NEW

# AvaSpec-ULS2048x64TEC-EVO SensLine Thermoelectrically Cooled Fiber-Optic Spectrometer

The AvaSpec-ULS2048x64TEC-EVO is an updated version of our AvaSpec-ULS2048x64TEC spectrometer, with improved electronics and cooling.

This instrument enhances the Sensline series with its cooled, back-thinned detector. The back-thinned detecor has good sensitivity in the UV and IR region. The 64 pixelheight (0.89 mm) enables catching as many photons as possible while the cooling enables long integration times up to 120 seconds with low-noise levels.

The instrument features Peltier cooling device integrated into our exclusive ultra-low stray light optical bench, which can reduce the temperature of the CCD chip to -30°C against ambient, improving the dark baseline and PRNU level significantly. The detector cooling also reduces the dark noise by a factor of 2-3.

The AvaSpec-ULS2048x64TEC-EVO uses a special low-noise version of the 2048x64 detector with integrated cooling.

All the features mentioned above make this instrument ideally suited for measuring low-light applications, such as fluorescence or low-light Raman measurements.

Optimal flexibility is guaranteed with the replaceable slit, making the instrument suitable for various kinds of applications.

The above mentioned qualities make the AvaSpec-ULS2048x64TEC-EVO 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.

**AvaSpec-ULS2048x64TEC-EVO**

## Technical Data

| | |
|---|---|
| **Optical bench** | ULS Symmetrical Czerny-Turner, 75 mm focal length |
| **Wavelength range** | 200-1160 nm |
| **Resolution** | 0.09 –20 nm, depending on configuration (see table) |
| **Stray light** | <1%, depending on the grating |
| **Sensitivity** | 300,000 counts/µW per ms integration time |
| **Detector** | Backthinned CCD, 2048x64 pixels, low noise, integrated cooling |
| **Temperature-cooled CCD** | Max. ΔT = -30°C versus ambient. Optimal setting: 5°C |
| **Signal/noise** | 550:1 |
| **AD converter** | 16-bit, 500 KHz |
| **Dynamic range** | 19,000 |
| **Dark noise** | 5 cnts |
| **Integration time** | 9.7 ms–120 s |
| **Interface** | USB 3.0 high speed, 5 Gbps<br>Gigabit Ethernet 1 Gbps |
| **Sample speed with on-board averaging** | 9.7 ms/scan |
| **Data transfer speed** | 9.7 ms/scan (USB3)<br>9.7 ms/scan (ETH) |
| **Digital IO** | HD-26 connector, 2 Analog in, 2 Analog out, 13 Digital bidirectional, trigger, sync., strobe, laser |
| **Power supply** | 12 VDC, 1.5 A |
| **Operating temperature** | 0-40°C |
| **Cooling** | 30°C versus ambient |
| **Dimensions, weight** | 185 x 145 x 185 mm, 3500 grams |

## Grating Selection Table for AvaSpec-ULS2048x64TEC-EVO

| Use | Useable range (nm) | Spectral range (nm) | Lines/mm | Blaze (nm) | Order code |
|---|---|---|---|---|---|
| UV/VIS/NIR | 200-1160** | 960** | 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 | 300-1160** | 860** | 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 | 600-1160** | 560** | 300 | 1000 | IA |
| NIR | 600-1160 | 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-ULS2048x64TEC

| | Slit size (µm) | | | | | |
|---|---|---|---|---|---|---|
| **Grating (lines/mm)** | **10** | **25** | **50** | **100** | **200** | **500** |
| **300** | 1.40 | 1.50 | 2.5 | 4.8 | 9.2 | 21.3 |
| **600** | 0.70-0.80* | 0.75-0.85* | 1.2 | 2.4 | 4.6 | 10.8 |
| **830** | 0.42-0.48* | 0.50-0.58* | 0.93 | 1.7 | 3.4 | 8.5 |
| **1200** | 0.25-0.31* | 0.37-0.43* | 0.52-0.66* | 1.1 | 2.3 | 5.4 |
| **1800** | 0.17-0.21* | 0.26-0.32* | 0.34-0.42* | 0.8 | 1.6 | 3.6 |
| **2400** | 0.12-0.18* | 0.18-0.24* | 0.26-0.34* | 0.44-0.64* | 1.1 | 2.7 |
| **3600** | 0.09-0.12* | 0.11-0.15* | 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-ULS2048x64TEC-EVO** | Thermoelectrically cooled fiber-optic spectrometer, 75 mm ultra-low stray light AvaBench, 2048x64 pixel, TE-cooled and regulated low-noise CCD detector, USB3/ETH high-speed interface and replaceable slit, incl. AvaSoft-Basic, USB cable, desktop housing. Specify grating, wavelength range and options |

## Options

| | |
|---|---|
| **DCL-UV/VIS-200** | • Detector Collection Lens to enhance sensitivity, Quartz, 200-1100 nm |
| **SLIT-XX-RS** | • Replaceable slit with SMA connector. Specify slit size XX= 10, 25, 50, 100, 200 or 500 µm |
| **SLIT-XX-RS-FCPC** | • As SLIT-XX-RS, but with FC/PC connector |
| **OSF-YYY** | • Order-sorting filter for reduction of 2nd order effects, 1 mm thick, 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, recommended with OSF-305 |
| **OSC-UA** | • Order-sorting coating with linear variable filter for UA, VA gratings |
| **OSC-UB** | • Order-sorting coating with 350 and 600 nm long-pass filter for UB or BB (<350 nm) gratings |

PHOTO TECHNICA www.phototechnica.co.jp フォトテクニカ株式会社
〒336-0017 埼玉県さいたま市南区南浦和 2-18-2
TEL:048-871-0067 FAX:048-871-0068
e-mail:voc@phototechnica.co.jp



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