

# FT/IR X series Accessory & Optional software

Fourier Transform Infrared Spectrometer



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# FT/IR-4X, 6X, 8X Overview

## FT/IR-4X | FTIR Spectrometer

FT/IR-4X is research-grade in performance, functionality and expandability, and supports high resolution, high S/N, high sensitivity detectors, extending measurement wavenumber, microscopy with linear array detector, and rapid scan. The sample compartment is 200 mm wide, the same width as that of a large model, and can accommodate conventional accessories, including those from third parties.

- Excellent signal-to-noise ratio (35,000 : 1)
- High resolution ( $0.4\text{ cm}^{-1}$ )
- Rapid scan option
- Options are available to change to Near-Mid IR (11500 to  $375\text{ cm}^{-1}$ ) and Mid-Far IR (6000 to  $220\text{ cm}^{-1}$  or 6000 to  $50\text{ cm}^{-1}$ ) by replacing the light source, beam splitter, window plate, and detector.



FT/IR-4X

## FT/IR-6X | FTIR Spectrometer

FT/IR-6X is a powerful FTIR spectrometer for research application, with an excellent signal-to-noise ratio (47,000 : 1) and high resolution ( $0.25\text{ cm}^{-1}$ ). It has the capability of extending the measurement wavenumber range ( $25,000$  to  $20\text{ cm}^{-1}$ ), and also has the option of applying the IR measurement under vacuum conditions, FT/IR-6X with superior performance, functionality and flexibility providing the optimal solution.

- Excellent signal-to-noise ratio (47,000 : 1)
- High resolution ( $0.25\text{ cm}^{-1}$ )
- Rapid scan option
- Wavenumber range extension option ( $25,000$  to  $20\text{ cm}^{-1}$ )
- Vacuum option



FT/IR-6X

## FT/IR-8X | FTIR Spectrometer

FT/IR-8X is our flagship FTIR spectrometer, with an excellent signal-to-noise ratio (55,000 : 1) and high resolution ( $0.07\text{ cm}^{-1}$ ). FT/IR-8X can be used with options for rapid scan measurement and step scan measurement with nanosecond time resolution (up to 10 nsec.). In addition, measurement wavenumber region can be extended as an option, and it is possible to upgrade FT/IR-8X to a vacuum model.

- Excellent signal-to-noise ratio (55,000 : 1)
- High resolution ( $0.07\text{ cm}^{-1}$ )
- Rapid scan option / Step scan option
- Wavenumber range extension option ( $25,000$  to  $20\text{ cm}^{-1}$ )
- Vacuum option



FT/IR-8X

# Attenuated Total Reflection

Total reflection occurs when a light from a medium (crystal) with a high refractive index is incident upon a medium (sample) with a low refractive index at a higher angle of incidence than the critical angle ( $\theta$ ). Unlike the reflection at a metal surface, this reflected light penetrates into the sample for a depth proportional to the wavelength of the light at the inter surface (evanescent wave) and is reflected. An infrared absorption spectrum of surface of sample can be obtained by measuring this reflection energy.

## ATR PRO 4X | Single Reflection ATR Accessory (for FT/IR-4X)

### ATR PRO ONE X | Single Reflection ATR Accessory

#### Configuration

ATR PRO 4X base assembly (iQX accessory, Smart-Purge), Flexible metal head

**\*Crystal kit is not included in ATR PRO 4X.**

#### Specifications

Crystal:	Diamond (High-throughput type, Wide-band type), ZnSe, Ge
ATR/sample contact area:	$\phi$ 1.8 mm (Diamond), $\phi$ 2.5 mm (ZnSe, Ge)
Number of reflection:	1
Angle of incidence:	45° (center)
Pressure:	700 kg/cm <sup>2</sup> (Diamond), 400 kg/cm <sup>2</sup> (ZnSe, Ge)

**\*ATR PRO 4X is the dedicated accessory for FT/IR-4X.**



ATR PRO ONE X

## ATR PRO 4X VIEW | Single Reflection ATR Accessory with Camera (for FT/IR-4X)

### ATR PRO ONE X VIEW | Single Reflection ATR Accessory with Camera

#### Configuration

ATR PRO 4X VIEW base assembly (iQX accessory, Smart-Purge), Flexible metal head, Flexible resin head

**\*Crystal kit is not included in ATR PRO 4X VIEW.**

#### Specifications

Crystal:	Diamond (High-throughput type, Wide-band type), ZnSe, Ge
ATR/sample contact area:	$\phi$ 1.8 mm (Diamond), $\phi$ 2.5 mm (ZnSe, Ge)
Number of reflection:	1
Angle of incidence:	45° (center)
Pressure:	700 kg/cm <sup>2</sup> (Diamond), 400 kg/cm <sup>2</sup> (ZnSe, Ge)
Camera:	USB3 Vision camera included
Observation area:	Approximately 1.0 mm x 0.7 mm
Illumination:	High-intensity white LED, Dual Indirect Illumination for observation
Software functions:	Digital zoom (Max: 5 times), simultaneous saving of both image and spectrum data, length measuring function (VIEW)

**\*PKS-D1, PKS-D1F, PKS-G1 and PKS-Z1 do not support sample observations.**

**\*ATR PRO 4X VIEW is the dedicated accessory for FT/IR-4X.**



ATR PRO 4X VIEW

## ATR PRO PENTA X | Multi Reflection ATR Accessory

#### Specifications

Crystal:	Ge
Number of reflections:	14
Angle of incidence:	45° (center)
iQX accessory:	Standard
Purge:	Smart-Purge available

**\*PV type MCT detector is required.**



ATR PRO PENTA X

## ATR PRO 550X | Sample Shielding Single Reflection ATR Accessory

### Configuration

ATR PRO 550X base assembly (iQX accessory, Smart-Purge), Flexible metal head, Flexible resin head, Flat head, Concave head

**\*Crystal kit is not included in ATR PRO 550X.**

### Specifications

Crystal: ZnSe, Ge, Diamond  
ATR/sample contact area:  $\phi 1.5$  mm  
Number of reflection: 1  
Angle of incidence:  $45^\circ$  (center)  
Pressure:  $400 \text{ kg/cm}^2$



ATR PRO 550X

## ATR PRO 410MX | Multi Reflection ATR Accessory

### Configuration

ATR PRO 410MX base assembly (iQX accessory, Smart-Purge)

**\*Crystal kit is not included in ATR PRO 410MX.**

### Specifications

Crystal: ZnSe, Ge (for solid sample), ZnSe, Ge (for liquid sample)  
ATR/sample contact area:  $5 \text{ mm} \times 20 \text{ mm}$   
Number of reflection: 5  
Angle of incidence:  $45^\circ$  (center)



ATR PRO 410MX

## ATR PRO 650X | $65^\circ$ Incident-Type Single Reflection ATR Accessory

### Specifications

Crystal: Ge  
ATR/sample contact area:  $\phi 3 \text{ mm}$   
Number of reflections: 1  
Angle of incidence:  $65^\circ$  (center)  
iQX accessory: Standard  
Purge: Smart-Purge available  
Presser head: Flexible metal head, Flat head  
Sample size: 6 inch

**\*A polarizer and attenuator mesh are optional.**



ATR PRO 650X

## ATR PRO 610X | Polarizer Single Reflection ATR Accessory

### Configuration

ATR PRO 610X base assembly (iQX accessory, Smart-Purge), Flexible metal head, Flat head, Concave head, Polarizer, Analyzer

**\*Crystal kit is not included in ATR PRO 610X.**

### Specifications

Crystal: ZnSe (for ATR PRO 610X),  
Ge (for ATR PRO 610X),  
Diamond (for ATR PRO 610X)  
ATR/sample contact area:  $\phi 1.5 \text{ mm}$   
Number of reflection: 1  
Angle of incidence:  $45^\circ$  (center)  
Polarizer/Analyzer: Wire-grid polarizer (KRS-5)  
Polarizer rotation angle:  $0$  to  $360^\circ$   
Pressure:  $400 \text{ kg/cm}^2$



ATR PRO 610X

# Grazing Angle Reflection Absorption

Grazing Angle Reflection Absorption Spectroscopy (RAS) has the benefit of greater sensitivity - up to 1 or 2 orders of magnitude compared with transmission. When parallel polarized light is incident to a metal surface, the electric vectors in the incident and reflected light interfere to mutually strengthen and form a vertical standing wave. The interaction of this stationary wave with a thin film on the metal surface, causes an absorption that is stronger than simple transmission measurement.

## RAS PRO 85X | 85° Incident-Type Grazing-Angle RAS Accessory

### Specifications

Optical system:	Refractive optics
Angle of incidence:	85°
Polarizer:	Wire-grid polarizer (KRS-5)
Polarizing direction:	Fixed at 0° to the plane of incidence
Sample placement:	Horizontal
Sample mask:	20 mm × 10 mm, 10 mm × 10 mm (Option: 10 mm × 5 mm)
iQX accessory:	Standard
Purge:	Smart-Purge available

\*For the measurement with the 10 mm × 10 mm or 10 mm × 5 mm masks, MCT detector is required.



RAS PRO 85X

## RAS PRO 80X | 80° Incident-Type Grazing-Angle RAS Accessory

### Specifications

Angle of incidence:	80°
Polarizer:	PL-82 is required
Sample mask:	20 mm × 10 mm, 10 mm × 10 mm
Sample placement:	Horizontal
iQX accessory:	Standard
Purge:	Smart-Purge available



RAS PRO 80X

# Diffuse Reflection

Diffuse reflectance is a useful technique for samples with a roughened surface which are not amenable to transmission or ATR measurement, such as some powders, pharmaceuticals, plastics and food products etc.

## DR PRO 410MX | Diffuse Reflection Accessory

### Specifications

Sampling:	7-position sample holder x 2
iQX accessory:	Standard
Purge:	Smart-Purge available

\*Automatic sample switching is optional.



DR PRO 410MX

## DR-81 | Diffuse Reflection Accessory

### Configuration

DR-81 main unit, 5-position sample holder (2 pcs.), Push rod, Air blower



DR-81

# Specular Reflection

## RF-81S | Specular Reflection Accessory

RF-81S can measure the relative reflectance of samples with respect to the reference sample. In addition, it can also be used to obtain reflection absorption information of the film (micrometer order thickness) on the metal surface.

### Specifications

Angle of incidence:	10°
Number of reflection:	1
Sample mask:	φ1, 3 and 5 mm



RF-81S

# MAIRS

## AM-4500X | Automated MAIRS Measurement Unit

AM-4500X can obtain the molecular orientation information of thin film on an infrared-transparent substrate. Dedicated software can perform two measurement methods (pMAIRS and MAIRS2).

### Specifications

Sample holder:	2 positions
Rotation angle of sample:	0 - 45°
Polarizer:	Wire-grid polarizer (KRS-5)
Iris diaphragm:	Available (Adjusting the ring: φ1 mm to fully open, adjust manually)
Attenuator:	Available (4, 10 and 25%)
iQX accessory:	Available

**\*An MCT detector is required for pMAIRS.**

**\*AMP-4500X automatic rotation infrared polarizer is required for MAIRS2.**



AM-4500X with AMP-4500X

# Others

## VAT-500X | Variable Angle Transmittance Accessory

VAT-500X changes the sample setting angle in transmission measurement. It also allows the polarizer to be inserted into the light path, allowing dichromatic measurement of Polymeric film, coated film, organic film, and others.

### Specifications

Measurement mode:	Transmission
Sample size:	4-inch diameter, 1-mm thickness
Angle of sample:	0 - 90°
Polarizer:	Wire-grid polarizer (KRS-5)
iQX accessory:	Available



VAT-500X

## PL-82 | Polarizer

The PL-82 linearly polarizes light in the IR region for measurements of polymer films, coatings and oriented film samples.

### Specifications

Polarizer: Wire grid polarizer (KRS-5)  
Angle setting display: 0 - 180°



PL-82

## AS-50X | Transmittance Measurement Autosampler

The AS-50 enables to perform the transmittance measurement of maximum 49 samples automatically.

### Specifications

Sampling: 3 mm diameter pellet  
Film holder  
Number of samples: 49



AS-50X

## SSH-4000X | Sample Shuttle

Shuttle measurement alternately measures the sample and background under the set measurement conditions. Since the sample measurement data for each alternate measurement is corrected by the background data, the baseline is stable even when the measurement is performed for a long time, and it is less susceptible to the effects of water vapor and carbon dioxide.



SSH-4000X

## TSC-4X | Transmission Sample Compartment for FT/IR-4X

TSC-4X is a transmission-only sample compartment for FTIR. By designing it exclusively for transmission measurement, the volume is minimized and the purge gas replacement efficiency is improved.

## ESC-4X | Extended Sample Compartment for FT/IR-4X

ESC-4X can extend the sample compartment space, allowing for mounting of some accessories that cannot be accommodated in the standard sample compartment of FT/IR-4X. Additionally, it enables to use purge function of these accessories.



FT/IR-4X with ESC-4X



# Sampling Tools

Transmission remains one of the most sensitive methods used in mid-IR spectroscopy. However, correct sample thickness is essential for obtaining good spectra. The wide range of sampling accessories has been designed for the comprehensive analysis of gases, liquids and solid samples. For gas analysis, pathlengths range from 5 cm up to 12 m for ppm sensitivity. Various cell and window designs are available for the measurement of aqueous and non-aqueous liquids. Films and other solids are measured using film holders, KBr pellet presses and other accessories designed for the transmission of light through a prepared sample.

## Sealed Liquid Cell

Cells in various window materials and pathlengths are available. Short pathlength cells such as 0.1 mm cell are suitable for volatile liquid samples. Since the cell thickness is fixed, this cell is suitable for quantitative analysis.



### Sealed liquid cell (NaCl window)

1103-J211A	Sealed liquid cell, NaCl window spacer thickness: 0.025 mm
1103-J212A	Sealed liquid cell, NaCl window spacer thickness: 0.05 mm
1103-J213A	Sealed liquid cell, NaCl window spacer thickness: 0.1 mm
1103-J214A	Sealed liquid cell, NaCl window spacer thickness: 0.2 mm
1103-J215A	Sealed liquid cell, NaCl window spacer thickness: 0.5 mm
1103-J216A	Sealed liquid cell, NaCl window spacer thickness: 1 mm
1103-J217A	Sealed liquid cell, NaCl window spacer thickness: 2 mm
1103-J218A	Sealed liquid cell, NaCl window spacer thickness: 5 mm
1103-J219A	Sealed liquid cell, NaCl window spacer thickness: 10 mm

### Sealed liquid cell (KBr window)

1103-J201A	Sealed liquid cell, KBr window spacer thickness: 0.025 mm
1103-J202A	Sealed liquid cell, KBr window spacer thickness: 0.05 mm
1103-J203A	Sealed liquid cell, KBr window spacer thickness: 0.1 mm
1103-J204A	Sealed liquid cell, KBr window spacer thickness: 0.2 mm
1103-J205A	Sealed liquid cell, KBr window spacer thickness: 0.5 mm
1103-J206A	Sealed liquid cell, KBr window spacer thickness: 1 mm
1103-J207A	Sealed liquid cell, KBr window spacer thickness: 2 mm
1103-J208A	Sealed liquid cell, KBr window spacer thickness: 5 mm
1103-J209A	Sealed liquid cell, KBr window spacer thickness: 10 mm

### Sealed liquid cell (KRS-5 window)

1103-J231A	Sealed liquid cell, KRS-5 window spacer thickness: 0.025 mm
1103-J232A	Sealed liquid cell, KRS-5 window spacer thickness: 0.05 mm
1103-J233A	Sealed liquid cell, KRS-5 window spacer thickness: 0.1 mm
1103-J234A	Sealed liquid cell, KRS-5 window spacer thickness: 0.2 mm
1103-J235A	Sealed liquid cell, KRS-5 window spacer thickness: 0.5 mm
1103-J236A	Sealed liquid cell, KRS-5 window spacer thickness: 1 mm
1103-J237A	Sealed liquid cell, KRS-5 window spacer thickness: 2 mm
1103-J238A	Sealed liquid cell, KRS-5 window spacer thickness: 5 mm
1103-J239A	Sealed liquid cell, KRS-5 window spacer thickness: 10 mm

### Sealed liquid cell (CaF<sub>2</sub> window)

1103-J221A	Sealed liquid cell, CaF <sub>2</sub> window spacer thickness: 0.025 mm
1103-J222A	Sealed liquid cell, CaF <sub>2</sub> window spacer thickness: 0.05 mm
1103-J223A	Sealed liquid cell, CaF <sub>2</sub> window spacer thickness: 0.1 mm
1103-J224A	Sealed liquid cell, CaF <sub>2</sub> window spacer thickness: 0.2 mm
1103-J225A	Sealed liquid cell, CaF <sub>2</sub> window spacer thickness: 0.5 mm
1103-J226A	Sealed liquid cell, CaF <sub>2</sub> window spacer thickness: 1 mm
1103-J227A	Sealed liquid cell, CaF <sub>2</sub> window spacer thickness: 2 mm
1103-J228A	Sealed liquid cell, CaF <sub>2</sub> window spacer thickness: 5 mm
1103-J229A	Sealed liquid cell, CaF <sub>2</sub> window spacer thickness: 10 mm

## Demountable Liquid Cell

The demountable liquid cell is used when an accurate sample thickness is not required. The assembling cell can adjust the sample thickness by choosing a spacer. In addition, the demountable liquid cell is convenient for use with high viscosity samples, because the cell windows may be easily cleaned by the user.



### Demountable liquid cell (NaCl window)

1103-J491A	Demountable liquid cell, NaCl window spacer thickness: 0.025 mm
1103-J492A	Demountable liquid cell, NaCl window spacer thickness: 0.05 mm
1103-J493A	Demountable liquid cell, NaCl window spacer thickness: 0.1 mm
1103-J494A	Demountable liquid cell, NaCl window spacer thickness: 0.2 mm
1103-J495A	Demountable liquid cell, NaCl window spacer thickness: 0.5 mm
1103-J496A	Demountable liquid cell, NaCl window spacer thickness: 1 mm
1103-J497A	Demountable liquid cell, NaCl window spacer thickness: 2 mm
1103-J498A	Demountable liquid cell, NaCl window spacer thickness: 5 mm
1103-J499A	Demountable liquid cell, NaCl window spacer thickness: 10 mm

### Demountable liquid cell (KBr window)

1103-J481A	Demountable liquid cell, KBr window spacer thickness: 0.025 mm
1103-J482A	Demountable liquid cell, KBr window spacer thickness: 0.05 mm
1103-J483A	Demountable liquid cell, KBr window spacer thickness: 0.1 mm
1103-J484A	Demountable liquid cell, KBr window spacer thickness: 0.2 mm
1103-J485A	Demountable liquid cell, KBr window spacer thickness: 0.5 mm
1103-J486A	Demountable liquid cell, KBr window spacer thickness: 1 mm
1103-J487A	Demountable liquid cell, KBr window spacer thickness: 2 mm
1103-J488A	Demountable liquid cell, KBr window spacer thickness: 5 mm
1103-J489A	Demountable liquid cell, KBr window spacer thickness: 10 mm

### Demountable liquid cell (KRS-5 window)

1103-J521A	Demountable liquid cell, KRS-5 window spacer thickness: 0.025 mm
1103-J522A	Demountable liquid cell, KRS-5 window spacer thickness: 0.05 mm
1103-J523A	Demountable liquid cell, KRS-5 window spacer thickness: 0.1 mm
1103-J524A	Demountable liquid cell, KRS-5 window spacer thickness: 0.2 mm
1103-J525A	Demountable liquid cell, KRS-5 window spacer thickness: 0.5 mm
1103-J526A	Demountable liquid cell, KRS-5 window spacer thickness: 1 mm
1103-J527A	Demountable liquid cell, KRS-5 window spacer thickness: 2 mm
1103-J528A	Demountable liquid cell, KRS-5 window spacer thickness: 5 mm
1103-J529A	Demountable liquid cell, KRS-5 window spacer thickness: 10 mm

### Demountable liquid cell (CaF<sub>2</sub> window)

1103-J511A	Demountable liquid cell, CaF <sub>2</sub> window spacer thickness: 0.025 mm
1103-J512A	Demountable liquid cell, CaF <sub>2</sub> window spacer thickness: 0.05 mm
1103-J513A	Demountable liquid cell, CaF <sub>2</sub> window spacer thickness: 0.1 mm
1103-J514A	Demountable liquid cell, CaF <sub>2</sub> window spacer thickness: 0.2 mm
1103-J515A	Demountable liquid cell, CaF <sub>2</sub> window spacer thickness: 0.5 mm
1103-J516A	Demountable liquid cell, CaF <sub>2</sub> window spacer thickness: 1 mm
1103-J517A	Demountable liquid cell, CaF <sub>2</sub> window spacer thickness: 2 mm
1103-J518A	Demountable liquid cell, CaF <sub>2</sub> window spacer thickness: 5 mm
1103-J519A	Demountable liquid cell, CaF <sub>2</sub> window spacer thickness: 10 mm

## Demountable Cell (A-type)

When accurate sample thicknesses is not required, this is used to hold samples sandwiched between window plates or coated on window plates. Spacers are available for adjusting the thickness of samples.



### Demountable cell (A-type, NaCl window)

1103-J411A	Demountable cell (A-type), NaCl window spacer thickness: 0.025 mm
1103-J412A	Demountable cell (A-type), NaCl window spacer thickness: 0.05 mm
1103-J413A	Demountable cell (A-type), NaCl window spacer thickness: 0.1 mm
1103-J414A	Demountable cell (A-type), NaCl window spacer thickness: 0.2 mm
1103-J415A	Demountable cell (A-type), NaCl window spacer thickness: 0.5 mm
1103-J416A	Demountable cell (A-type), NaCl window spacer thickness: 1 mm
1103-J417A	Demountable cell (A-type), NaCl window spacer thickness: 2 mm
1103-J418A	Demountable cell (A-type), NaCl window spacer thickness: 5 mm
1103-J419A	Demountable cell (A-type), NaCl window spacer thickness: 10 mm

### Demountable cell (A-type, KBr window)

1103-J401A	Demountable cell (A-type), KBr window spacer thickness: 0.025 mm
1103-J402A	Demountable cell (A-type), KBr window spacer thickness: 0.05 mm
1103-J403A	Demountable cell (A-type), KBr window spacer thickness: 0.1 mm
1103-J404A	Demountable cell (A-type), KBr window spacer thickness: 0.2 mm
1103-J405A	Demountable cell (A-type), KBr window spacer thickness: 0.5 mm
1103-J406A	Demountable cell (A-type), KBr window spacer thickness: 1 mm
1103-J407A	Demountable cell (A-type), KBr window spacer thickness: 2 mm
1103-J408A	Demountable cell (A-type), KBr window spacer thickness: 5 mm
1103-J409A	Demountable cell (A-type), KBr window spacer thickness: 10 mm

## MagHoldIR | Magnetic Demountable Cell

MagHoldIR is a sample holder using disposable windows suitable for micro-volume samples such as liquids, paints or adhesives. A sample is placed between the disposable KBr windows and secured by the magnetic cover. CaF<sub>2</sub> and BaF<sub>2</sub> windows are available as options.

### MagHoldIR kit

2000-5100	MagHoldIR Magnetic demountable cell (KBr kit)
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## MagCELL | Magnetic Demountable Liquid Cell

MagCELL is a demountable cell holder that utilizes a magnetic cover plate to fix the windows of the cell, providing excellent reproducibility and minimizing variations in peak intensity. Changing spacers, the infrared peak intensity can be optimized for precise analysis.

### MagCELL kit

2000-5109	MagCELL Magnetic demountable liquid cell (KBr kit)
2000-5110	MagCELL Magnetic demountable liquid cell (CaF <sub>2</sub> kit)
2000-5111	MagCELL Magnetic demountable liquid cell (BaF <sub>2</sub> kit)
2000-5112	MagCELL Magnetic demountable liquid cell (KRS-5 kit)
2000-5165	MagCELL Magnetic demountable liquid cell (NaCl kit)
2000-5185	MagCELL Magnetic demountable liquid cell (ZnSe kit)



## Demountable Cell (K-type)

When accurate sample thicknesses is not required, this is used to hold samples sandwiched between window plates or coated on window plates. Spacers are available for adjusting the thickness of samples.



### Demountable cell (K-type, NaCl window)

1103-J441A	Demountable cell (K-type), NaCl window spacer thickness: 0.025 mm
1103-J442A	Demountable cell (K-type), NaCl window spacer thickness: 0.05 mm
1103-J443A	Demountable cell (K-type), NaCl window spacer thickness: 0.1 mm
1103-J444A	Demountable cell (K-type), NaCl window spacer thickness: 0.2 mm
1103-J445A	Demountable cell (K-type), NaCl window spacer thickness: 0.5 mm
1103-J446A	Demountable cell (K-type), NaCl window spacer thickness: 1 mm
1103-J447A	Demountable cell (K-type), NaCl window spacer thickness: 2 mm
1103-J448A	Demountable cell (K-type), NaCl window spacer thickness: 5 mm
1103-J449A	Demountable cell (K-type), NaCl window spacer thickness: 10 mm

### Demountable cell (K-type, KBr window)

1103-J431A	Demountable cell (K-type), KBr window spacer thickness: 0.025 mm
1103-J432A	Demountable cell (K-type), KBr window spacer thickness: 0.05 mm
1103-J433A	Demountable cell (K-type), KBr window spacer thickness: 0.1 mm
1103-J434A	Demountable cell (K-type), KBr window spacer thickness: 0.2 mm
1103-J435A	Demountable cell (K-type), KBr window spacer thickness: 0.5 mm
1103-J436A	Demountable cell (K-type), KBr window spacer thickness: 1 mm
1103-J437A	Demountable cell (K-type), KBr window spacer thickness: 2 mm
1103-J438A	Demountable cell (K-type), KBr window spacer thickness: 5 mm
1103-J439A	Demountable cell (K-type), KBr window spacer thickness: 10 mm

### Demountable cell (K-type, KRS-5 window)

1103-J471A	Demountable cell (K-type), KRS-5 window spacer thickness: 0.025 mm
1103-J472A	Demountable cell (K-type), KRS-5 window spacer thickness: 0.05 mm
1103-J473A	Demountable cell (K-type), KRS-5 window spacer thickness: 0.1 mm
1103-J474A	Demountable cell (K-type), KRS-5 window spacer thickness: 0.2 mm
1103-J475A	Demountable cell (K-type), KRS-5 window spacer thickness: 0.5 mm
1103-J476A	Demountable cell (K-type), KRS-5 window spacer thickness: 1 mm
1103-J477A	Demountable cell (K-type), KRS-5 window spacer thickness: 2 mm
1103-J478A	Demountable cell (K-type), KRS-5 window spacer thickness: 5 mm
1103-J479A	Demountable cell (K-type), KRS-5 window spacer thickness: 10 mm

### Demountable cell (K-type, CaF<sub>2</sub> window)

1103-J461A	Demountable cell (K-type), CaF <sub>2</sub> window spacer thickness: 0.025 mm
1103-J462A	Demountable cell (K-type), CaF <sub>2</sub> window spacer thickness: 0.05 mm
1103-J463A	Demountable cell (K-type), CaF <sub>2</sub> window spacer thickness: 0.1 mm
1103-J464A	Demountable cell (K-type), CaF <sub>2</sub> window spacer thickness: 0.2 mm
1103-J465A	Demountable cell (K-type), CaF <sub>2</sub> window spacer thickness: 0.5 mm
1103-J466A	Demountable cell (K-type), CaF <sub>2</sub> window spacer thickness: 1 mm
1103-J467A	Demountable cell (K-type), CaF <sub>2</sub> window spacer thickness: 2 mm
1103-J468A	Demountable cell (K-type), CaF <sub>2</sub> window spacer thickness: 5 mm
1103-J469A	Demountable cell (K-type), CaF <sub>2</sub> window spacer thickness: 10 mm

## CG-100-S | 100 mm Gas Cell

### Specifications

Cell body:	SUS 316
Window:	KBr, CaF <sub>2</sub> , BaF <sub>2</sub> , ZnSe, KRS-5
Pathlength:	100 mm

\*Window is not included in CG-100-S.



## Sealed Gas Cell

The sampling is done by opening/closing the glass cock of the gas cell. The window material is sealed to the cell-frame using adhesive.

### Sealed gas cell (NaCl)

1103-J601A	Gas cell (glass body), NaCl window, path length 50 mm
1103-J602A	Gas cell (glass body), NaCl window, path length 100 mm

### Sealed gas cell (KBr)

1103-J603A	Gas cell (glass body), KBr window, path length 50 mm
1103-J604A	Gas cell (glass body), KBr window, path length 100 mm

### Sealed gas cell (KRS-5)

1103-J605A	Gas cell (glass body), KRS-5 window, path length 50 mm
1103-J606A	Gas cell (glass body), KRS-5 window, path length 100 mm

### Sealed gas cell (CaF<sub>2</sub>)

1103-J607A	Gas cell (glass body), CaF <sub>2</sub> window, path length 50 mm
1103-J608A	Gas cell (glass body), CaF <sub>2</sub> window, path length 100 mm



## Demountable Gas Cell

This is a demountable gas cell on which the window plate can be freely removed and polished. The cell is suitable for measuring flammable and corrosive gases.

### Demountable gas cell

1103-J610A	Demountable gas cell, NaCl window, path length 100 mm
1103-J612A	Demountable gas cell, KBr window, path length 100 mm
1103-J614A	Demountable gas cell, KRS-5 window, path length 100 mm
1103-J616A	Demountable gas cell, CaF <sub>2</sub> window, path length 100 mm



## LPC-3M-S | Long Path Gas Cell (3 m)

## LPC-8M-S | Long Path Gas Cell (8 m)

## LPC-8M-FV | Long Path Gas Cell (8 m, for full vacuum system)

## LPC-12M-S | Long Path Gas Cell (12 m)

## LPC-12M-FV | Long Path Gas Cell (12 m, for full vacuum system)

The sub-ppm analysis of trace components in high purity gases can be very important for many industries, including semiconductor manufacturing. Several types of long-path gas cells are available to comply with these requirements. The materials of the cell body is stainless. A long-path gas cell exclusively for the FT-IR full vacuum model instruments is also available.

### Specifications

Pathlength:	3 m (LPC-3M-S), 8 m (LPC-8M-S, LPC-8M-FV), 12 m (LPC-12M-S, LPC-12M-FV)
Cell volume:	0.4 L (LPC-3M-S), 1.1 L (LPC-8M-S, LPC-8M-FV), 2.3 L (LPC-12M-S, LPC-12M-FV)
Cell body:	SUS 316
Inner coating:	Electro-polished
Window:	KBr, CaF <sub>2</sub> , BaF <sub>2</sub> , ZnSe, KRS-5
O-ring:	Viton

\*Window is not included in LPC-3M-S, LPC-8M-S, LPC-8M-FV, LPC-12M-S and LPC-12M-FV.

### Long path gas cells

6909-J149A	LPC-3M-S	3 m Gas cell (SUS)
6909-J138B	LPC-8M-S	8 m Gas cell (SUS)
6909-J139B	LPC-8M-FV	8 m Gas cell (SUS) for FV model
6909-J126B	LPC-12M-S	12 m Gas cell (SUS)
6909-J128B	LPC-12M-FV	12 m Gas cell (SUS) for FV model



LPC-12M-S

LPC-12M-FV

# KBr Pellet/Plate Method

KBr pellet method is a traditional sampling method, most commonly used on powders and other solid samples. The technique involves grinding the sample and diluting it in KBr, then pressing the mixture to produce a pellet.

KBr plate method allows a sample to be placed between disposable KBr plates and pressed into a thin disk, decreasing the effects of contamination and moisture absorption. This method can be widely used for macro/micro FT-IR measurements.

## KBr Pellet Die

Three types of die kits are available to form pellets of 7, 10 and 20 mm in diameter. A hydraulic press is required when forming pellets.



### KBr Pellet Die

6526-H050B	PT-7	KBr pellet die, pellet size: 7 mm dia.
6584-H110A	PT-10	KBr pellet die with pellet holder Type 3, pellet size: 10 mm dia.
6584-H120A	PT-20	KBr pellet die with pellet holder Type 4, pellet size: 20 mm dia.

## Micro KBr Pellet Die

Three types of die kits are available to form micro pellets of 2, 3 and 5 mm in diameter. The average quantity of sample required is 50 µg for the 3 pellet die. A mini-press or hydraulic press is required when forming pellets.



### Micro KBr Pellet Die

6584-H202A	MT-1B	Micro KBr pellet die, pellet size: 2 mm dia.
6584-H302A	MT-1C	Micro KBr pellet die, pellet size: 3 mm dia.
6584-H402A	MT-1E	Micro KBr pellet die, pellet size: 5 mm dia.

### Micro KBr Pellet Die (with coating)

6584-H303B	MT-1C-A	Micro KBr pellet die (corrosion-resistant coated), pellet size: 3 mm dia.
6584-H403B	MT-1E-A	Micro KBr pellet die (corrosion-resistant coated), pellet size: 5 mm dia.

## TabletMaster | KBr Pellet/Plate Die

TabletMaster is novel tools to create the pellet for KBr pellet/plate methods. KBr pellet is created into a disposable disk called "ClearDisk". Therefore, it is not necessary to clean/dry the disk every time, allowing users to measure samples without worrying about the contamination due to insufficient disk cleaning.



### Tablet Master starter kit

2000-5150	TabletMaster Starter kit 3 mm ID
2000-5151	TabletMaster Starter kit 5 mm ID
2000-5172	TabletMaster Starter Kit 8 mm ID
2000-5153	TabletMaster Starter kit 10 mm ID
2000-5154	TabletMaster Starter kit 13 mm ID

### Tablet Master starter kit (with coating)

2000-5178	TabletMaster Starter kit 3 mm ID (with corrosion protection coating)
2000-5179	TabletMaster Starter kit 5 mm ID (with corrosion protection coating)
2000-5180	TabletMaster Starter kit 8 mm ID (with corrosion protection coating)
2000-5181	TabletMaster Starter kit 10 mm ID (with corrosion protection coating)
2000-5182	TabletMaster Starter kit 13 mm ID (with corrosion protection coating)

## Mini-Press

The mini-press is used when forming micro pellets of  $\phi 2$  mm and  $\phi 3$  mm. The micro pellets can be easily made by applying hand pressure.

### Mini-Press

6502-J040A	MP-1	Mini press, manual operation
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## Hydraulic Press

The hydraulic press is used when forming pellets of  $\phi 5$ ,  $\phi 7$ ,  $\phi 10$ , and  $\phi 20$  mm. 100 kN and 200 kN types of presses are available.

### Hydraulic Press

2521-0002	P-16B-027B 100kN	Hydraulic press
2521-0001	P-1B-041B 200kN	Hydraulic press



## iTP-8 | intelligent TabletPress

iTP-8 intelligent TabletPress is a tool for forming KBr pellet, and provides instructions for the degree of pressing. This function allows users to determine when the pellet forming is complete, enabling everyone to create stable and proper KBr pellets.

### iTP-8

2000-5191	iTP-8	intelligent TabletPress
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## Agate Mortar and Pestle

An agate mortar and pestle are used to crush samples and reduce particle size when creating KBr pellets.

### Agate Mortar and Pestle

0501-0006	Agate mortar with pestle 80 mm O.D.
0501-0005	Agate mortar with pestle 60 mm OD



## Pellet Holder

Two types are available. The Type III is for a 10 mm diameter pellet and a Micro KBr pellet, and the type IV is for 13 and 20 mm diameter pellets.

### Specifications

Sampling size: Micro KBr pellet,  $\phi 10$  mm pellet (III type)  
 $\phi 13$ , 20 mm pellet (IV type)

### Pellet holder

6423-H080A	KBr pellet holder Type III
6423-H081A	KBr pellet holder Type IV





## MagRevolVR | Magnetic sample holder for film/thin samples

MagRevolVR is a sample holder that utilizes a magnetic cover plate to fix the film or thin samples. Wide and soft magnet sheet enables to fix a sample with various thicknesses, from thin films to thick wafers. Sample plate can be rotated, enabling the orientation measurement by using Infrared polarizer.

MagRevolVR  
2000-5157

MagRevolVR Magnetic demountable sample holder  
for film/thin samples



## Universal sample holder

Universal sample holder is used to measure small film-type samples using the transmission method. Changing the combination of slits on two mask plates, the aperture size can be optimized for maximum light intensity corresponding to the size and shape of a sample.

Universal sample holder

2000-5045

2021-1

Universal sample holder



## DC-500 | Diamond Cell

DC-500 is an accessory designed for compressing and flattening a sample between two diamond plates with adjustment of the applied pressure using two thumb screws. It can be used for direct transmission measurement with the standard sample holder in an FTIR spectrometer using the macro plate (included).





# Detectors

## MCT Detector

The MCT detector features high sensitivity and high-speed response. Five types of MCT detectors are available for different measurement purposes.

### Specifications

Measurement range: 5000 - 750  $\text{cm}^{-1}$  (MCT-N)  
12000 - 650  $\text{cm}^{-1}$  (MCT-M)  
12000 - 450  $\text{cm}^{-1}$  (MCT-W)  
5000 - 850  $\text{cm}^{-1}$  (MCT-PV, for ATR PRO PENTA X)  
5000 - 850  $\text{cm}^{-1}$  (MCT-SS, for Step Scan)  
Liq. nitrogen holding time: 8 hours

**\*The holding time is the value at the installation. The holding time becomes shorter depending on the usage conditions.**



MCT detector

## InGaAs Detector

InGaAs detector is a room temperature-type detector that has high sensitivity in the near-IR region. The detector is also used for rapid scan measurements because it has good response to rapid changes in light intensity.

### Specifications

Measurement range: 12000 - 4000  $\text{cm}^{-1}$

## InSb Detector

InSb detector is a liquid nitrogen-cooled detector that has high sensitivity in the near-IR region. The detector is also used for rapid scan measurements because it has good response to rapid changes in light intensity.

### Specifications

Measurement range: 11500 - 1850  $\text{cm}^{-1}$   
Liq. nitrogen holding time: 8 hours

**\*The holding time is the value at the installation. The holding time becomes shorter depending on the usage conditions.**



InSb detector

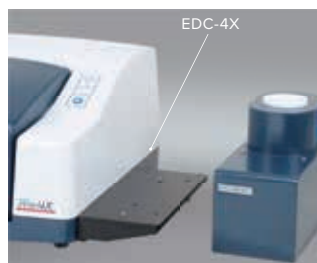
## EDC-4X | External Detector Unit

## SDU-6X1 | External Detector Unit

## SDU-6X2 | External Detector Unit

The external detector unit enables to use the additional detectors which cannot be built into FTIR main unit. EDC-4X is used with FT/IR-4X, allowing the users to exchange the optional detector. SDU-6X1/6X2 is used with FT/IR-6X or FT/IR-8X, allowing to mount up to two detectors. SDU-6X2 allows to connect IR microscope to the FTIR main unit.

**\*SDU-6X1/6X2 is not available with FTIR main unit which three detectors are built into.**



# Infrared Microscopes

## IRT-5200 | Infrared Microscope

With an expandable spectral range and high-clarity visual observation, the IRT-5000 series features:

- IQ Mapping for sample imaging without moving the stage
- Automatic XYZ stage with joystick control
- Dual detectors and user-swappable detectors
- Multiple objectives with automatic switching
- Spectrum preview to check conditions before measurement
- Data storage linked with sample image and measurement information



## IRT-7100 | Automated Infrared Microscope

## IRT-7200 | Multi-Channel Infrared Microscope

With a fully automated sample stage, autofocus and up to four objectives, the IRT-7100 features:

- Dual detector and user-swappable detectors
- IQ Mapping
- Field upgrade for ultrafast IR imaging

The IRT-7200 linear array FTIR microscope, has the same features as the IRT-7100 model plus:

- Linear array imaging detector
- Ultrafast IR Imaging function up to 9,600 data/minute
- Dynamic Imaging with an FTIR step-scan option



## IRT-1000X | Infrared Microscope

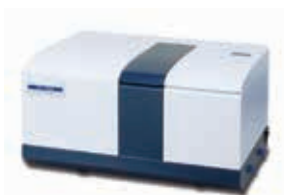
IRT-1000X is a compact, lightweight, and low-cost microscope that can be easily attached to and removed from the sample chamber of the FTIR main unit in the same way as other accessories.



# Additional Instruments

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

Perform FTIR measurement and vibrational circular dichroism with the same system. The VFT-4000 VCD accessory is easily installed in the field without complicated adjustments and features auto-alignment, a narrow-band mode, purge capability and a wide spectral range from 3,200 to 850  $\text{cm}^{-1}$ . A dedicated VCD spectrometer is also available.



## EXBS-6X | Automated Beam Splitter Changer Unit

## EXPT-6XWGV | Automated Gate Valve and Window Changer Unit

By combining the FT/IR-6X/8X with the automated beam splitter exchange and automated window-switching unit (or automated gate valve unit), the instrument can perform measurements across a wide spectral range under vacuum without manually switching optical elements.



## AYT-12 | Automatic Y/θ Stage for 12-Inch Wafer

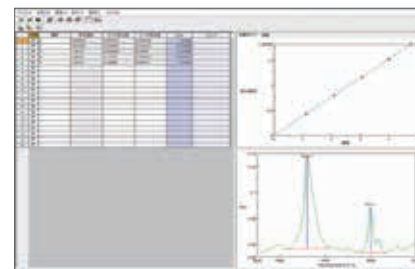
AYT-12 is used for automated measurement of the transmittance, reflectance and film thickness of semiconductor wafers up to a maximum size of 12 inches. This system includes dedicated software for various applications, such as mapping measurement and multilayer film-thickness, quantitation of lightweight elements in Si and more. Wafer sizes include: 12 inches (standard) and 4, 5, 6, 8 inches (optional).



# Optional software

## QAU-4X | Quantitation Program

QAU-4X is a quantitative analysis program based on the Beer-Lambert-Bouguer Law. Samples can be quantified using peak height, peak area etc. calibration curves include: linear, quadratic or cubic fitting functions.



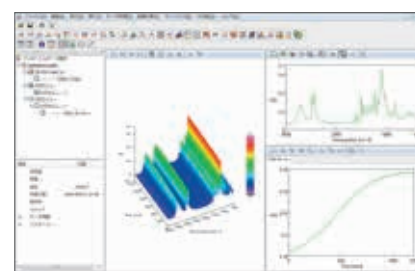
## Multi-Component Quantitation Program

This program is used for quantitation of up to a maximum 50 components simultaneously. It can also be combined with the interval scan program to perform time based concentration measurement of each component. This software application easily transforms any JASCO FTIR into a dedicated turnkey process gas analyzer system when coupled with a gas sampling manifold.

\*QAU-4X is required.

## PLS-4X | PLS Quantitation Program

Multi-variate analysis techniques are widely used for multicomponent mixtures. The PLS method is generally used for quantitative analysis of multi-component samples.



## ITM-4X | Interval Measurement Program

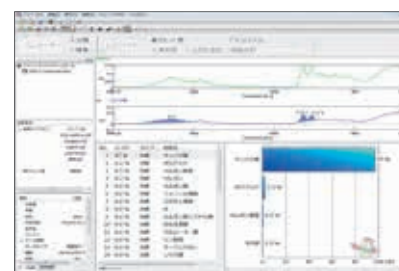
ITM-4X is used to acquire spectral data during a time course measurement. This program is commonly used for long-term observation of spectral changes in slow reactions. Intensity changes at a specified wavenumber can also be monitored. The spectral data can be displayed in 2-D at a specified time and as a 3-D plot. Time course data based on peak height, peak area or peak shift at a specified wavenumber can be calculated and displayed as a 2-D plot.

## ADSS-4X | Advanced Spectral Search Program

ADSS-4X provides assistance in analyzing a spectrum of an unknown sample and identifying the sample using the following two functions:

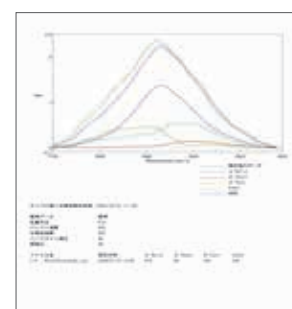
**Classification:** The program classifies the spectra of unknown samples into the 35 categories, or as "Nothing". Spectra are classified using a machine learning technique without the use of libraries.

**Search:** The program compares the spectrum of an unknown sample with spectra in standard libraries to determine the closest standard sample. User libraries for spectrum searching created by the [Spectrum Library Manager] program can be used with ADSS-4X.



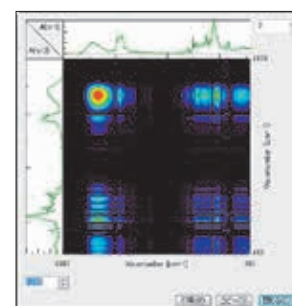
## IR SSE-4X | Secondary Structure Estimation Program

The amide region of a protein IR spectrum changes slightly according to changes in its secondary structure. SSE-4X is used to estimate the protein secondary structure using either a PCR or PLS method with reference data sets correlated with the results of X-ray structure analysis. Samples can be measured either in liquid or solid phase (crystal and amorphous), which can be difficult for structural analysis using X-ray and CD.



## 2DCS-SPCMGR2 | Two-Dimensional Correlation Analysis Program

The 2-D correlation analysis program performs a time domain Fourier transform of time-resolved spectra obtained, for example by, interval scan measurements, and then a plot of the correlation intensities of the real part (synchronous correction) and imaginary part (asynchronous correction) is made as separate contour maps. Analyzing the correlation spectra of each plot provides an estimation of the chemical and/or structural changes in a sample.



## MCR-4X | Macro Command Program

MCR-4X macro command program is used to automate a series of tasks, for many types of measurement and for comprehensive analysis and printing. The Macro Script Generator uses simple tool buttons to allow the user to easily create macro scripts without any special programming knowledge.

## RAD-4X | Radiation Calculation Program

RAD-4X is used to analyze the spectral emission of a black body source.



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