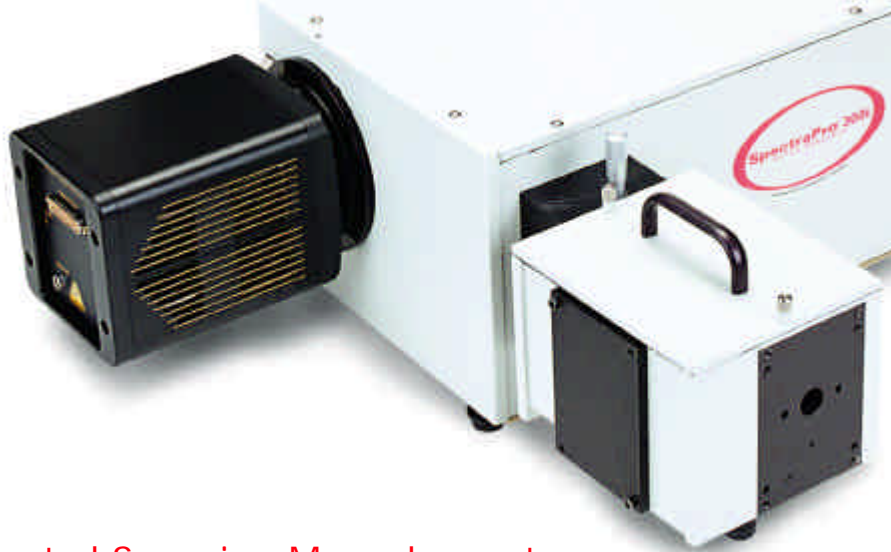


Acton Research SpectraPro®

Monochromators and Spectrographs . . .
Higher Throughput, Resolution, and Precision



Automated Scanning Monochromators And Flat-Field Imaging Spectrographs

The Acton Research SpectraPro®
Precision and Unlimited Versatility

The SpectraPro series of monochromators and spectrographs are recognized as industry standards for rugged, high-performance operation and versatility. Each features an automated, multiple-grating turret for extended spectral coverage. Four standard focal lengths and a host of unique, customized features make SpectraPro spectrometers ideal for environmental, industrial, educational, and research applications. Through innovative engineering, these monochromators and spectrographs can be incorporated into completely integrated spectroscopy systems customized to suit your specific application.

SpectraPro 150

The SpectraPro 150 is a 150-mm, f/4-aperture imaging monochromator and spectrograph that features a high-throughput imaging optical system, interchangeable dual-grating turrets, and easy computer control. The SpectraPro 150 is ideal for a wide range of CCD and scanning applications, including illumination, absorption/transmission, fluorescence, reflection, and source characterization.

SpectraPro 300i

The SpectraPro 300i is a 300-mm, f/4-aperture, triple-grating monochromator and spectrograph that features dual exit ports for maximum versatility and convenience, a large 14 x 27-mm focal plane, and an imaging optical system designed for multichannel CCD spectroscopy. Polished aspheric mirrors are used to achieve superior imaging with low scatter. Excellent spatial resolution allows for multiple fiberoptic inputs. This spectrometer is ideal for CCD applications, including Raman, fluorescence, emission, and absorption/transmission.



SpectraPro 150 Specifications

| | |
|---------------------|---|
| (1200-g/mm grating) | |
| Focal length | 150 mm |
| Aperture ratio | f/4 |
| Optical design | imaging Czerny-Turner with aspheric mirrors |
| Scan range | 0 to 1400-nm mechanical range |
| Resolution | 0.4 nm @ 435.8 nm, 10- μ m slits |
| Dispersion | 5 nm/mm (nominal) |
| Accuracy | \pm 0.25 nm |
| Repeatability | \pm 0.05 nm |
| Drive-step size | 0.005 mm |
| Focal-plane size | 25 mm wide x 10 mm high |
| Standard slits | manual; adjustable from 10 μ m to 3 mm wide; 4- or 14-mm slit heights |
| Grating size | 32 x 32 mm |
| Grating mount | dual-grating turret |
| Grating turrets | interchangeable (standard) |
| Size | 7 in (178 mm) long; 7 in (178 mm) wide; 6.5 in (165 mm) high; 4-in (102-mm) optical axis height |
| Weight | 10 lb (4.5 kg) |

SpectraPro 300i Specifications

| | |
|---------------------|--|
| (1200-g/mm grating) | |
| Focal length | 300 mm |
| Aperture ratio | f/4 |
| Optical design | imaging Czerny-Turner with aspheric mirrors |
| Scan range | 0 to 1400-nm mechanical range |
| Resolution | 0.1 nm @ 435.8 nm, 10- μ m slits |
| Dispersion | 2.7 nm/mm (nominal) |
| Accuracy | \pm 0.2 nm |
| Repeatability | \pm 0.05 nm |
| Drive-step size | 0.0025 mm |
| Focal-plane size | 27 mm wide x 14 mm high |
| Standard slits | adjustable from 10 μ m to 3 mm wide; 4- or 14-mm slit heights; motorized (optional) |
| Grating size | 68 x 68 mm; 68 x 84 mm (optional) |
| Grating mount | triple-grating turret |
| Grating turrets | interchangeable (optional) |
| Size | 13.25 in (337 mm) long; 10 in (254 mm) wide; 8 in (203 mm) high; 4.875-in (123.8-mm) optical axis height |
| Weight | 35 lb (15.9 kg) |

SpectraPro 500i Specifications

(1200-g/mm grating)

| | |
|------------------|---|
| Focal length | 500 mm |
| Aperture ratio | f/6.5 |
| Optical design | imaging Czerny-Turner with aspheric mirrors |
| Scan range | 0 to 1400-nm mechanical range |
| Resolution | 0.05 nm @ 435.8 nm, 10- μ m slits |
| Dispersion | 1.7 nm/mm (nominal) |
| Accuracy | \pm 0.2 nm |
| Repeatability | \pm 0.05 nm |
| Drive-step size | 0.0025 nm |
| Focal-plane size | 27 mm wide x 14 mm high |
| Standard slits | adjustable from 10 μ m to 3 mm wide; 4- or 14-mm slit heights; motorized (optional) |
| Grating size | 68 x 68 mm; 68 x 84 mm (optional) |
| Grating mount | triple-grating turret |
| Grating turrets | interchangeable (optional) |
| Size | 21 in (534 mm) long; 11 in (280 mm) wide; 8 in (203 mm) high; 4.875-in (123.8-mm) optical axis height |
| Weight | 40 lb (18 kg) |

SpectraPro 750 Specifications

(1200-g/mm grating)

| | |
|------------------|--|
| Focal length | 750 mm |
| Aperture ratio | f/9.7 |
| Optical design | computer-optimized Czerny-Turner |
| Scan range | 0 to 1400-nm mechanical range |
| Resolution | 0.023 nm |
| Dispersion | 1.1 nm/mm |
| Accuracy | \pm 0.1 nm |
| Repeatability | \pm 0.05 nm |
| Drive-step size | 0.0025 nm |
| Focal-plane size | 27 mm wide x 14 mm high |
| Standard slits | adjustable from 10 μ m to 3 mm wide; 4- or 14-mm slit heights; motorized (optional) |
| Grating size | 68 x 68 mm; 68 x 84 mm (optional) |
| Grating mount | triple-grating turret |
| Grating turrets | interchangeable (standard) |
| Size | 30 in (762 mm) long; 11 in (280 mm) wide; 8 in (203 mm) high; 4.12-in (105-mm) optical axis height |
| Weight | 45 lb (20.5 kg) |

SpectraPro 500i

The SpectraPro 500i is a 500-mm, f/6.5-aperture, triple-grating monochromator and spectrograph that features a high-throughput imaging optical system for multichannel spectroscopy, optional dual entrance and exit ports for maximum versatility, and easy-to-use computer control. The SpectraPro 500i combines high spectral resolution with exceptional imaging capabilities, making it the ideal choice for multichannel CCD applications. The SpectraPro 500i works especially well for Raman, laser fluorescence, atomic emission, absorption/transmission, and photoluminescence.

SpectraPro 750

The SpectraPro 750 is a 750-mm, f/9.7-aperture, triple-grating monochromator and spectrograph that features a versatile multiport optical system, 0.0025-nm drive-step size, built-in computer compatibility, and a wide scanning range. As a monochromator, it offers built-in stepping-motor scanning and 0.023-nm resolution, plus easy integration into automated spectral-data-acquisition systems. As a spectrograph, the SpectraPro 750 provides 1.1-nm/mm dispersion, a large 14-mm-high by 27-mm-wide focal plane, and interchangeable turrets. The SpectraPro 750 is ideal for Raman, laser fluorescence, atomic emission, and photoluminescence.



Dispersion (nm/mm) and Coverage (nm) on a 1-inch Focal Plane for Specific Gratings (g/mm) in SpectraPro Spectrographs*

| Model | 150 g/mm | 300 g/mm | 600 g/mm | 1200 g/mm | 1800 g/mm | 2400 g/mm | 3600 g/mm |
|----------------|-----------|-----------|-----------|-----------|-----------|------------|------------|
| SP-150 | 40 nm/mm | 19 nm/mm | 9 nm/mm | 4 nm/mm | 2.2 nm/mm | 1.2 nm/mm | 1.1 nm/mm |
| | 1000 nm | 483 nm | 229 nm | 100 nm | 56 nm | 30 nm | 28 nm |
| SP-300i | 21 nm/mm | 11 nm/mm | 5 nm/mm | 2.3 nm/mm | 1.4 nm/mm | 0.85 nm/mm | 0.7 nm/mm |
| | 533 nm | 279 nm | 127 nm | 58 nm | 36 nm | 22 nm | 18 nm |
| SP-500i | 13 nm/mm | 6.5 nm/mm | 3.2 nm/mm | 1.5 nm/mm | 0.9 nm/mm | 0.6 nm/mm | 0.45 nm/mm |
| | 330 nm | 165 nm | 81 nm | 38 nm | 23 nm | 15 nm | 11.5 nm |
| SP-750 | 8.8 nm/mm | 4.4 nm/mm | 2.2 nm/mm | 1 nm/mm | 0.6 nm/mm | 0.4 nm/mm | 0.3 nm/mm |
| | 224 nm | 112 nm | 56 nm | 25 nm | 15.2 nm | 10 nm | 7.6 nm |

* All specifications are nominal.

SpectraPro Advantages

- High throughput
- High resolution
- 68 x 84-mm gratings for constant aperture (optional)
- Positrack grating interchange
- Interchangeable turrets (optional)
- No-compromise multichannel resolution
- Exclusive Acton Research high-reflectivity coatings
- Over 100 gratings to choose from
- Highest precision motorized slits (optional)
- RS232C and IEEE488 communications
- SpectraPro control software
- Labview drivers

Higher Throughput

All SpectraPro monochromators and spectrographs have high-aperture optics, and feature corrected and computer-optimized optics to reduce astigmatism. The SpectraPro models 300i, 500i, and 750 can be equipped with optional 68 x 84-mm gratings to ensure that the full aperture of the spectrometer is maintained even at longer wavelengths. Other spectrometers typically suffer as much as a 30% loss in aperture at the longer wavelengths. All SpectraPro monochromators and spectrographs also feature enhanced UV-to-VIS reflective coatings with 90% or better average reflectance. Specialized gold and silver reflective coatings for IR and NIR wavelengths are available as options.

No-Compromise Resolution

In high-aperture imaging spectrographs, the off-axis aberrations can compromise system performance. The best focal plane for spectral resolution is not the same as the best focal plane for spatial resolution of multiple fiber inputs. Only SpectraPro offers interchangeable focal-plane adapters optimized for your particular needs. Anything less is a compromise in performance.

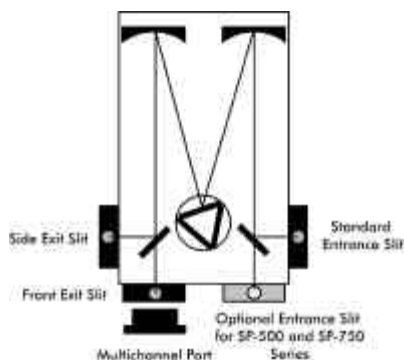
Positrack Grating Interchange

The advantage of having a multiple-grating turret is to be able to quickly change gratings. The wavelength of the spectrometer from grating to grating interchange should be maintained to the same precision as expected on a single grating. The entire SpectraPro line meets this stringent requirement while other competing systems may not. With Positrack, you are always in calibration.

Versatility

The SpectraPro 300i, 500i, and 750 series are available in multiple-port configurations. All can be configured with two exit ports for use with CCDs and single-channel detectors. The 500i and 750 can also be configured with two entrance ports. Whether you need two detectors for extended spectral coverage or a CCD/PMT combination, there is a SpectraPro to meet your requirements.

Port Configuration Diagram



| Model # | Configuration | Options |
|----------------------------|--|---|
| SP-150M | Monochromator with side entrance slit and front exit slit | |
| SP-150S | Spectrograph with side entrance slit and front exit multichannel-detector port | |
| SP-305 SP-555 SP-755 | Monochromator with side entrance slit and front exit slit | Optional front entrance slit available on SP-555 and SP-755 |
| SP-306 SP-556 SP-756 | Spectrograph with side entrance slit and multichannel-detector port on front exit | Optional front entrance slit available on SP-556 and SP-756 |
| SP-307 SP-557 SP-757 | Dual-exit-port monochromator with side entrance slit and side and front exit slits | Optional front entrance slit available on SP-557 and SP-757 |
| SP-308 SP-558 SP-758 | Monochromator/spectrograph with side entrance slit, side exit slit and front exit multichannel-detector port | Optional front entrance slit available on SP-558 and SP-758 |

Integrated Solutions with Acton Research SpectraSense™

SpectraSense spectral-acquisition and manipulation software seamlessly integrates interactive control of your SpectraPro monochromators and spectrographs, SpectruMM™ CCDs, and the NCL™ single-channel detection system. SpectraSense provides real-time interactive control of all experimental parameters, as well as real-time data manipulation. An extremely intuitive interface allows easy access to change or verify any system components, including switching between multichannel and single-channel detection systems. It is preconfigured to acquire data for Raman, fluorescence, percent-absorption, and percent-reflection measurements on the fly. A unique process-monitoring interface employing real-time chemometrics makes SpectraSense the most versatile spectral-acquisition software available. See our Complete Spectroscopic-Acquisition Systems brochure for details on the SpectruMM detection systems and SpectraSense software.

Double Monochromators

Double monochromators are also available in both additive and subtractive models in 300-mm, 500-mm, and 750-mm configurations. Additive models feature a triple-grating turret and provide twice the dispersion of single monochromators of the same focal length. They also have the square of the stray-light rejection. Double additives are designed for high-resolution, high-purity applications.

Double subtractive systems are supplied with single-grating kinematic mounts. They provide zero dispersion and an extremely pure homogenous bandpass of light at the exit. Typical applications include prefiltering of Rayleigh scattering for Raman spectroscopy and photoluminescence. Imaging subtractives can also be used with a CCD camera to spatially map spectral characteristics of a sample.

All doubles can be ordered with exit ports on the first monochromator for single-spectrometer operation and dual exit ports for multiple detectors.

Vacuum Monochromators

Roper Scientific/Acton Research is the premier manufacturer of vacuum monochromators and spectrographs for the research and industrial markets. We offer models with focal lengths between 0.2 m and 1.3 m. Our exclusive VM504 is the only triple-grating-turret vacuum monochromator/ spectrograph available. It is capable of making measurements from the vacuum UV to the far IR without breaking vacuum.



Double Monochromator

Available Accessories

Light-input accessories:

- Raman notch filter chamber
- Nikon® camera lens adapter
- Bilateral slit assembly
- Motorized slit assembly
- Source-compensation accessory

Light sources:

- Mercury light source
- Deuterium light source
- Tungsten-halogen light sources
- Xenon light source
- Infrared light source
- Deuterium and tungsten-halogen dual light source

Universal sample chamber and sample holders

- Four-port sample chamber
- General-purpose sample holder
- Fixed-position mount w/removable sample holder
- Fixed-position microscope slide holder

Filter wheel assemblies:

- Manual six-position filter wheel
- Motorized six-position filter wheel

Single-channel detector assemblies:

- Silicon detectors
- Photomultiplier tubes (PMTs)
- Integrated photon-counting assemblies
- Solid-state infrared detectors

Fiberoptic bundles and adapters:

- Single-leg fiber bundles
- Two-leg fiber bundle
- Four-leg fiber bundle
- Fixed-position fiber adapter
- Adjustable fiber adapter
- Imaging fiber adapter

See our Spectroscopy Accessories catalog for complete details on available accessories.

USA

Roper Scientific/Acton Research
530 Main Street
Acton, MA 01720
phone: 978.263.3584
fax: 978.263.5086
email: mail@acton-research.com

BENELUX

Roper Scientific, BV
Groenekansweg 246g
3737 AL GROENEKAN, Netherlands
tel: 31.30.2202722
fax: 31.30.2211261
email: prinst@xs4all.nl

FRANCE

Princeton Instruments, SARL
Z.I. Petite Montagne Sud
4, rue de l'Oisans - C.E. 1702
91017 Evry Cedex, France
tel: 33.160.86.03.65
fax: 33.160.86.07.09
email: princeton.instruments@wanadoo.fr

GERMANY

Photometrics, GmbH
Sollner Str. 61
D-81479 München, Germany
tel: 49.89.79.95.80
fax: 49.89.79.97.15
email: photometrics_munich@compuserve.com

JAPAN

Nippon Roper, K. K.
D-10E 1-3 Nakase,
Mihama-ku, Chiba-shi
Japan 261-8501
tel: 81.43.274.8022
fax: 81.43.274.8023
email: sales@roper.co.jp

UK

Roper Scientific
P.O. Box 1192
43 High Street
Marlow, Buckinghamshire
SL7 1GB UK
tel: 44.1628.890858
fax: 44.1628.898381
email: sales@roperscientific.co.uk

For the latest product and technical information visit us at

www.roperscientific.com

Roper Scientific / Acton Research

Product Literature

Data sheets

Brochures

SpectraPro monochromators

Spectrum Acquisition Systems

Spectroscopy accessories

Guide to system configuration



ROPER SCIENTIFIC™
ACTON RESEARCH

Gratings

CCD Chips

GS 1024 x 128 Front

GS 1024 x 128 Back

GS 1024 x 256 Front

GS 1024 x 256 Back

S 1340 x 100 Front

S 1340 x 100 Back

S 1340 x 100 Red

S 1340 x 100 Back Red

S 1340 x 400 Front

S 1340 x 400 Back

S 1340 x 400 Red

S 1340 x 400 Back Red

S 1024 x 256 Front

S 1024 x 256 Open Elect.

S 1024 x 256 Back