample

Specifications:

Tube size:	5 mm O.D. × 178 mm
Tubing material:	Synthetic quartz

● PPH-150 Phosphorescence measurement cell kit for powder sample

Specifications:

Cell size:	ϕ 7 mm × 0.5 or 1 mm

● CPH-160 Phosphorescence measurement cell kit for solid sample

Specifications:

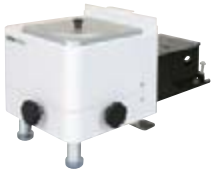
Minimum sample size:	5 (H) × 5 (W) × 1 (T) mm
Maximum sample size:	18 (H) × 10 (W) × 3 (T) mm

All models ····· used with all models of the FP-8000 series
FP-8200 ····· used only with the FP-8200
FP-8300 ····· used only with the FP-8300
FP-8500 ····· used only with the FP-8500
FP-8600 ····· used only with the FP-8600
PC ····· must be used with Spectra Manager only
Purge ····· Purge capability is standard.

Others

CSH-831 Cryostat holder

FP-8300 FP-8500 FP-8600



• Compatible cryostat:
Oxford instruments Optistat DN / DN-V

HPC-836 High temperature powder cell unit

FP-8300 FP-8500 FP-8600 PC

The HPC-836 employs an internal heater for temperature control using the PC and can be used to measure the temperature variation of the sample fluorescence intensity

Specifications:

Temperature control system:	Heating system
Heat radiation system:	Water-cooled
Temperature control range:	Room temperature + 25 to 300 ºC (cooled water temperature at 25 ºC)
Temperature stability:	±1 ºC
Standard cell:	Powder cell A, ϕ 20 mm × 1 mm Powder cell B, ϕ 20 mm × 0.5 mm

OBF-832 Optical fiber unit

FP-8300 FP-8500 FP-8600

The OBF-832 can be used to measure a sample located outside of the sample compartment using an optical fiber probe.

• Compatible optical fiber:
LSS4.6-1000S 1 m Optical fiber
LSS4.6-2000S 2 m Optical fiber

EFA-833 Epi-fluorescence unit

FP-8300 FP-8500 FP-8600

The EFA-833 is designed to irradiate a sample facing downward on the top of the accessory and measure the sample epifluorescence

Specifications:

Incident angle:	45 ºC
Minimum beam size:	1 × 1.5 mm (ellipse)

Polarizer / Filter

FDP-837 Automatic polarizer

FP-8300 FP-8500 FP-8600

• Wavelength range:
220 - 700 nm

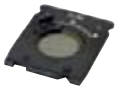
FSP-838 Depolarization plate

All models

• Wavelength range:
200 - 900 nm

FDP-223 / FDP-243 Polarizer and analyzer accessory

All models



FDP-223

FDP-243

FDP-223 (for UV-Vis)
• Wavelength range: 220 - 700 nm
FDP-243 (for Visible)
• Wavelength range: 400 - 700 nm

FLS-236 Liquid optical filter

FP-8300 FP-8500 FP-8600

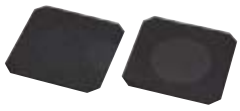
FST-470 Filter set

FP-8200 FP-8300 FP-8500 FP-8600

Filter set for fluorescence analysis.

Attenuator

FP-8200 FP-8300 FP-8500 FP-8600



Automatic cut filter

FP-8200

Automatic cut filter for higher order diffraction

* This filter is built into the FP-8300/8500/8600 as a standard feature.

Jigs

ESC-842 Calibrated WI light source

All models

The ESC-842 is used for spectral correction of the emission optical system.

• Correction wavelength range:
300 - 1010 nm

ESC-843 Calibrated D_2 light source

All models PC

The ESC-843 is used for spectral correction of the emission optical system.

• Correction wavelength range:
200 - 400 nm

SID-844 Calibrated detector

All models PC

The SID-844 is used for spectral correction of the excitation optics.

• Correction wavelength range:
200 - 900 nm

WRE-362 PM tube

FP-8200 FP-8300 FP-8500

PM tube for wavelength expansion.

* The expanded wavelength range is described in the specification sheet.

VDK-840 Validation kit 1

All models

The VDK-840 is used for spectral correction of the excitation optics and for the stray light instrument validation test.
• Correction wavelength range:
200 - 600 nm

VDK-841 Validation kit 2

All models

The VDK-841 consists of correction filters for the stray light instrument validation test.

Specifications

		FP-8200	FP-8300	FP-8500	FP-8600
Light source:		Xe lamp with shielded lamp house, 150 W			
Light source (for validation):		Integrated, selectable low pressure mercury lamp			
Photometric system:		Ratio-photometer system using monochromatic light to monitor the intensity output of the Xe lamp			
Monochromator:		Holographic concave grating in modified Rowland mount			
Wavelength range (Standard):	Ex:	Zero order, 200 - 750 nm			Zero order, 200 - 850 nm
	Em:				Zero order, 200 - 1010 nm
Wavelength range (Optional):		Zero order, 200 - 900 nm		Zero order, 200 - 850 nm	N/A
Automatic cut filter for higher-order diffraction light:		Option	Standard		
Sensitivity (RMS)[*1]:	Peak[*2]:	380:1	680:1	1200:1	600:1
	Base[*3]:	1,600:1	2,800:1	5,000:1	2,500:1
Resolution:	Ex:	2.5 nm (at 546.1 nm)	1.0 nm (at 546.1 nm)		1.0 nm (at 546.1 nm)
	Em:				2.0 nm (at 546.1 nm)
Band width:	Ex:	2.5, 5, 10, 20 nm	1, 2.5, 5, 10, 20 nm	1, 2.5, 5, 10, 20, L5, L10 nm	1, 2.5, 5, 10, 20, L5, L10 nm
	Em:				2.5, 10, 20, 40, L10, L20 nm
Wavelength accuracy:	Ex:	±2.0 nm	±1.5 nm	±1.0 nm	±1.0 nm
	Em:				±2.0 nm
Wavelength repeatability:	Ex:	±1.5 nm	±1 nm	±0.3 nm	±0.3 nm
	Em:				±0.6 nm
Wavelength scan speed:	Ex:	20, 50, 100, 200, 500, 1,000, 2,000, 5,000, 10,000, 20,000 nm/min		20, 50, 100, 200, 500, 1,000, 2,000, 5,000, 10,000, 20,000, 60,000 nm/min	20, 50, 100, 200, 500, 1,000, 2,000, 5,000, 10,000, 20,000, 60,000 nm/min
	Em:				20, 50, 100, 200, 500, 1,000, 2,000, 5,000, 10,000, 20,000, 60,000, 120,000 nm/min
Slew speed:	Ex:	30,000 nm/min		60,000 nm/min	60,000 nm/min
	Em:				120,000 nm/min
Response:		20, 50, 100, 200, 500 msec, 1, 2, 4, 8 sec	10, 20, 50, 100, 200, 500 msec, 1, 2, 4, 8 sec		
Detector:		Ex: Silicon photodiode, Em: PMT			
Photometric range:		-10,000 to 10,000			
Sensitivity selection:		High, Medium, Low, Very Low, Manual, Auto SCS			
Auto gain:		Standard			
Shutter function:		Standard (Automatic control)			
Sample illuminating system:		Horizontal illumination			
Sample compartment:		10 mm rectangular cell holder, nitrogen purgeable			
Recognition of IQ accessory :		Standard			
Start button:		Standard			
Analog output:		Standard			
Instrument communication:		USB 2.0			
Control and data processing:		Spectra Manager™ II/CFR, iRM		Spectra Manager™ II/CFR	
Spectral correction:		Option		Standard (Spectral correction using a Rhodamine B ethylene glycol solution is standard; other jigs for spectral correction are available separately as options.)	
Dimensions:		490 (W) × 545 (D) × 270 (H) mm	520 (W) × 545 (D) × 270 (H) mm	570 (W) × 545 (D) × 270 (H) mm	
Weight:		33.6 kg	36 kg	39 kg	
Power requirement:		270VA			
Installation environment:		Temperature: 15 to 35 ºC, Humidity: Less than 85%			

[*1] Minimum signal-to-noise ratio of Raman band of water at 350 nm excitation wavelength, bandwidth Ex 5 nm, Em 5 nm (FP-8600: Ex 5 nm, Em 10 nm), response 2 seconds.
[*2] Noise is measured on the Raman peak.
[*3] Noise is measured on the baseline.

● Specifications are subject to change without notice.

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