

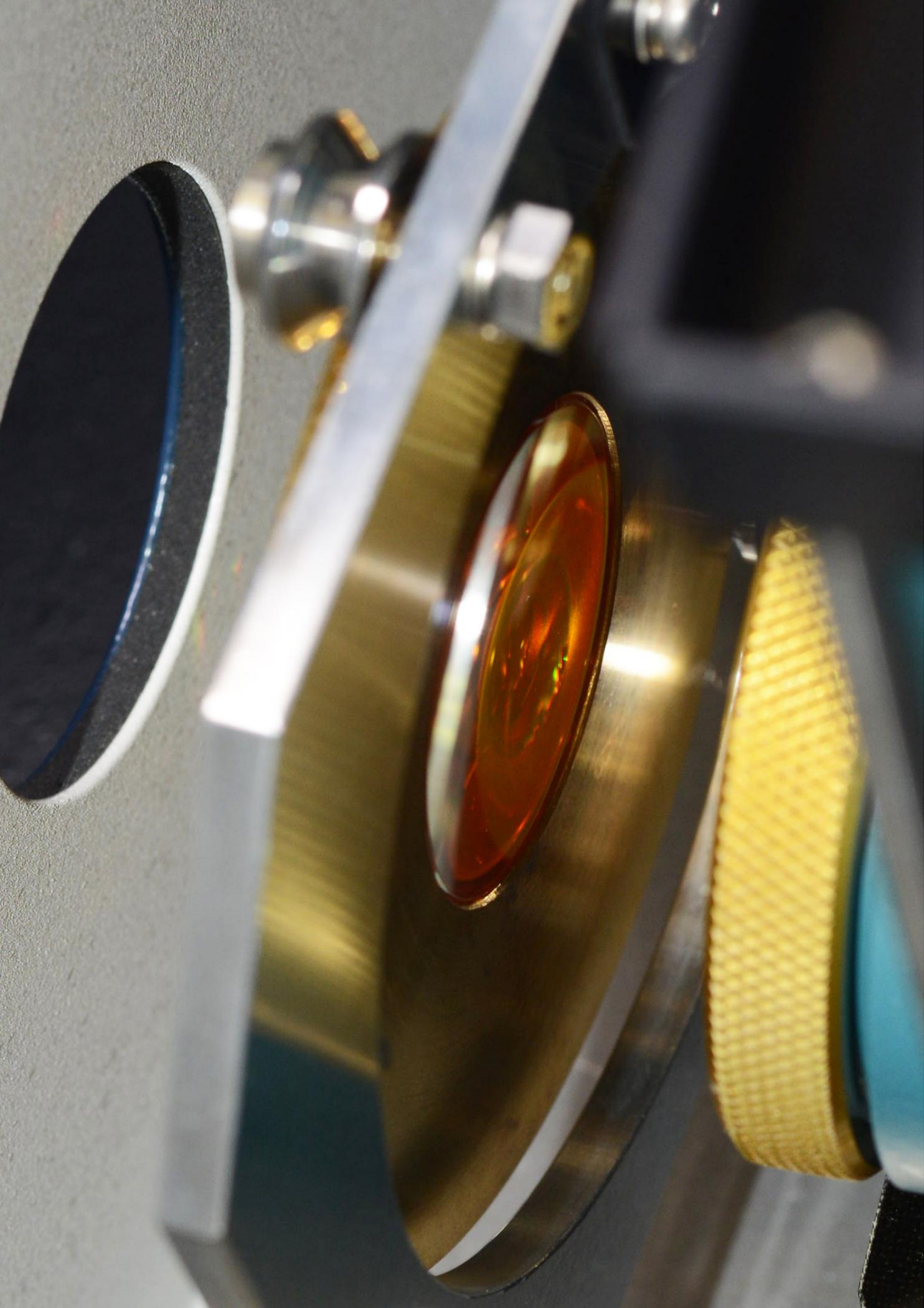
# FVS-6000

Vibrational Circular Dichroism Spectrometer



**JASCO**

Performance  
Innovation  
Reliability



JASCO has developed the FVS-6000 high performance Vibrational Circular Dichroism (VCD) spectrometer with the most advanced electronics with Digital Signal Processing (DSP) and an auto-aligned optical mechanism to eliminate artifacts from birefringence and linear dichroism. The FVS-6000 provides detailed VCD measurement in the fingerprint region, and also has the unique feature of an extended measurement range (option) of 4000 to 750  $\text{cm}^{-1}$  for increased spectral information. Since the CD signals in the IR region are one or more orders of magnitude lower than electronic CD signals in the UV-Visible region, high sensitivity and stability are a necessity for a VCD spectrometer, the dedicated FVS-6000 VCD spectrometer is fully optimized for highly sensitive VCD measurement.

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# Sensitivity and Stability

## Optimized Optics

The FVS-6000 uses a 28° Michelson interferometer to minimize the effects of polarization and reflective optics to eliminate artifacts caused by birefringence resulting in high quality, artifact free VCD data. The isolated mount of the IR source and the thermal control of the photo-elastic ensure long-term baseline stability required for high signal-to-noise measurement.

## VCD Auto Alignment

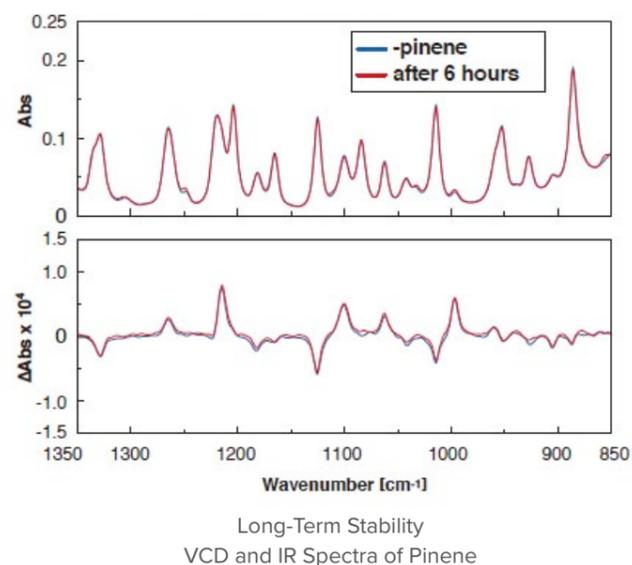
Auto-alignment is used to optimize the VCD optical system to reduce linear anisotropy artifacts. No manual alignment is required when the detector and/or optical filters are exchanged.

## Lock-In Detection using Digital Signal Processing (DSP)

Phase-sensitive lock-in detection using DSP with a sophisticated algorithm developed especially for VCD offers dramatic improvement in the S/N ratio.

## Instrument Purge

The optical system, sample chamber and detector housing can all be purged independently using N<sub>2</sub> gas to eliminate baseline interference from atmospheric gases.



# Features

## Wide Band Measurement

The FVS-6000 can measure data across a wide spectral range from 3,200 to 850 cm<sup>-1</sup> (standard). Optional detectors and filters are used to extend the range to 4,000 to 750 cm<sup>-1</sup>, to include measurement of OH and NH bands. Detectors can be easily exchanged (without manual alignment), and optical filters can be selected automatically by a PC-controlled 6-position filter wheel.

## Narrow Band Measurement

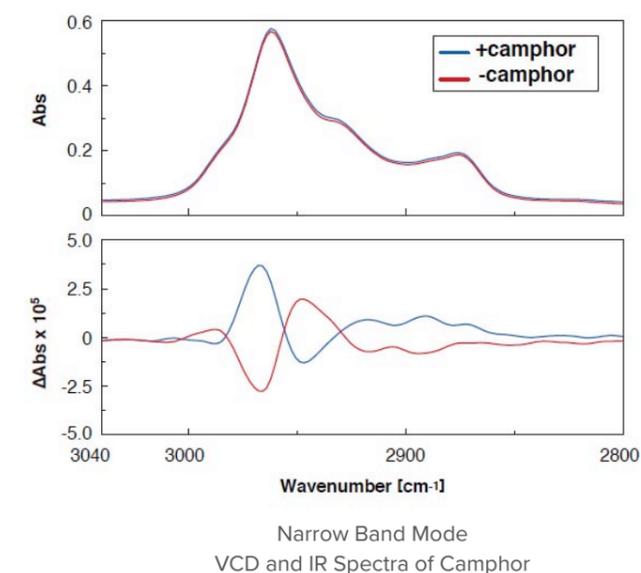
The narrow band mode allows measurements of peaks with small intensities at targeted absorption bands with higher sensitivity using optional band pass filters.

## Sample Cells and Sample Shuttle

A thermostatted single position cell holder, a 3-position sample shuttle, a sample rotation cell holder for averaging birefringence in sample cells, and a wide range of small-volume liquid cells are all available as options.

## Spectra Manager™

Spectra Manager™ Suite, the cross-platform measurement and analysis package for all JASCO spectrometers, offers quick and easy VCD data acquisition and analysis. Theoretically calculated VCD intensities from several commercially available calculation software packages can be plotted as simulated spectra and compared with the experimental data for further structural analysis of molecules.



# Accessories

## Cell Holders and Autosampler

### SRU-FVS | VCD Sample Rotation Unit

The SRU-FVS can be used to eliminate the artifacts generated by linear dichroism (LD) and linear birefringence (LB) from the cell and sample. There are two measurement modes that can be performed; while sample is rotating and also at a fixed angle.

The VCD Sample Rotation Unit is used to eliminate artifacts, including linear dichroism (LD) and linear birefringence (LB) from cells and samples.



### TAS-FVS | VCD Autosampler

The TAS-FVS has 3 sample positions and can be used as an autosampler or as a sample shuttle. As a sample shuttle, long term measurements can be made with improved baseline stability and baseline flatness.



### TCH-FVS | Peltier Temperature Controlled Cell Holder

For temperature stable measurement over long periods the TCH-FVS can be used with standard fixed path length and demountable cells.

Temperature range -5 to 90°C water cooled type (a water circulator is required).



## Options

- SRH-FVS-T | Tablet Holder for SRU-FVS
- SRH-FVS-F | Film Holder for SRU-FVS
- CHP-FVS | Cell Holder Plate for TCH-FVS

## Detectors and Filters

Detectors can be easily exchanged with no manual alignment, and optical filters can be switched by a PC-controlled 6-position filter wheel.

Standard detector: MCT-V MCT Detector (range: 3200 ~ 850  $\text{cm}^{-1}$ )  
Standard filters: 3200 ~ 2000  $\text{cm}^{-1}$  and 2000 ~ 850  $\text{cm}^{-1}$

## Optional Detectors

For VCD measurements in the low wavenumber region:

MCT-C | MCT Detector (range: 1000 ~ 750  $\text{cm}^{-1}$ )  
OPF-1000-750 | Optical Filter (range: 1000 ~ 750  $\text{cm}^{-1}$ )

For VCD measurements in the high wavenumber region (CH, NH and OH bands):

INSB-FVS | InSb Detector (range: 4000 ~ 1850  $\text{cm}^{-1}$ )  
OPF-4000-2650 | Optical Filter (Range: 4000 ~ 2650  $\text{cm}^{-1}$ )

For narrow band measurement with high sensitivity in C=O and amide regions:

OPF-1850-1550 | Optical Filter (range: 1850 ~ 1550  $\text{cm}^{-1}$ )

## Optional Cells

### Sealed Liquid Cells

LCB-050-FVS | BaF<sub>2</sub> Window, 50  $\mu\text{m}$  path length  
LCB-150-FVS | BaF<sub>2</sub> Window, 150  $\mu\text{m}$  path length  
LCC-050-FVS | CaF<sub>2</sub> Window, 50  $\mu\text{m}$  path length  
LCC-150-FVS | CaF<sub>2</sub> Window, 150  $\mu\text{m}$  path length  
Path length options: 25, 100, 250, 500 and 1000  $\mu\text{m}$

### Demountable Liquid Cells

#### DCB-FVS | BaF<sub>2</sub> Window

Offers wider spectral range up to ~750  $\text{cm}^{-1}$  but is slightly more deliquescent. Long exposure to aqueous solution or moisture causes a clouding on the BaF<sub>2</sub> window surface.

#### DCC-FVS | CaF<sub>2</sub> Window

Windows have no substantial problem with water, but preclude measurement below 1100  $\text{cm}^{-1}$ .

Both include 50 and 100  $\mu\text{m}$  teflon spacers.

Small-volume liquid cells are available as options.

# Spectra Manager™ Software Suite

## Instrument Control

Drivers are included to control each JASCO spectroscopy system. 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

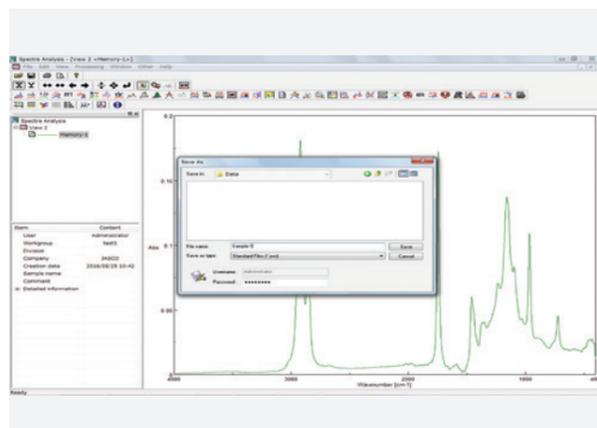
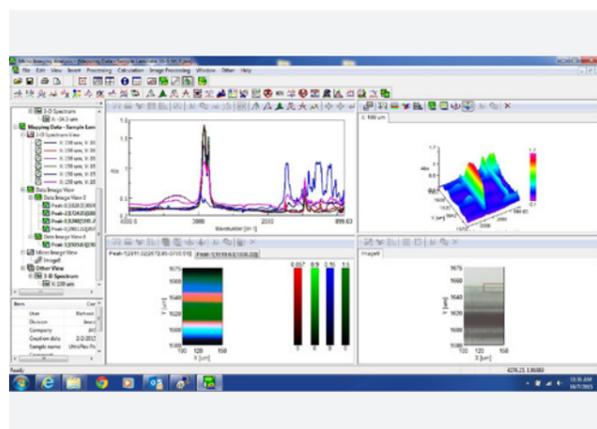
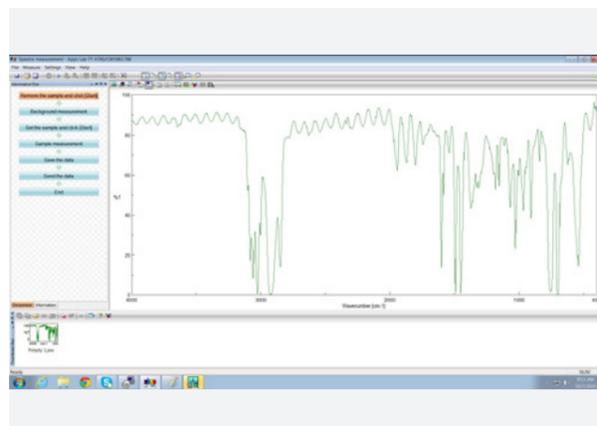
User-friendly features include overlay printing in colors and patterns, autoscale mode, full control of style and font, with customizable workspace and toolbars.

## Data Processing and Spectral Analysis

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

## Report Publishing

JASCO canvas is used to create layout templates of spectral data and results to meet individual reporting requirements.



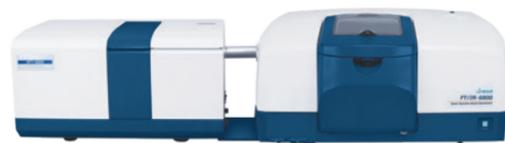
## A SINGLE PLATFORM FOR EVERY INSTRUMENT.

JASCO has developed the unique and powerful, cross-platform Windows® software package to control the widest range of optical spectroscopy instrumentation. Spectra Manager™ is a comprehensive lab companion for measuring and processing data, eliminating the need to learn multiple software programs and allowing data from many instruments to be analyzed and displayed together on the same platform.

# Related Products

## VFT-4000 Vibrational Circular Dichroism (VCD) Attachment

The VFT-4000 is a VCD attachment for the FT/IR-4000/6000 FTIR spectrometers, developed for measuring vibrational circular dichroism in the infrared region. The VFT-4000 can be used to obtain very useful information for the optical activity of carbohydrates and provide tertiary structure identification of chiral molecules. Since the CD signals in the infrared region are one or more orders of magnitude lower than ECD signals in the UV-Vis region, the VCD spectrometer needs high sensitivity and high stability. The VFT-4000 enables highly stable and sensitive measurement using lock-in detection by a DSP (digital signal processor) with a sophisticated algorithm optimized for VCD as well as thermal control of the PEM.



### J-1100

The J-1100 Circular Dichroism spectrophotometer is a compact, general-purpose space-saving design. This simple yet powerful instrument is perfect for users looking to obtain more routine CD measurements in both industry and academia.

### J-1500

The J-1500 allows for the maximum flexibility to upgrade your CD system with different measurement techniques. While the standard measurement modes are CD, LD, and absorbance, up to four simultaneous modes can be measured when combined with a wide range of sampling accessories.



### J-1700

The J-1700 was specifically designed for more demanding near-infrared CD applications. In addition to the enhanced far-UV capabilities, researchers probing the chiral activity of molecules in the NIR spectral region now have the ability to obtain data at wavelengths up to 2500 nm. The InGaAs detector has a wavelength range from 900-2500 nm, while the PMT ranges from 163-960 nm. The automatic detector interchange allows researchers to obtain both far-UV and NIR measurements without having to manually switch detectors. The addition of a grating monochromator to the double-prism monochromator setup provides low stray light and high light intensity, generating CD signals with high S/N performance throughout a large spectral range.



## FTIR-4000 and FTIR-6000

Redefine this powerful, easy-to-use technique. Each compact model offers reliable operation with some of the highest performance parameters in the industry. Including a sealed interferometer with corner-cube mirrors and AccuTrac™ DSP technology for rapid and accurate track of mirror position and velocity for optimum wavenumber precision and signal-to-noise performance.



# Specifications

	FVS-6000	VFT-4000
Instrumentation	VCD instrument	VCD accessory for FT/IR-4000, 6000
Measurement Range	3200-850 cm <sup>-1</sup> (std) 4000-750 cm <sup>-1</sup> (option)	3200-850 cm <sup>-1</sup> (std) 4000-750 cm <sup>-1</sup> (option)
Resolution	16-0.5 cm <sup>-1</sup>	Depending on FTIR model
Noise Level Measurement Condition	less than 8×10 <sup>-6</sup> ΔAbs 4cm-1, 20 min Accumulation	about 1×10 <sup>-5</sup> ΔAbs 4cm-1, 20 min Accumulation
Detector	PV-MCT (15 hours hold) PC-MCT InSb Replaceable	PV-MCT (15 hours hold) PC-MCT InSb Replaceable
Lock in Detection	DSP	DSP
Options	Auto sampler Temperature control cell	Auto sampler Temperature control cell
PC Communication	USB2.0 main unit RS-232C PEM driver	USB2.0 main unit RS-232C PEM driver

\*These are general specifications. The configuration will determine the specifics that can be found in our HPLC brochure.



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Products described herein are designed and manufactured by ISO-9001- and ISO-14001-certified JASCO Corporation