Specifications

	NRS-5100	NRS-5200	NRS-7100	NRS-7200
Spectrograph				
Spectrograph (Focal length)	Aberration-corrected Czerny-Turner monochrometer (f = 300 mm)		Aberration-corrected Czerny-Turner monochrometer (f = 500 mm)	
Scanning mechanism	High-precision direct drive			
Low wavenumber attachment	None	Standard (Excitation WL: 400 ~ 800 nm)	None	Standard (Excitation WL: 400 ~ 800 nm)
Wavenumber range (Raman shift)	50 ~ 8000 cm^{-1} [*1]	10 ~ 8000 cm^{-1} [*2]	50 ~ 8000 cm^{-1} [*1]	5 ~ 8000 cm^{-1} [*2]
Maximum resolution	1 cm^{-1} (532 nm excitation, 1800 gr/mm, 1024 pixel CCD) 0.4 cm^{-1} optional (532 nm excitation, 2400 gr/mm, 2048 pixel CCD)		0.7 cm^{-1} (532 nm excitation, 1800 gr/mm, 1024 pixel CCD) 0.3 cm^{-1} optional (532nm excitation, 2400 gr/mm, 2048 pixel CCD)	
Grating	1800 gr/mm (Option: 3600, 2400, 1200, 600, 300, 150 gr/mm)			
Max. No. of mountable grating	3		4	
UV upgrade	Factory option for UV laser excitation (including UV optical elements and UV light observation camera) [*3]			
Rejection filter	532 nm notch filter (Option: Notch filters and edge filters for other excitation wavelengths)			
Rejection filter switching	Manual exchange (Option: automated 8-position switching mechanism)			
Beam splitter	Beam splitter with automated switching mechanism (Option: Dichroic Mirrors, Max. 2 dichroic mirrors can be mounted) [*4]			
Detector				
Standard detector	4-stage Peltier cooled CCD detector (UV-NIR range, 1024 × 255 pixel)			
Optional detectors	4-stage Peltier cooled CCD detector (high-resolution, 2048 × 512 pixel), Liquid-nitrogen-cooled InGaAs detector (for 1064 nm excitation laser, 1024 pixel)			
Dual detector switching	Factory option (required when using 2 detectors)			
Laser				
Laser	532 nm, 50 mW (Option: 244 [*5], 266 [*5], 325 [*5], 355 [*5], 442, 488, 514.5, 633, 660, 785, 1064 nm)			
Maximum number of laser mounted at a time	Internal: Max. 2 [*6], External: Max. 6 (VIS-NIR laser: Max. 3, UV laser: Max. 3), Total: Max. 8 lasers, 9 wavelengths			
Microscope				
Microscopic observation	Standard:High-resolution built-in CMOS camera (Option:binocular, trinocular, polarization observation, differential interference, transmission illumination)			
Confocal optics	Standard			
DSF (Dual Spatial Filter)	Standard *Not available for UV upgraded model			
SRI (Spatial Resolution Image)	Standard *Not available for UV upgraded model			
Objectives	5×, 20×, 100× objectives (Option: Long working distance type, UV type, NIR type)			
Standard sample stage	Manual XYZ stage (operable distance X: 75, Y: 50, Z: 30 mm)			
Optional sample stages	XY autostage with joystick accessory (travel range X:100, Y:70 mm, 0.04 μm step), Z autostage (travel range Z:30 mm, 0.1 μm step)			
SPRIntS imaging	Factory option (including VertiScan, high-speed data import, 3D imaging measurement, Z autostage, autofocus function)			
Autostage imaging	Factory option (including imaging measurement, 3D imaging measurement, XYZ autostage, autofocus function)			
Macro measurement unit	Factory option (SPRIntS imaging system and the Macro measurement unit cannot be provided simultaneously)			
Auto-alignment feature	Laser beam auto-alignment, Raman scattering auto-alignment			
SGI (slit guide image)	Standard			
Neon lamp	Standard (for wavenumber correction)			
Safety feature	Integrated sample chamber laser interlock, laser light-path protection (Class 1 compliance)			
Software				
Standard function	Point measurement, wide spectral-band measurement, basic spectral data processing functions, search/functional group analysis (Sadtler KnowItAll), cosmic-ray removal, auto-fluorescence-correction, wavenumber correction, sensitivity correction, JASCO canvas (printing function), validation, user help function			
Functions included in SPRIntS imaging and autostage imaging	Omnifocal image, Real-time display of spectrum, chemical image and current measurement point, multi-image map, auto-focus (supporting both sample image contrast and laser focus algorithms), imaging analysis (including Peak height (ratio), Peak area (ratio), Peak shift, PWHH), PCA mapping, 3-D imaging (including 3-D Raman image display, 3-D image slice display)			
Optional programs	High-throughput screening measurement [*7], interval measurement analysis, stress analysis [*8], carbon analysis, polysilicon crystallinity evaluation, 2D correlation			
Anti-vibration table [*9]	Option (air source for anti-vibration table: nitrogen gas or air source, secondary pressure 0.25 - 0.3 MPa)			
Dimensions & Weight (Main unit only)	880(W) × 890(D) × 670(H) mm About 200 kg	1360(W) × 890(D) × 670(H) mm About 240 kg	1060(W) × 1220(D) × 670(H) mm About 230 kg	1540(W) × 122 (D) × 670(H) mm About 270 kg
Power requirement	AC100 V ±10 V, 200 V ±20 V, 200 VA			

[*1] At 532 nm excitation wavelength with the standard rejection filter.

[*2] At 532 nm excitation wavelength with the low wavenumber attachment.

[*3] UV laser, edge filter for UV laser, and UV objectives are additionally required.

[*4] One dichroic mirror can be mounted when either the UV upgrade or the SPRIntS imaging option is configured. No dichroic mirror can be utilized when both the UV upgrade and the SPRIntS imaging options are fitted.

[*5] The specifications are partially different from the standard model when UV laser is used.

[*6] The laser may not be internally mounted due to the specification of the laser.

[*7] Autostage imaging option is required.

[*8] SPRIntS imaging option or autostage imaging option is required.

[*9] Raman system must be placed on anti-vibration or equivalent table.

NRS-5000/7000 Series

Laser Raman Spectrometers

● Specifications are subject to change without notice.

For more information, please contact:
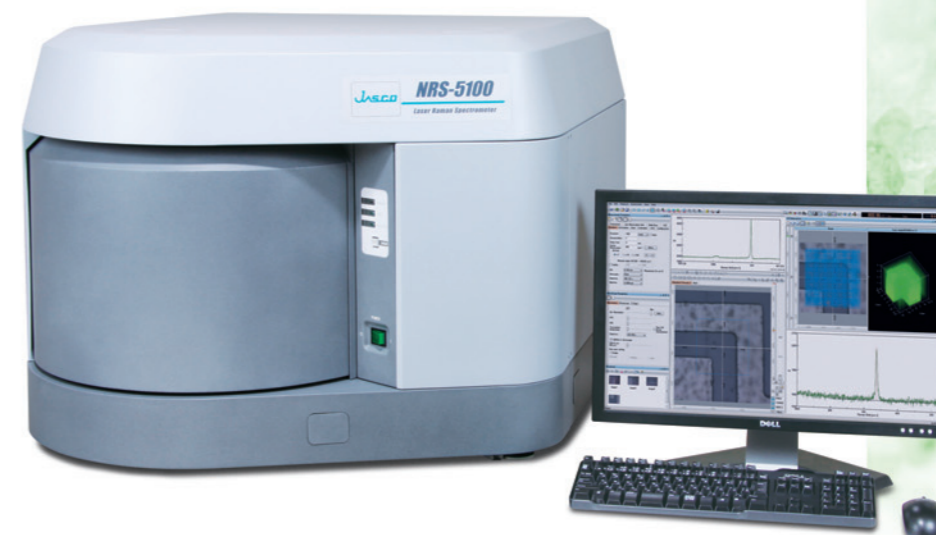
JASCO International Co., Ltd.

NRS-5000/7000 Series
Laser Raman Spectrometers
High performance Raman microscopy systems

NRS-7000 Series

NRS-7100	Maximum Resolution: 0.7 cm^{-1}/ 0.3 cm^{-1}(optional)
	Measurement range: 50 to 8000 cm^{-1}
NRS-7200	Maximum Resolution: 0.7 cm^{-1}/ 0.3 cm^{-1}(optional)
	Measurement range: 5 to 8000 cm^{-1}

NRS-5000 Series

NRS-5100	Maximum Resolution: 1 cm^{-1}/ 0.4 cm^{-1}(optional)
	Measurement range: 50 to 8000 cm^{-1}
NRS-5200	Maximum Resolution: 1 cm^{-1}/ 0.4 cm^{-1}(optional)
	Measurement range: 10 to 8000 cm^{-1}

The performance and functions expected on a micro-Raman spectrometer are all provided with the NRS-5000/7000 series Raman systems, assuring consistent performance for rapid acquisition of high quality data with automated system control and minimal optical adjustments.

For application expansion, an automated multi-grating turret, up to 2 detectors and a maximum of 8 lasers ranging from the UV through the NIR are capable of integration with the instrument system, all optical components are PC controlled for maximum flexibility with minimum user interaction.

1064 nm laser and InGaAs detector options for fluorescence free measurements
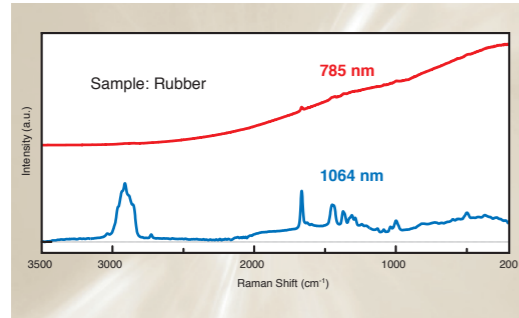
All models can integrate Near-IR excitation lasers, especially useful for samples which generate fluorescence, even when excited using 785 nm.

Unique DFS function for high spatial resolution
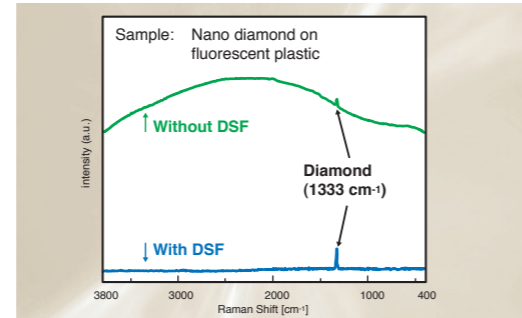
Unique DFS function provides higher spatial resolution than normal confocal optics to irradiate only the target sample.
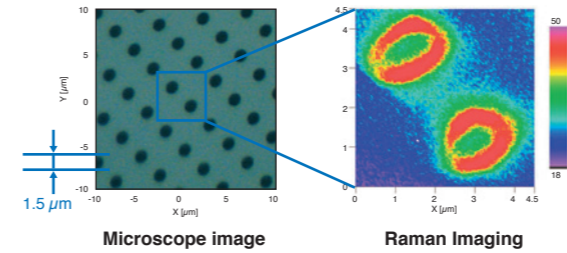
NRS-5000/7000 Series features

- **Research-grade model assuring high spectral quality**
- **Exceptional wavenumber accuracy with a high-precision rotary-encoder direct drive mechanism**
- **Low wavenumber measurement (NRS-5200/7200)**
- **Auto-alignment of microscope laser introduction optics and Raman scattering light path**
- **Wavenumber calibration using an integrated Ne lamp**
- **Unique Dual Spatial Filter (DSF) for higher spatial resolution than conventional confocal optics**
- **Patented Spatial Resolution Image (SRI) function for simultaneous observation of sample image, laser spot and aperture image**
- **Full range of options including macro-Raman measurement unit and fiber optic probes**

From high resolution measurements to high-speed imaging

High-resolution imaging of a small area at sub-micron scale using the SPRIntS imaging capabilities without an auto-stage

The matrix area surrounding a 1.5 μm diameter hole formed on a Si wafer was measured using a 40 nm stepping function. The 1.5 μm feature could be easily observed in the Raman image.

Microscope image　**Raman Imaging**

Accurate 3-D Imaging by the distortion-free VertiScan function

This function acquires depth imaging data from a sample using the confocal capability of the Raman spectrometer and creates a 3-D image from the Raman intensity data. Multilayer sample analysis is also possible using this function.

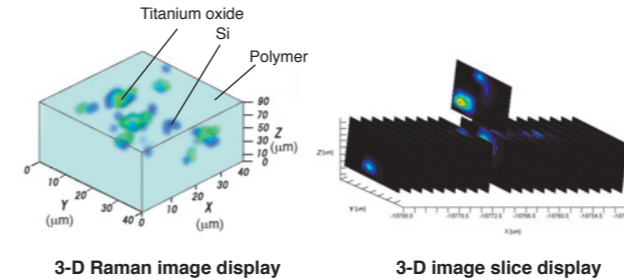
3-D Raman image display　**3-D image slice display**

SPRIntS High Speed Imaging system
("SPRIntS": Software Programmable Raman Integration Speed)

SPRIntS imaging is a laser scanning function which supports high speed measurements by scanning the laser excitation beam using individual scan mirrors (VertiScan) to irradiate the sample while collecting data from a high-speed CCD detector at a minimum of every 5 milliseconds. The VertiScan function also supports a 3-D imaging function by utilizing the Z-autostage and the confocal capability of the instrument system. The VertiScan system is unlike other laser scanning functions because the sample is illuminated with a vertical laser beam every time to retain measurement confocality and obtain a high quality, undistorted Raman image.

High speed imaging for a large spatial sample by using the SPRIntS and auto-stage imaging capabilities

A 10 mm diameter area of a pharmaceutical tablet was measured in just 15 minutes by using the SPRIntS and auto-stage imaging capabilities.


Sample image of a pharmaceutical tablet　**Raman image of active ingredient in analgesic drug**
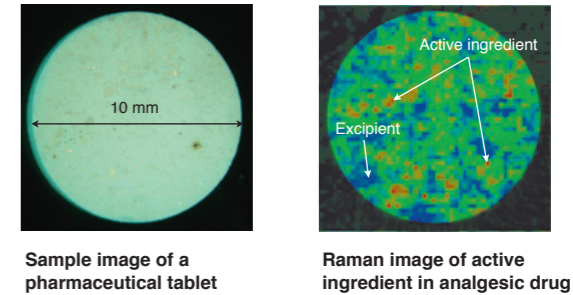
Spectra Manager II
for system control, data acquisition, and data analysis
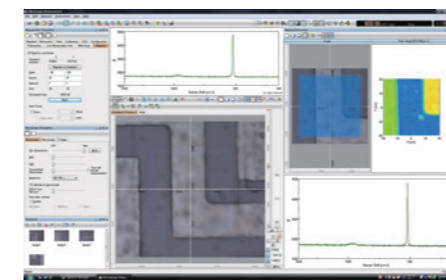
Spectra Manager II for the NRS-5000/7000 offers revolutionary features to simplify previously difficult measurement and analysis tasks, while adding various user-support tools such as auto-fluorescence-correction, wavenumber correction, intensity correction, and a novel user-advice function. With a graphical user interface, the Raman microscope analysis program offers maximum ease of use for microscopic measurements.

1-click Fluorescence removal by Auto Fluorescence correction function
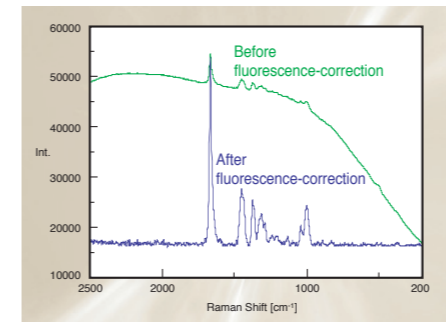
- An image of each measurement point can be saved as a thumbnail image, displayed at the bottom of the screen, and linked with the measurement point

- User advice functions to obtain optimized measurement conditions

- Suitable data collection parameters advised through real-time analysis of preview spectra.

- Sadtler KnowItAll, a highly acclaimed spectral library search software, is provided as standard.

- New multi-focus function allows creation of an "omnifocal image" from several images with different focal depths. By using the simultaneously obtained Z-axis information, a 3-dimensional video image can be created.