

# INTRODUCTION

To facilitate easier and more accurate measurements during an experiment, Avantes offers a wide selection of high quality accessories. From integrating spheres to cuvette holders, filter holders and fiberoptic multiplexers Avantes has you covered for your fiber-optic accessory needs.



Avantes Accessories can be divided into several categories:

- USB to ethernet converter
- Cuvette holders. They are available in five different categories
  - 10 mm optical path, for UV/VIS/NIR absorbance measurements
  - 10 mm optical path, for UV/VIS fluorescence measurements
  - 10 mm optical path, for dual channel spectroscopy and fluorescence measurements
  - Variable length, from 10 to 100 mm for low absorption measurements
  - Direct-attached cuvette holders.
- Integrating spheres, available in three types:
  - Irradiance, for measuring radiometric and photometric quantities of LEDs and other light sources
  - Reflection, for measuring color parameters of object surfaces, such as L, a, b, hue, chromaticity
  - Reflection spheres with integrated light sources
- AvaTrigger external triggerbox device
- Inline or direct-attached filter holders and TTL•controlled shutters
- Inline or direct-attached fiber-optic attenuator
- Fiber-optic multiplexer, 1x16, 2x8 or 4x4 channels
- Optical table mounts for collimating lenses, as presented under fiber-optic accessories
- Flow cells for different types of applications:
  - Inline absorption measurements and process control 1/2" and 1/4" with 5 or 10 mm path length
  - Micro-flow cells for low volume, high pressure and HPLC applications
  - Long path flow cells for very low absorption measurements
- White and specular reflection tiles/standards to be used as a reference material for reflection measurements, such as color applications
- Power adapters and battery packs





## AvaGigE: use your spectrometer on the network



USB cables have a maximum length of 5 meters. This means that controlling your spectrometer from a longer distance is difficult. This is why Avantes developed the AvaGigE: a USB to ethernet converter. Using a USB hub, you can connect the AvaGigE to up to 16 spectrometers with standard USB cables, connect the other side to the network and you're ready to go.

AvaSoft (version 7.7 and higher) and the GigE DLL interface enable connection and control of the spectrometer(s) as if they were right next to you. Data speeds are practically equivalent to a standard USB 2.0 connection. Setup can also be done via a web-based configuration utility included with the AvaGigE.

### Features:

- IP-based spectrometer control
- Field upgradable and network settings through web interface
- Can connect multiple AvaGigE to a single network
- No windows drivers needed: controlled directly through Avantes DLL with ethernet support
- Maximum network cable length 100
   meters (CAT5E or better)

### **Technical Data**

Power input	110-240VAC/50-60Hz Max. 20W		
DC Consumption	5V/3.0A Max		
Dimension	110 mm (L) X 69.5 mm (W) X 48.5 mm (H)		
Communication input	1 Gigabit Ethernet 1 USB 2.0		
Data transfer	160 spectra/sec (AvaSpec-2048-USB2 in network with AvaSoft) 300 spectra/sec (Avaspec-2048-USB2 through AvaGigE to PC)		
Operating Temperature	0-40 °C		
Storage Temperature	-25-70°C		

### **Ordering Information**

AvaGigE • USB to Ethernet converter with controlling software

Three years limited warranty on all Avantes spectrometers, light sources and accessories



## **Cuvette Sample Holders**

The CUV-UV/VIS, CUV-FL-UV/VIS and CUV-ALL/UV/VIS are especially designed for absorption and fluorescence measurements and should be used with standard 10x10 mm cuvettes. For non-standard cuvettes, adjustable ball-detents ensure repeatable placement and measurements at the same location. All cuvette holders have a 5 mm wide slit to hold filters and a cover to prevent ambient light from entering the light path.

The CUV-UV/VIS features two COL-UV/VIS collimating lenses with adjustable focus to maximize light throughput. The CUV-FL-UV/VIS has the same specifications, but the collimating lenses are placed under an angle of 90 degrees for fluores-cence measurements (to isolate excitation from emission wavelengths). The other two ports on the CUV-FL-UV/VIS have SiO<sub>2</sub> coated aluminum mirrors (CUV-FL-MIRROR) to enhance the excitation and fluorescence signals. The CUV-ALL-UV/VIS features four collimating lenses, all COL-UV/VIS, in two optical paths.

For UV measurement Avantes offers quartz cuvettes. The CUV-10-2 has two optical windows for absorption measurements. The CUV-10-4 features four optical windows, ideal for fluorescence with the CUV-FL-UV/VIS or dual path measurements with the CUV-ALL-UV/VIS. **CUV-UV/VIS** 





### **Technical Data**

	CUV-UV/VIS	CUV-FL-UV/VIS	CUV-ALL-UV/VIS
Cuvette Dimensions		10 x 10 mm	
Fiber connection	2 x COL-UV/VIS, SMA	2 x COL-UV/VIS, SMA, 2 mirrors	4 x COL-UV/VIS, SMA
Filter slot		Max 5 mm wide	
Overall dimensions	100 x 60 x 40 mm	100 x 100 x	40 mm
Cover	Black anodized	aluminum with black PE insert, 45	5 x 45 x 80 mm

CUV-UV/VIS	Cuvette Holder, 10 mm path, incl. 2 UV/VIS/NIR lenses and cover
CUV-FL-UV/VIS	- Fluorescence Cuvette Holder, 10 mm path, incl. 2 UV/VIS/NIR lenses under 90° , 2 x $\rm{SiO}_2$ coated aluminum mirrors and cover
CUV-ALL-UV/VIS	• Cuvette Holder 10 mm path, 2 beams, 4 x UV/VIS/NIR lenses and cover
CUV-FL-MIRROR	• SiO <sub>2</sub> coated aluminum mirror
CUV-10-2	• Quartz Cuvette 10 mm, 2 windows, 3.5 ml
CUV-10-4	• Quartz Cuvette 10 mm, 4 windows, 3.8 ml



### CUV-UV/VIS-TC



## Temperature Controlled Cuvette Holders

For extra stability during demanding measurements such as fluorescence, Avantes offers the CUV-UV/VIS-TC, a temperature controlled cuvette holder. The temperature can be set anywhere between -30°C and +105°C with an accuracy of 0.05°C.

Other features include magnetic stirring, slit attenuation kit and fused-silica lens systems with SMA fiber-optic connectors. It can be combined with any AvaLight light source or AvaSpec spectrometer to create a powerful measurement system. The CUV-UV/VIS-TC is available in fluorescence, absorption or combined fluorescence/absorption configurations. A special direct-attached fluorescence configuration is available for coupling the Avalight-XE pulsed Xenon source for maximized fluorescence excitation energy.

Application areas enabled by the CUV-UV/ VIS-TC series include DNA melting and annealing, protein thermodynamics, fluorophore characterization, enzyme kinetics and online thermocycling of biological particles.

### Cuvette Dimensions Fiber connection Temperature control (Peltier) TE control accuracy Stirring Overall dimensions Control unit

### **Technical Data**

imensions	10 x 10 mm
connection	2 x COL-UV/VIS, SMA, 2 mirrors
ol (Peltier)	-30°C to +105°C
accuracy	± 0.05 °C
Stirring	Variable speed magnetic stirring
limensions	100 x 100 x 40 mm
ontrol unit	TE controller unit and circulation pump

### **Ordering Information**

CUV-UV/VIS-TC-ABS	• Temperature controlled cuvette holder absorbance Kit, includes sample compartment, Temperature-Controller, two QIL-UV imaging lenses, BATH 100 submersible pump, QSLITS optical slits, cover with access cap, tubing, cables and a stir bar
CUV-UV/VIS-TC-FL	• Temperature controlled cuvette holder fluorescence Kit, same as CUV-UV/VIS-TC-ABS but with two QIL-UV imaging lens assemblies and two QMP mirror plugs
CUV-UV/VIS-TC-ABS/FL	<ul> <li>Temperature controlled cuvette holder fluorescence &amp; absorbance kit, same as CUV-UV/ VIS-TC-ABS, but with two QIL-UV imaging lens assemblies, two QCL-UV collimating lens assemblies, and two QMP mirror plugs</li> </ul>
CUV-UV/VIS-TC-AVXE	<ul> <li>Base plate and support with AR-coated fused silica lens pair for excitation using the Avalight-XE pulsed Xe light sources</li> </ul>

### Accessories

CUV-TC-QCL-UV	• Extra AR-coated UV/VIS collimating lens for CUV-UV/VIS-TC
CUV-TC-QIL-UV	• Extra AR-coated UV/VIS imaging lens for CUV-UV/VIS-TC
CUV-TC-QMP	Spherical mirror plate with steering plate for CUV-UV/VIS-TC
CUV-TC-QFH	• Filter holder for CUV-UV/VIS-TC
CUV-10-4	• Quartz Cuvette 10 mm, 4 windows, 3.8 ml



Accessories

## **Direct-attach Accessories**

Avantes offers a wide range of high quality direct-attach accessories, such as cuvette holders, filter holders and attenuators for the AvaLight series of light sources. In the table below an overview of direct-attach accessories for each light source can be found. For more information, please take a look at the following pages. The last column is a combination of the attenuator, the cuvette holder and the filter holder in one easy to attach device.





### **Direct-attach accessories**

Coupling to	Mounting	Round ½" Filter Holder	Cuvette Holder	Attenuator	Cuvette/ Filter Holder/ Attenuator
AvaLight-HAL	Front plate	FH-DA-HAL	CUV-DA-HAL	ATT-DA-HAL	CUV-ATT-DA-HAL
AvaLight-DHS	Front plate	n/a	CUV-DA-DHS	n/a	n/a
AvaLight-DHc					
AvaLight-XE	SMA thread	FH-DA	CUV-DA	ATT-DA	CUV-ATT-DA
AvaLight-LED					
Fiber-optic	fiber	FH-INL	CUV-UV/VIS	ATT-INL	n/a

For the latest information, go to www.avantes.com



## **Direct-attach variable In-Line Filter Holder**

As part of the wide range of direct-attach accessories, Avantes offers the FH-DA series of filter holders. They can hold 0.5 inch filters of 1-8 mm thick.

The filter holders are equipped with two quartz collimating lenses for the UV/VIS/ NIR range. Avantes offers a wide range of round 12 mm filters.

The FH-DA is available in two versions: the FH-DA for the Avalight-XE, AvaLight-DHc and AvaLight-LED. The FH-DA-HAL is designed to work seamlessly with the AvaLight-HAL.

### **Technical Data**

	FH-DA		FH-DA-HAL	
Wavelength range	200-2500 nm			
<b>Filter Dimensions</b>	Round, 13 mm diameter, 1-8 mm thick			
Fiber connection	SMA-905 connector			
Light source	AvaLight-DHc/XE/LED AvaLight-HAL			
t source mounting	SMA-905 thread Front plate			
Material	Black anodized aluminum			
Dimensions	44.5 x round 20 mm 37 x 40 x 41 mm			

### Separate round filters to install in FH-DA series

GL-WG305-12	Separate 12 x 3 mm long-pass filter > 305 nm
GL-KG3-12	Separate 12 x 3 mm band-pass filter, transparent > 325 nm and < 700 nm
GL-BG28-12	Separate 12 x 3 mm band-pass filter, transparent > 360 nm and < 500 nm
GL-GG385-12	Separate 12 x 3 mm long-pass filter > 385 nm
GL-GG475-12	Separate 12 x 3 mm long-pass filter > 475 nm
GL-OG515-12	Separate 12 x 3 mm long-pass filter > 515 nm
GL-OG550-12	Separate 12 x 3 mm long-pass filter > 550 nm
GL-OG590-12	Separate 12 x 3 mm long-pass filter > 590 nm
GL-NG9-1-12	Separate 12 x 1 mm Neutral Density filter, (transmission 10%, 400-1100 nm)
GL-NG9-2-12	Separate 12 x 2 mm Neutral Density filter, (transmission 1%, 400-1100 nm)
GL-NG9-3-12	Separate 12 x 3 mm Neutral Density filter, (transmission 0.1%, 400-1100 nm)

### **Ordering Information**

FH-DA	• Direct-attach Filter Holder for 12 mm diameter filters, 1-8 mm thick, incl. one UV/VIS collimating lenses
FH-DA-HAL	• As FH-DA, meant for the AvaLight-HAL light source.





FH-DA

Fiber con Light Light source mo Μ Dime

## **CUV Direct-attach Cuvette Holders**

To mount a cuvette holder directly to your light source, Avantes offers a range of direct-attached cuvette holders. The CUV-DA connects to the AvaLight-DHc, -XE and -LED light sources, the CUV-DA-DHS to the AvaLight-DHS and AvaLight-DHS-BAL and the CUV-DA-HAL to the AvaLight-HAL. These devices can be used for either absorbance or fluorescence measurements.

All CUV-DA cuvette holders feature two 90-degree and one 180-degree threads that allow the COL-UV/VIS collimating lens to be connected for absorbance or fluorescence setups. Each of CUV-DA series cuvette holders includes two SiO<sub>2</sub> aluminum mirrors to further enhance fluorescence signals. These are mounted at 90 degrees to the excitation source and emission output. The CUV-DA has a 5 mm wide filter slot.

For the AvaLight-HAL and the AvaLight-DHS the direct-attached cuvette holders can be mounted directly on the front panel of the light source by removing the standard filter holder.

### **CUV-DA**



### **Technical Data**

	CUV-DA			CUV-DA-DHS	CUV-DA-HAL
Lightsource	Avalight-DHc Avalight-LED Avalight-XE			AvaLight-DH-S	AvaLight-HAL
Wavelength range			200-250	00 nm	
<b>Cuvette Dimensions</b>			10 x 10	) mm	
Light source connection	SMA thread incl col. lens			Mounting plate	Mounting plate
Fiber connection	1 x COL-UV/VIS, SMA-905 connectors				
Fluorescence mirrors	2 x SiO <sub>2</sub> coated aluminum mirrors				
Filter slit	Max. 5 mm wide				n.a.
Dimensions	60 x 43 x 28 mm			60x 50 x 50 mm	60x 35 x 35 mm

CUV-DA	• Direct-attach 10 mm cuvette holder for AvaLight-DHc/XE/LED, incl. COL-UV/VIS lens and 2 mirrors
CUV-DA-DHS	• Direct-attach 10 mm cuvette holder for AvaLight-D(H)-S, incl. COL-UV/VIS lens and 2 mirrors
CUV-DA-HAL	• Direct-attach 10 mm cuvette holder for AvaLight-HAL(S), incl. COL-UV/VIS lens and 2 mirrors
CUV-FL-MIRROR	• SiO <sub>2</sub> coated aluminum mirror
CUV-10-4	• Quartz Cuvette 10 mm, 4 windows, 3.8 ml



## **Direct-attach Fiber-optic** Attenuator



When light intensity has to be reduced, the direct-attached attenuator is a great choice with your AvaLight series light sources. The attenuator helps in situations where detector saturation is an issue. It is attached to the light source and has a SMA connector to couple to other measurement devices and your spectrometer.

The attenuation can be set from o-100%, which can be fixed with a set screws. It is supplied with a UV/VIS/NIR collimating lens. The ATT-DA series attenuators come in two versions: the ATT-DA is meant to be used with the AvaLight-DHc, the AvaLight-XE and AvaLight-LED. The ATT-DA-HAL is meant to be used with an AvaLight-HAL light source.

### **Technical Data**

	ATT-DA	ATT-DA-HAL	
Wavelength range		200-2500 nm	
Attenuation		0-100%	
Iris aperture		0.0 – 12.0 mm	
Iris construction		2 x 5 leaves	
Fiber connection		SMA-905 connector	
Light source	AvaLight-DHc/XE/LED	AvaLight-HAL	
Light source mounting	SMA-905 thread	Front plate	
Material		Black anodized aluminum	
Dimensions	27 mm round x 49 mm	37 x 41 x 57 mm	

### **Ordering Information**

ATT-DA • Direct-attach Fiber-optic Attenuator, 0-100%, SMA connector

ATT-DA-HAL • As ATT-DA, for Avalight-HAL

Did you know Avantes is specialized fiber-optic cables?



Accessories

## **Cuvette holder with attenuator** and filter holder

Have the most flexible setup with the combined cuvette holder, attenuator and filter holder. You can control the light throughput from o-100%, which can be fixed with a set screw. Use the cuvette holder for any cuvette up to 10x10 mm and add half inch diameter (12-13 mm) filters of 1-8 mm thick. The combined direct-attached accessory is available in two versions: the CUV-ATT-DA is used with the AvaLight-DHc (Deuterium and Halogen), AvaLight-XE (Xenon) and AvaLight-LED. The CUV-ATT-DA-HAL is meant for the AvaLight-HAL (Halogen) light source.

### **CUV-ATT-DA**



### **Technical Data**

	CUV-ATT-DA	CUV	-ATT-DA-HAL
Wavelength range		200-2500	0 nm
<b>Cuvette Dimensions</b>		10 x 10	mm
Attenuation		0-100	%
Filter slit		Max 5 mm	n wide
Fiber connection		SMA-905 co	nnector
Fluorescence mirrors		2 x SiO <sub>2</sub> coated alu	minum mirrors
Light source	AvaLight-DHc/XE/LED	Aval	ight-HAL
Light source mounting	SMA-905 thread	Front	t plate
Material		Black anodized	aluminum
Dimensions	42 x 34 x 85 mm	42 x	45 x 93 mm

### **Ordering Information**

CUV-ATT-DA

• Combined direct-attach Fiber-optic Attenuator, Filter Holder and Cuvette Holder, SMA connector **CUV-ATT-DA-HAL** • As CUV-ATT-DA, but for AvaLight-HAL light source





## Variable In-Line Filter Holder

### FH-INL-1"



**FH-INL** 



When an in-line filter is needed, Avantes offers two types of in-line filter holders: the FH-INL-1" and the FH-INL. The FH-INL-1" is designed to hold one inch filters from 1-60 mm thick. The FH-INL is designed for 1/2" or 12-13 mm filters of 1-8 mm thick. Both in-line filter holders come with two quartz collimating lenses for the UV/VIS/ NIR range. Avantes offers a wide range of round 12 mm filters (for FH-INL). For more specifications please see the table below.

### **Technical Data**

	FH-INL		FH-INL-1"
Wavelength range		200-25	500 nm
Filter Dimensions	Round, 12-13 mm diameter, 1-8 mr	n thick	Round, max 1 inch (25.4 mm) diameter, 1-60 mm thick
Fiber connection	2	SMA-905	connectors
Material	Bla	ck anodiz	ed aluminum
Dimensions	round 20 x 50 mm		81 x 41 x 51 mm

### Separate round filters to install in FH-INL

GL-WG305-12	Separate 12 x 3 mm long-pass filter > 305 nm
GL-KG3-12	Separate 12 x 3 mm band-pass filter, transparent > 325 nm and < 700 nm
GL-BG28-12	Separate 12 x 3 mm band-pass filter, transparent > 360 nm and < 500 nm
GL-GG385-12	Separate 12 x 3 mm long-pass filter > 385 nm
GL-GG475-12	Separate 12 x 3 mm long-pass filter > 475 nm
GL-0G515-12	Separate 12 x 3 mm long-pass filter > 515 nm
GL-OG550-12	Separate 12 x 3 mm long-pass filter > 550 nm
GL-OG590-12	Separate 12 x 3 mm long-pass filter > 590 nm
GL-NG9-1-12	Separate 12 x 1 mm Neutral Density filter, (transmission 10%, 400-1100 nm)
GL-NG9-2-12	Separate 12 x 2 mm Neutral Density filter, (transmission 1%, 400-1100 nm)
GL-NG9-3-12	Separate 12 x 3 mm Neutral Density filter, (transmission 0.1%, 400-1100 nm)

FH-INL	• In-line Filter Holder for 12-13 mm diameter filters 1-8 mm thick, incl. UV/VIS collimating lenses and SMA connectors
FH-INL-1"	• Inline filterholder for 1" filters, max 60 mm optical path, incl 2 collimating lenses and SMA connectors.



## **In-line Fiber-optic Attenuator**

For applications and setups where light intensity has to be reduced, Avantes offers the ATT-INL in-line fiber-optic attenuator and the ATT-DA direct-attached fiber-optic attenuator. This device is an iris attenuator which controls light throughput to avoid detector saturation. The ATT-INL is coupled between two SMA terminated fiber-optic

cables, whereas the ATT-DA can be connected directly to the light source. Both devices consist of two UV/VIS/NIR collimating lenses mounted on either side of an adjustable iris.

The attenuation can be set from 0-100% and can be fixed with a set screw.

### ATT-INL



### **Technical Data**

Wavelength range	200-2500 nm
Attenuation	0-100%
Iris aperture	0.0 – 12.0 mm
Iris construction	2 x 5 leaves
Fiber connection	2 SMA-905 connectors, incl. 2 COL-UV/VIS collimating lenses
Material	Black anodized aluminum
Dimensions	57 x 25 x 25 mm

### Ordering Information

**ATT-INL** • In-line Fiber-optic Attenuator, 0-100%, SMA connectors

## Variable Pathlength Cuvette Holder

For low absorption measurements and flow cell cuvettes, the CUV-VAR-UV/ VIS cuvette holder is the ideal solution. It features a variable, adjustable path length, ranging from 10-160 mm, ensuring maximum flexibility. It can be used as a standard cuvette holder with a 10 mm path length, as a filter holder with 2 mm path length or any path length up to 160 mm.

This item is equipped with two COL-UV/VIS collimating lenses to support applications in the 200-2500 nm wavelength range.

### **CUV-VAR-UV/VIS**



### **Technical Data**

200 x 80 x 25 mm

Base Dimensions (L x W x H) **Fiber connection** Optical path Cuvette holder insert Focal heiaht Overall dimensions (L x W x H) 200 x 96 x 62 mm

2 x COL-UV/VIS, SMA connectors 10-160 mm Optical path 20 mm for 10 mm cuvettes 15 mm from base plate

### **Ordering Information**

CUV-VAR-UV/VIS • Cuvette Holder with variable 0-100 mm path, incl. 2 COL-UV/VIS collimating lenses



## **Integrating Spheres**

### AvaSphere 30-REFL



An integrating sphere works as a light collector. The light collected can be used as a diffuse illumination or measurement source. The basic principle is that light enters the sphere through the sample port, goes through multiple reflections on the highly reflective, Lambertian surface of the sphere and is scattered uniformly around the interior of the sphere. Behind a baffled port inside the sphere which is independent of the angular properties of the sample port, a fiber-optic cable collects a homogenized light signal and carries it to the spectrometer. The baffle is very significant as it prevents first reflections from entering the detection fiber.

The AvaSphere series integrating spheres are available with active diameters of 30, 50 and 80 mm and an SMA port at 90 degrees for collecting the irradiance and reflection signals. The reflection spheres feature an additional SMA-connector port at 8 degrees from normal (from sample port) for direct illumination. This port couples external light into the sphere through a fiber-optic cable connected to a COL-UV/ VIS collimating lens. The sample port diameters are 6 mm for the AvaSphere-30, 10 mm for the AvaSphere-50 and 15 mm for the AvaSphere-80. All sample ports are knife-edge, ensuring a near 180 degree field of view of the sample port. The irradiance version of the integrating sphere can be used for measurements of light sources, such as lasers, LEDs and incandenscent sources. For irradiance measurements of 5 mm cylindrical LEDs, a special adapter is available for the AvaSphere-50/80-IRRAD. This adapter ensures correct and reproducible positioning of the LEDs inside the sphere.

The AvaSphere reflection version is used for the measurement of total integrated reflectance of a surface, as well as for color measurements and fluorescence spectroscopy on solids/powders. The principle of measurement is based on direct illumination and indirect reflection. The AvaSphere-50-LS-HAL with internal light source can be a used as a low-cost uniform source and is available with an intensity calibration file.

The inside of the integrating spheres is made of a highly reflective diffuse PTFE material. This provides over 96% reflectance over a wide wavelength range of 250-2500 nm. For the AvaSphere-50-REFL a special black gloss-trap is available to exclude specular reflection in the measurement. Please order this option when ordering the sphere. In case specular reflection needs to be included, a white reflective part, which is standard on all AvaSphere-50-REFL, can be mounted in the position of the gloss-trap.



## AVANTES solutions in spectroscopy

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### **Reflection Integrating Sphere**

Reflectance Factor ODM 100 98 Reflectance [%] 96 94 92 90 250 500 750 1000 1250 1500 1750 2000 2250 2500 Wavelength [nm]

Reflection Curve AvaSphere

### **Technical Data**

	AvaSphere-30	AvaSphere-50	AvaSphere-80
Internal diameter (mm)	30	50	80
Sample port diameter (mm)	6	10	15
<b>External Dimensions</b>	59.5 mm diameter 40 mm height	69.5 mm diameter 60 mm height	109 mm diameter 95 mm height

### **Ordering Information**

	-
AvaSphere-30-IRRAD	• Integrating Sphere 30 mm for light measurements (250-2500 nm), Sample-port 6 mm
AvaSphere-50-IRRAD	Integrating Sphere 50 mm, Sample-port 10 mm
AvaSphere-80-IRRAD	Integrating Sphere 80 mm, Sample-port 15 mm
AvaSphere-30-REFL	• Integrating Sphere 30 mm for reflection (250-2500 nm), Sample-port 6 mm, 2 SMA port
AvaSphere-50-REFL	<ul> <li>Integrating Sphere 50 mm for reflection, Sample-port 10 mm</li> </ul>
AvaSphere-80-REFL	<ul> <li>Integrating Sphere 80 mm for reflection, Sample-port 15 mm</li> </ul>
AvaSphere-50-LS-HAL	• Integrating Sphere 50 mm for reflection, built-in halogen light source, sample-port 10 mm
AvaSphere-LED-ADR	• Cylindrical Adapter to hold 3, 5, 8 mm LED's inside the AvaSphere-50-IRRAD
AvaSphere-LED-ADR-80	• As AvaSphere-LED-ADR, but for AvaSphere-80-IRRAD
AvaSphere-GT50	<ul> <li>Optional Gloss-trap for AvaSphere-50-REFL, coated with black absorbing material. Only in combination with AvaSphere-50-REFL.</li> </ul>
AvaSphere-GT50-W	• Gloss-trap coated with white material to include specular reflection. Standard included in AvaSphere-50-REFL.

Three years limited warranty on all Avantes spectrometers, light sources and acce<u>ssories</u>



### AvaSphere-50-LS-HAL



Inte Sample

Providing up to 160 times more light on your sample for a reflection measurement relative to our standard reflectance integrating sphere, the AvaSphere-50-LS-HAL is a valuable instrument for reflection applications. It is a combination of an integrating sphere and a halogen light source. The sphere provides diffused halogen light on your sample without the losses associated with fiber-optic coupling. It has a direct collimated SMA-port for collection of the reflection signal with any of our AvaSpec spectrometers.

halogen light source

It's mostly useful for dark or low reflecting materials and NIR spectral measurements where signal strength can be limited. It is also very useful for measuring gem stones. In the application section of this catalog a complete gemology setup can be found.

The AvaSphere-50-LS-HAL has an internal diameter of 50 mm, a sample port of 10 mm and an SMA terminated reference port. The 5W halogen lamp is stabilized and cooled with forced airflow. A 24V/1.25A power supply is included.

### **Technical Data**

Wavelength range	360-2500 nm
Internal diameter	50 mm
ample port diameter	10 mm
Color temperature	2700 К
Stability/Drift	< 0.1% / h
Bulb life	4.000 hrs
Power requirement	24VDC, 280 mA
External Dimensions	70 mm diameter, 75 mm height

Integrating Sphere with internal

### **Ordering Information**

AvaSphere-50-LS-HAL	<ul> <li>Integrating sphere 50 mm for reflection (360-2500 nm), including 5W halogen lightsource, sample port 10 mm diam., 2 SMA ports (reflection and reference) and 24V power supply.</li> </ul>
AvaLight-DH-B	Replacement 5W halogen bulb for AvaSphere-50-LS-HAL
AvaSphere-50-HOLD	• WS-2-GEM tile holder for AvaSphere-50-LS-HAL for gemology applications

Pre-configured spectrometers can be shipped within 24 hours



## Large Integrating Spheres

For measurement of high powered LEDs and sources, Avantes offers the AvaSphere-100, -150 and -200. The number corresponds with the internal diameter of the spheres in millimeters.

The 100, 150 and 200 models come with three ports: at 0, 90 and 180 degrees. The port of your choice is fitted with a baffled SMA-905 connector, please specify when ordering. Either of the other two ports can be used for illumination or sampling. The default sample port sizes are typically 25% of the sphere's diameter. Port plugs or reducers are available on request. All spheres can be attached to spectrometers via fiber-optic cables and the entire system can be irradiance calibrated to measure total flux of a lamp under test.

Special sizes on request.



### **Technical Data**

	AvaSphere-100	AvaSphere-150	AvaSphere-200
Wavelength range		400-1100 nm	
Internal diameter	102 mm	152 mm	203 mm
Port diameters	25.4 mm	38.1 mm	50.8 mm
Port Reducers		10 mm	
External Dimensions	118 mm	168 mm	218 mm

### **Ordering Information**

AvaSphere-100	• Integrating Sphere, 100 mm, 3 ports (0,90,NP), 1baffled SMA port, incl. Postmount
AvaSphere-100-SMA	• Additional SMA port for the AvaSphere-100
AvaSphere-100-PR10	Port reducer for the AvaSphere-100 to 10 mm
AvaSphere-100-PP	• Port plug for unused ports for the AvaSphere-100
AvaSphere-150	• Integrating Sphere, 150 mm, 3 ports (0,90,NP), 1baffled SMA port, incl. Postmount
AvaSphere-150-SMA	• Additional SMA port for the AvaSphere-150
AvaSphere-150-PR10	• Port reducer for the AvaSphere-150 to 10 mm
AvaSphere-150-PP	• Port plug for unused ports for the AvaSphere-150
AvaSphere-200	• Integrating Sphere, 200 mm, 3 ports (0,90,NP), 1baffled SMA port, incl. Postmount
AvaSphere-200-SMA	• Additional SMA port for the AvaSphere-200
AvaSphere-200-PR10	• Port reducer for the AvaSphere-200 to 10 mm
AvaSphere-200-PP	• Port plug for unused ports for the AvaSphere-200

For the latest information, go to www.avantes.com



## Variable Collimating Lens Holder



For transmission measurements of samples of various sizes and thicknesses, the variable collimating lens holder is the perfect tool. The vertical bars can be adjusted to samples up to 160 mm thick. The base is made of anodized aluminum and features adjustable mount bars. Each bar has four

3/8"-24 threaded holes for COL-UV/VIS collimating lenses. Adjusting the bars is easy, simply loosen the screws and slide.

Two COL-UV/VIS collimating lenses are included with the variable collimating lens holder.

### **Technical Data**

	Base	Mounting bars
Dimensions	200 x 80 x 25 mm, total height 120 mm	35 x 7 mm thick
Threads	n.a.	4 holes 3/8"-24, 20 mm apart
Collimating Lenses	n.a.	2 COL-UV/VIS

### **Ordering Information**

CLH-VAR-UV/VIS • Variable Collimating Lens Holder, including 2 COL-UV/VIS lenses



## **Optical Post Mount**

For easy mounting a collimating lens on a bread-board laboratory table, rail carriers and other bench plates, the Optical Post Mount (OPM) should be used. This device is an M6 threaded anodized aluminum

assembly with a 3/8"-24 hole for mounting a COL-UV/VIS collimating lens. The OPM is 30 mm in diameter with an internal post that is 6.5 mm in diameter. The height of the focusing axis is 100 mm.

### **Ordering Information**

**OPM** • Optical Post Mount, no lenses included

Download the latest software for your AvaSpec at www.avantes.com



## **AvaTripod**

The AvaTripod is a flexible and versatile accessory, which is useable in various applications. The top of the tripod has an attachment head which features two holes; one measuring 6.8 mm in diameter to hold the barrel of a cosine corrector (CC-UV/VIS) or a reflection probe and a setscrew to hold the probe or cosine corrector in place. The second hole is a 3/8"-24 threaded hole for a COL-UV/VIS collimating lens.

The head can be fixed at any position, at any angle with an adjustable height of 200-300 mm.



### **Technical Data**

250 x 250 x 300 mm Max Dimensions 75 x 75 x 200 mm (folded) 1 hole 3/8"-24 for COL-UV/VIS collimating lens Threads 1 hole 6.8 mm diameter with setscrew for FCR probes and cosine correctors Height adjustment 200-300 mm

### **Ordering Information**

AvaTripod • Tripod with COL-UV/VIS thread and 6.8 mm hole for FCR and CC-UV/VIS

## AvaTrigger External trigger box

We made it smaller and more sensitive... Introducing the new AvaTrigger. Designed for use with any AvaSpec-USB2 spectrometer, it enables two different external triggering methods: optical and manual.

The optical trigger is useful for measuring pulsed light sources, such as solar simulations. Your Avantes spectrometer can start integrating within 1.5 microseconds after receiving the signal from the AvaTrigger. Alternatively, you can specify a delay time if you are interested in measuring spectral output against time (temporal stability).

The AvaTrigger has an SMA-905 connector to easily couple with any accessory or light source from Avantes' extensive line-up.

The sensitivity of the optotrigger can be adjusted by a potentiometer at the front. A green indicator LED on the front panel of the AvaTrigger shows a short pulse when a TTL pulse is sent to your spectrometer.

The IC-DB26-2 interface cable required to connect the AvaTrigger with your Avantes spectrometer is included in the box.

### AvaTrigger



Trigger Input Internal Delay time to TTL output Minimal pulse duration Trigger in Power consumption IO connector to AvaSpec Dimensions Weight

### **Technical Data**

Opto	Pushbutton
Ca. 300 ns*	20 µsec
	10 µsec
	5 mA @ 5VDC (internal)
Pin 3 (5VDC),	Pin 4 (hardware trigger to AvaSpec), pin 8 (enable trigger), pin 10 GND
	75 x 78 x 37 mm
	260 g

\*depending on the slew rate of the light source

### Ordering Information

AvaTrigger-USB2 • External trigger source for all AvaSpec-USB2 spectrometers, incl. IC-DB26-2



## Fiber-optic Switch (FOS)

### **FOS-2-Inline**



The fiber-optic switches (FOS) from Avantes are the ideal accessory to facilitate automatic shuttering of a spectrometer or to correct for light source drift. Automatic shuttering can be achieved with the FOS-1-Inline while light source drift correction requires the FOS-2-Inline. Both FOS designs can either be used automatically or operated electronically via a TTL pulse from an external source or AvaSpec spectrometer.

The FOS is coupled in the optical path between two SMA terminated fibers and features it two or four COL-UV/VIS collimating lenses (UV/VIS/NIR) and a filter holder for filters that are up to 5 mm thick. TTL signals can be provided by an external device or by an AvaSpec spectrometer connected through a cable (IC-DB26-2), ordered separately.

AvaSoft-Full spectroscopy software supports light source drift correction for a setup where one of the FOS-2-inline channels is connected to a reference measurement (such as a white tile, cuvette with blank) and the other channel is connected to the actual measurement. This provides for periodic switching to the reference channel and this updated reference data is used to correct the data measured at the sample channel.

A PS-24V/1.25A 24 volt DC power adapter is required for either of the FOS-series fiber-optic switches.

### **Technical Data**

Wavelength rangeFiber connection2 SN<br/>collitFilter slit1Shutter frequency1Shutter delay1Shutter attenuation1Material1Dimensions1

FOS-1-inline	FOS-2-inline	
200-25	500 nm	
2 SMA-905 connectors, incl. 2 COL-UV/VIS collimating lenses	4 SMA-905 connectors, incl. 4 COL-UV/VIS collimating lenses	
Max. 5 r	nm wide	
Max.	40 Hz	
10	ms	
60	dB	
Black anodiz	ed aluminum	
130 x 65	x 65 mm	

### **Ordering Information**

FOS-1-Inline	In-line Fiber-optic Switch, one optical path, incl. 2 COL-UV/VIS
IC-DB26-2	• Interface cable AvaSpec-USB2 platform to FOS-1-inline, 2 m
FOS-2-Inline	In-line Fiber-optic Switch, 2 optical path, incl. 4 COL-UV/VIS
IC-DB26-FOS2-2	• Interface Y-cable AvaSpec-USB2 platform to FOS-2 and AvaLight-S, 2 m
PS-24V/1.25A	• Power supply 100-240VAC/24VDC, 1.25A, necessary for FOS

Accessories

Three years limited warranty on all Avantes spectrometers, light sources and accessories



## Fiber-optic Multiplexer (FOM)

To configure systems which enable a single light source and spectrometer to make multi-point serial measurements, Avantes offers the FOM fiber-optic multiplexer. The device is available in three different configurations: 1 input to 16 outputs, 2 inputs to 8 outputs or 4 inputs to 4 outputs. The FOM consists of a precisely controlled stepper motor and a rotary block. The optical path is coupled through multiple COL-UV/ VIS collimating lenses.

The fiber-optic multiplexer is controlled via a USB-connection to a PC. The FOM software enables full control over the switching order, switching time and delay time and operates as a stand-alone unit. To integrate the FOM with AvaSpec spectrometers and your own devices the FOM-DLL software development kit is available and should be ordered separately.

Applications for the FOM include process control, where multiple locations need to be measured with multiple probes, all with one spectrometer and/or light source.

### FOM-UVIR400-2x8



### **Technical Data**

	FOM-UVIR400-1x16		FOM-UVIR400-2x8		FOM-UVIR400-4x4
Multiplex Channels	1 x 16		2 x 8		4 x 4
Optical Throughput		>	60 % (based on 400 µr	n fibers	)
Wavelength Range			250-2500 nm (UV/VIS	5/NIR)	
Fibers	Standard r	max. 40	0 μm, different dimens	ions avo	ailable on request
Connectors			All SMA-905		
Optical Repeatability			> 99%		
Switching Time		< 6	0 ms between adjacent	positic	ins
Interface			USB 2.0		
Power Requirement			100-230 VAC, 60\	/A	
Dimensions			244 x 144 x 354 m	ım	

### **Ordering Information**

- FOM-UVIR400-1x16 FOM-UVIR400-2x8
- Fiber-optic Multiplexer, 1 x 16 channels, 400 µm fibers • Fiber-optic Multiplexer, 2 x 8 channels, 400 µm fibers **FOM-UVIR400-4x4** • Fiber-optic Multiplexer, 4 x 4 channels, 400 µm fibers

### Options

FOM-DLL

• Interface DLL package for Fiber-optic Multiplexer (FOM-UVIR400-1x16 and FOM-UVIR400-2x8, and FOM-UVIR400-4x4) for Windows XP through 8



## Fiber-optic Process Flow Cells



For in-line absorbance measurements, the fiber-optic process flow cells (FOPFC) are the best solution. These devices are available with different optical path lengths and configurations and are easily coupled to our extensive line of fiber-optic cables and bundles through the SMA connectors.

The FOPFC features a sensor body, emitter focusing optic and receiver focusing optic assemblies. The optic assemblies enable coupling to fiber bundles with SMA connectors, linking the process to the spectrometer and light source. The device has a modular design, standard process flange connections and is optimized for use in harsh environments with high temperatures and pressures. SMA connector protection caps are available on request.

### **Technical Data**

Materials	316Ti Stainless Steel , 316L Stainless Steel, TFMC (carbon-filled Teflon®), Kynar®, PEEK, Monel®, Hastelloy C®, Inconel®, Tantalum, Titanium
Process Connections	ANSI Flange, DIN Flange, Tri-Clamp, Female NPT, Straight Pipe Thread DIN ISO 228/1 G, SMS Thread, Sanitary Thread (DIN 11851).
Line Size	¼″ to 12″ (DN 6 to DN 300)
Wavelength Range	250-2500 nm (UV/VIS/NIR)
Optical Path Length	1 -1000 mm, depending on Line Size
Window Material	Sapphire
Optical Air Purge	Standard, avoids condensation on optics
Elastomers	Viton®, EPDM, Kalrez®, NBR, Fluoraz 797®, Silicone, and others
Operating Temperature	240°C
<b>Operating Pressure</b>	10 mbar - 500 bar

### **Ordering Information**

**FOPFC** • Fiber-optic Process Flow Cell with SMA connectors, specify materials, Process Connections and Line-Size / Path Length

Pre-configured spectrometers can be shipped within 24 hours



## **In-Line Flow cells**

For in-line absorbance or fluorescence measurements, Avantes offers the in-line flow cells. They are available for tubing diameters of 1/4, 1/2 and 1 inch. The flow cells consist of Swagelok union cross tube fittings and two UV/VIS/NIR collimating lenses.

The optical path depends on the size of the flow cell: the 1/4" version has an optical path of 5 mm, the 1/2" of 10 mm and the 1" version 20 mm. They feature SMA-905 connectors for easy coupling to any of our wide range of fiber-optic cables or bundles

Al flow cells come with variable focusing to optimize light throughput over the spectral range. All flow cells are also available in high temperature configurations (up to 200°C). Special gas flow cells are also available and are designed to withstand pressures up to 200 bar.

Flowcell-1/2"



### **Technical Data**

	¼" flow cell	½" flow cell	1" flow cell	
Optical path	5 mm	10 mm	20 mm	
Sample volume	62 µl	124 μl	248 µl	
Wavelength range		200-2500 nm		
Fiber connection		2 x SMA-905 connectors		
<b>Collimating optics</b>	Plano Convex, focal length 8.7 mm			
Max. Temperature	80ºC (H	T version till 200°C available on	request)	
Max. Pressure	10 b	ar (Special Gasflowcell up to 200	) bar)	
Material	Stainless steel for the fitting, black anodized aluminum for the SMA-905 connectors			
Overall dimensions	55 x 45 x 15 mm	72 x 50 x 22 mm	98 x 60 x 38 mm	

### **Ordering Information**

Flowcell-1/4"	$\bullet$ Flow cell 1/4" with variable SMA adapter, 5 mm path length, incl. 2 UV/VIS/NIR lenses
Flowcell-1/2"	$\bullet$ Flow cell $1\!$
Flowcell-1"	• Flow cell 1" with variable SMA adapter, 20 mm path length, incl. 2 UV/VIS/NIR lenses
Flowcell-1/4"-FL	$\bullet$ Fluorescence Flow cell $1\!\!4''$ with 2 SMA adapters, incl. 1 UV/VIS/NIR lens
Flowcell-1/4"-5-HPHT	• Flow cell for gasses and liquids, ¼", 5 mm optical path length with SMA adapter, inclu- ding 2 UV/VIS/NIR lenses, high pressure 200 bar, high temp 200°C.
Flowcell-1/4"-50-HPHT	<ul> <li>Flow cell for gasses and liquids, ¼", 50 mm optical path length with SMA adapter, including 2 UV/VIS/NIR lenses, high pressure 200 bar, high temp 200°C.</li> </ul>

### Option

-HT • High temperatures up to 200°C



## **Micro Flow Cell**



For in-line measurements of low liquid volumes, Avantes offers our micro flow cells. The micro flow cells feature a Z-design and can easily be coupled to 1.5 mm PTFE tubing with 0.5 mm inner diameter. Typically these are used for absorption measurements and HPLC applications. Two special fiber-optic cables (FC part number terminating in FIA)are required for coupling with these micro flow cells. The special fiber-optic cable is the window for these flow cells.

### **Technical Data**

Micro flow Z-cell -10 Micro flow cell -1.5		
200-2500 nm		
10 mm		1.5 mm
18 µì		3 μ]
	1.5 mm	(1/16")
	10	bar
	1.6 mm	n ferrule
32 x 38 x 13 mm / PEEK		
	Micro flow Z-cell -10 10 mm 18 µl	Micro flow Z-cell -10 200-25 10 mm 18 μl 1.5 mm 10 1.6 mm 32 x 38 x 15

FLOWCELL-Z-10	• Flow Z cell with 10 mm optical path
FLOWCELL-1.5	• Flow Z cell with 1.5 mm optical path
FC-UV400-1-FIA-SR	$\bullet$ Fiber cable 400 $\mu m,$ UV/VIS, sol. Resistant for Flow Z cell 10/1.5



## LPC series Long Path Flow Cells

When measurements need to be done in low-concentration fluids, the LPC series long path flow cells are the ideal choice. Available in 50 mm, 100 mm, 500 mm, 1 m and 2 m versions, they can be used to measure low-volume, low concentration (ppbppt) aqueous samples. They are suitable for discrete or continuous flow cell sampling.

The LPC long-pass flow cells consist of 550-micron inner-diameter fused silica capillary tubing with a low refractive index polymer and an internal volume of 240µl/ meter. The tubing has chromatography fittings for liquid flow. Coupling to a light source and spectrometer is easily done via SMA terminations.

These devices can be used in a wide variety of applications, such as liquid chromatography detection, drinking water analyses, as well as environmental and oceanographic monitoring systems.

### LPC-FS-500 500 mm path length



### **Technical Data**

Waveguide material	Fused silica tubing coated with low refractive index polymer
<b>Optical Pathlength</b>	50 mm, 100 mm, 500 mm, 1 m, 2 m
Inner Diameter	550 μm
Internal Volume	13-240 μl
Fiber input	400 μm
Max. Temperature	160 °C
Pressure Range	1.5 - 2000 PSI

### **Ordering Information**

LPC-FS-50	<ul> <li>Long path flow cell fused silica tubing, 50 mm pathlength</li> </ul>
LPC-FS-100	• As LPC-FS-50, 100 mm pathlength
LPC-FS-500	• As LPC-FS-50, 500 mm pathlength
LPC-FS-1000	• As LPC-FS-50, 1 m pathlength
LPC-FS-2000	• As LPC-FS-50, 2 m pathlength

Three years limited warranty on all Avantes spectrometers, light sources and accessories



### WS-2 and WS-2-GEM





## **Reference Tiles**

For diffuse reflection measurements, Avantes offers the WS-2 reference tile. For specular reflection measurements, the RS-2 is available.

The WS-2 reference tile is made out of a white diffuse PTFE based material, which is considered the highest grade reference material for diffuse reflectance. It is mostly used in colorimetric application where a reference signal has to be obtained during a reflection measurement.

The PTFE material is high purity and processed using exacting standards to an amorphous structure, so the tile reflects light from 350-1800 nm at circa 98% and from 250-2500 nm at more than 92%. The material offers long term stability, even in UV applications. The plastic is hydrophobic and chemically inert. so it is cleanable.

For gemology applications, the WS-2 is used in combination with a reflection integrating sphere. The gemstone is put on the middle of the tile with the integrating sphere over it. The special WS-2-GEM is designed to facilitate holding and cooling a gemstone with liquid nitrogen, as it features a cavity and hole in the middle of the tile.

The WS-2-CAL is a NIST traceable calibrated white reference tile which includes an electronic calibration file covering 250-2500 nm.

The RS-2 is a mirror tile which can be used as a reference standard for specular reflection measurements.

The RS-2-CAL is a calibrated mirror tile which includes a NIST traceable calibration file, which is created using an 8° absolute specular reflectance measurement over the wavelength range from 250-2500 nm.

As with most Avantes products, these accessories can be delivered in a custom design. Contact us for more information.

### **Technical Data**

Material Max. temperature Dimensions tile Housing

	WS-2		RS-2	
rial	Diffuse PTFE material		BK7 with Al+MgF $_2$ coating	
ure	280°C		80°C	
tile	32 mm diameter / 10 mm thick		32 mm diameter / 1 mm thick	
ing	38 mm diameter, black PVC, cover red anodized			

For the latest information, go to www.avantes.com











WS-2	White reference tile		
WS-2-GEM	• White reference tile with cone, specially for Gemstone measurement		
WS-2-CAL	• NIST traceable calibrated white reference tile with 8° hemispherical calibration		
RS-2	• Specular Reflectance standard with $Al+MgF_{2^{\prime}}$ 200-1100 nm		
RS-2-CAL	• NIST traceable calibrated Specular Reflectance standard with $Al+MgF_{2'}$ 250-2500 nm		



## 12 and 24 volts power adapters for spectrometer and light sources

### **PS-12V Power adapter**



Most AvaSpec spectrometers are USB powered, but some users prefer to externally power their instrument. Avantes PS-12V and PS-24V can be used to connect your AvaSpec spectrometer and AvaLight light sources to any 100-240V power connection.

The PS-12V has a maximum output of 1.0A and is used with all AvaSpec spectrometers and most light sources and accessories. The

PS-24V is to be used with the AvaLight-HAL halogen light source and the FOS-inline fiber-optic switch.

All power supplies are equipped with automatic thermal and overload cut-off circuitry. Please specify on the order which plug should be delivered based upon your geography: Euro, UK, USA or Australian plugs are available.

### **Technical Data**

	PS-12V/1.0A	PS-24V/1.25A
Power Input	100-240 VAC ± 10%/ 47-63 Hz	
Power consumption	400 mA	700 mA
Power Output	12 VDC ± 5%, depending on load	24 VDC ± 5%, depending on load
Output current (max.)	1.0 A	1.25 A
DC -Connector	5.5 mm OD, 2.1 mm ID, 11.5 mm long	3.5 mm OD, 1.3 mm ID, 10 mm long
Dimensions	92 mm x 40 mm x 28 mm	105 mm x 68 mm x 39 mm
Operating Temperature	0 - 45°C	
Cable length	<b>h</b> 2.0 m	

### **Ordering Information**

PS-12V/1.0A	Power supply 100-240VAC/12VDC, 1.0A
PS-24V/1.25A	• Power supply 100-240VAC/24VDC, 1.25A for AvaLight-HAL/FOS

### Euro plug standard, special power plug specify

-UK • UK plug -US • USA plug

-AUS • Australian plug

Did you know Avantes is specialized fiber-optic cables?



## Battery packs for portability of Avantes spectrometers and light sources

If you have a need for portability with our spectrometers or light sources, Avantes offers a range of battery packs to power our instruments in the field.

### 5+12V battery pack

Th 5+12V battery pack was specifically designed for the AvaSpec-NIR series cooled spectrometers and the AvaSpec-TEC spectrometers that require a 5V-2A power supply for cooling. It has 5 NiMH batteries, with 13Ah capacity, enabling 6 hours of flawless operation.

### 12V battery pack

The 12V battery pack can be used with all our AvaSpec USB2-based spectrometers and most of our small form factor AvaLight illumination sources. It consists of 10 powerful NiMH batteries with a capacity of 1500mAh and allows you to use the spectrometers for up to eight hours without charging. It is suitable for all AvaSpec spectrometers and most small form factor light sources such as AvaLight-LED, AvaLight-XE, AvaLight-DHc and AvaLight-CAL.

### 24V battery pack

The 24V battery pack is designed to be used with the AvaLight-HAL. It consists of 20 NiMH batteries and a capacity of 3200 mAh. This provides enough for 2.5 hours of continuous operation.

### **12V Battery pack**



### **Technical Data Battery Packs**

	5+12V	12V	24V
Power Input	5-9.6 VDC for loading	15-32 VDC/1.0A for loading	24-32 VDC/1.0A for loading
Input connector	4-pole Binder 719 male connector	3-pole Binder 719 male con- nector	3-pole Binder 719 male con- nector
Power Output	5 and 12 VDC	12 VDC	24 VDC
Output power	5 NiMH cells, 13 Ah	10 NiMH cells, 1500 mAh	20 NiMH cells, 3200 mAh
Output -Connector	6-pole Hirose connector, 12 mm diameter x 55 mm	5.5 mm OD, 2. 1 mm ID, 11.5 mm long	3.5 mm OD, 1.3 mm ID, 10 mm long
Dimensions	150 x 165 x 85 mm	100 x 110 x 44 mm	150 x 165 x 44 mm
Operating Temperature	0 - 45°C	0 - 45°C	0 - 45°C

Three years limited warranty on all Avantes spectrometers, light sources and accessories



### 1A Battery pack Charger

2.5A Battery pack Charger





### **Technical Data Battery Pack Chargers**

	5V/ 2.5A	12/24V/1.0A
Power Input	100-240 VAC / 50-60 Hz	100-240 VAC ± 10%/ 47-63 Hz
Power consumption	800 mA	700 mA
Power Output	4.8-9.6 VDC ± 5%	15-32 VDC $\pm$ 5%, depending on load
Output current (rapid charge)	2500 mA	950 mA
Output current (trickle charge)	n.a.	56 mA
DC -Connector	4-pole Binder 719 female connector	3-pole Binder 719 female connector, incl. temp feedback
Dimensions	110 mm x 53 mm x 32 mm	105 mm x 68 mm x 39 mm
<b>Operating Temperature</b>	0 - 40°C	0 - 40°C
Cable length	2.0 m	2.0 m

Batterypack-5+12V/13Ah	• Battery pack 5 VDC and 12 VDC, 13 Ah
Batterypack-5+12V/13Ah-RM	• Battery pack 5 VDC and 12 VDC, 13 Ah, Rack-mounted version
Batterypack-12V/1.5Ah	• Battery pack 12 VDC, 1500 mAh
Batterypack-12V/1.5Ah-RM	<ul> <li>Battery pack 12 VDC, 1500 mAh, Rack-mounted version</li> </ul>
Batterypack-24V/3.2Ah	• Battery pack 24 VDC, 3200 mAh
Batterypack-24V/3.2Ah-RM	<ul> <li>Battery pack 24 VDC, 3200 mAh, Rack-mounted version</li> </ul>
Batterypack-charger-5V/2.5A-EUR	$\bullet$ Charger for battery pack 5 VDC, 2.5 A , Europlug standard, otherwise please specify –UK, -US, -AUS
Batterypack-charger-1.0A-EUR	<ul> <li>Charger for battery pack 12 V/24 VDC, 1.0 A, Europlug standard, otherwise please specify –UK, -USA, -AUS</li> </ul>



