

AvaSpec-NIR256/512-1.7-EVO

NIRLine Near-Infrared Spectrometer

AvaSpec-NIR256/512-1.7-EVO



For measurements in the near-infrared range out to 1.7 μm , Avantes offers a new series of uncooled spectrometer configurations. The AvaSpec-NIR256-1.7-EVO and the AvaSpec-NIR512-1.7-EVO offer the same high-sensitivity optical bench with the next generation of electronics. Both instruments deliver the same exceptional performance specifications such as a sample speed of only 0.53 ms/scan and integration times as fast as 20 μs , as the Avantes instruments you have come to trust.

For applications where resolution is key, or more datapoints for modelling are required, the 512 pixel detector will be the best choice.

The AvaSpec-NIR256/512-1.7-EVO spectrometers pair the same trusted InGaAs array detectors with our ultra low-noise electronics board featuring USB3 and Giga-Ethernet connection port. Digital and analog I/O ports enable external triggering and control over the shutter and pulsed lightsources and choose from two distinct software-controlled gain-setting modes, high-sensitivity mode (HS, default) and the low-noise (LN) mode.

These affordable, uncooled instruments are USB powered and are available with a choice of four gratings and replaceable slits to match the bandwidth and requirements fitting your application.

Technical Data

	AvaSpec-NIR256-1.7-EVO	AvaSpec-NIR512-1.7-EVO
Optical bench	Symmetrical Czerny-Turner, 50 mm focal length,	
Wavelength range	900-1750 nm	
Resolution (slit & grating dependent)	2 - 50 nm	
Stray light	<1%	
Sensitivity HS in counts /μW per ms	8,200,000 (integral 1000-1750 nm)	3,800,000 (integral 1000-1750 nm)
Dynamic range HS	6000:1	
Integration time HS	20 μs - 500 ms	
Signal/noise HS	1900:1	
Sensitivity LN in counts /μW per ms	469,000 (integral 1000-1750 nm)	222,000 (integral 1000-1750 nm)
Dynamic range LN	9000:1	
Integration time LN	20 μs - 20 seconds	
Signal/noise LN	5000:1	
Detector	InGaAs linear array, 256 pixels, 50 μm x 500 μm	InGaAs linear array, 512 pixels, 25 μm x 500 μm
AD converter	16-bit, 500 kHz	
Interface	USB3.0 high speed, 5 Gbps, Gigabit Ethernet 1 Gbps	
Sample speed with on-board averaging	0.53 ms/scan	
Data transfer speed	0.53 ms/scan (USB3)	
Digital IO	HD-26 connector, 2 Analog in, 2 Analog out, 13 Digital IO bi-directional, trigger, synchronization, strobe, laser	
Power supply	Default USB power, 600 mA or external 12VDC, 320mA (4W)	
Dimensions, weight	185 x 100 x 184 mm, 2700 grams	

Grating Selection Table

Use	Useable range (nm)	Spectral range (nm)	Lines/mm	Blaze (nm)	Order code
NIR	900 - 1750	850	200	1500	NIR200-1.5
NIR	1000 - 1700	340	400	1600	NIR400-1.6
NIR	900 - 1400	200	600	1200	NIR600-1.2
NIR	1300 - 1600	152	600	1600	NIR600-1.6

Resolution Table (FWHM in nm)

Grating (lines/mm)	Slit size (μm)				
	25*	50	100	200	500
200	6	8	12	22	50
400	2.5	3	6	12	25
600	n.a.	2	4	8	18

* only for AvaSpec-NIR512

Options

- SLIT-XX-RS** • Replaceable slit with SMA connector, specify slit size XX = 25*, 50, 100 or 200 μm
- SLIT-XX-RS-FCPC** • As SLIT-XX-RS, but with FC/PC connector

* only for AvaSpec-NIR512

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For external triggering, Avantes offers the AvaTrigger;
featuring optical triggering, an external TTL
and manual triggering through the push of a button.

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Available soon: AvaSpec-Mini-NIR

Small and Powerful OEM NIR Spectrometer

AvaSpec-Mini-NIR256-1.7



The latest addition to our CompactLine: the AvaSpec-Mini-NIR!

The AvaSpec-Mini-NIR is a compact NIR spectrometer, based on a combination of our popular AvaSpec-NIR256-1.7 and Mini-series.

This NIR spectrometer might not be as sensitive as our bigger NIR spectrometers, but this loss in sensitivity is greatly compensated by its size and robustness.

Like our other CompactLine spectrometers, this device is only the size of a deck of cards

and USB powered, which makes it easy to integrate into other devices, including but not limited to OEM handheld applications.

This versatile miniature near-infrared spectrometer is well suited for various applications, including food analysis and the recycling industry.

Of course, the AvaSpec-Mini-NIR works seamlessly with our AvaSoft software and the Windows and Linux libraries we have available.

Technical Data

Optical bench	Symmetrical Czerny-Turner, 75 mm focal length, MK II
Wavelength range	900-1750 nm
Stray light	1%
Sensitivity HS in counts/μW per ms	665,000 (integral 1000-1750 nm)
Dynamic range HS	4750:1
Integration time HS	10 μs – 300 ms
Signal/noise HS	1900:1
Dark noise HS	14 counts
Sensitivity LN in counts/μW per ms	38,000 (integral 1000-1750 nm)
Dynamic range LN	7500:1
Integration time LN	10 μs – 5 seconds
Signal/noise LN	5000:1
Dark noise LN	9 counts
Detector	InGaAs array, 256 pixels
AD converter	16-bit, 500 kHz
Interface	USB2.0 (480 Mbps)/pigtailed (50 cm) USB-A
Sample speed with store to RAM	0.53 ms/scan
Data transfer speed	1.2 ms/scan
I/O	5 bidirectional programmable I/O: 1 analog out, 1 analog in, 1 x 5V
Power supply	Default USB power, 500 mA
Dimensions, weight	95 x 68 x 20 mm, 185 g
Temperature range	0-55°C

Grating selection table for AvaSpec-Mini-NIR

Use	Useable range (nm)	Spectral range (nm)	Lines/mm	Blaze (nm)	Order code
NIR	900-1750	750	200	1550	NIR200-1.6
NIR	900-1495	355-345	400	1210	NIR400-1.2
NIR	1250-1700	340-335	400	1600	NIR400-1.6
NIR	900-1450	225-210	600	1280	NIR600-1.3
NIR	1350-1735	205-185	600	1669	NIR600-1.7

Resolution table (FWHM in nm) for AvaSpec-Mini-NIR*

Grating (lines/mm)	Slit size (μm)			
	50	100	200	500
200	6	12	24	50
400	3	6	12	25
600	2	4	4	18

* Typical values. Small deviations are possible.

Ordering information

AvaSpec-Mini-NIR256-1.7

• Miniature NIR fiber-optic spectrometer, 75 mm focal length, 256 pixel InGaAs detector, USB2 powered interface

Specify grating, wavelength range and options. Other gratings are possible on request.

Options

SLIT-XX

• Slit size, please specify XX = 50, 100, 200 or 500 μm

For non-OEM users, a preconfigured model will be available upon release

AvaSpec-NIR256/512-1.7-HSC-EVO NIRLine Near-Infrared Spectrometer

AvaSpec-NIR256-1.7-HSC-EVO



For measurements in the near-infrared range up to 1.7 μm , Avantes offers a new series of cooled spectrometer configurations. The AvaSpec-NIR256-1.7-HSC-EVO and the AvaSpec-NIR512-1.7-HSC-EVO offer the high-sensitivity, 100mm optical bench (HSC) with the next generation of electronics.

Both instruments deliver exceptional performance specifications, such as a high sample speed and integration times as fast as 20 μs , as the Avantes instruments you have come to trust.

For applications where resolution is key, or more datapoints for modelling are required, the 512 pixel detector will be the best choice.

The AvaSpec-NIR256/512-1.7-HSC-EVO spectrometers pair the same

trusted InGaAs array detectors with our ultra-low-noise electronics board, featuring USB3 and Giga-Ethernet connection port.

The instruments are standard equipped with a replaceable slit. Digital and analog I/O ports enable external triggering and control over the shutter and pulsed lightsources and the choice between two distinct software-controlled gainsetting modes, high-sensitivity mode (HS, default) and the low-noise mode (LN).

Cooling ensures optimal noise condition even at longer integration times. All NIR-1.7 instruments offer four different gratings, making it possible to choose the bandwidth fitting your application.

Technical Data

	AvaSpec-NIR256-1.7-HSC-EVO	AvaSpec-NIR512-1.7-HSC-EVO
Optical bench	Symmetrical Czerny-Turner, 100 mm focal length, 1 stage TE-cooled	
Wavelength range	900 - 1750 nm	
Resolution (slit & grating dependent)	1.9 - 32 nm	1.7 - 32 nm
Stray light	<1%	
Sensitivity HS in counts /μW per ms	4,800,000 (integral 1000-1750 nm)	2,500,000 (integral 1000-1750 nm)
Dynamic range HS	4900:1	
Signal/noise HS	5000:1	
Integration time HS	20 μs - 500 ms	
Sensitivity LN in counts /μW per ms	160,000 (integral 1000 - 1750 nm)	83,000 (integral 1000 - 1750 nm)
Dynamic range LN	7600:1	
Signal/noise LN	5000:1	
Integration time LN	20 μs - 20 seconds	
Detector	TE-cooled InGaAs linear array, 256 pixels, 50 μm x 500 μm	TE-cooled InGaAs linear array, 512 pixels, 25 μm x 500 μm
AD converter	16-bit, 1,2 MHz	
Interface	USB3.0 high speed, 5 Gbps, Gigabit Ethernet 1 Gbps	
Digital IO	HD-26 connector, 2 Analog in, 2 Analog out, 13 Digital IO bi-directional, trigger, synchronization, strobe, laser	
Power supply	12VDC, 12W	
Dimensions, weight	185 x 160 x 184 mm, 3.6 kg	

Timing and Triggering

Sample speed with on-board averaging	0.13 ms/scan	0.24 ms/scan (USB3)
Data transfer speed	0.4 ms/scan (USB3)	0.53 ms/scan (USB3)
Min. delay / jitter	4.92 μs / 0.38 ns	

Grating Selection Table

Use	Useable range (nm)	Spectral range (nm)	Lines/mm	Blaze (nm)	Order code
		256/512			
NIR	900 - 1700	800 - 660*	150	1250	NIR150-1.2
NIR	994 - 1280	278	300	1200	NIR300-1.2
NIR	950 - 1800	262 - 230*	400	1200	NIR400-1.2
NIR	960 - 1800	262 - 230*	400	1600	NIR400-1.6

* only for AvaSpec-NIR512

Resolution Table (FWHM in nm)

Grating (lines/mm)	Slit size (μm)				
	25*	50	100	200	500
150	4.0	5.7	7.0	12.8	32
300	1.8	2.3	3.0	4.0	10
400	1.7	1.9	2.5	3.3	8.3

Options

SLIT-XX-RS	• Replaceable slit with SMA connector, specify slit size XX = 25*, 50, 100, 200 or 500 μm
SLIT-XX-RS-FCPC	• as SLIT-XX-RS, but with FC/PC connector

* only for AvaSpec-NIR512

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For external triggering, Avantes offers the AvaTrigger;
featuring optical triggering, an external TTL
and manual triggering through the push of a button.

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AvaSpec-NIR256/512-2.5-HSC-EVO NIRLine Near-infrared Spectrometer

AvaSpec-NIR256-2.5-HSC-EVO



The NIR spectrometers in our EVO series offer more sensitivity, low weight and small size. They are based on a 100 mm optical bench with an NA of 0.13, offering optimal balance between resolution and sensitivity.

The 2.5-HSC series feature 256 or 512 pixel InGaAs detectors and are available in multiple configurations. These instruments are perfect for analyzing grain, corn, wheat, soya, polymers, but also for medical uses, process monitoring and other analyses.

The 256 pixel detectors offer the best sensitivity for most applications.

For applications where resolution is key or more datapoints for modelling are required, the 512 pixel detector will be the best choice.

Also available on the –HSC is the user selectable gain-setting mode: LN (lownoise, standard setting), which gives you a longer integration time and higher signal to noise ratio, and HS mode (high-sensitivity) for measuring in low light conditions. Analog and digital IO ports enable external triggering and control of shuttered and pulsed light sources from the AvaLight series.

Technical Data

	AvaSpec-NIR256-2.5-HSC-EVO	AvaSpec-NIR512-2.5-HSC-EVO
Optical bench	TE-cooled symmetrical Czerny Turner, 100 mm focal length	
Wavelength range	1000 - 2500 nm	
Resolution	4.4 - 85.0 nm	2.6 - 85.0 nm
Pixel dispersion (with NIR 075-1.7 grating)	6.2 nm	3.1 nm
Stray light	<1.0%	
Sensitivity HS in counts / μW per ms (1000 - 2500 nm)	990,000	480,000
Signal/noise HS	1800:1	1900:1
Integration time HS	10 μ s - 5 ms	
Sensitivity LN in counts / μW per ms (1000 - 2500 nm)	55,000	26,600
Signal/noise LN	4000:1	3700:1
Integration time LN	10 μ s - 100 ms	
Detector	InGaAs linear array with 2-stage TE-cooling, 256 pixel	InGaAs linear array with 2-stage TE-cooling, 512 pixel
Pixel size (WxH)	50 x 250 μ m	25 x 250 μ m
AD converter	16 bit, 500 kHz	
Interface	USB 3.0 high speed, 5 Gbps Gigabit Ethernet 1 Gbps	
Sample speed with on-board averaging	0.54 ms/scan (USB3)	
Data transfer speed	1.11 ms/scan (USB3)	
Digital IO	HD-26 connector, 2 Analog in, 2 Analog out, 13 Digital bi-directional, trigger, sync, strobe, laser	
Power supply	12 V, 40W	
Operating temperature range	0 - 40 $^{\circ}$ C	
Cooling	45 $^{\circ}$ C versus ambient	
Dimensions, weight	185 x 145 x 185 mm, 3.5 kg	

Grating Selection Table

Use	Useable range (nm)	Spectral range (nm)	Lines/mm	Blaze (nm)	Order code
NIR	1000 - 2500	1500	75	1700	NIR075-1.7
NIR	1000 - 2500	1173 - 1150*	100	2500	NIR100-2.5
NIR	1000 - 2500	800 - 660*	150	2000	NIR150-2.0
NIR	1000 - 2500	815 - 700*	150	2600	NIR150-2.6
NIR	1000 - 2500	574 - 530*	200	1500	NIR200-1.5

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

Resolution Table (FWHM in nm)

Grating (lines/mm)	Slit size (μm)				
	25*	50	100	200	500
75	8.9	12.9	16.0	33.9	84.5
100	7.2	9.5	12.0	20.0	50.0
150	4.0	5.7	7.0	12.8	32.0
200	2.6	4.4	5.2	9.3	23.3

Options

SLIT-XX-RS • Slit size, please specify XX = 25, 50, 100, 200 or 500 μm

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