

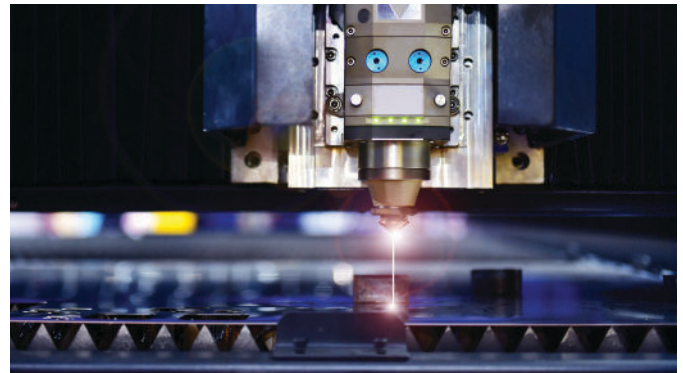
# Avantes LIBS Instruments

**AVANTES**<sup>USA</sup>  
MEMBER OF THE NYNOMIC GROUP

## Data Sheet

### Laser Induced Breakdown Spectroscopy

Laser-induced breakdown spectroscopy (LIBS) is a popular elemental analysis technique that uses a short laser pulse to create micro-plasma on a sample's surface. It is widely used across industries and offers several advantages over other elemental analysis methods. Avantes has been supporting the LIBS application for 25 years.



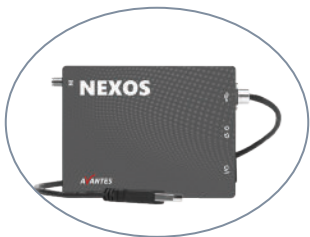
### Avantes Advantages:

- Multi-channel capabilities for high resolution
- Superior timing and triggering (21 ns jitter)
- Flexibility in spectrometer configuration (200-1100nm)
- Resolution as high as 0.05 nm (FWHM)
- Extensive knowledge on LIBS applications
- Custom fiber optic cable for all types of environments

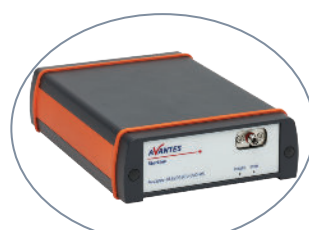
### Spectrometer Model Recommendations



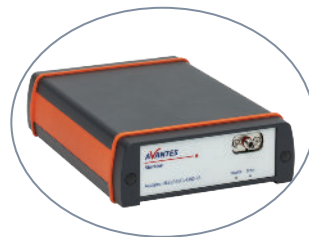
**AvaSpec-VARIUS™**  
2048 and 4096 pixel options  
190-1100 nm



**AvaSpec-NEXOS™**  
2048 and 4096 pixel options  
190-1100 nm



**AvaSpec-ULS4096CL-EVO**  
4096 pixels  
190-1100 nm



**AvaSpec-ULS2048CL-EVO**  
2048 pixels  
190-1100 nm

### Multi-Channel Housing Configurations Examples (ULS instrument only)



Dual Channel Housing  
For ULS Spectrometers



4-Channel Desktop Housing  
for ULS Spectrometers



8-Channel Rackmount for  
ULS Spectrometers

# Examples of Single and Multi-Channel Configurations

## Contact a Sales Engineer for More Options

### Single Channel Configurations

| Broadband Example |                |                                           |                                              |
|-------------------|----------------|-------------------------------------------|----------------------------------------------|
| Grating           | Spectral Range | Resolution w/ 10µm slit                   | Resolution w/ 25µm slit                      |
| 1200 line/mm UC   | 200-450nm      | 2048: 0.20-28nm; 4096: 0.14-0.18nm (FWHM) | 2048: 0.27-0.38nm; 4096: 0.14-0.18 nm (FWHM) |
| 1800 line/mm UD   | 200-365nm      | 2048: 0.10-18nm; 4096: 0.09-0.11nm (FWHM) | 2048: 0.10-18nm; 4096: 0.20-0.29 nm (FWHM)   |

\* These configurations require a slit selection (10 or 25 micron typically), cylindrical lens (DCL-UV/VIS), Order sorting coatings (OSC-UA, OSC-UC)

### Dual Channel Configurations

| Targeted Range Choose between 200-1100nm (Example 190-410nm) |                         |                |                                      |                                      |
|--------------------------------------------------------------|-------------------------|----------------|--------------------------------------|--------------------------------------|
|                                                              | Grating                 | Spectral Range | Resolution w/ 10µm slit              | Resolution w/ 25µm slit              |
| Channel 1                                                    | 2400 line/mm UE grating | 190-311 nm     | 2048: 0.09-0.13nm; 4096: 0.07-0.09nm | 2048: 0.13-0.17nm; 4096: 0.13-0.17nm |
| Channel 2                                                    | 2400 line/mm NB grating | 305-410nm      | 2048: 0.09-0.13nm; 4096: 0.07-0.09nm | 2048: 0.13-0.17nm; 4096: 0.13-0.17nm |

\* These configurations require a slit selection (10 or 25 micron typically), cylindrical lens (DCL-UV/VIS), Order sorting coatings (OSC-UB) or order sorting longpass filters (OSF-XX)

\*\*Due to pixel size resolution for 10 or 25 micron slit is the same but 25 micron slit increases signal throughput by 2.5

### Four-Channel Configuration Example

| 6-Channel Configuration Example (200-1050 nm) |                         |                |                                     |                            |
|-----------------------------------------------|-------------------------|----------------|-------------------------------------|----------------------------|
|                                               | Grating                 | Spectral Range | Resolution w/ 10µm slit             | Resolution w/ 25µm slit    |
| Channel 1                                     | 1200 line/mm UC grating | 200-466nm      | 2048: 0.2-0.28nm; 4096: 0.14-0.18nm | 2048: 0.30nm; 4096: 0.30nm |
| Channel 2                                     | 1200 line/mm UC grating | 460-694nm      | 2048: 0.2-0.28nm; 4096: 0.14-0.18nm | 2048: 0.30nm; 4096: 0.30nm |
| Channel 3                                     | 1200 line/mm UC grating | 690-890nm      | 2048: 0.2-0.28nm; 4096: 0.14-0.18nm | 2048: 0.30nm; 4096: 0.30nm |
| Channel 4                                     | 1200 line/mm UC grating | 885-1050nm     | 2048: 0.2-0.28nm; 4096: 0.14-0.18nm | 2048: 0.30nm; 4096: 0.30nm |

\* These configurations require a slit selection (10 or 25 micron typically), cylindrical lens (DCL-UV/VIS), and order sorting longpass filters (OSF-XX)

\*\*Due to pixel size resolution for 10 or 25 micron slit is the same but 25 micron slit increases signal throughput by 2.5

### Eight-Channel Configuration Example

| 8-Channel Desktop Housing Example |                         |                |                                        |                                        |
|-----------------------------------|-------------------------|----------------|----------------------------------------|----------------------------------------|
|                                   | Grating                 | Spectral Range | Resolution w/ 10µm slit                | Resolution w/ 25µm slit                |
| Channel 1                         | 3600 line/mm UF grating | 190-262 nm     | 2048: 0.06-0.08 nm; 4096: 0.05-0.06 nm | 2048: 0.1 nm; 4096: 0.1 nm             |
| Channel 2                         | 2400 line/mm UE grating | 257-369 nm     | 2048: 0.09-0.13 nm; 4096: 0.07-0.09 nm | 2048: 0.13-0.17 nm; 4096: 0.13-0.17 nm |
| Channel 3                         | 2400 line/mm VE grating | 365-460 nm     | 2048: 0.09-0.13 nm; 4096: 0.07-0.09 nm | 2048: 0.13-0.17 nm; 4096: 0.13-0.17 nm |
| Channel 4                         | 2400 line/mm VE grating | 455-533 nm     | 2048: 0.09-0.13 nm; 4096: 0.07-0.09 nm | 2048: 0.13-0.17 nm; 4096: 0.13-0.17 nm |
| Channel 5                         | 1800 line/mm VD grating | 528-647 nm     | 2048: 0.10-0.18 nm; 4096: 0.09-0.11 nm | 2048: 0.20-0.29 nm; 4096: 0.20-0.29 nm |
| Channel 6                         | 1800 line/mm VD grating | 642-739 nm     | 2048: 0.10-0.18 nm; 4096: 0.09-0.11nm  | 2048: 0.20-0.29 nm; 4096: 0.20-0.29 nm |
| Channel 7                         | 1200 line/mm NC grating | 634-838 nm     | 2048: 0.20-0.28nm; 4096: 0.14-0.18nm   | 2048: 0.27-0.38 nm; 4096: 0.27-0.38 nm |
| Channel 8                         | 1200 line/mm NC grating | 832-1004 nm    | 2048: 0.20-0.28nm; 4096: 0.14-0.18nm   | 2048: 0.27-0.38 nm; 4096: 0.27-0.38 nm |

\* These configurations require a slit selection (10 or 25 micron typically), cylindrical lens (DCL-UV/VIS), and order sorting longpass filters (OSF-XX)

\*\*Due to pixel size resolution for 10 or 25 micron slit is the same but 25 micron slit increases signal throughput by 2.5