

# 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

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