

Spectrometry

In principle our cameras runs with all kinds of spectrometer, but it should be considered that the spectra must be focused on a straight line. The focal line of a standard monochromator is a curve. Therefore a measured spectra will be defocused on the sensor surface. The offered spectrographs have a special flat field correction for use with linear sensors (i: imaging type). We offer complete systems with camera. The camera can be unmounted and used separately in all systems of us.

For low cost spectroscopic applications we recommend the LC camera with the ILX511 sony sensor. Anyway the best choice for spectroscopy are the Hamamatsu PDA's (Photo Diode Arrays) or FFT's (CCD-arrays, FFT: Full Frame Transfer) with especially large pixel sizes and increased sensitivity.

3 spectrometer with different gratings are ideal suited for our line scan cameras.

Spectrometer:

SR163 (Andor) f/3.6:

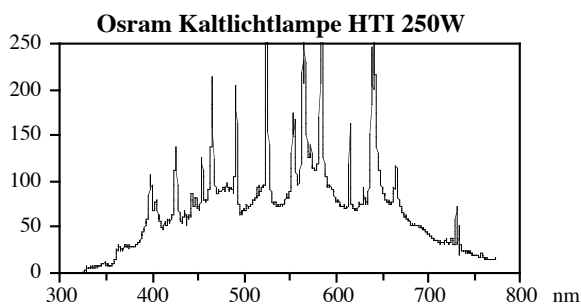
- fixed grating
+ small dimension, low price

Acton 2156 (PI) f/4.0:

+ 2 grating turnable by computer

Acton 2356/2556 (PI) f/3.9/6.5

- high price
+ 3 gratings turnable by computer



Example - spectra of a cold light lamp

The covered spectral range could be calculated by the reciprocal dispersion(**r. d.**).

Example:

The sensor S8381 has 1024 pixel with 25 μm pitch.

The length is $L = 1024 * 25 = 25600 \mu\text{m} = 25.6 \text{ mm}$.

With grating 300 l/mm a region of $r.D. * L = 19 * 25.6 = 486 \text{ nm}$ is focused to the sensor. The absolute wavelength region depends on the position of the grating.

For example it can be adjusted to 300 - 786 nm. Turning the grating will increase the region to higher wavelength. The sensor has a resolution of $486 \text{ nm} / 1024 = 0,5 \text{ nm}$.

Anyway the over all resolution is limited by the optical components and the slit width.

Inexpensive spectrometer with camera



Price for a complete low cost system

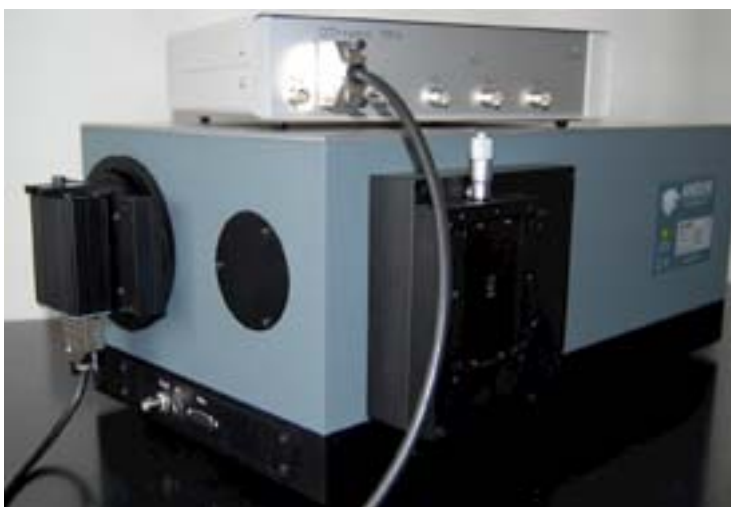
Complete spectrometer (1 grating)	€	5860,-
ILX511 camera 1000	€	1450,-
Driver (Win-version)	€	380,-
PCI interface	€	700,-
Sum	€	8390,-

Example with grating 300l and ILX 511

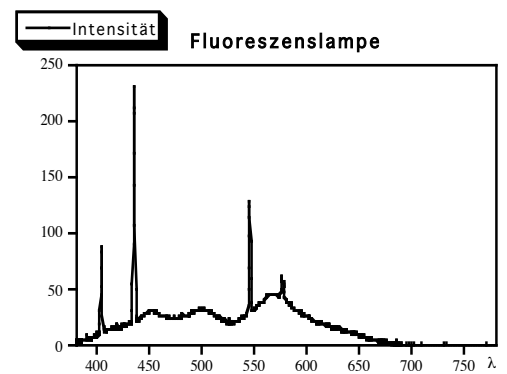
Resolution	better 1.5 nm
Intensity	12 bit (0..4096)
Length of sensor	2048 pixel á 14µm = 28.7mm
Slit width	50µm = 3.5 pixel
Spectral region	400 - 1100nm
Up to 400 spectra / second	

Camera with SR163 and camera series 2000 (16bit)
 grating with 150, 300, 600 or 1200 l/mm available

High resolution system

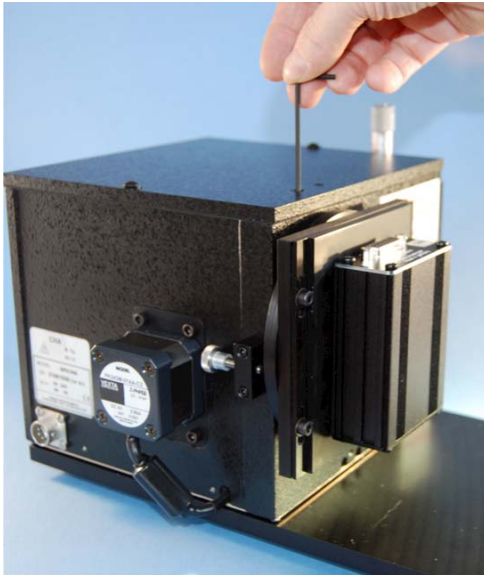


Camera with CamControl and sensor head with SR500.
 The spectrometer is computer controlled.



Spectra of a fluorescent lamp

Computer controlled Spectrometer



here: Acton spectrometer 2156 with sensor head

simple, computer controlled spectrometer for single camera or sensor head

- cover wide wavelength region
- simple adjustable camera focus
- good price/value ratio
- adjustable input slit

Gratings for spectrometer 2156/2356/2556/2756 i (i : imaging type)

Gitter	150 l/mm	300 l/mm	600 l/mm	1200 l/mm
Sp 2156i	40 nm/mm 1061 nm	19 nm/mm 519 nm	9 nm/mm 246 nm	4 nm/mm 107 nm
Sp 2356i	21 nm/mm 568 nm	11 nm/mm 281 nm	5 nm/mm 136 nm	2.3 nm/mm 62 nm
Sp 2556i	13 nm/mm 346 nm	6.4 nm/mm 171 nm	3.1 nm/mm 83 nm	1.4 nm/mm 39 nm
Sp 2756i	8.8 nm/mm 235 nm	4.4 nm/mm 1061 nm	2.1 nm/mm 57 nm	1 nm/mm 27 nm

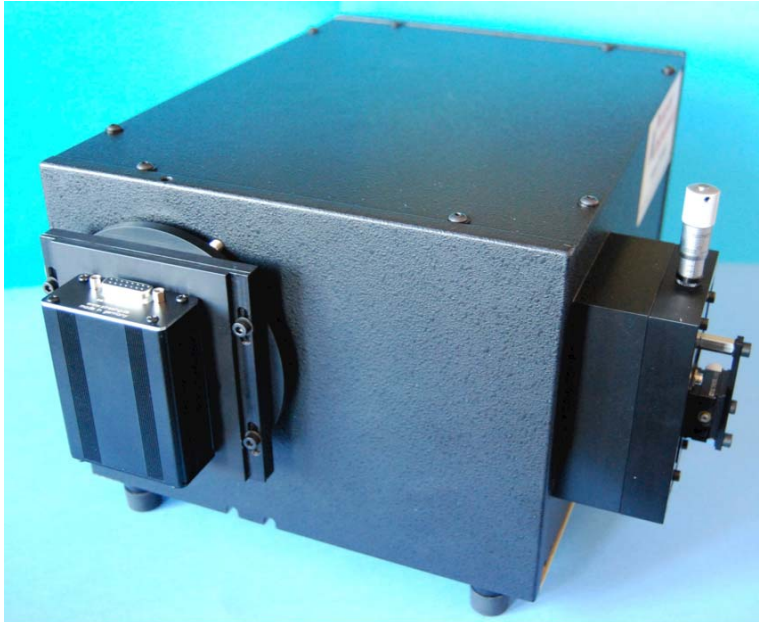
r.d. in nm/mm, covered range when using a sensor of 26.8mm length.

Dimensions 2156i : 178 x 178 x 165 mm (long x wide x high)
 Focal length / plane size : 150mm / 25mm x 10 mm (width x height)
 Effective aperture : f / 4.0
 Grating size : 32mm x 32mm

Dimensions 2356i: 337 x 254 x 203mm (long x wide x high)
 Focal length / plane size: 300 mm / 27mm x 14 mm (width x height)
 Effective aperture: f / 3.9
 Grating size: 68mm x 68mm

Dimensions 2556i : 534 x 280 x 203mm (long x wide x high)
 Focal length / plane size: 500 mm / 27mm x 14 mm (width x height)
 Effective aperture: f / 6.5
 Grating size: 68mm x 68mm

High resolution spectrometer



Shown here:

Acton 2356 with PDA double line sensor head and adjustable fiber input.

The bigger spectrometers have better resolution and can be used for our double line sensor head (2 sensors on one board). Here the build in output diaphragm must be removed.



Here you see an Oriel MS257 (Newport) with 2 exits. One has a cooled IR- Camera Series 2000CV2 (1100-2600nm) and the other a cooled FFT- Camera series 2000CV2 (200-1100nm).

The MS257 has a turret with 4 gratings and a flip mirror at the exit. All functions are motorized and can be controlled with a computer.

Prices for spectrometer

		09.2018
SR 163 (Andor)	with flange	€ 4.200,-
	adjustable Slit	€ 1.100,-
	grating 150, 300, 600 or 1200 l/mm	€ 560,-
SP 2156i (Acton)	with mount for all cameras	€ 7.000,-
	grating 150, 300, 600 or 1200 l/mm	€ 1.000,-

other spectrometer and fiber input on demand.