Рамановские микроскопы NRS
Технические характеристики

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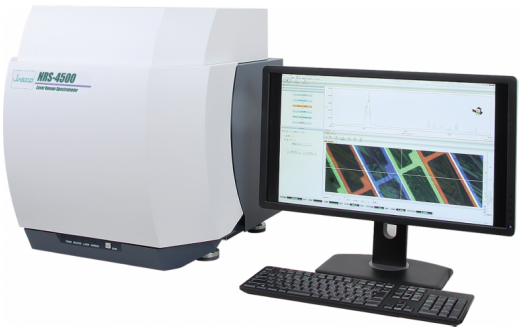
NRS Series Confocal Raman Imaging Microscopy

Confocal Raman Imaging Microscopes

The NRS Series of confocal Raman imaging microscopes includes three different optical configurations; the easy to use, yet powerful NRS-4500, with up to three laser wavelengths (wide range, from visible to NIR) including the common dual laser 532/785nm configuration. The sophisticated NRS-5000 Series, with 300mm spectrograph, offering higher spectral and spatial resolution with the use of dual spatial filtration (DSF) and the NRS-7000 Series with 500mm spectrograph and poly-dispersive options. Both the NRS-5000 and NRS-7000 can be configured with up to 8 lasers (9 wavelengths). All models include Class 1 laser safety as standard and share the same comprehensive Spectra Manager™ Suite of measurement and micro-imaging software.



NRS-4500 Confocal Raman Imaging Microscope with High Speed QRi

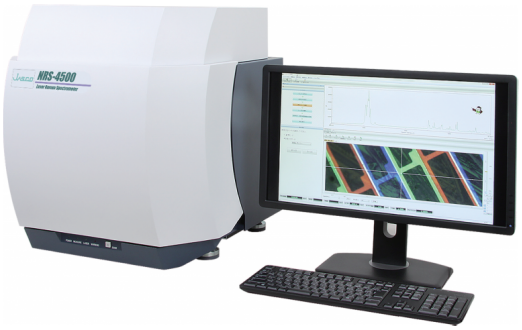
System Features

- High accuracy spectral resolution, with the use of rotary encoders for the grating drive mechanism to as little as 0.3cm^{-1} per pixel
- High spatial resolution with 0.1µm step, using the automated XYX stage (actual resolution depends on laser wavelength and objective magnification and N.A.)
- QRi – a combination of EMCCD with an ultra-fast XYZ stage giving 0.1µm step resolution QRI increases the data acquisition speed by up to 50x compared with a conventional mapping stage and also offers a significant improvement in sensitivity. Available on all models
- Advanced Sample Search – identify target components based on size, shape, color and contrast
- IQ-Frame – register and find the exact measurement positions every time in IR and Raman microscopy
- SSI using AI algorithms for quickly analysis rough or uneven samples for fast measurement
- MCR for component imaging using real-time chemometrics
- Advanced Spectral Search for real-time component identification
- SPRinTS (Software Programmable Raman Integration Speed) which uses Vertiscan to scan the laser through the objective to map samples that are likely to move using a conventional mapping stage, such as liquids and suspensions. Available on the NRS-5000 and NRS-7000 models only
- Long working distance stage and objectives, for larger samples and temperature control and high pressure accessories
- Optional fiber probe interface for external measurements
- Macro objective for measurement of powders and liquids
- Patented Fluorescence Rejection, an algorithm to reduce or eliminate fluorescence an enhance Raman measurement. Available on all models
- Spectra Manager™ Imaging Suite with KnowItAll®, for comprehensive measurement, analysis and reporting. The cross platform software includes the same feature for all NRS models with many options for chemometrics, spectral analysis, etc.

NRS-4500 Series Confocal Raman Microscope

NRS-4500 Confocal Raman Microscope

The NRS-4500 Series is a purpose designed Confocal Raman Microscope with a wide functionality to make setup fast and easy. When changing lasers the selection and alignment of the laser, rejection filter and grating are fully automated. The laser spot is observed on all models including 1064nm ensuring that the sample being viewed in actually being measured. Sample identification, imaging analysis and identification can all be done in real time, speeding up the process of preparing the sample to seeing the results.



NRS-4500 Confocal Raman Microscope

Optical Configuration

The f200 spectrograph includes up to 4 automatically selected gratings and detection by a high performance CCD or InGaAs array (with options for electron multiplying EMCCDs). The observation system includes a super resolution CMOS camera with Olympus optics and a choice of objectives from x5 to x100. Objective options include NIR and long working distance for working with heating cooling/sample stages.

Class 1 Laser Safety

The standard Class 1 safety cabinet

Confocal Imaging

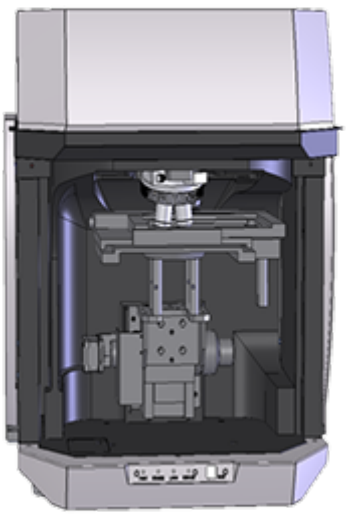
An automatic XYZ stage is used for confocal imaging with X/Y spatial resolution to 1 µm (Z=1.5 µm). Spectra Manager™ Suite with the Imaging Analysis application is used to collect a three dimensional image of the sample which can be rotated and viewed from any angle. The image map is created using peak data corresponding to key functional groups and analysis of multiple peaks can be combined to create powerful data images.

Rigid Optical Bench and Laser Image

The raman microscope has a completely rigid structure to prevent flexing and is not built around an optical microscope. Switching between observation and measurement modes is completely automatic and can be done with the safety cabinet closed.

Standard Configuration for a Raman Microscope 532/785nm Lasers with Matching Edge Filters

The NRS-4500 Raman Microscope offers several standard configurations including the typical 633nm single laser or 532/785nm laser combination with matching notch or edge filters, with an option for a third laser which can be mounted internally or externally. Observation of the laser spot ensures perfect alignment of the target sample position and provides an indication of surface roughness. All laser wavelengths are selected in the software and once selected, the optical system (including the laser) is automatically aligned for optimal throughput and resolution. Four software selectable gratings control the spectral range and resolution from 8000 to 100 cm-1 (8000 to 50 cm-1 as an option). The grating direct drive system includes a rotary encoder to ensure excellent wavelength reproducibility ±0.2cm-1.



Fluorescence Rejection in a Raman Microscope

457nm Laser and Patented Fluorescence Rejection Algorithm

JASCO has developed new and novel (patented) mechanisms to deal with sample fluorescence. As with other Raman systems, we can utilize laser wavelengths of 785 nm and up to 1064 nm, but we have recently incorporated a 457 nm laser that offers significantly higher Raman signal, improved spatial resolution and much lower fluorescence for many different sample types. Selecting a different excitation laser wavelength is only one of the ways the NRS-4500 minimizes fluorescence interference. The Fluorescence Rejection algorithm (patented) included in the Spectra Manager™ can effectively remove or minimize fluorescence regardless of the laser wavelength used either at the time of measurement or during post-processing.

Flexible Sampling Options for a Raman Microscope

With a choice of refractive objectives, both micro and macro measurements are possible as well as options for long working distance objectives for heating/cooling stages and other sampling accessories. The NRS-4500 can be used with either a manual sample stage or the PC-controlled, automated XYZ confocal mapping stage. A fiber probe can be added for external measurement.

Powerful 'UserAssist' Control for Both New Users and Experienced Spectroscopists

The 'UserAssist' software aids the user in setting up the NRS-4500 for sample measurement; a simple sequence guide takes you through setup and optimization of measurement parameters with helpful advice and tips, such as a warning if you have the laser intensity set too high. When each of the parameters has been set, the NRS-4500 automatically selects the laser and matching notch filter, the grating for the appropriate resolution, focuses on the sample and then the spectral measurement is performed.

'Sample Search' Function

The new 'Sample Search' function is used with the automated XYZ stage. A new algorithm developed by JASCO (patent pending) analyzes the microscopic image and automatically selects measurement position(s) based on size, contrast and/or color of the target material. The user simply clicks the measurement button to execute spectral measurements of the desired sample positions.

Chemical Image Identification and Functional Groups Registry

To provide faster Raman microscope image processing, the Imaging Analysis software includes a 'Registry' of possible functional groups or other relevant compound information based on peak height or area calculations. After peak height or area calculation is developed, it can be saved to the Registry for future analysis use. The registry includes the peak calculation information and a 'label' describing the relevant vibrational motion. Image maps can be developed from mapping data simply by clicking on the desired, registered calculation to obtain a false color image of the peak intensity data for the registered calculation.

6 Cool Features for the NRS-4500 Raman Microscope

- QRI Quick Raman Imaging: High speed imaging for large areas, this combines a fast stage with Electron Multiplying CCD (EMCCD) to take very quick exposures across the sample.
- Macro Measurement: A simple side on macro lens allows the user to measure liquids or powders in cuvettes or glass vials. Automatic spectral comparison indicates the compound in the sample.
- Analysis Wizard: Automatically go from viewing raw unprocessed data through all of the processing required to prepare every spectrum for multivariate curve regression to identify the principal components and image them using false color maps.
- SSI Surface Scan Imaging A fast and powerful tool for productivity when imaging or mapping a large sample area with rough, uneven or tilted surface, such as geological sample or a pharmaceutical tablet.
- FocusNAV: The autofocus function allows the Raman to do the focusing, not the user, when surveying a sample for measurement.
- Advanced Sample Search: For measurement of particulates, image analysis is applied to the visual image to identify and select particles based on size, shape and contrast.

Model	NRS-4500
Monochromator:	Aberration-corrected, Czerny-Turner mount single monochromator, f = 200 mm
Wavenumber Scanning Mechanism:	High-accuracy direct-drive type (with rotary encoder) Wavenumber repeatability: ± 0.2 cm-1
Wavenumber Range:	8000 to 100 cm-1(standard) 8000 to 50 cm-1 (option, required 532 nm E grade edge filter)
Resolution:	2 cm-1/pixel (standard, 100 to 3900 cm-1) 0.7 cm'/pixel (option, 100 to 1350 cm-1, 532 nm, 2400 gr/mm grating, 1650 pixel CCD)
Grating:	Standard: 900 gr/mm Selectable from 2400, 1800, 1200, 600, 300, 150 gr/mm (Max. 4 gratings can be mounted simultaneously)
Optical Alignment:	Auto-Alignment (Laser light) Raman light path auto alignment function Automatic switching of imaging lens for optimized spectrograph illumination.
Rejection Filter Switching:	Automatic filter switching mechanism (up to 4 filters) as standard Notch filter: 5 year warranty Edge filter: 3 year warranty
Detector	
Detector:	Air-cooled Peltier CCD detector (Max. -60°C), 1650 x 200 pixel, 16 µm x 16 µm, Visible to NIR
Optional Detectors:	Visible high sensitivity type, NIR high-sensitivity type, High-resolution type, InGaAs etc.
Laser	
Laser:	Standard: 532 nm, 20 mW Optional laser: 405, 442,457,488, 514.5,532,633,785,1064 nm, etc. *Red wavelengths are recommended lasers. *In case of 1064 nm, detector needs to be changed to InGaAs.
Number of Mountable Lasers:	Maximum 3 lasers (3 internal or 2 internal and 1 external)
Microscope	
Sample Observation:	High resolution CMOS camera (300 M pixel)
Confocal Optical System:	Standard
Spatial Resolution:	XY = 1 µm, Z = 1.5 µm
Objective Lens:	5x, 20x, 100x, (Plan Achromat objective lens) Manual 6 position objective carousel as standard Electronic drive 6 position carousel as option. Long working distance type, NIR type, water immersion lenses are also available as

Model	NRS-4500
	options
Sample Stage:	Automatic XYZ stage with auto-focus function
Imaging Measurement:	Option, Automatic stage imaging with auto focus, XYZ 0.1 µm step, 3D imaging, omni-focus
Laser Safety Classification and Safety Mechanism:	Class I Interlock mechanism by software and hardware, Laser optical path protection
Macro Measurement:	Option, Carousel type macro-measurement unit is available as local upgrade option
Fiber Probe:	Option (Manual switching)
Other Hardware Options:	Dichroic mirror, Polarized observation, differential interference contrast, transmitted illumination
Software	
Standard Program:	Microscope spectra measurement, Validation, Spectra analysis, Imaging analysis, Wavenumber correction, Sensitivity correction, Fluorescence correction, JASCO canvas
Imaging Program:	Sample search function, Multiple focus function, Focused view, 3D structure observation, Peak calculation, PCA mapping, Refractive index correction
Correction Program:	Standard, Auto-fluorescence correction, Sensitivity correction, Wavenumber correction (Ne lamp and Std sample are included)
Optional Program:	Interval measurement analysis, Thermal change measurement, Imaging analysis, Stress analysis, Carbon analysis
Others	
Anti-Vibration Table:	Option (air source for anti-vibration table: nitrogen gas or air source, secondary pressure 0.25 - 0.3 MPa)
Dimension and Weight:	Main Unit 550 (W) x 610 (D) x 800 (H) mm, approx. 80 kg - Power Supply : 220 (W) x 320 (D) x 70 (H) mm, approx. 3 kg AC 100 V ±10 V, AC 200 V ±20 V, 200VA

NRS-5000 Series Confocal Raman Microscope

The NRS-5000 is a research-grade confocal Raman microscope with an f300 spectrograph that combines the flexibility of multiple detectors and multiple laser sources to quickly change between measurement modes for fast data acquisition to reduce experimental time. A number of unique technologies have been developed to improve measurement efficiency; these include

- QRi for very fast imaging with high-resolution auto-stage
- SPRIntS for fast mapping without the necessity of moving the sample stage
- SRI (Spatial Resolution Image) for simultaneously viewing the sample image and laser spot.
- DSF (Dual Spatial Filtration) which optimizes confocal focusing of the image produced by the objective lens to reduce aberration and improve spatial resolution and reduce the effects of matrix fluorescence.

NRS Series Raman Spectrometers

A rigid honeycomb optical base is the foundation of the instrument ensuring alignment and stability. The laser(s), microscope, software-switched optics and a unique aberration-corrected polychromator with CCD or InGaAs detectors provide an integrated compact package that is . Operator safety (Class 1 laser safety) is maintained by a fully enclosed automated sample chamber door. This provides a 120 degree opening for the user to freely access the sample stage and objectives revolver when setting up the experiment.

The NRS-5500 is equipped with a spectroscope with a focal length of 300 mm and is designed with an emphasis on the balance between S/N ratio and resolution. The NRS-7500 is equipped with a 500 mm focal length spectrometer and is designed to achieve the highest level of peak resolution.

A high resolution color CCD viewing system with synchronized image capture and spectrum measurement enables accurate sample identification and positioning. All data is recorded in the Spectra Manager™ imaging application. An automated 4 position grating selector, 2 internally mounted detectors and up to 8 lasers ranging from the UV through the NIR. The NRS-5000 is software controlled for maximum flexibility so that once the sample is loaded onto the sampling stage the user has complete control under conditions of class 1 laser safety.

The peak shifts slightly when the silicon is stressed. The magnitude of stress can be analyzed from the shift value. Simultaneous measurement with a Ne lamp enables highly accurate stress measurement.

NRS-5500/7500 can automatically switch 4 gratings by software operation. The grating can be selected according to the laser, and no optical adjustment is required. By using different gratings, it is possible to measure a wide range of wavenumbers at once or to measure a narrow range of wavenumbers in detail with high wavenumber resolution.

Two detectors can be installed at the same time. Detectors are selected according to conditions such as wavelength band, desired resolution, and high-speed imaging. Detector switching can be completed only by software operation.

System Features

- Exceptional wavenumber accuracy with a high-precision rotary-encoder direct drive mechanism
- Wide wavenumber range up to 8000 cm^{-1}
- Automated XYZ with joystick and mouse/keyboard control
- Spectra Manager™ operating system for measurement and confocal imaging
- Low wavenumber measurement, close to the Rayleigh scatter(NRS-5600/7600)
- Auto-alignment of microscope laser introduction optics and Raman scattering light path

- Wavenumber calibration using an internal Ne lamp
- Unique Dual Spatial Filter (DSF) providing higher spatial resolution than conventional confocal optics, especially in the Z axis
- Patented Spatial Resolution Image (SRI) function for simultaneous observation of sample image, laser spot and aperture image

Options

- The Objective revolver can be mounted with a range of objective lenses matched to the measurement range (including dedicated NIR) and with a variety of magnification and working distances from x5 to x100
- Up to 8 lasers (9 wavelengths) each with a selected Edge or Notch filter
- Trinocular for direct observation
- Laser wavelengths from deep UV to 1064nm
- Detectors include CCD, EM-CCD and InGaAs
- Macro-Raman measurement unit for large liquid and solid samples
- Measurement polarization
- Observation polarization
- Fiber optic probes
- Transmission Raman
- Macro Raman
- Heated and cryo-stages
- Gas cells
- Use with Surface Enhanced Substrates (SERS)

NRS-5500

Maximum Resolution	1 cm^{-1} 0.4 cm^{-1} (optional)
Measurement Range	50 to 8000 cm^{-1}

NRS-5600

Maximum Resolution	1 cm^{-1} 0.4 cm^{-1} (optional)
Measurement Range	10 to 8000 cm^{-1}

Models	NRS-5500	NRS-5600
Spectrograph		
Spectrograph (Focal Length)	Aberration-corrected Czerny-Turner monochrometer (f = 300 mm)	
Scanning Mechanism	High-precision direct drive	
Low Wavenumber Attachment	None	Standard (Excitation WL: 400 ~ 800 nm)
Wavenumber Range (Raman shift)	50 ~ 8000 cm^{-1}*1	10 ~ 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)	
Grating	1800 gr/mm (Option: 3600, 2400, 1200, 600, 300, 150 gr/mm)	

Models	NRS-5500	NRS-5600
Max. No. of Mountable Grating	3	
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 Lasers 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)	

Models	NRS-5500	NRS-5600
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 (Main Unit Only)	880(W) × 890(D) × 670(H) mm	1360(W) × 890(D) × 670(H) mm
Weight (Main Unit Only)	About 200 kg	About 240 kg
Power Requirement	AC100 V ±10 V, 200 V ±20 V, 200 VA	

NRS-7000 Series Confocal Raman Microscope

The innovative instrument design ensures freedom from daily adjustments and alignment. A specially designed honeycomb optical base plate is the foundation for the entire instrument guaranteeing alignment and stability. The laser(s), enclosed microscope, software-switched optics and a unique aberration-corrected polychromator with CCD detector provide an integrated package compact enough to fit on a laboratory bench.

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NRS-7000 Series Raman with f500 spectrograph

With superb stability and effortless software controlled optics, the NRS Series Raman systems offer performance second to none, with no time-consuming realignment. Simply insert the sample, focus, and collect the spectrum. The integrated, automated XYZ mapping stage with auto-focusing option allows full PC control. Complete operator safety is maintained by the fully enclosed automated sample chamber door which provides a 120 degree opening to allow full microscope access.

All NRS Series Raman instruments include a color CCD sample viewing system with image capture capability. For additional flexibility, a trinocular microscope attachment can be added for direct binocular viewing. Utilizing the same basic optical system, we've designed a family of micro-Raman spectrometers that offer a range of capabilities from simple, single laser, single grating instruments to advanced research grade systems with low wave number measurement, wavelength extension from the deep UV to NIR, and the ability to use or add up to 6 lasers.

For application expansion, an automated multi-grating turret, 2 internally mounted 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.

System Features

- Exceptional wavenumber accuracy with a high-precision rotary-encoder direct drive mechanism
- Wide wavenumber range up to 8000 cm^{-1}
- Automated XYZ with joystick and mouse/keyboard control
- Spectra Manager™ operating system for measurement and confocal imaging
- Low wavenumber measurement, close to the Rayleigh scatter(NRS-7600)
- Auto-alignment of microscope laser introduction optics and Raman scattering light path
- Wavenumber calibration using an internal Ne lamp
- Unique Dual Spatial Filter (DSF) providing higher spatial resolution than conventional confocal optics, especially in the Z axis
- Patented Spatial Resolution Image (SRI) function for simultaneous observation of sample image, laser spot and aperture image

Options

- The Objective revolver can be mounted with a range of objective lenses matched to the measurement range (including dedicated NIR) and with a variety of magnification and working distances from x5 to x100
- Up to 8 lasers (9 wavelengths) each with a selected Edge or Notch filter
- Trinocular for direct observation

- Laser wavelengths from deep UV to 1064nm
- Detectors include CCD, EM-CCD and InGaAs
- Macro-Raman measurement unit for large liquid and solid samples
- Measurement polarization
- Observation polarization
- Fiber optic probes
- Transmission Raman
- Macro Raman
- Heated and cryo-stages
- Gas cells
- Use with Surface Enhanced Substrates (SERS)

NRS-7500

Resolution	0.7 cm -1/ 0.3 cm -1 (optional)
Measurement Range	50 to 8000 cm -1

NRS-7600

Resolution	0.7 cm -1/ 0.3 cm -1 (optional)
Measurement Range	5 to 8000 cm -1

Models	NRS-7500	NRS-7600
Spectrograph		
Spectrograph (Focal Length)	Aberration-corrected Czerny-Turner monochrometer (f = 500 mm)	
Scanning Mechanism	High-precision direct drive	
Low Wavenumber Attachment	None	Standard (Excitation WL: 400 ~ 800 nm)
Wavenumber Range (Raman Shift)	50 ~ 8000 cm^{-1}*1	10 ~ 8000 cm^{-1}*2
Maximum Resolution	0.7 cm^{-1} (532 nm excitation, 1800 gr/mm, 1024 pixel CCD) 0.3 cm^{-1} optional (532 nm 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	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	

Models	NRS-7500	NRS-7600
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		

Models	NRS-7500	NRS-7600
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, 3D imaging (including 3D Raman image display, 3D 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 (Main Unit Only)	1060(W) × 1220(D) × 670(H) mm	1540(W) × 122 (D) × 670(H) mm
Weight (Main Unit Only)	About 230 kg	About 270 kg
Power Requirement	AC100 V ±10 V, 200 V ±20 V, 200 VA	

По вопросам продаж и поддержки обращайтесь:

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