AvaSpec-ULS3648TEC SensLine Thermo-Electric Cooled Fiber-optic Spectrometer

AvaSpec-ULS 3648TEC

The AvaSpec-ULS3648TEC spectrometer is one of the newest spectrometers in the SensLine. The instrument features our re-designed three-stage Peltier cooling device integrated into our exclusive ultra-low stray-light optical bench, which can reduce the temperature of the CCD chip by -35 °C against ambient, improving the dark base-line and PRNU level by a significant factor. The detector cooling also reduces the dark noise by a factor of 2-3.

The size of the ULS3648TEC is reduced by more than 35% compared with Avantes previous TEC spectrometers.

The above mentioned features make the AvaSpec-ULS3648TEC an excellent choice for low light-level applications, such as fluorescence and Raman measurements, where integration times of more than 5 seconds may be needed. The AvaSpec-ULS3648TEC can be delivered as 1- or 2-channel instrument and has all the standard options, gratings and specifications of the standard AvaSpec-ULS3648.
The AvaSpec-ULS3648TEC is built into a newly designed housing with an integrated temperature regulator, USB2 high-speed communication, dual cooling fans and an integrated power supply.

Technical Data

Optical Bench	ULS Symmetrical Czerny-Turner, 75 mm focal length
Wavelength range	200-1100 nm
Resolution	0.05 –20 nm, depending on configuration (see table)
Stray-light	0.04-0.1%, depending on the grating
Sensitivity	160,000 counts/µW per ms integration time
Detector	CCD linear array, 3648 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	350:1
AD converter	16-bit, 1 MHz
Integration time	10 µs – 10 minutes
Interface	USB 2.0 high-speed, 480 Mbps RS-232, 115.200 bps
Sample speed with store to RAM	3.7 ms /scan
Data transfer speed	3.7 ms /scan (USB2) 750 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

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Grating selection table for AvaSpec-ULS3648TEC

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 3648 pixels will be used for the useable range*

Resolution table (FWHM in nm) for AvaSpec-ULS3648TEC

	Slit size (µm)					
Grating (lines/mm)	10	25	50	100	200	500
300	0.60 – 0.70*	1.10-1.30*	2.20-2.40*	4.60	9.00	20.0
600	0.30 – 0.36*	0.58-0.68*	1.17	2.20	4.50	10.0
830	0.25	0.48	0.93	1.70	3.40	8.0
1200	0.14 – 0.18*	0.30	0.62	1.08	2.20	5.0
1800	0.09 – 0.11*	0.18	0.36-0.40*	0.78	1.50	3.7
2400	0.07 – 0.09*	0.13 – 0.15*	0.26-0.32*	0.40-0.64*	1.10	2.7
3600	0.05 – 0.06*	0.10	0.19	0.40	0.80	2.0

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

Ordering Information

AvaSpec-ULS3648TEC-USB2	• Thermo-Electric Cooled Fiber-optic Spectrometer, 75 mm Ultra-Low Stray-light AvaBench, 3648 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 (>305 nm) and VB gratings in AvaSpec-ULS3648, recommended with OSF-305
OSC-UA	• Order-sorting coating with 350 and 600 nm long-pass filter for UA, VA gratings in AvaSpec-ULS3648
OSC-UB	• Order-sorting coating with 350 and 600 nm long-pass filter for UB or BB (<350 nm) gratings in AvaSpec-ULS3648
-FCPC	• FC/PC fiber optic connector
- RS	• Replaceable slit