

AvaSpec-ULS2048LTEC SensLine Thermo-Electric Cooled Fiber-optic Spectrometer

AvaSpec-ULS2048LTEC



Long integration times in general are equivalent to higher dark noise. Avantes Thermo-Electric Cooled (TEC) spectrometers systems overcome this problem by cooling the detector. These instruments are equipped with triple stage cooling, keeping your detector at optimal 5 degrees Celsius (maximum -35°C difference from ambient temperature).

The detector cooling provides a significantly lower and more stable dark baseline and PRNU level. Dark noise is reduced by a factor of 2-3. This allows the ULS2048LTEC to be used in very low light conditions, such

as fluorescence and Raman measurements. If needed, integration times of more than 5 seconds are possible.

The AvaSpec-ULS2048LTEC has an integrated temperature regulator, USB2.0 high-speed interface and two cooling fans to actively ventilate the heat sink of the Peltier cooling elements. The spectrometer power supply is integrated into the housing.

Technical Data

Optical Bench	ULS Symmetrical Czerny-Turner, 75 mm focal length
Wavelength range	200-1100 nm
Resolution	0.06 -20 nm, depending on configuration (see table)
Stray-light	0.04-0.1%, depending on the grating
Sensitivity	470,000 counts/μW per ms integration time
Detector	CCD linear array, 2048 pixels
Temperature cooled CCD	Max. ΔT = -35 °C versus ambient
Time to stabilize	4 minutes
Dark baseline improvement @ ΔT=-35°C and it>5 sec	> Factor 6
PRNU improvement @ ΔT=-35°C and it>5 sec	> Factor 8
3-stage Peltier cooling internal Power supply @ ΔT=-35°C	5VDC, 3.0A
Signal/Noise	300:1
AD converter	16-bit, 2 MHz
Integration time	1.11 ms - 10 minutes
Interface	USB 2.0 high-speed, 480 Mbps RS-232, 115.200 bps
Sample speed with store to RAM	1.1 ms /scan
Data transfer speed	1.8 ms /scan (USB2) 430 ms/scan (RS-232)
Digital IO	HD-26 connector, 2 Analog in, 2 Analog out, 3 Digital in, 12 Digital out, trigger, sync.
Power supply	100-240 VAC, 50W
Dimensions, weight	250 x 179 x 144 mm, 3.6 kg

Our TEC-spectrometers are kept at a steady 5°C for maximum precision

Grating selection table for AvaSpec-ULS2048LTEC

Use	Useable range (nm)	Spectral range (nm)	Lines/mm	Blaze (nm)	Order code
UV/VIS/NIR	200-1100**	900**	300	300	UA
UV/VIS/NIR	200-1100**	900**	300	300/1000	UNA-DB
UV/VIS	200-850	520	600	300	UB
UV	200-750	250-220*	1200	250	UC
UV	200-650	165-145*	1800	UV	UD
UV	200-580	115-70*	2400	UV	UE
UV	200-400	70-45*	3600	UV	UF
UV/VIS	250-850	520	600	400	BB
VIS/NIR	300-1100**	800**	300	500	VA
VIS	360-1000	500	600	500	VB
VIS	300-800	250-200*	1200	500	VC
VIS	350-750	145-90*	1800	500	VD
VIS	350-640	75-50*	2400	VIS	VE
NIR	500-1050	500	600	750	NB
NIR	500-1050	220-150*	1200	750	NC
NIR	600-1160	350-300	830	800	SI
NIR	600-1100**	500**	300	1000	IA
NIR	600-1100	500	600	1000	IB

* depends on the starting wavelength of the grating; the higher the wavelength, the bigger the dispersion and the smaller the range to select.

** please note that not all 2048 pixels will be used for the useable range

Resolution table (FWHM in nm) for AvaSpec-ULS2048LTEC

Grating (lines/mm)	Slit size (µm)					
	10	25	50	100	200	500
300	1.0	1.4	2.5	4.8	9.2	21.3
600	0.40-0.53*	0.7	1.2	2.4	4.6	10.8
830	0.32	0.48	0.93	1.7	3.4	8.5
1200	0.20-0.28*	0.27-0.38*	0.52-0.66*	1.1	2.3	5.4
1800	0.10-0.18*	0.20-0.29*	0.34-0.42*	0.8	1.6	3.6
2400	0.09-0.13*	0.13-0.17*	0.26-0.34*	0.44-0.64*	1.1	2.7
3600	0.06-0.08*	0.10	0.19	0.4	0.8	1.8

* depends on the starting wavelength of the grating; the higher the wavelength, the bigger the dispersion and the better the resolution

Ordering Information

- AvaSpec-ULS2048LTEC-USB2**
- Thermo-Electric Cooled Fiber-optic Spectrometer, 75 mm Ultra-Low Stray-light AvaBench, 2048L pixel 3-stage TE-cooled and regulated CCD detector, USB2 high-speed interface, incl. AvaSoft-Basic, USB cable, desktop housing.
 - Specify grating, wavelength range and options

Options

- DUV** • Deep-UV detector coating >150 nm
- DCL-UV/VIS-200** • Detector Collection Lens to enhance sensitivity, Quartz, 200-1100 nm
- SLIT-XX** • Slit size, please specify XX = 10, 25, 50, 100, 200 or 500 µm
- OSF-YYY** • Order-sorting filter for reduction of 2nd order effects, please specify YYY= 305, 395, 475, 515, 550 or 600 nm
- OSC** • Order-sorting coating with 600 nm long-pass filter for BB (>350 nm) and VB gratings in AvaSpec-ULS2048L, recommended with OSF-305
- OSC-UA** • Order-sorting coating with 350 and 600 nm long-pass filter for UA, VA gratings in AvaSpec-ULS2048L
- OSC-UB** • Order-sorting coating with 350 and 600 nm long-pass filter for UB or BB (<350 nm) gratings in AvaSpec-ULS2048L
- FCPC** • FC/PC fiber optic connector
- RS** • Replaceable Slit