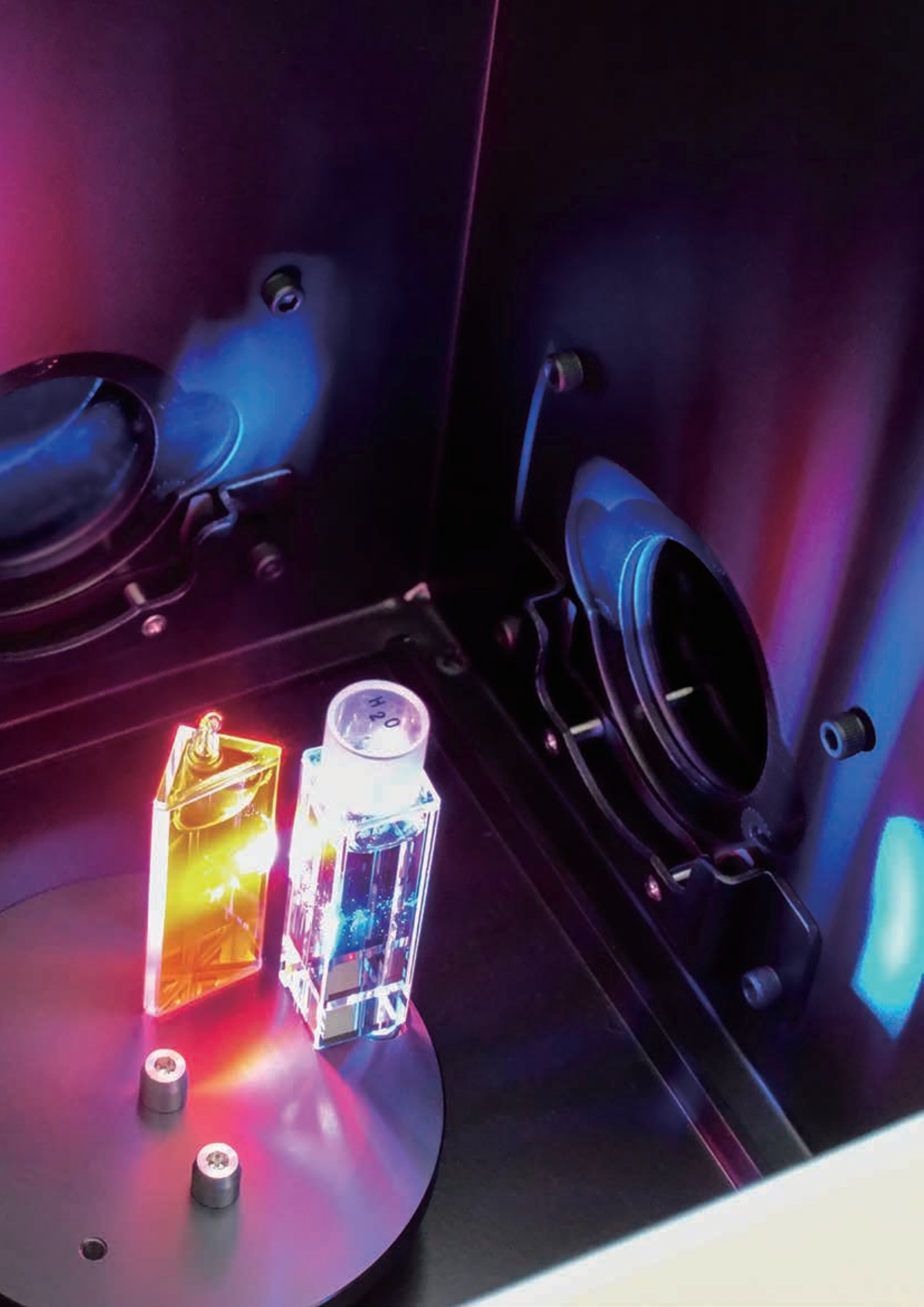
Spectrofluorometer

FP-8050 Series

JASCO

Performance
Innovation
Reliability


H2O

In 1967, JASCO launched the FP-1, which was the first in a long line of spectrofluorometers. The FP-8050 Series is the latest range of instruments developed to provide accurate measurements for bio- and material sciences, from a simple entry level model for fluorescence spectral measurements and sensitive quantitation to the advanced models developed for demanding research applications including spectral correction and quantum yields.

The FP-8050 Series includes the powerful cross-platform Spectra Manager™ suite of software.

Table of Contents

FP-8050 Series

The FP-8050 Series of spectrofluorometers includes four different instruments that provide solutions for the broadest range of applications including QC, biomolecular structural studies, environmental monitoring and advanced materials science. The FP-8050 Series has many flexible options for academic or industrial research, teaching, or use in quality control labs. Users can have the greatest confidence in their measurements, with an optical bench specifically designed for the highest sensitivity, widest dynamic range, and exceptional spectral purity with automatic cut-off filters to exclude higher order diffraction.

The FP-8050 Series combines a compact design with the largest range of accessories together with Spectra Manager™ Suite, a comprehensive data platform that gives you complete control over measurement, analysis and data archiving. In addition to the standard analysis programs, JASCO has developed many different applications software for dedicated sample measurement.

FP-8250

Simple and sensitive system which readily accommodates routine measurements and accessories, such as spectral scanning, quantitation, and temperature control.

FP-8350

Workhorse model offering the powerful combination of affordable performance, sensitivity and flexibility for most biological, environmental, and materials applications.

FP-8550

Sophisticated optical system offering the ultimate in sensitivity, spectral accuracy, and flexibility for the most challenging materials and biological samples.

FP-8650

Uniquely optimized for NIR applications with extended wavelength measurement to 1010 nm.

Advanced Features of the FP-8050 Series

- High-throughput optical system
- Highest S/N performance
- Wide dynamic range (up to 7 orders of magnitude)
- Auto Gain and Auto Sensitivity Control System
- Automatic cut-off filters for higher-order diffraction
- Advanced digital signal processing
- High-speed scanning
- Spectral bandwidth down to 1 nm
- Spectral Correction

Extensive Breadth of Features and Accessories

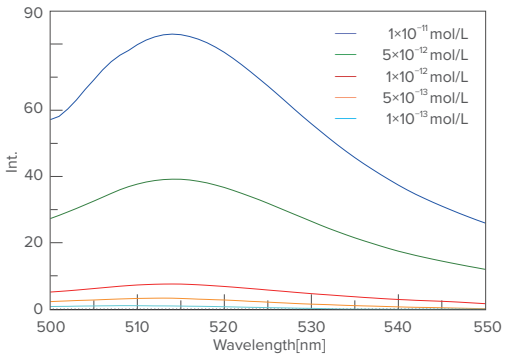
- Compact benchtop footprint
- Precision temperature control accessories for liquids and solids
- Polarizers allow for automatic anisotropy measurements
- Integrating spheres for Quantum Yield Determination
- Microplate Reader for rapid sample throughput
- Microsampling accessories for small volume samples
- Stopped-flow systems for monitoring fast kinetics
- Spectra Manager™ software for control and data analysis
- Flexible design for expanding capabilities as needs evolve

Versatility for a Wide Range of Applications

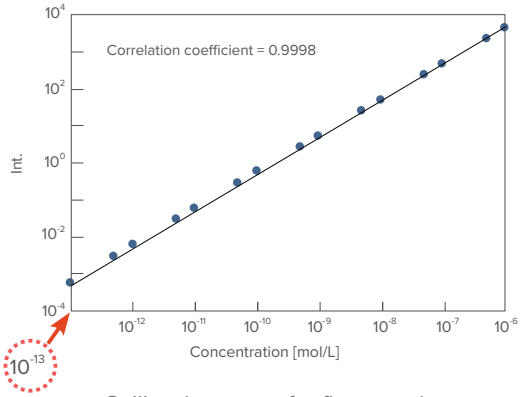
- Protein dynamics
- Quantitative analysis
- Cellular membrane studies
- Enzyme kinetics
- Water quality monitoring
- Quantum dot and probe design
- Carbon nanostructures and 2D materials
- Fluorescent tracking materials
- Short lifetime phosphorescence and PHOLEDs

Outstanding sensitivity and linear dynamic range

The high-throughput optical system and low noise signal processing of the FP-8050 Series results in a high signal-to-noise (S/N) performance up to 8,500:1* (RMS). In addition, the dynamic range of FP-8050 Series has been developed to provide up to 7 orders of magnitude. As shown in the calibration curve for fluorescein, there is excellent linearity even for samples at very low concentrations.



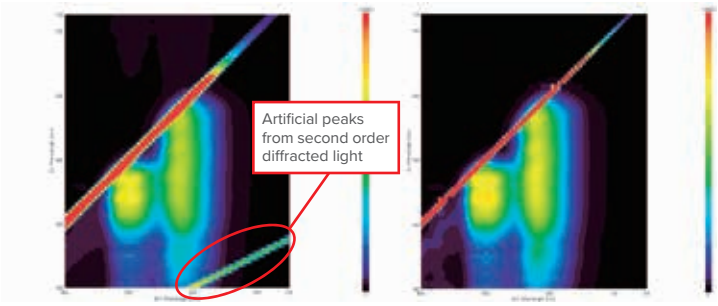
Fluorescein spectra for a range of concentrations



Calibration curve for fluorescein
(Auto Sensitivity Control System (SCS) ON)

Higher-order light cut-off filters

In order to remove peaks originating from higher-order diffracted light, cut-off filters appropriate to the measurement wavelength should be used. The models FP-8350, FP-8550, and FP-8650 include cut-off filters that are switched automatically as the wavelength range is set by the user.



Without Cut-Off Filter With Cut-Off Filter

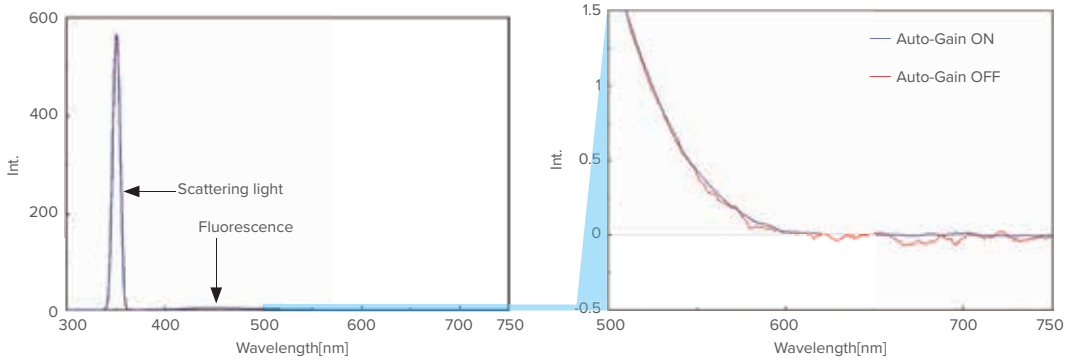
3D Spectra of Fluorescent Orange Color Plate

Accurate spectral correction

Spectral correction should be made to any fluorometer for the measurement of accurate and reliable spectral data. All models in the FP-8050 Series can be spectrally corrected using a simplified procedure. JASCO has a range of calibration standards for spectral correction, including standard light sources and Rhodamine B. These can be found on page 26.

Auto-adjustment of detector gain and sensitivity

The FP-8050 Series includes both Auto-Gain and Auto Sensitivity Control System (SCS), which automatically adjust the detector gain and sensitivity for optimum measurement. Auto-Gain automatically adjusts the gain of the signal from the detector so that the S/N is optimized throughout the entire scan range for spectral measurement, and weak fluorescence peak shapes can be observed against scattered light with a high S/N. The Auto-SCS allows the user to create calibration curves for a wide concentration range without having to manually change the instrument sensitivity settings.



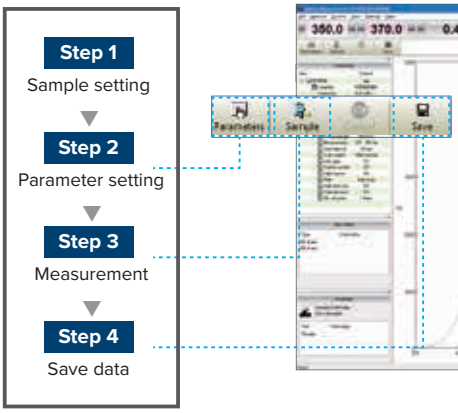
Fluorescence spectra of quinine sulfate solution

*Typical S/N for FP-8500 for water Raman, using on peak baseline noise.

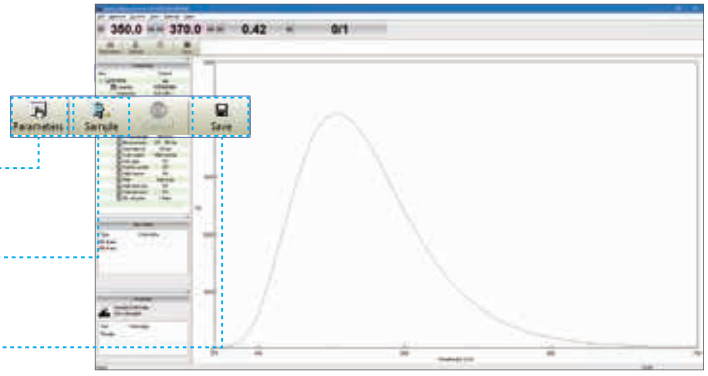
Convenience for routine operation

Tool buttons

A simple sequence of buttons guides the user through routine operation from measurement to saving data.



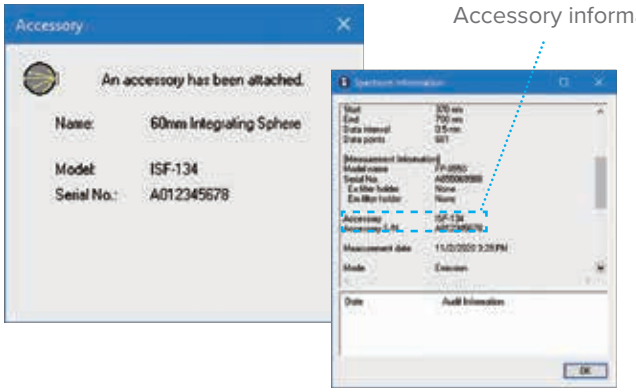
Operation procedure



[Spectra measurement] window

Automatic Accessory Recognition

Accessories are automatically recognized when installed in the instrument. Spectra Manager™ logs the accessory name and serial number; this information is saved in the data file for a complete record of the measurement.



Accessory information

Enhanced Measurement Functions

Saturation log (photometric value)

If the photometric value exceeds a set limit during measurement, it is recorded in the log file.

Simple parameters

In basic mode, the user can make measurements with minimal parameter settings for fast set-up and analysis.

Fluorescence Maxima search

Automatically finds the appropriate excitation and emission wavelengths.

Self-motion auto-zero

Ensures that the user performs an "auto-zero" prior to sample measurement for accurate data.

Automated shutter function (open/close)

Limits the exposure of the sample to light during measurement.

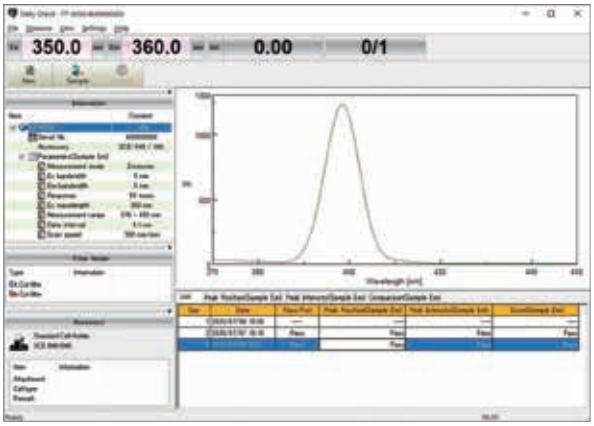
Daily monitoring of instrument performance

Validation program

The Validation program includes a full suite of tests to validate instrument performance. When executed, simple prompts guide the user on how to perform the tests. All instruments in the FP-8050 Series include a mercury lamp as standard for wavelength calibration.

Daily Check program

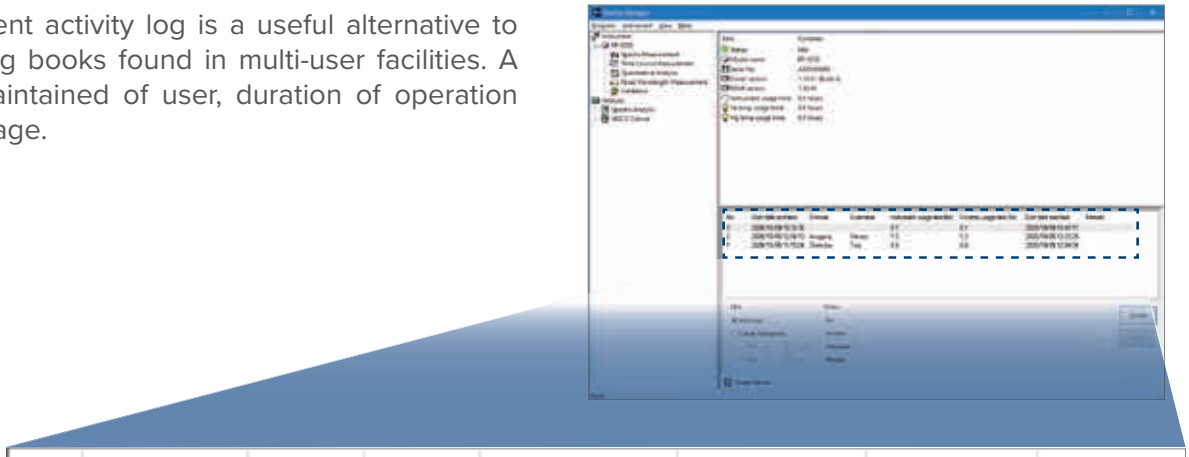
The Daily Check is a simple alternative to the Validation program; a less comprehensive performance check can be made at any time for continuous performance monitoring. After starting the Daily Check program, a timer is activated, and sample measurement is executed automatically after a predetermined stabilization time. The batch display lets the user check the cumulative data over a period of time.



Daily Check program

Instrument activity log

The instrument activity log is a useful alternative to the paper log books found in multi-user facilities. A record is maintained of user, duration of operation and lamp usage.



No.	Start date and time	Division	Username	Instrument usage time (hr)	Xe lamp usage time (hr)	End date and time	Remark
3	2020/10/09 10:33:36			0.1	0.1	2020/10/09 10:40:17	
2	2020/10/05 12:04:13	Inorganic	Steven	1.3	1.3	2020/10/05 13:22:29	
1	2020/10/05 11:15:04	Chem bio	Tina	0.8	0.8	2020/10/05 12:04:04	

Instrument usage record

Long-life light source

Continuous output xenon arc lamps offer the greatest sensitivity. For the longest and highest performance, the FP-8050 Series now includes a newly designed Xe arc lamp with prolonged lifetime. This new light source can be used up to 3x longer than previous lamps (maximum operating time: approximately 3000 hours), with long-term stable measurements, reduced maintenance and lower running costs.

Instrument Overview

FP-8250

A simple, robust solution for routine fluorescence measurements such as spectral scanning, temperature dependent measurement, and quantitation.

The FP-8250 is a user-friendly, general-purpose instrument that allows for measurement with a quick press of a start button on top of the instrument. The simplified, yet sensitive design includes everything that is required for routine fluorescence measurements in a quality-control or teaching lab. The standard Auto-Sensitivity Control System (Auto-SCS) and Auto-Gain features enable measurement over a wide range of concentrations using a single calibration method. The Spectra Manager™ Suite of spectroscopy software offers full system control, with easy-to-use tools for data processing and analysis.

- High sensitivity S/N > 4,500 (RMS, water Raman)
- High-speed scanning up to 20,000 nm/min
- Wavelength range: 200 to 750 nm

FP-8350

A workhorse system and the best choice for sensitivity and flexibility, providing solutions for a diverse range of applications with an unparalleled range of accessories.

The FP-8350 is a user friendly spectrofluorometer with a wide range of accessories that are well suited to biological research. The standard automatic cut-off filters eliminate artifact peaks due to second-order scatter, giving users confidence in their spectra data. Single and multi-cell Peltier accessories provide exceptional temperature control for thermal studies such as molecular conformation and folding. Automated broad wavelength polarizers can be used for a range of experiments including anisotropy for further insight into binding events. Rapid-kinetics and titration measurements can be automated with fully integrated stopped-flow and auto-titrator units. Solid samples can be measured with dedicated holders for powders, films, etc.

- High sensitivity S/N > 8,000 (RMS, water Raman)
- High resolution of 1.0 nm
- Wavelength range: 200 to 750 nm (900 nm optional)

FP-8550

Sophisticated optical system – ultimate performance with the highest sensitivity and spectral accuracy.

The FP-8550 is a powerfully sensitive spectrofluorometer with the broadest range of accessories, whatever the application: biological, environmental, materials science, teaching labs, and core facilities. It includes an optimized optical design for very low stray-light and enhanced spectral purity. Combined with the most thorough spectral correction, material engineers and researchers are assured of accurate measurements for the evaluation of advanced materials. The FP-8550 performs with the highest sensitivity* for fast measurement of samples with low level fluorescence, whether they are challenging biochemical systems or low quantum efficiency materials. The Auto-Gain and Auto-SCS functions optimize the S/N for samples with large differences in signal intensity and concentration offering a dynamic range up to 7 orders of magnitude. High-speed scanning of phosphorescent samples and 3D spectra enables fast acquisition of high-quality, high-density data.

- *High sensitivity S/N > 8,500 (RMS, water Raman)
- High-speed scanning up to 60,000 nm/min
- Wavelength range: 200 to 850 nm
- Validation accessory included as standard

FP-8650

For UV-visible to NIR applications.

The FP-8650 spectrofluorometer uses a uniquely red-sensitive PMT that extends the measurement range from the UV-Visible to the near infrared. Providing excitation wavelengths from 200 to 850 nm and emission detection up to 1010 nm, samples such as carbon nanotubes, porphyrins and other NIR markers can easily be measured. It is especially well-suited for monitoring NIR-labeled biologicals far away from background auto-fluorescence The compact instrument design incorporates high-speed scanning and automatic cut-off filters to exclude higher-order diffraction for fast, accurate acquisition of single spectra and EEMs (Excitation-Emission-Matrices).

- High sensitivity S/N > 3,500 (RMS, water Raman)
- High-speed scanning up to 120,000 nm/min Emission
- Wavelength range (Excitation): 200 to 850 nm
- Wavelength range (Emission): 200 to 980 nm (1010 nm optional)
- Validation accessory inculded as standard

Temperature Control

Single-Position Peltier Cell Holders

EHC-113 | Peltier-thermo Cell Holder (air)

ETC-115 | Peltier-thermo Cell Holder (water)

EHC-113

ETC-115

Specifications

Model	EHC-113	ETC-115
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 (20 °C water temperature)
Temperature Control Accuracy	±0.1 °C	
Temperature Accuracy	With cell holder sensor: ±0.5 °C (20 to 40 °C), ±1 °C (<20 °C and >40 °C) With in-cell sensor: ±0.2 °C	
Standard Accessory	In-cell sensor	

Multi-Position Peltier Cell Changer

PCT-118 | Peltier-thermo 4-position Automatic Cell Changer (water)

PCT-118

Specifications

Compatible Cells	Micro cell: 3 × 3 or 5 × 5 mm, Rectangular cell: 10 × 10 mm, 4 pcs
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 (20 °C water temperature)
Temperature Control Accuracy	±0.1 °C
Temperature Accuracy	With cell holder sensor: ±0.5 °C (20 to 40 °C), ±1 °C (<20 °C and >40 °C) With in-cell sensor: ±0.2 °C
Standard Accessory	In-cell sensor, 1 piece
Optional Accessory	In-cell sensor, 3 pieces set (factory option)

used with all FP-8050 Series **All Models**
used with FP-8250 **FP-8250**
used with FP-8350 **FP-8350**
used with FP-8550 **FP-8550**
used with FP-8650 **FP-8650**
purge is standard **Purge**

Constant Temperature Cell Holders/Changers

CTH-107 | Water-thermo Cell Block

STR-112 | Water-thermo Cell Holder with Stirrer

Specifications

Model Name	CTH-107	STR-112
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 °C	

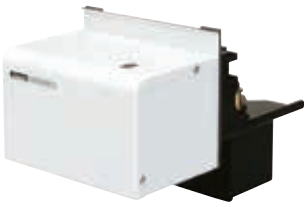
STR-112

FCT-117 | Water-thermo 8-position Automatic Turret Cell Changer

FCT-117S | Water-thermo 8-position Automatic Turret Cell Changer with Stirrer

Specifications

Model Name	FCT-117	FCT-117S
Compatible Cells	Micro cell: 3 × 3 or 5 × 5 mm, Rectangular cell: 10 × 10 mm, 8 pcs	
Temperature Control	Thermostatted water circulation	
Stirring System	-	Integrated variable speed magnetic stirrer
Operating Temperature	5 to 90 °C	



FCT-117

CSP-129 | Sample Compartment Lid with Pipette Port

Allows the addition of a reagent to the sample cell without opening and closing the sample compartment lid. It is recommended for use with cell holders that include an integrated stirrer, such as the STR-112, EHC-113 or ETC-115 cell holders.

Compatible syringe needle: 2 inches (50 mm)

**3 mm microcell cannot be used.*

CSP-129

Other Temperature Control Accessories

CTU-100 | Mini Water Circulation Bath

Specifications

Dimensions	170 (W) x 200 (H) x 311 (D) mm
Temperature Control Range	10 °C below ambient temperature to 40 °C (IN and OUT connected)
Temperature Sensor Accuracy	±0.2 °C (at 20 °C)
Bath Capacity	100 mL
Cooling/Heating Capacity	57 W

CTU-100

Sample Holders

Ambient Temperature Cell Holders

FUV-803 | Absorbance Measurement Cell Block

Specifications

Wavelength Range	220 to 900 nm; depending on configuration

FUV-803

FHM-804 | High Sensitivity Measurement Cell Block

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

FHM-804

FSA-805 | 30-Degree Incident Angle Cell Block for Triangle Cell

FSA-806 | 30-Degree Incident Angle Cell Block for Rectangular Cell

Specifications

Model	FHM-804	FUV-803	FSA-805	FSA-806
Compatible Cells	Micro cell: 3 × 3 or 5 × 5 mm, Rectangular cell: 10 × 10 mm	Rectangular cell: 10 × 10 mm	Triangular cell	Rectangular cell: 10 × 10 mm
Diffusion Plate Material		Spectralon		
Sensitivity	Max. 3x higher than standard cell holder (0.05 Abs. or less, 10 mm cell)			

FSA-805

Solid Sample Holders

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

FDA-808 | Solid Sample Holding Block

FLH-809 | Film Holding Block

FPA-810 | Powder Sample Cell Block

FP-1061
Powder Sample Cell

FDA-808

FLH-809

FPA-810

Specifications

Model		FDA-808	FLH-809	FPA-810
Incident Angle		30 degrees		
Solid Sample	Min sample size	25 (H) x 25 (W) mm	12 (H) x 12 (W) mm	–
	Max sample size	50 (H) x 50 (W) mm	50 (H) x 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

PSH-002/102/103 | 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

250BP30 | Optional Bandpass Filter

This bandpass filter can be mounted to the holder located on the excitation side of the solid sample block. The center wavelength is 250 nm, half bandwidth is 30 nm, with a 5 mm thickness and 25 mm cell size.

Microsampling

used with all FP-8050 Series **All Models**
used with FP-8250 **FP-8250**
used with FP-8350 **FP-8350**
used with FP-8550 **FP-8550**
used with FP-8650 **FP-8650**
purge is standard **Purge**

Micro cell Jackets and Micro cells

When sampling very small volumes, two microsampling accessories are available. The micro cell jacket and micro cell (FMH-857 and J/3-3.45/Q/3*) is a 3 × 3 mm cell designed for sample volumes as small as 50 µL. The FMH-802 and J/3-5.45/Q/5* is a 5 × 5 mm quartz cell with 400 µL volume with a stir bar and 500 µL without.

FMH-857 | **3 mm Micro Cell Jacket for J/3-3.45/Q/3***
3 mm Micro Quartz Cell

FMH-802 | **5 mm Micro Cell Jacket for J/3-5.45/Q/5***
5 mm Micro Quartz Cell

*FMH-857 with J/3-3.45/Q/3**

*FMH-802 with J/3-5.45/Q/5**

One-Drop Accessory

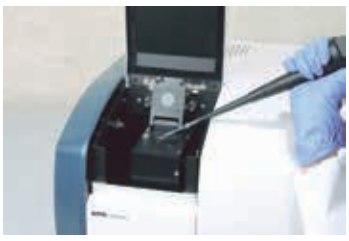
The SAF-151 One-Drop Measurementt Unit for the FP-8050 Series to measure micro-volume samples of protein and nucleic acids. The minimum sample volume is 5 µL for the 1 mm pathlength cell and measurement only takes 15 seconds.

SAF-151 | **One-Drop Measurement Unit**

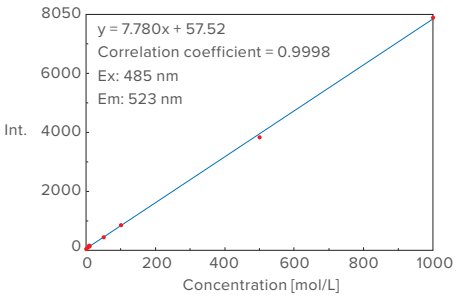
SAF-151

One-Drop Fluorescence Measurement

SAF-151 One-Drop Measurement Unit offers quantitative analysis or simple spectrum measurements requiring a minimum sample volume of 5 µL. Without using a rectangular cell, easy and accurate measurements can be obtained with only one drop of sample from a pipette.



One-Drop Measurement System



Calibration Curve of
λ DNA labeled with PicoGreen

*Manufactured by Starna.

Integrating Spheres and Phosphorescence

Phosphorescence data can be obtained using a variety of measurement programs such as Spectra Measurement, Quantitative Calibration and Analysis, Fixed Wavelength Measurement, Time Course Measurement, and Phosphorescence Lifetime Measurement.

ISF-134 | 60 mm dia. Integrating Sphere

Used for quantum efficiency measurements and color evaluation measurements of opaque solid or powder samples.

ISF-134

ILF-135 | 120 mm dia. Integrating Sphere

Used for quantum efficiency measurements of liquids or thin membrane samples on a transparent substrate as well as opaque solid or powder samples.

ILFC-147 | LN_2 Cooled 120 mm dia. Integrating Sphere

Used for quantum efficiency measurement of samples cooled with liquid nitrogen. It can also be used at ambient temperatures without liquid nitrogen.

Specifications

Model Name	ISF-134	ILF-135	ILFC-147
Inner Diameter	60 mm	120 mm	120 mm
Minimum Sample Size	20 (H) x 20 (W) x 0.5 (T) mm	20 (H) x 10 (W) x 0.5 (T) mm	20 (H) x 10 (W) x 0.5 (T) mm
Maximum Sample Size	60 (H) x 50 (W) x 25 (T) mm	30 (H) x 20 (W) x 6 (T) mm	30 (H) x 20 (W) x 6 (T) mm
Cells	PSH-004 (standard), PSH-002, PSH-003, PSH-005 (optional)	1, 2 mm liquid cell, 3 mm powder cell, 10 mm rectangular cell, KBr plate sample holder	1, 2 mm liquid cell, 3 mm powder cell, 10 mm rectangular cell, KBr plate sample holder, LPH-140, PPH-150, CPH-160
Optional Spectral Correction Accessories	ESC-142, ESC-143		

PMU-130 | Liquid Nitrogen Cooling Unit

Used to measure samples cooled with liquid nitrogen.

Specifications

Cooling Temperature	77 K (-196°C)
Optional Cells	LPH-140, PPH-150, CPH-160

PMU-130

used with all FP-8050 Series **All Models**
used with FP-8250 **FP-8250**
used with FP-8350 **FP-8350**
used with FP-8550 **FP-8550**
used with FP-8650 **FP-8650**
purge is standard **Purge**

Cells for ISF-134

PSH-002

PSH-004 | Powder Sample Cell
(Cell Size: ϕ 12 mm, Thickness: 0.5 to 4 mm)

PSH-003 | Small Quantity Powder Sample Cell
(Cell Size: ϕ 5 mm, Thickness: 0.5 to 4 mm)

PSH-002 | Powder Sample Cell
(Cell Size: ϕ 16 mm, Thickness: 0.5 to 4 mm)

PSH-005 | Powder Sample Cell
(Cell Size: ϕ 8 mm, Thickness: 0.5 to 4 mm)

Cells for IILF-135/ILFC-147

1 mm liquid cell

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

2 mm liquid cell

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

3 mm powder cell

Cell size: 19 (H) x 10 (W) x 3 (T) mm

10 mm Rectangular Cell Holder

Used to mount a 10 x 10 mm rectangular cell inside the ILF-135/ILFC-147 integrating spheres.

KBr Plate Sample Holder

Used to sandwich a powder sample between two KBr plates (5 × 5 × 1 mm).

Cells for ILFC-147/PMU-130

LPH-140 | Phosphorescence Measurement Cell Kit for Liquid Sample

Tube Size: 5 mm O.D. x 178 mm
Tubing Material: Synthetic quartz

PPH-150 | Phosphorescence Measurement Cell Kit for Powder Sample

Cell Size: ϕ 7 mm x 0.5 or 1 mm

CPH-160 | Phosphorescence Measurement Cell Kit for Solid Sample

Min. Sample Size: 5 (H) x 5 (W) x 1 (T) mm
Max. Sample Size: 18 (H) x 10 (W) x 3 (T) mm

Fluorescence Polarization Anisotropy

Fluorescence anisotropy occurs when a fluorophore emits different intensities of light dependent on the polarization angle of the incident light. Fluorescence anisotropy can be used to probe the structural flexibility of a fluorophore, which cannot be obtained by fluorescence spectroscopy alone.

Polarizer/Filter Accessories

FDP-837 | Automatic Polarizer
Wavelength range: 220 to 700 mm

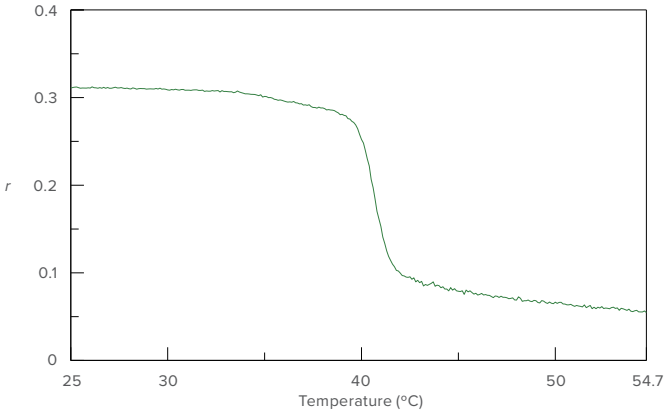
FSP-838 | Depolarization Plate
Wavelength range: 200 to 900 mm

FDP-223 / FDP-243 | Polarizer and Analyzer Accessory
FDP-223 (for UV-Vis)
- Wavelength range: 220 to 700 nm

FDP-243 (for Visible)
- Wavelength range: 400 to 700 nm

Example of Anisotropy Measurement

A fluorescent dye (DPH) was added to a lipid bilayer and the degree of polarization was measured as a function of temperature, as well as the fluorescence intensity and anisotropy. The data obtained can be used to elucidate binding properties and phase transitions induced through vesicle interactions and the heat of temperature changes.



Fluorescence anisotropy at each temperature (DPH interacting with liposome)

All Models used with all FP-8050 Series
FP-8250 used with FP-8250
FP-8350 used with FP-8350
FP-8550 used with FP-8550
FP-8650 used with FP-8650
Purge purge is standard

OBF-132 | Optical Fiber Unit

Used to measure a sample located outside the sample compartment using optical fiber probe.

OBF-132

EFA-133 | Epi-Fluorescence Unit

Used to irradiate a sample facing downward on the top of the accessory and to measure the samples epifluorescence. The minimum incident beam size is 1 x 1.5 mm with a 45° incident angle.

EFA-133

HPC-136 | High Temperature Powder Cell Unit

An internal heater provides temperature control for measuring the effects of temperature variation on the sample fluorescence intensity.

Specifications

Temp Control System	Heating system
Heat Radiation System	Water-cooled
Temp Control Range	Room temperature + 25 to 300°C (cooled water temperature at 25°C)
Temp Stability	±1 °C
Standard Cell	Powder cell A, ϕ 20 mm x 1 mm Powder cell B, ϕ 20 mm x 0.5 mm

HPC-136

CSH-131 | Cryostat Holder

Used with either the Optistat DN or DN-V by Oxford instruments.

CSH-131

Autosampling

Autosampling Systems

The autosampler system obtains automated measurement by combining an autosampler, syringe pump or sipper, and flow cell unit. Up to 192 liquid samples can be measured on all FP-8050 models, however, there are various rack options that can be used with either test tubes and/or vials. The system allows for automated scanning measurements at predetermined parameters using a flow cell. The PC control Spectra Manager™ software is included as standard.

ASU-800 | Autosampler Unit

Optional sample racks (must be specified)

Rack	Compatible Test Tube and Vial	Max. Number of Samples
SRA-811 15 mm O.D. Test Tube	15 mm (O.D.) ×105 mm (H), 10 mL	100
SRA-812 13 mm O.D. Test Tube	13 mm (O.D.) × 100 mm (H), 7 mL	100
SRA-813 12 mm O.D. Test Tube	12 mm (O.D.) × 105 mm (H), 5 mL	150
ISRA-814 10 mm O.D. Test Tube	10 mm (O.D.) × 90 mm (H), 3 mL	150
SRA-818 Vial	Screw top vial, 2 mL	120
SRA-816 Microplate	96-well microplate, 250 µL	192
SPA-817 Constant Temperature Microplate	96-well amplification plate, 250 µL	192

ASP-849

ASP-849 | Syringe Pump

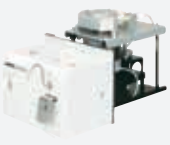
Can be used in conjunction with ASU-800 and FSC-124 micro flow cell holder. The ASP-849 can be used with syringe volumes of 1.0, 2.5, 5.0, and 10.0 mL and has a reproducible volume delivery within ±1 %.

QFS-122

QFS-122 | Vacuum Sipper

Specifications

Cell Capacity	120 µL
Cell Material	Synthetic quartz
Tubing Material	Teflon, SUS
Carryover	Less than 2 %
Min. Sample Requirement	700 µL



SHP-120

SHP-120 | Peristaltic Sipper

Specifications

Cell Capacity	15 µL
Cell Material	Synthetic quartz
Tubing Material	PharMedTeflon, SUS
Carryover	Less than 2 %
Min Sample Requirement	700 µL

AWU-820 | Washing Unit

Optional washing unit for use with QFS-122 and SHP-120.

FSC-124

Flow Cell Holders

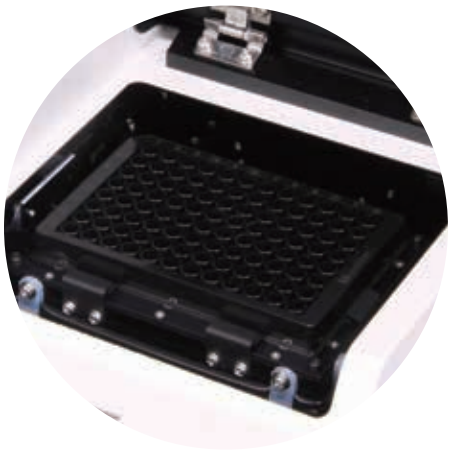
FSC-124 | Micro Flow Cell Holder

15, 30, and 100 µL flow cell blocks are available.

Microplate Reader

Microplate Reader

The FMP-125 Microplate reader can be used with the FP-8350, FP-8550 and FP-8650. Four standard measurements are available including Spectra Measurement, Quantitative Analysis, Time Course, and Fixed Wavelength. Quantitative Analysis can be used to create a calibration curve, as well as measure unknown samples in a single microplate while the Time Course Measurement software can be used to measure parallel kinetics for multiple samples.



FMP-125 | Microplate Reader

Specifications

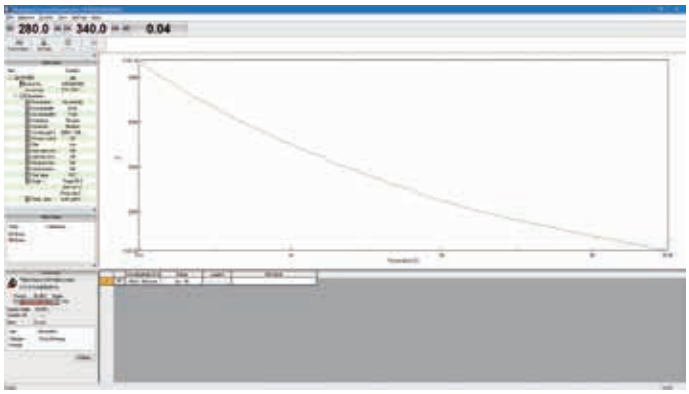
Compatible Plate	96-well and 384-well black microplate for fluorescence (SBS standard), 1 pc.
Measurement Time	1 min./plate (96-wells, fixed wavelength measurement, specified condition)
Min Sample Requirement	80 µL/well (96-well microplate)
Photometric Reproducibility	±3 %
Optional Accessories	Constant temperature microplate holder
Temperature Control System	Heating system (Option)
Temperature Control Range	Room temperature +10 to 50 °C (Option)

All Models used with all FP-8050 Series
FP-8250 used with FP-8250
FP-8350 used with FP-8350
FP-8550 used with FP-8550
FP-8650 used with FP-8650
Purge purge is standard

Spectra Manager™ Software Suite

Instrument Control

Drivers are included to control each spectroscopy instrument and parameter dialogs allow easy editing of pre-saved parameter files. Data acquired from each instrument is automatically loaded into the analysis program to free up the PC and control software to acquire more data during post-acquisition processing. Each instrument driver also has its own dedicated application for instrument hardware diagnostics and validation.

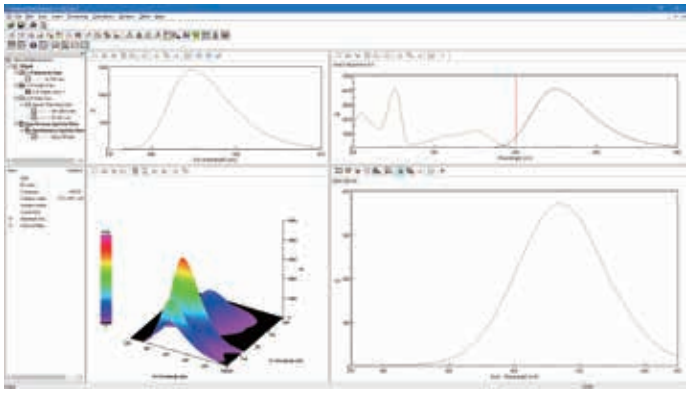


Flexible Display Features

User-friendly features include overlay printing in colors and patterns, autoscale mode, and style and font, as well as customized toolbars.

Data Processing and Spectral Analysis

View and process several types of measurement data files (UV/Vis/NIR, FTIR, Raman, Fluorescence, CD) in a single window, using a full range of data processing functions. Features include arithmetic operations, derivatives, peak detection and processing, smoothing, and baseline correction.

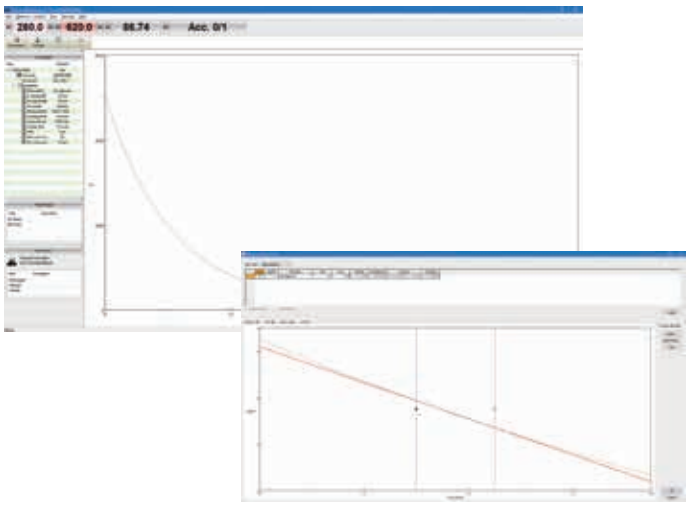


Report Publishing

JASCO Canvas allows users to create layout templates of spectral data and results to meet individual reporting requirements.

Macro Command Option

This software can be used to develop user-designed application programs for individual experimental set-up and routine measurements, including instrument control, data acquisition, post-acquisition data processing and reporting.

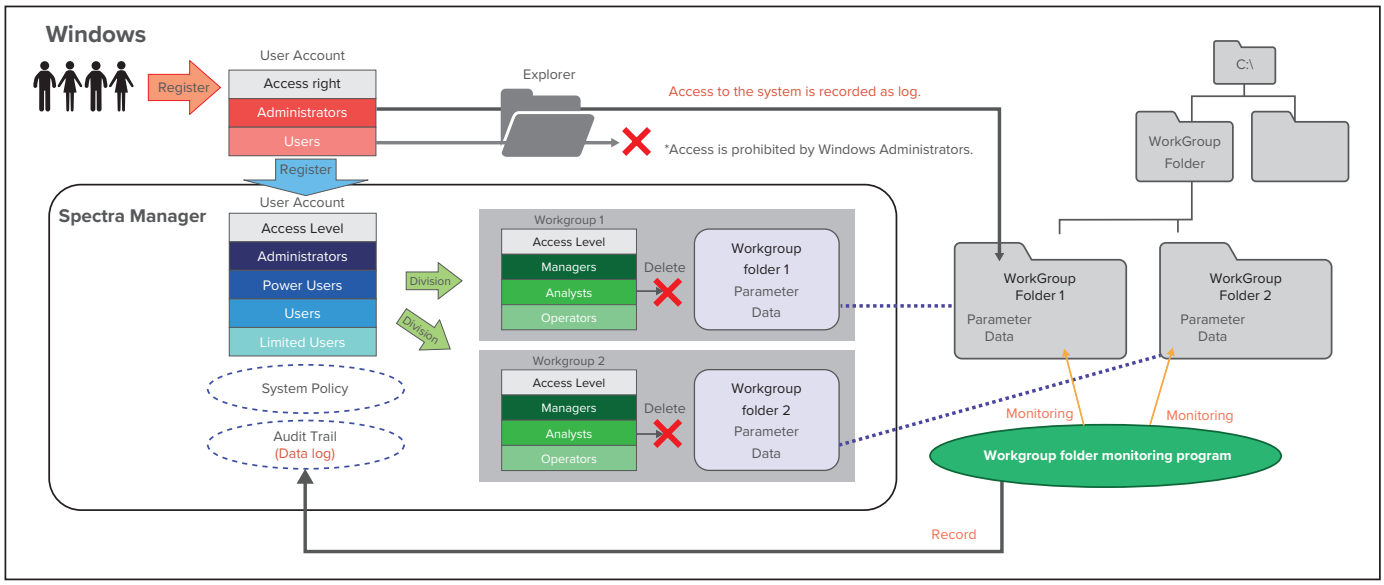


Secure Access with Spectra Manager™ CFR

Spectra Manager CFR provides secure access and compliance with 21 CFR Part 11. System access requires a username and password, which are assigned by the Workgroup Manager. Individual levels determine the access to administrative tools that include instrument and analysis application installation, user and workgroup setup, security policies, as well as system and application history logs. Three levels of electronic signatures are required, including creation, review, and approval stages. An audit trail is assigned to every data file, recording any spectral data processing.

Regulatory Compliance with Spectra Manager CFR™

JASCO Spectra Manager is designed and developed under ALCOA+ and is a total solution platform to create accurate and complete data.



Data Integrity

User Management

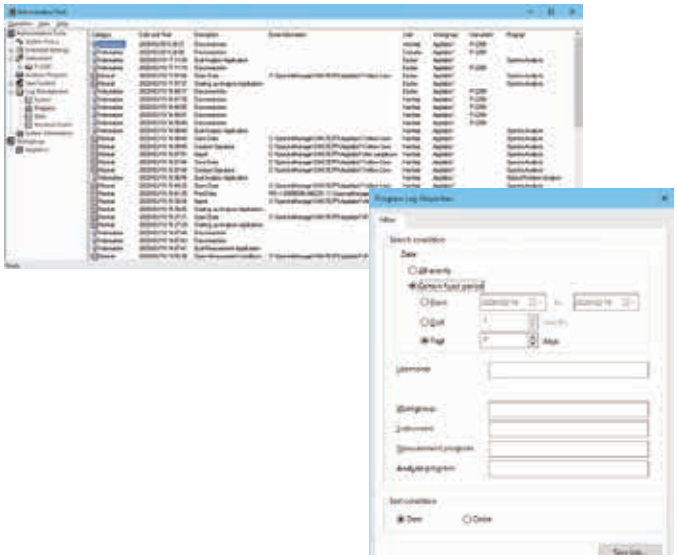
Based on the dual security category ([Access Level] and [Work Group]), it is possible to manage different authorization process in flexible and independent as total analysis systems, instrumentations and analytical applications.

User Account Security

Based on functions to prevent duplicate account or to protect password, and to prevent unauthorized access, administrative authorizations as system access and electric signature etc., can be managed strictly.

Enduring Electronic Record

Based on prohibiting function to delete electronic record and to overwrite save, and also functions for backup and restore data, electronic records can be saved properly and can be searched accurately during the data lifecycle.



Audit Trail

It is categorized as 3 different records (system log, application log and data log), and it is recorded. Each log can be filtered and displayed under recorded date, user name etc, and it can be exported for audit trail review.

Computerized System Validation

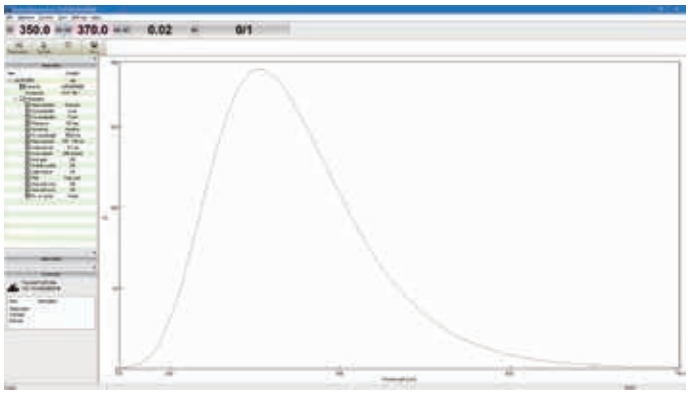
Spectra Manager CFR is developed and manufactured properly under quality control system adapted ISO 9001, and adapted CSV standard.

Standard Measurement Programs

Spectra Measurement

The FP-8050 Series spectrofluorometer can measure five different types of spectra: emission, excitation, synchronous, single-beam emission and single-beam excitation in both fluorescence and phosphorescence* modes.

**Excludes FP-8250.*

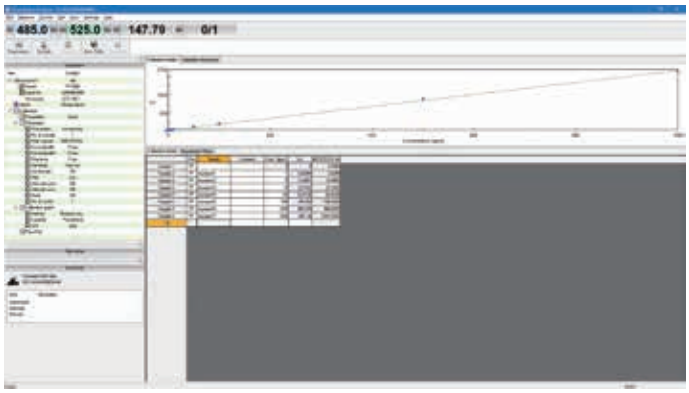


Time Course Measurement

The Time Course Measurement program is used for measuring temporal changes of fluorescence intensity at a fixed wavelength. Up to 100,000 hours (FP-8350/8550/8650) and 1,667 hours (FP-8250) of continuous measurements can be performed using a 60 minute and 60 second interval, respectively.

Quantitative Analysis

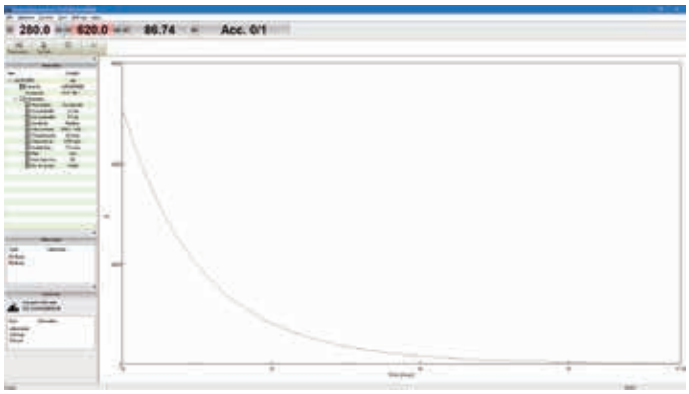
In the Quantitative Analysis software, optimal parameters from two photometric modes, emission and excitation, and three quantitation methods, no base (1 wavelength), one-point base (2 wavelengths) and two-point base (3 wavelengths) can be selected depending on the application. Other quantitative calibration curve methods such as log or spline functions are also available.



Phosphorescence Lifetime Measurement

Measures changes in the phosphorescence of a sample briefly irradiated by the excitation source.

**Excludes FP-8250.*

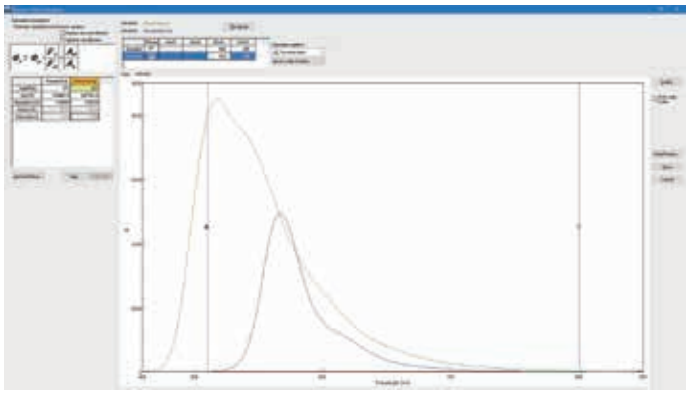


Interval Scan Measurement

Measures up to three spectra (fluorescence, excitation, and synchronous) and displays the results as either 2D or 3D spectra, as well as contour or color-coded plots.

Fixed Wavelength Measurement

This program can be used to measure a sample's fluorescence or phosphorescence intensity at fixed excitation and emission wavelengths for up to four wavelengths.



Relative Quantum Yield

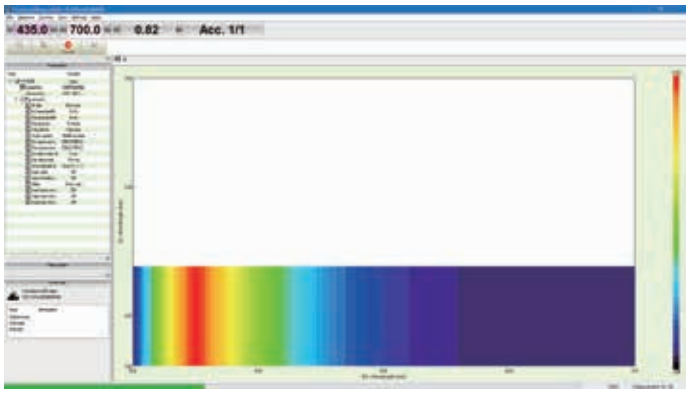
All models in the FP-8050 Series include a relative quantum yield calculation program as standard.

Absorbance Spectra Measurement

Obtain the transmittance, absorbance, or reflectance spectrum by measuring the synchronous spectrum of a sample. The optional FUV-803 Absorbance measurement cell block is required for absorbance and transmittance measurements while reflectance measurements require an integrating sphere.

3D Measurements

Allows for the simultaneous display of several different sets of data, including 2D, 3D, and synchronous spectra. The 3D plots can be viewed in Contour, Color 3D, and Color-mapping.



Spectral Correction

Allows users to easily compare measured spectral data from several instruments as well as determine the quantum yield efficiency. Corrected spectra can be obtained immediately after the measurement is completed. The FP-8250/8350 require optional jigs for spectral correction. A Rhodamine B ethylene glycol solution is also included as a standard and additional sources for correction can be obtained separately.

Validation

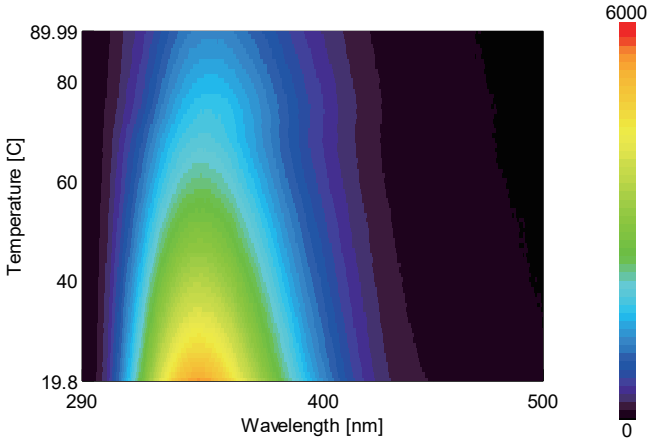
The validation program includes instrument test procedures in compliance with JIS (K 0120 2005) and JAIMAS (0004-2005). This program provides six performance tests including wavelength accuracy, wavelength repeatability, resolution, stray light, sensitivity, and photometric stability. The test results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

Optional Software

Measurement Programs - From Data Acquisition to Data Processing and Analysis

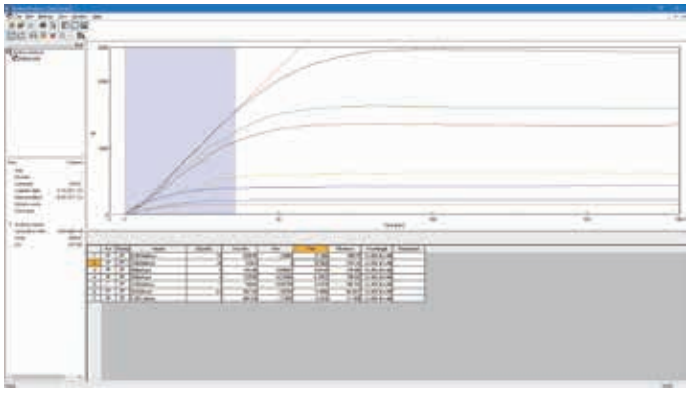
FWTP-174 | Temperature Control Measurement

This program can be used to evaluate the melting temperatures of biological samples. The melting temperature, T_m, is calculated from the results of a time course measurement during a temperature change. The ETC-115 single position or PCT-118 Water-cooled Peltier thermostatted 4-position cell holders are required for use.



FWTS-172 | Temperature Interval Scan Measurement

This program is used to acquire excitation and emission spectra at a defined temperature interval with a temperature controlled accessory such as the ETC-115 single position or PCT-118 Water-cooled Peltier thermostatted 4-position cell holders.



VWKN-772 | Advanced Kinetics Analysis

This program obtains a time course kinetic measurement and plots the data in various graphs, as well as calculates the maximum reaction velocity (V_{max}), Michaelis-Menten constant (K_m), and Hill constant (n). It can be used with automated cell holders.

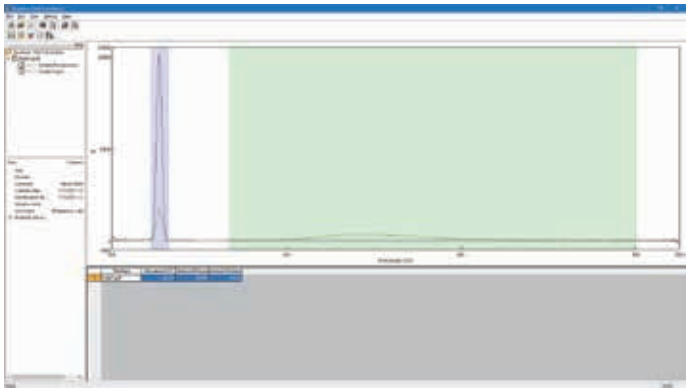
FWAP-175 | Fluorescence Polarization Measurement

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.

FWQE-880 | Quantum Yield Calculation

Calculates the quantum yield of a sample with the use of an integrating sphere as well as the ESC-142 calibrated light source (WI)

**Excludes the FP-8250/8350.*



FWTC-173 | Dual-Wavelength Time Course Measurement

Enables time course measurements of the ratio of fluorescence intensities at two different wavelengths for either the excitation or emission. The calcium concentration calculation function in the program can also calculate the change in concentration of an intracellular ion.

FWFC-178 | Fluorescent Object Color Measurement

Enables evaluation of fluorescent sample color (fluorescent objective color) using the ISF-134 60 mm diameter integrating sphere and ESC-142 calibrated light source (WI). This program calculates the fluorescent sample color using a desired light source when the spectra of the various light sources are pre-registered. Spectral measurements are required in the range wider than 300 - 780 nm for excitation and 380 - 780 nm for emission.

**Excludes the FP-8250/8350.*

FWLU-179 | Luminous Color Measurement

Obtains the luminescence or emission spectra of light emitting samples using ESC-142 Calibrated light source (WI). Data analysis includes a colored chromaticity diagram and calculation of the correlated color temperature and color rendering index.

FWMC-183 | Macro Command

Executes a sequence of pre-programmed operations automatically, including parameter setting, measurements, analysis and printing.

Validation and Accessory Kits

ESC-142 | JASCO Calibrated Light Source WI
The ESC-142 is used for spectral correction of the emission optical system from 300 to 1010 nm.

ESC-143 | JASCO Calibrated Light Source D_2
The ESC-143 is used for spectral correction of the emission optical system from 200 to 400 nm.

SID-144 | JASCO Calibrated Detector
The SID-144 is used for spectral correction of the excitation optics from 200 to 900 nm.

VDK-840 | Validation Kit 1
The VDK-840 is used for spectral correction of the excitation optics and for the stray light instrument validation test from 200 to 600 nm.

VDK-841 | Validation Kit 2
The VDK-841 consists of correction filters for the stray light instrument validation test.

WRE-362 | PM Tube

WRE-165 | PM Tube
PM Tube for wavelength expansion.

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

All Models used with all FP-8050 Series
FP-8250 used with FP-8250
FP-8350 used with FP-8350
FP-8550 used with FP-8550
FP-8650 used with FP-8650
Purge purge is standard

Specifications

Model		FP-8250	FP-8350	FP-8550	FP-8650
Light Source		Xe lamp with shielded lamp house, 150 W (Long-life type)			
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	Zero order, 200 - 850 nm
	Em				Zero order, 200 - 980 nm
Wavelength Range (Optional)	Ex	-	Zero order, 200 - 900 nm	-	-
	Em				Zero order, 200 - 1010 nm
Automatic Cut-Off Filter for High-Order Diffraction Light		-	Standard		
Sensitivity (RMS)*		4,500:1	8,000:1	8,500:1	3,500:1
Resolution	Ex	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	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	±1.5 nm		±1.0 nm (±0.3 nm at 546.1 nm)	±1.0 nm (±0.3 nm at 546.1 nm)
	Em				±2.0 nm (±0.3 nm at 546.1 nm)
Wavelength Repeatability		±1.0 nm		±0.3 nm	
Wavelength Scan Speed	Ex	20, 50, 100, 200, 500, 1,000, 2,000, 5,000, 10,000, 20,000 nm/min		10, 20, 50, 100, 200, 500, 1,000, 2,000, 5,000, 10,000, 20,000, 60,000 nm/min	10, 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		10, 20, 50, 100, 200, 500 msec, 1, 2, 4, 8 sec			
Detector		Ex: Silicon photodiode, Em: PMT			
Photometric Range		-10,000 - 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			
Instrument Communication		USB 2.0			
Control and Data Processing		Spectra Manager™ Ver.2.5/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		520 (W) x 545 (D) x 270 (H) mm		570 (W) x 545 (D) x 270 (H) mm	
Weight		36 kg		39 kg	
Power Requirement		290VA		320 VA	
Installation Environment		Temperature: 15 to 30°C, Humidity: Less than 85%			

* Typical specification.

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