FP-8000 Series
Spectrofluorometer

FP-8200
Spectrofluorometer

FP-8300
Spectrofluorometer

FP-8500
Spectrofluorometer

FP-8600
Spectrofluorometer

JASCO

Achieved 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 system with large sized accessories.

FP-8500

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

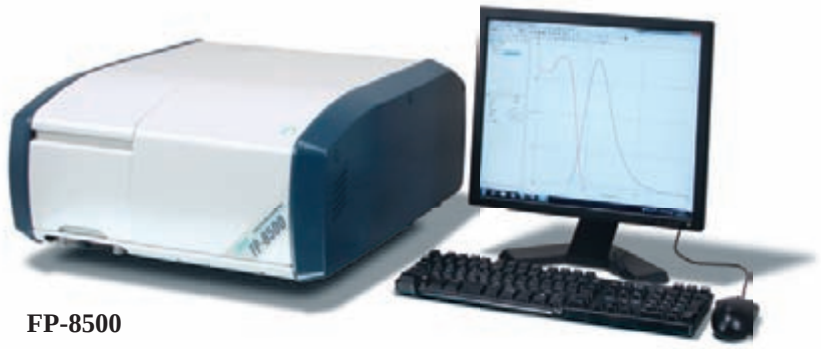
FP-8600

Covering wavelength region from UV/VIS to NIR while maintaining the same instrument size

FP-8000 series are new spectrofluorometers incorporating JASCO' s latest technologies ever possible with enhanced performances and functionalities, realizing high sensitivity measurement, wide dynamic range, automatic cut filter for higher-order diffraction, rapid 3-D measurement by fastest scan speed and high speed data acquisition for phosphorescence measurement.
In order to comply with all the needs of operators, a wide range of accessories are available, and in addition JASCO Spectra Manager™ II installed in the FP-8000 series assures the easy- to -use system.
In FP-8000 series 4 models are available, to meet users' requirements as wide as from Bio-science to advanced materials applications.

FP-8200

iRM-900
Intelligent remote module

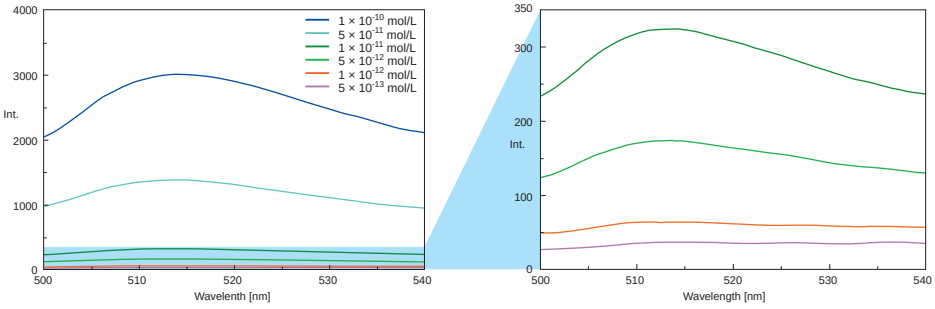


FP-8500

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

nance for measurement, analysis

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

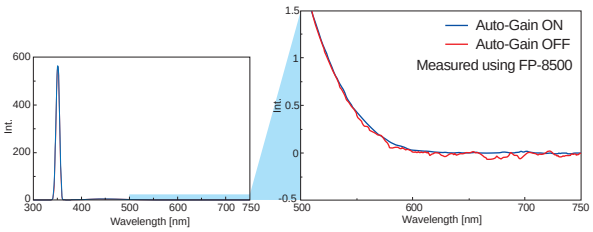
A wide dynamic range for luminescence measurements can be covered properly using the Auto-Gain and Auto-SCS features, automatically adjusting the detector sensitivity for optimum measurements.

Auto-Gain

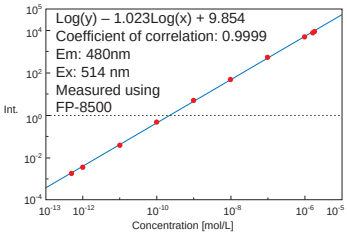
Data with an optimized S/N throughout the entire scan range can be obtained with ease for spectra or time course measurements by using the Auto-Gain function, automatically adjusting the gain due to fluorescence intensity.

Auto-SCS

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



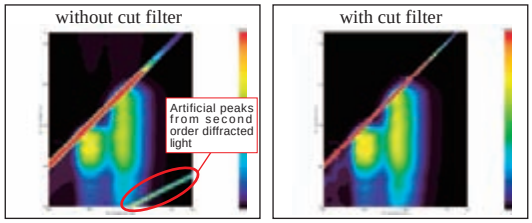
Spectrum of quinine sulfate solution (Auto-Gain)



Calibration curve of fluorescein solutions (Auto-SCS)

Automatic cut filter for higher-order diffraction

In order to remove higher-order diffraction light from excitation light, mounting cut filter was required depending on the excitation wavelength. For FP-8300, 8500 and 8600, cut filter for higher-order diffraction is equipped as standard and for FP-8200, available as an option. It allows to obtain spectra without peaks originating from the higher-order diffracted light.



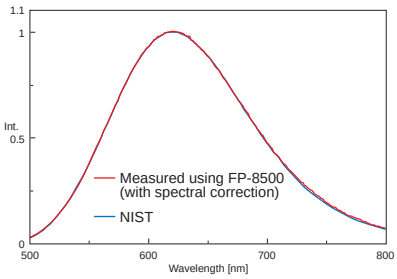
3D spectra of fluorescent orange color plate

Spectral correction

Accurate spectral correction is required to evaluate efficient luminous compounds, such as LED.
Calibrated halogen lamp and calibrated deuterium lamp are available for FP-8000 for spectral correction on emission sides, even in UV wavelength range. Rhodamine B has been used mainly for excitation side spectral correction, but the calibrated detector is now available which enables to perform the spectral correction on excitation side in much wider wavelength range.

Spectra of NIST SRM 2940

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



Spectra of NIST SRM 2940

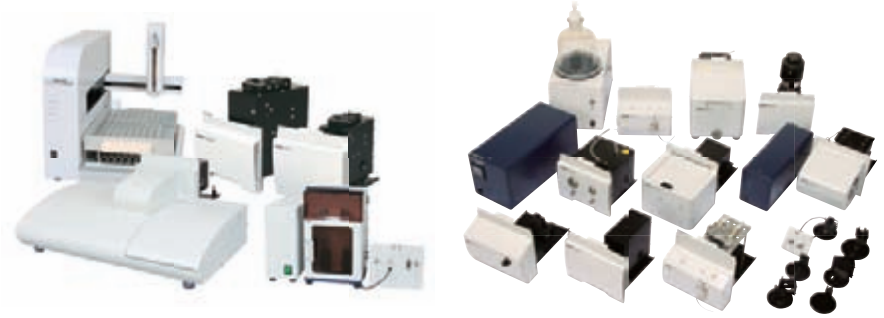
IQ accessories (Automatic accessory recognition function)

When a compliant accessory is installed in the sample compartment, the software automatically recognizes the accessory to be set. Measurement parameters used previously are set up, and such information as accessory name and serial number are recorded in the measurement data. Only by setting accessory in conjunction with IQ Start, the specified analysis can be started.

Automatic accessory recognition

Expandability

FP-8000 series has excellent expandability, which enables the measurements of sample with a variety of sample shapes and different measuring procedures by utilizing a wide range of optional accessories and programs.



Compact and suitable for routine measurement of liquid samples

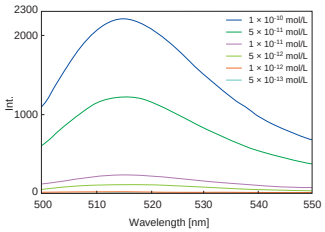
FP-8200 Spectrofluorometer

The FP-8200 is a general-purpose spectrofluorometer with excellent basic performance and functionalities suitable even for routine fluorescence analysis especially of liquid sample. 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 option for accurate spectra without artificial peaks from second order light. Two kinds of graphical user interface are available, such as 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.

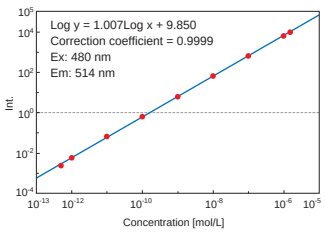
- **Six-digit dynamic range**
- **Auto-SCS and Auto-Gain functions**
- **High sensitivity S/N > 1,600, RMS**
- **High-speed scanning up to 20,000 nm/min**
- **Wavelength range, 200 to 750 nm (to 900 nm, option)**

Wide dynamic range

Wide dynamic range over 6 orders magnitude was accomplished. Auto-Gain and Auto-SCS functions which can adjust detector sensitivity automatically is available, allowing sample measurement without caring detector sensitivity adjustment.



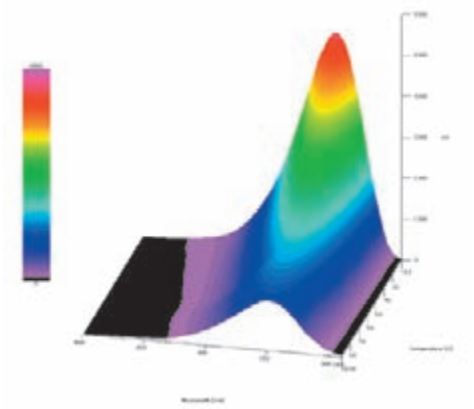
Spectra of fluorescein solutions



Calibration curve of fluorescein solutions

Temperature interval scan measurement

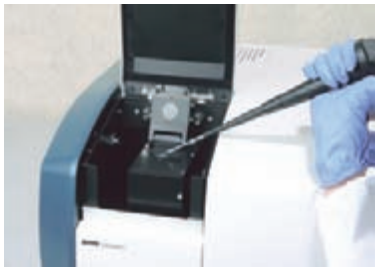
For FP-8200, full and variety of optional accessories are available, such as an optional program allowing to indicate temperature dependence of spectra using 3-D (only Spectra Manager™ II).



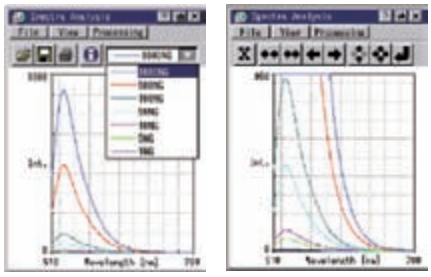
Temperature interval scan measurement of Lysozyme

One drop fluorescence measurement

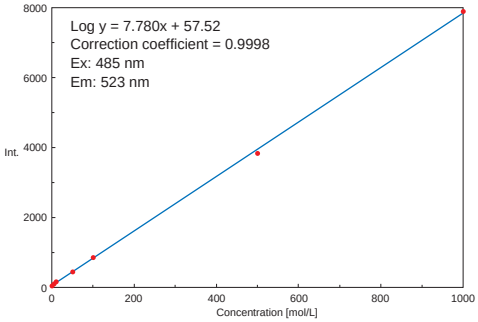
The SAF-850 (FP-8200) or SAF-851 (FP-8300/8500/8600) One drop measurement accessory offers quantitative analysis or spectrum measurement by minimum sample volume of 5 µL. Without using rectangular cell, easy and accurate measurement can be done by only one drop of sample using pipette. Approximately 30 seconds is required for measurement per one sample.



One-drop measurement system



Spectra and calibration curve 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

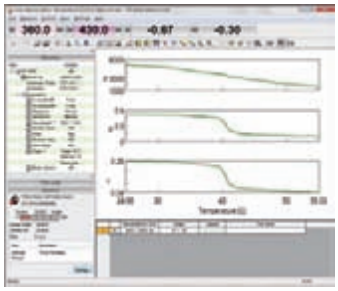
FP-8300 Spectrofluorometer

The FP-8300 is a user-friendly spectrofluorometer for multi purpose such as from routine analysis to research study. The FP-8300 can be expanded to accept any optional accessories such as automatic titration unit or microplate reader. Using FP-8300, the most suitable system can be configured for phosphorescence measurement of sample cooled using liquid nitrogen or measurement using integrating sphere unit. The standard automatic cut filter for higher-order diffraction enables to obtain spectra without artificial peaks from second order light. iRM (intelligent remote module) type is also available for such expanded system as well as Spectra Manager™ II.

- **Supporting any accessories**
- **From routine analysis to research study**
- **Automatic cut filter for higher-order diffraction**
- **Wavelength range, 200 to 750 nm (to 900 nm, option)**
- **High resolution 1.0 nm**

Anisotropy measurement

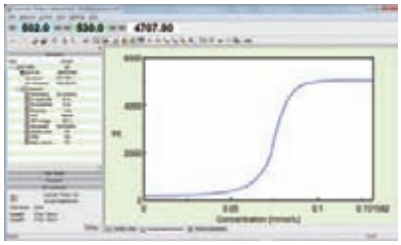
Fluorescent dye (DPH) was added to liposome (lipid bilayer) and degree of polarization was measured by changing temperature. Total fluorescence intensity (F), degree of polarization (P) and anisotropy (r) are determined using measured I perpendicular and I parallel. Change of degree of polarization and anisotropy due to phase transition of liposome were observed around 40 degree Celsius.



Measuring degree of polarization of liposome

Automatic titration measurement (only Spectra Manager™ II)

NaOH solution was added to pH dependency fluorescent dye of BCECF acid and change of fluorescent intensity was measured. By this system such phenomenon as denaturation of protein can be observed by measuring the change of fluorescent intensity.

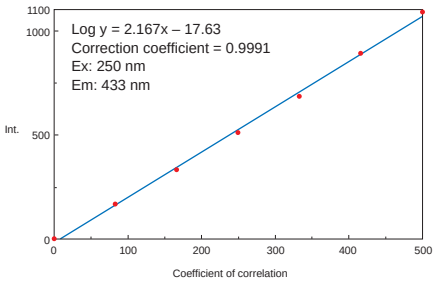


Automatic titration measurement program [Measurement screen]

ATS-827 Automatic titration unit

Quantitative analysis of Phosphorescence/ Phosphorescence lifetime

Spectra Manager™ II for FP-8300 is equipped with quantitative analysis program of phosphorescence as standard. Using the program enables to perform quantitative analysis of sample labeled by rare-earth complex with approximate 1 millisecond phosphorescence lifetime. Calibration curve using benzophenone in ethanol solution was created, and then high coefficient of correlation, 0.9991 was obtained.



Calibration curve of benzophenone in ethanol soution

Connecting with microplate reader

The FP-8300 with Spectra Manager™ II enables to connect with the FMP-825 Microplate reader.
Four kinds of measurements (Spectrum measurement, Quantitative analysis, Time course measurement and Fixed wavelength measurement) are available. Quantitative analysis allows the operation from creation of calibration curve to measuring unknown samples in one microplate. Time course measurement can perform parallel kinetics.

Microplate reader system

Quantitative measurement of the Microplate reader

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

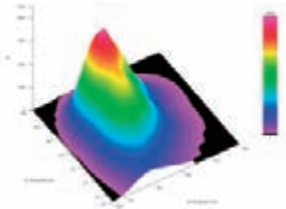
FP-8500 Spectrofluorometer

The FP-8500 is a highest performance spectrofluorometer covering the wavelength range from 200 nm to maximum 850 nm. The sensitivity which is the most important for fluorescence measurement is signal to noise ratio 5,000:1 as RMS and wavelength scan speed achieved is maximum 60,000 nm/min. The high quality spectra based on high resolution with 1 nm spectral bandwidth, the automatic cut filter for higher-order diffraction and accurate spectral correction assure coming new applications such as evaluation of advanced materials. The high speed data acquisition enables comfortable measurement of 3-D spectra and phosphorescence measurement.

- **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 (to 850 nm, option)**
- **Validation accessory as standard**

Fast scan speed measurement

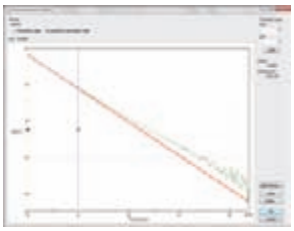
The FP-8500 achieved the fastest scan speed of 60,000 nm/min. Only a short time is required for 3-D spectra measurement which needs to obtain a lot of spectra. It takes only one minute for the 3-D spectra measurements acquiring 45 quinine sulfate spectra.



3-D fluorescence spectra of quinine sulfate

Phosphorescence lifetime of about 1 millisecond

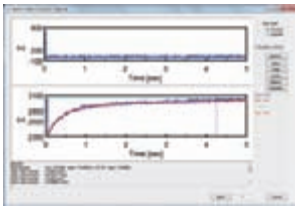
Phosphorescence lifetime of about 1 millisecond can be observed by the data acquisition capability of FP-8500 as fast as 0.05 milliseconds as minimum data interval. 1.08 milliseconds was obtained as phosphorescence lifetime of Eu complex.



Phosphorescence lifetime of Eu complex

Stopped-flow

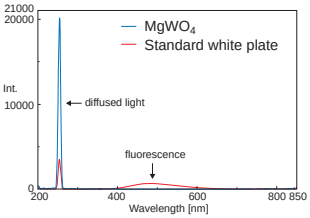
The FP-8500's fast data acquisition capability also contributes greatly to such tracing short time reaction as stopped-flow.
Unfolding process of Cytochrome C due to denaturation was measured by fluorescence stopped-flow method. Approximately 1,000 data were obtained in 5 seconds measurement time. Reaction rate calculation program is also available, and a very good fitting result was obtained supposing the reaction in two steps.



Reaction velocity calculation result

Quantum yield calculation

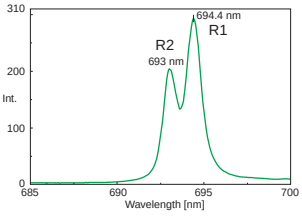
The peak of fluorescence even weaker than the diffused light can be measured with good S/N using Auto-Gain function and the spectrum which has no artificial peaks due to higher order diffracted light assures more accurate calculation of quantum yield.
$MgWO_4$ was measured and internal quantum yield of $MgWO_4$ was calculated to be 80.8 %, which is in good agreement with the published value of 81 %.



The fluorescence spectrum of $MgWO_4$ and a standard white board

High resolution in longer wavelength range

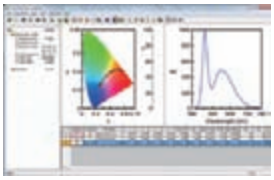
The FP-8500 can measure sample which have sharp peaks with high resolution of 1.0 nm spectral bandwidth. Ruby's R line emission spectrum was measured, and R1 and R2 peaks of which distance is approximately 1.4 nm were observed as clearly separated.



Emission spectrum of Ruby's R line.

Evaluation of luminous color

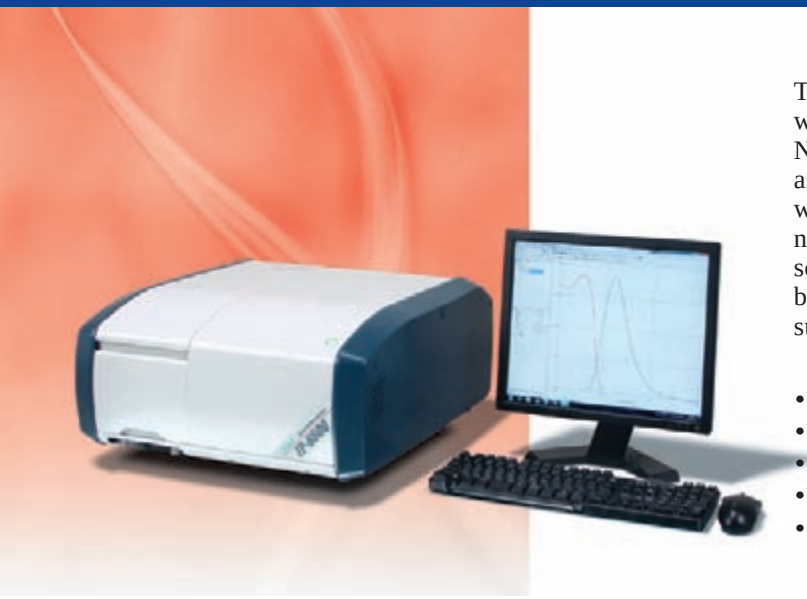
Spectra without any artificial peaks due to higher order diffracted light also improve color calculation accuracy. Luminous color of three kinds of white LED was measured ,and plotted on the chromaticity diagram. Color evaluation systems for fluorescent material or LED can also be configured using luminous color analysis program, wavelength expansion up to 850 nm and fluorescence spectral correction functions.



Luminescence color analysis result

Covering wavelength region from UV/VIS to NIR while maintaining the same instrument size

FP-8600 Spectrofluorometer

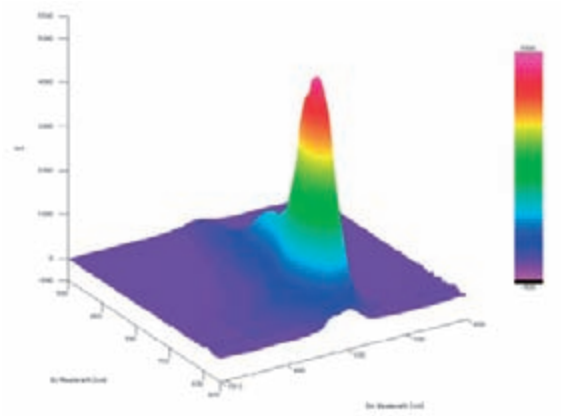


The FP-8600 is a spectrofluorometer with PMT for wavelength expansion covering whole range from UV to NIR. The wavelength range from 200 to 850 nm for Ex side and 1010 nm for Em side allows measurement of materials which have specific absorption in NR region such as carbon nanotube. The excellent features including high speed scanning and higher-order diffraction cut function enable to be applied for state-of-the-art research and development such as new application to coming advanced materials.

- **Wavelength range, 200 to 1010 nm, Em (to 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 Bio sample measurements using NIR fluorescent reagent in order to prevent auto fluorescence**

Fluorescence measurement in longer wavelength range

3-D spectra of Alexa Fluoro 790, which is used as a label of oligonucleotide modified by proteins or amines and has fluorescence at 814 nm, was measured.

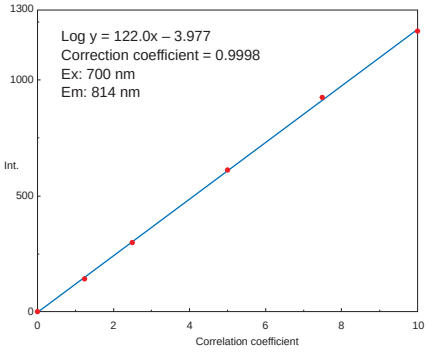


3D spectra of the Alexa Fluoro 790

Fluorescent dye for longer wavelength range

Calibration curve of fluorescent dye Alexa Fluoro 790 was created using one-drop measurement accessory SAF-851 whose minimum required sample volume is 5 uL. SAF-851 is suitable for measuring proteins after labeling the proteins by fluorescent dye.

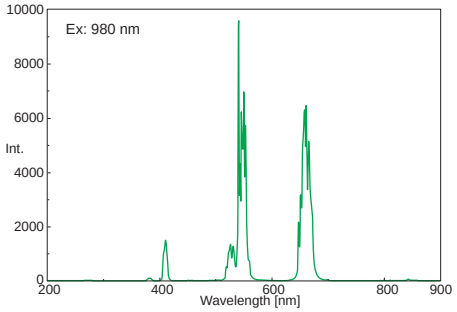
SAF-851
One-drop measurement unit



Calibration curve of Alexa Fluoro 790

Up-conversion phosphor measuring system

Generally, emission wavelength is longer than excitation wavelength, while up-conversion phosphors have the significant property such that its emission wavelength is shorter than excitation wavelength.
The emission spectrum of up-conversion phosphor was measured using the FP-8600 with dedicated accessory mounted with 980 nm NIR laser.
Besides the above, JASCO can provide many special measurement system to meet castomers' specific requirements, such as the system with NIR wavelength expansion up to 1400 nm for measuring carbon nanotubes.



Emission spectrum of up-conversion phosphor

Irradiation of 980 nm laser light to up-conversion phosphor

Human eyes could not detect the light of 980 nm, while when 980 nm laser is irradiated to up-conversion phosphor, the irradiated spot can be seen as green lightning. This phenomenon can be explained as the fluorescence light from up-conversion phosphor when it was excited by 980 nm laser light appears in 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 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

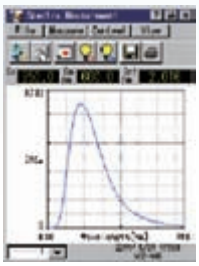
Easy data transfer to a PC

Print to a USB printer

Six standard measurement programs

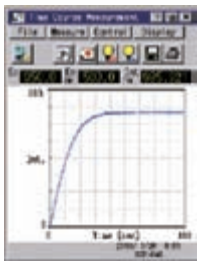
Programs for Spectra measurement, Time course measurement, Quantitative measurement, Fixed wavelength measurement, 3-D spectra measurement, and Abs measurement* are available.
Peak max. search function useful for searching the suitable measurement parameters is provided as one of measurement support functions.

● Spectra measurement program



The FP-8000 series spectrofluorometer allows to measure the five types of spectra, fluorescence emission spectrum, fluorescence excitation spectrum, fluorescence synchronous spectrum, emission single beam spectrum and excitation single beam spectrum.

● Time course measurement program



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

● Quantitative measurement program

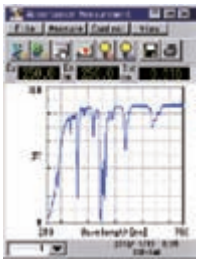
In the quantitative measurement, optimal parameters from two photometric modes, emission and excitation, and three quantitation methods, no base (1 wavelength), one-point base (2 wavelength) and two-point base (3 wavelength) can be selected depending on the application.

● Fixed wavelength measurement program

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

● Abs Measurement

The Absorbance measurement program allows to measure transmittance and absorbance spectrum by measuring the synchronous spectrum of sample while maintaining the difference between Ex and Em wavelength at 0 nm.

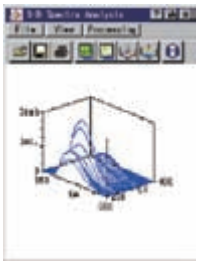


FUV-803

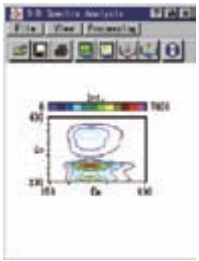
* FUV-803 Absorbance measurement cell block is separately required for the absorbance and transmittance measurements.

● 3-D spectra measurement program

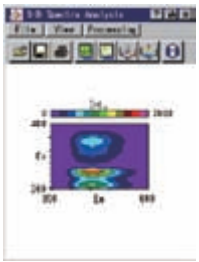
3-D spectra is very effective to figure out fluorescence characteristics of a sample. This function is provided as standard and enables to select display mode or display and save cross-section view.



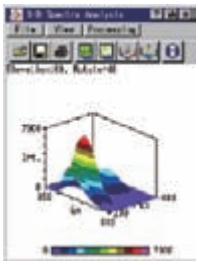
3-D spectra view



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

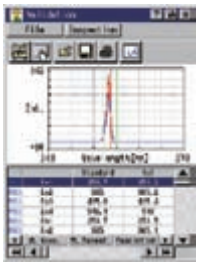
Each of measurement programs is equipped with convenient measurement support functions.
Sample spectra can be seen on the Preview screen in each of the measurement programs, and is convenient to confirm samples or measurement parameters for fixed wavelength or quantitative measurement.
Peak max. search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

*Jigs for inspection are separately required.

Validation

The validation program utilizes the inspection procedures in compliance with JIS (K 0120:2005) and JAIMAS (0004-2005). This program supports six inspection items such as wavelength accuracy, wavelength repeatability, resolution, stray light, sensitivity and photometric stability, and testing results can be saved and printed out.

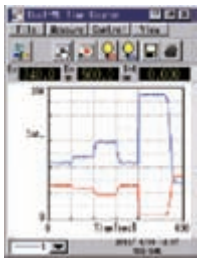
*Jigs for inspection are separately required.

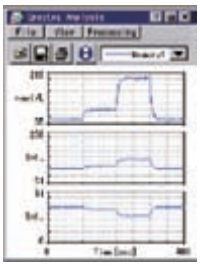


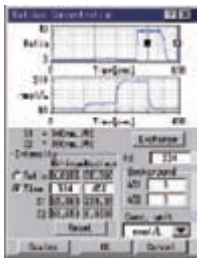
Optional programs for the iRM-900

FRTC-891 Dual-wavelength time course measurement program

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



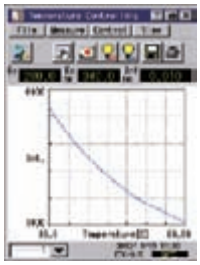




FRTP-892 Temperature control measurement program

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

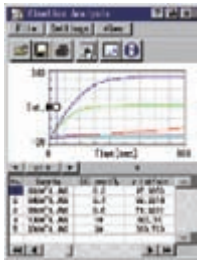
* Such accessories as ETC-814/ETC-815 water-cooled Peltier thermostatted cell holder or PCT-818 Water-cooled Peltier thermostatted 4-position automatic cell changer are separately required.

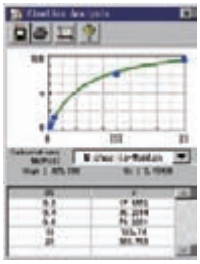


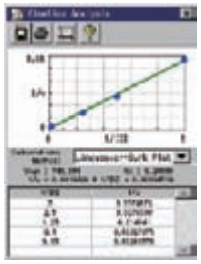
ETC-814

FRKN-893 Advanced kinetics analysis program

The FRKN-893 advanced kinetics analysis program enables time course measurement of sample, enzyme solution added with various concentration of substrate, plotting graphs and calculation of maximum reaction velocity (Vmax) and Michaelis Menten constant (Km). These programs can be used with cell changer accessories.



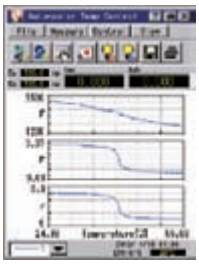




FRAP-894 Fluorescence polarization measurement program

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

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



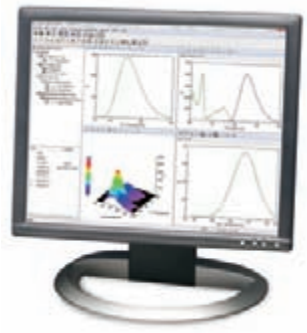
FDP-837 Automatic polarizer

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

Spectra Manager™ II and CFR Cross-p

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 four measurement programs, a spectra analysis program, an instrument validation program and the JASCO Canvas program as standard. It is possible to analyze data even 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.



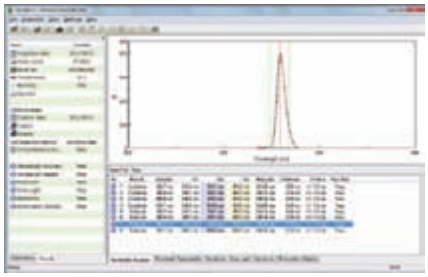
IQ Accessory and IQ Start

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

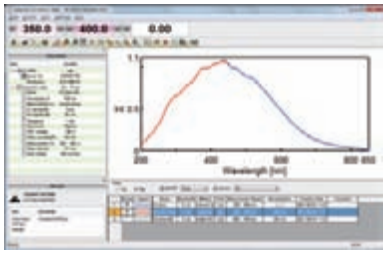
The validation program utilizes the inspection procedures in compliance with JIS (K 0120 2005) and JAIMAS (0004-2005). This program supports six inspection items such as wavelength accuracy, wavelength repeatability, resolution, stray light, sensitivity and photometric stability, and testing results can be saved and printed out.

* The FP-8200/8300 needs jigs for inspection separately as option.



Spectral correction

Spectral correction program which is required to compare measured spectral data obtained by different instruments or to determine quantum yield efficiency is available as standard for all of FP-8000 series main units.
Corrected spectra can be obtained immediately after measuring samples when the data for the spectral correction are measured and saved in advance.

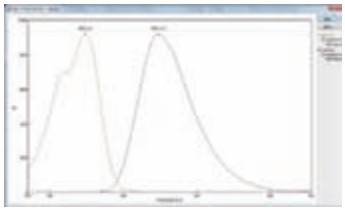


* The FP-8200/8300 needs jigs for inspection separately as option.

** Spectral correction except with Rhodamin B ethyl glycol solution needs jigs for inspection separately as option.

Measurement support functions

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

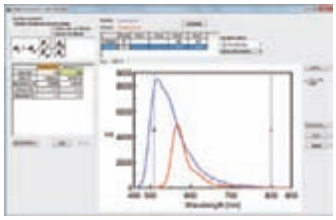


Peak max. search

Relative quantum yield

All the FP-8000 series models are equipped with relative quantum yield calculation program and Abs measurement program as standard, allowing to obtain relative quantum yield by each model.

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



Relative quantum yield calculation program inspection result

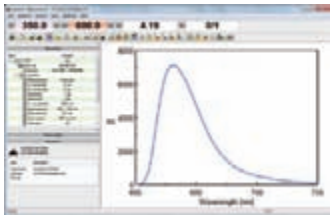
platform spectroscopy software package

Eight measurement programs

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

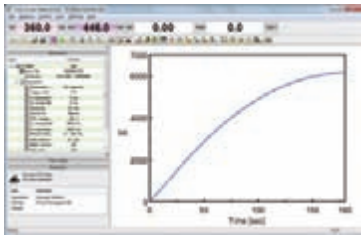
* Except for FP-8200

● Spectra measurement program



The spectra measurement program measures five types of spectra, emission spectra, excitation spectra, synchronous spectra, emission single beam spectra and excitation single beam spectra in two different measurement mode, fluorescence mode and phosphorescence mode.

● Time course measurement program

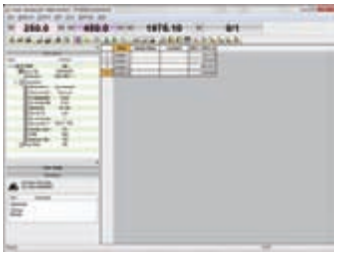


The time course measurement program is intended for measuring temporal changes of fluorescence/phosphorescence intensity of sample at fixed wavelength. For FP-8300 /8500/8600, up to 4,000 hours of continuous measurement can be performed with 0.05 mili seconds to 60 minutes interval in fluorescence mode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

● Quantitative measurement program

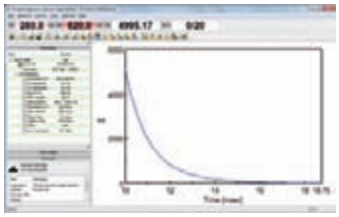
In the quantitative measurement, optical parameters from three photometric modes; fluorescence/phosphorescence and excitation, and three quantitation methods; no base (1 wavelength), one-point base (2 wavelength) and two-point base (3 wavelength) can be selected depending on the application. Such other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

● Fixed wavelength measurement program



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

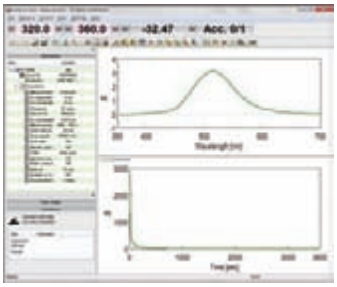
● Phosphorscence lifetime measurement program



The phosphorescence lifetime measurement program is intended for measurement of temporal changes of phosphorescence of a sample irradiated by Ex light after closing the Em shutter.

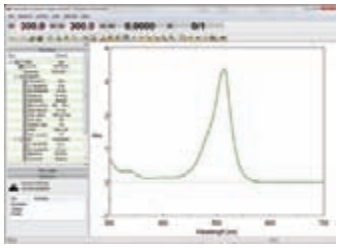
* Except for FP-8200

● Interval scan measurement program



The interval scan measurement program measures three types of spectra, fluorescence spectra, excitation spectra, synchronous spectra. It allows to display the results in 2-D and 3-D spectra as well as contour map and color-coded map.

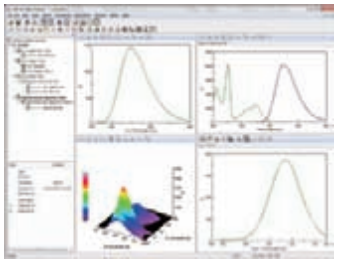
● Absorbance spectra measurement program



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

* FUV-803 Absorbance measurement cell block is separately required for the absorbance and transmittance measurements. The reflectance measurement is available for FP-8300/FP-8500/FP-8600 and also requires integrating sphere.

● 3-D spectra measurements



3-D spectral analysis

3-D spectra is very effective to figure out fluorescence characteristics of a sample.
Such displaying functions as Contour, Color 3-D, etc. are available for selection of desired display mode.
In addition, simultaneous display and saving of 2-D spectra and synchronous spectra as well as 3-D spectra can also be selected.

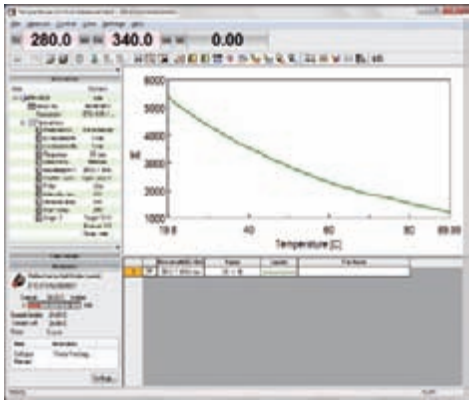
From data acquisition to data processing and analysis

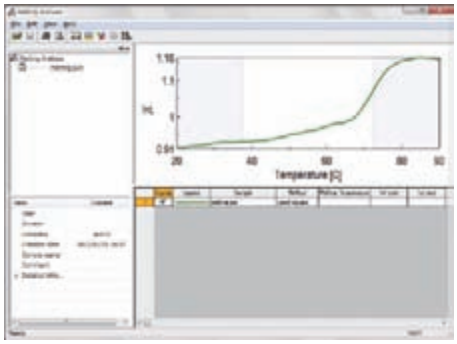
Optional Software Packages for Spe

FWTP-874 Temperature control measurement program

The FWTP-874 temperature control measurement program allows DNA or protein melting measurement and analysis. Melting temperature, Tm is calculated by the result of time course measurement during temperature change. This program can be used with cell changer accessories.

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



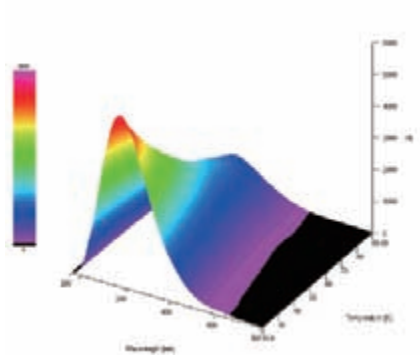


ETC-815

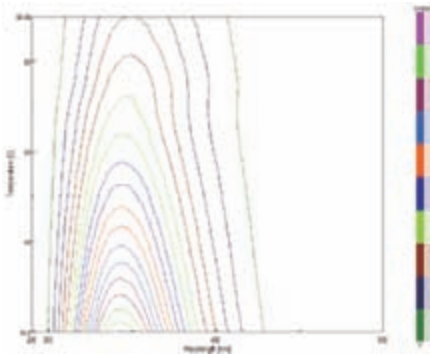
FWTS-872 Temperature interval scan measurement program

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

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



3-D spectral display

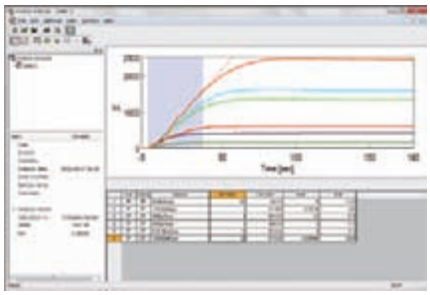


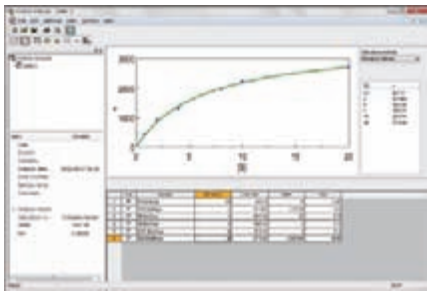
Contour map

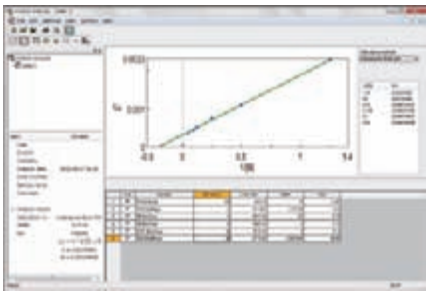
PCT-818

VWKN-772 Advanced kinetics analysis program

The VWKN-772 advanced kinetics analysis program enable time course measurement of sample, enzyme solution added with various concentration of substrate, plotting graphs and calculation of maximum reaction velocity (Vmax), Michaelis Menten constant (Km) and Hill constant (n). This program can be used with cell changer accessories.





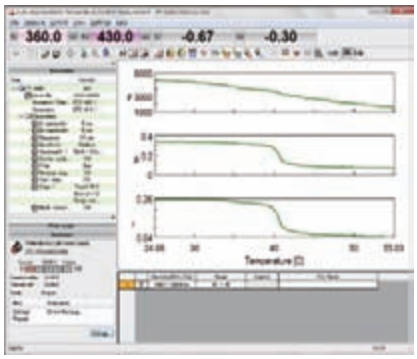


ctra Manager™ II

FWAP-875 Fluorescence polarization measurement program

By the FWAP-875 fluorescence polarization measurement program, total fluorescence intensity (F), fluorescence anisotropy (r) and degree of polarization (P) can be measured using FDP-837 automatic polarizer unit ,allowing auto-depolarization fixed wavelength measurement and auto-depolarization time course measurement.
Auto-depolarization temperature control measurement can also be offered by connecting with Peltier cell holder.
Auto-depolarization titration measurement is allowed by connecting with automatic titration unit.

* FDP-837 automatic polarizer unit is separately required.

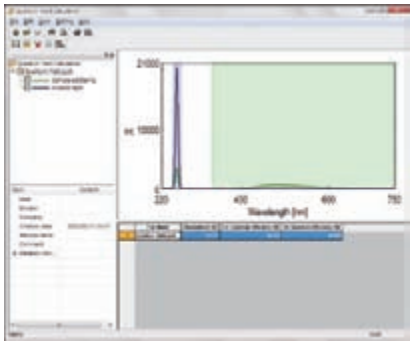


FDP-837

FWQE-880 Quantum yield calculation program

The FWQE-880 quantum yield calculation program calculates quantum yield which is the ratio of the number of photons emitted from the sample to the number of photons in the excited light absorbed using area of sample spectrum and spectrum of standard white plate.

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



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 ratio of fluorescence intensity at two wavelengths(Ex and Em sides). Calcium concentration calculation function in the program can calculate the change in concentration of 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 fluorescent sample color using desired light source when patters of the various light sources are pre-registered.

* Except for FP-8200.
** Such accessories as ISF-834 60 mm diameter integrating sphere, ESC-842 calibrated light source (WI) and WRE-362 PM tube for wavelength expansion are separately required. 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 display chromaticity diagram and calculation of correlated color temperature and color rendering index.

* Such accessories as ESC-842 Calibrated light source (WI) and WRE-362 PM tube for wavelength expansion are separately required.

VWMC-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 materal:	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 separately required.
** FMM-200 5mm Micro quartz cell is separately required.

SAF-850 One-drop measurement unit FP-8200
SAF-851 One-drop measurement unit FP-8300 FP-8500 FP-8600

The SAF-850/851 One-drop measurement Unit is a dedicated accessory for the FP-8000 series to measure micro-volume samples of protein and nucleic acid. The minimum sample volume is 5 uL 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 750 nm
Diffusion plate material:	Spectralon

FHM-804 High sensitivity measurement cell block

All models

The FHM-804 includes reflection mirror which enables to collect fluorescence light in order to improve light-usage efficiency.

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 decree incident angle cell block for rectangular cell

Specifications: All models

Compatible cells:	Rectangular cell, 10 × 10 mm, 1 pc.
Wavelength range:	220 to 750 nm
Diffusion plate material:	Spectralon

FUV-803

FSA-805

FHM-804

Constant temperature cell block/holders/changers

STR-811

STR-811

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 x 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 employs air-cooled Peltier system which does not need cooling water.
In-cell sensor enables to monitor the sample temperature.
The ETC-814/815 employs water-cooled Peltier system which covers wide temperature range.

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		
Heat radiating system:	Air-cooled	Water-cooled	
Stirring system:	Integrated variable speed magnetic stirrer		
Temperature setting range:	5 to 70 ºC	-10 to 110 ºC	
Temperature control range:	10 to 60 ºC (at 25 ºC)	0 to 100 ºC (at 25 ºC)	0 to 100 ºC (at 25 ºC)
Temperature control accuracy:	± 0.1 ºC (holder sensor)		
Temperature accuracy:	With cell holder sensor: ± 0.5 ºC (20 to 40 ºC), ± 1 ºC (other temp. range) With in-cell sensor: ± 0.2 ºC		
Standard accessory:	In-cell sensor		

PCT-818 Water-cooled peltier thermostatted 4-posiition automatic cell changer with stirrer

FP-8300 FP-8500 FP-8600 Purge

The PCT-818 employs water-cooled Peltier system which covers wide temperature range.
In-cell sensor enables to monitor the sample temperature.

Specifications:

Compatible cells:	Micro cell , 3 x 3 or 5 x 5 mm, rectangular cell, 10 x 10 mm, 1 pc.
Temperature control system:	Heating/cooling system utilizing Peltier effect
Heat radiating system:	Water-cooled
Stirring system:	Integrated variable speed magnetic stirrer
Temperature setting range:	-10 to 110 deg.C
Temperature control range:	0 to 90 deg.C (at 25 deg.C)
Temperature comtrol accuracy:	+/- 0.1 deg.C (holder sensor)
Temperature accuracy:	With cell holder sensor: +/- 0.5 deg.C (20 to 40 deg.C), +/- 1 deg.C (other temp. range) With in-cell sensor: +/- 0.2 deg.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 the cell holders with stirrer. Such as STR-811/812, EHC-813 and ETC-814/815.
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.

Option racks

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

QFS-821 Vacuum sipper

QFS-822 Vacuum sipper

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

SHP-819

SHP-820

Specifications:

Cell capacity:	120 µL
Cell material:	Synthetic quartz
Tubing material:	Teflon tube, etc.
Carruover:	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 tube, etc.
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

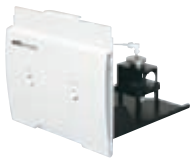
FSC-823 Micro flow cell holder

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-wells and 384-wells black microplate for fluorescence (SBS standard), 1pc.
Measurement time:	1 min./plate (96-wells, fixed wavelength measurement, specified condition)
Miminum sample requirement:	80 µL/well (96-wells 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 ºC

* 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 × 5 mm, rectangular cell, 10 × 10 mm, 1 pc.	
Compatible accessories:	STR-811, ETC-814	STR-812, EHC-813, ETC-815
Number of syringes:	2 pcs.	
Syringe volume:	1.0 mL	
Injection accuracy:	More than 99%	
Injection reproducibility:	Less than 1%	
Injection pitch:	0.1% of syringe volume	
Optional accessory:	0.1% of syringe volume	

* 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.	3 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		
Head radiating system:	–			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 sample, the FLH-809, film and solid sample, the FPA-810 is dedicated for powder sample measurement and can be used also for micro powder sample.

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:	Less than 10 mm	Less than 18 mm	–
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 excitation side of 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-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

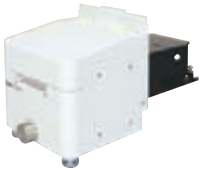
The ISF-834 is used for quantum efficiency measurement and color evaluation measurement of opaque solid or powder sample.

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-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 (D2)

* Spectra correction requires Rhodamine B Ethylene glycol solution.

ILF-835 100 mm dia. integrating sphere



FP-8300 FP-8500 FP-8600 PC Purge

The ILF-835 is used for quantum efficiency measurement of liquid sample and thin membrane sample on transparent substrate as well as opaque solid or powder sample.

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 (D2)

* Spectra correction requires Rhodamine B Ethylene glycol solution.

ILFC-847 Cooled 100 mm dia. integrating sphere

FP-8300 FP-8500 FP-8600 PC

The ILFC-847 enables quantum efficiency measurement of sample cooled by Liquid nitrogen. It also can be used under ambient temperature without dewar bottle.

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 (D2)

* Spectra correction requires Rhodamine B Ethylene glycol solution.

PMU-830 Liquid nitrogen cooling unit

FP-8300 FP-8500 FP-8600 PC

The PMU-830 allows to measure 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 allows to mount 10 mm rectangular cell inside of the integrating sphere.

● KBr plate sample holder

This holder accommodates sample powder sandwiched between two KBr plates (5 × 5 × 1 mm) used for micro IR measurement.

● 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:

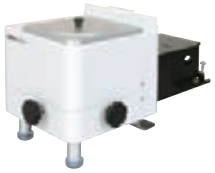
Minimum sample size:	5(H) × 5(W) × 1(T) mm
Maximum sample size:	18(H) × 10(W) × 3(T) mm

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 internal heater for temperature control through PC and enables to measure temperature variation of fluorescence intensity.

Specifications:

Temperature control system:	Heating system
Heat radiation system:	Water-cooled
Temperature control range:	Room temperature + 25 to 30 ºC (cooled water temperature at 25 ºC)
Temperatire 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 allows to measure sample located outside of sample compartment using optical fiber.

• Compatible 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 downward from the top and measure 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

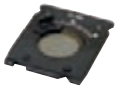
FSP-838 Depolarization plate

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

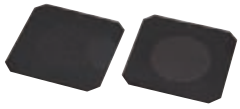
FST-470 Filter set

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 FP-8300/8500/8600 as standard.

Jigs

ESC-842 Calibrated WI light source

All models

The ESC-842 is used for spectral correction of emission optics.

• Correction wavelength range:
300 - 1010 nm

ESC-843 Calibrated D2 light source

All models PC

The ESC-843 is used for spectral correction of emission optics.

• Correction wavelength range:
200 - 400 nm

SID-844 Calibrated detector

All models PC

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

• Correction wavelength range:
200 - 900 nm

WRE-362 PM tube

FP-8300 FP-8500 FP-8600

PM tube for wavelength expansion.

* Expanded wavelength is described in the specification sheet.

VDK-840 Validation kit 1

All models

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

VDK-841 Validation kit 2

All models

The VDK-841 consists of corrected filters for stray light test.

Specifications

		FP-8200	FP-8300	FP-8500	FP-8600
Light source		Xe lamp with shielded lamp house, 150 W			
Light source (for validation):		Built-in low pressure mercury lamp			
Photometric system:		Ratio-photometer system using monochromatic light to monitor the intensity output of Xe lamp			
Monochromator:		Holographic concave grating in modified Rowland mount			
Wavelength range (Standard):	Ex:	Zero order, 200 - 730 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 of 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			
Output port:		USB 2.0			
Control and data processing:		Spectra Manager™ II/CFR, iRM		Spectra Manager™ II/CFR	
Spectral correction:		Option		Standard (Spectral correction except with Rhodamine B ethylene glycol solution needs jigs for inspection separately as option.)	
Dimensions:		490 (W) × 545 (D) × 270 (H) mm	520 (W) × 545 (D) × 270 (H) mm	500 (W) × 545 (D) × 200 (H) mm	
Weight:		33.6 kg	36 kg	39 kg	
Power requirement:		200V A			
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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