

# AvaLight-DHc Full-Range Compact Light Source

## AvaLight-DHc



Get the best out of two worlds with the AvaLight-DHc. It has both a deuterium light source and a halogen light source, providing you with adequate light between 200 and 2500 nm for nearly all absorbance chemistry applications. Deuterium emits light between 200 and 550 nm, where the halogen takes over up to 2500 nm. Coupling this lightsource to the rest of your spectroscopy system is easy with the SMA connector.

This light source is recommended in settings with large fiber cables or direct-attachment to a cuvette holder such as the CUV-DA, due to its relatively low output energy. The integrated TTL-shutter makes saving a dark measurement very simple in combination with AvaSoft (extra IC-DB26-2 needed).

Optionally the AvaLight-DHc is available in a rack-mountable version, to be used in the 19" rack or the 9.5" desktop system.

- Combined Deuterium-Halogen
- Integrated TTL-shutter

A direct-attach cuvette holder CUV-DA (see section accessories) is available for fluorescence or absorbance measurements.

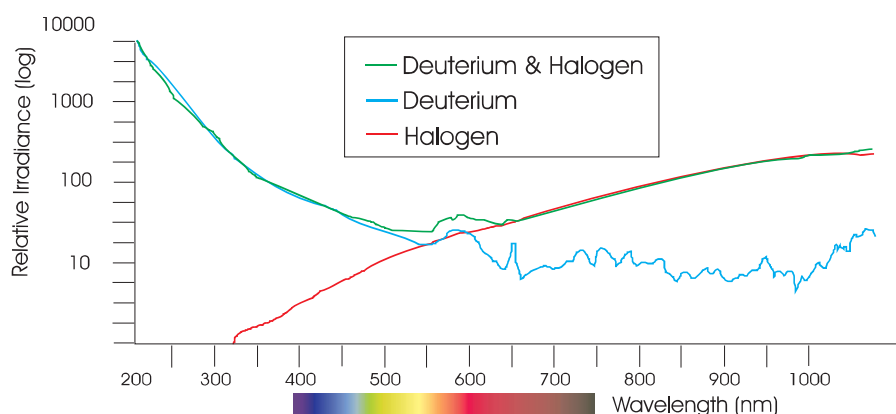


Figure 8 Spectral output of AvaLight-DHc

## Technical Data

	Deuterium Light Source	Halogen Light Source
<b>Wavelength Range</b>	200 - 400 nm	400 - 2500 nm
<b>Stability</b>	< 1 mAU	< 1 mAU
<b>Warm-up time</b>	8 min	1 min
<b>Drift</b>	< 0.25% / h	< 0.25% / h
<b>Optical Power in 600 <math>\mu</math>m fiber</b>	0.2 $\mu$ Watt	7 $\mu$ Watt
<b>Lamp Lifetime</b>	1000 hours	2000 hours
<b>Temp. Range</b>	5°C - 35°C	
<b>Power Supply</b>	12VDC / 450 mA	
<b>Dimensions, weight</b>	175 x 110 x 44 mm, 570 g	
<b>Lifetime shutter</b>	1.000.000 cycles (typical)	

## Ordering Information

<b>AvaLight-DHc</b>	• Compact Deuterium Halogen Light Source with TTL Shutter
<b>IC-DB26-2</b>	• Interface cable AvaSpec-USB2/EVO platform to AvaLight-DHc-TTL-shutter
<b>AvaLight-DHc-RM</b>	• Rackmount Compact Deuterium Halogen Light Source with TTL Shutter
<b>AvaLight-DHc-B</b>	• Compact Deuterium Halogen Replacement Bulb
<b>CUV-DA</b>	• Direct-attach cuvette holder for AvaLight-DHc/XE/LED
<b>PS-12V/1.0A</b>	• Power supply 100-240VAC/12VDC, 1.0A for AvaLight-DHc



We offer three years  
limited warranty on all  
Avantes spectrometers,  
light sources (excl. bulb)  
and accessories

# AvaLight-HAL-S-MINI Tungsten-Halogen Light Source

## AvaLight-HAL-S-MINI



From visible light to near infrared, that's where the AvaLight-HAL-S-Mini works best. It's a compact, stabilized halogen light source, with adjustable focusing of the fiber connection, maximizing output power at the desired wavelength. The light source also has adjustable output power to provide extra power or longer bulb life.

A filter-slot mounted on the front of the AvaLight-HAL-S-Mini accepts 1" round or 2" x 2" square filters, to block specific ranges of wavelengths or instantly lower the intensity.

The adjustable focus on the AvaLight-HAL-S-Mini helps you get the most out of your light source: it makes sure all possible power is transmitted through your optical fiber. Bulb replacement is easy and can be done in a matter of minutes.

Optionally a combined direct-attach cuvette holder and attenuator is available (CUV-ATT-DA-HAL). for attenuation you can use the Inline Filterholder, FH-INLINE or the Inline attenuator, ATT-INL.

The optical output can be controlled through a dongle at the backside or from your spectrometer. At low setting the lamp has a color temperature of 2700K but provides over 13000 hours of lifetime. The standard or medium setting changes the color temperature to 2850K and provides 50% more power with a bulb lifetime of 4000 hours. The high power setting gives a color temperature of 3000K, double power compared to the long-life setting and gives you up to 1000 hours of lifetime.

The AvaLight-HAL-S-Mini features an internal TTL-shutter, controllable from your AvaSpec spectrometer. This gives you the ability to use the auto-save dark option in AvaSoft spectroscopy software.

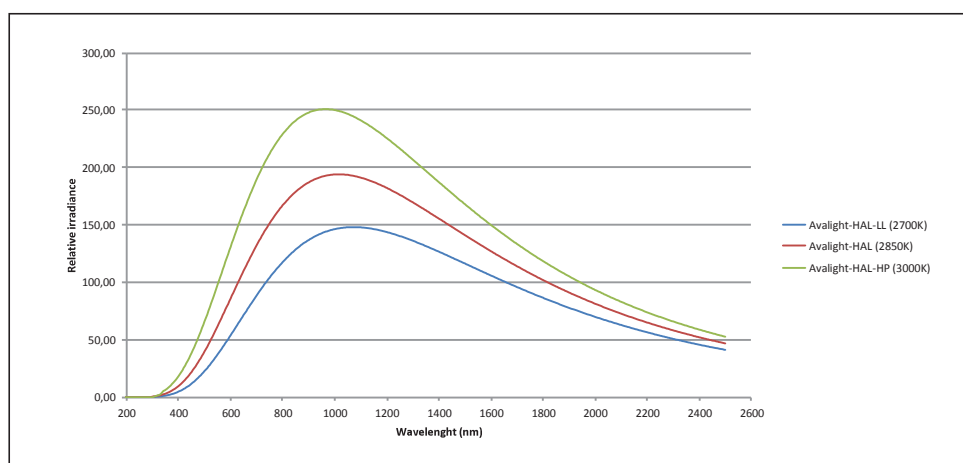


Figure 9 Spectral output of AvaLight-HAL-Mini

## Technical Data

	AvaLight-HAL-S-Mini (standard)	AvaLight-HAL-S-Mini (long life)	AvaLight-HAL-S-Mini (high power)
<b>Wavelength Range</b>	360-2500 nm		
<b>Stability</b>	± 0.1% / °C		
<b>Time to stabilize</b>	Ca. 10 min.		
<b>Output to bulb</b>	12.0 VDC / 0.83A	11.3 VDC / 0.8A	14.1 VDC / 1.0A
<b>Bulb Life</b>	4000 hrs	> 13000 hrs	< 1000 hrs
<b>Min. Optical power* 200 µm fiber</b>	0.5 mWatt	0.35 mWatt	0.7 mWatt
<b>Min. Optical power* 600 µm fiber</b>	4.5 mWatt	3.2 mWatt	6 mWatt
<b>Min. Optical power* 1000 µm fiber</b>	10 mWatt	7 mWatt	14 mWatt
<b>Bulb Color Temperature</b>	2,850 K	2,730 K	3,000 K
<b>Power requirement</b>	12 VDC / 2.08A		
<b>Temperature range</b>	0-55 °C		
<b>Dimensions, weight</b>	150 x 78 x 37 mm, 510 grams		
<b>Lifetime shutter</b>	1,000,000 cycles (typical)		

\* Optical power measured from 350-1100nm

## Separate Filters

<b>GL-WG305-3</b>	Separate 50 x 50 x 3 mm long-pass filter > 305 nm
<b>GL-KG3-3</b>	Separate 50 x 50 x 3 mm band-pass filter, transparent > 325 nm and < 700 nm
<b>GL-BG28-3</b>	Separate 50 x 50 x 3 mm band-pass filter, transparent > 360 nm and < 500 nm
<b>GL-GG395-3</b>	Separate 50 x 50 x 3 mm long-pass filter > 395 nm
<b>GL-GG475-3</b>	Separate 50 x 50 x 3 mm long-pass filter > 475 nm
<b>GL-OG515-3</b>	Separate 50 x 50 x 3 mm long-pass filter > 515 nm
<b>GL-OG550-3</b>	Separate 50 x 50 x 3 mm long-pass filter > 550 nm
<b>GL-NG9-1</b>	Separate 50 x 50 x 1 mm Neutral Density filter (transmission 10%, 400-1100 nm)
<b>GL-NG9-2</b>	Separate 50 x 50 x 2 mm Neutral Density filter (transmission 1%, 400-1100 nm)
<b>GL-NG9-3</b>	Separate 50 x 50 x 3 mm Neutral Density filter (transmission 0.1%, 400-1100 nm)

More filter types available, please contact us for ordering information

## Ordering Information

<b>AvaLight-HAL-S-Mini</b>	• 10W Tungsten Halogen lamp, fan cooled, incl. TTL shutter, needs extra PS-12V/2.08A power supply
<b>AvaLight-HAL-S-RM</b>	• Rack-mounted version of AvaLight-HAL-S-Mini
<b>IC-DB26-2</b>	• Interface cable AvaSpec-USB2/EVO platform to AvaLight-HAL-(S)-Mini for shutter and power setting
<b>AvaLight-HAL-B-Mini</b>	• 10W Tungsten Halogen Replacement bulb for AvaLight-HAL-(S)-Mini
<b>PS-12V/2.08A</b>	• Power supply 100-240VAC/12VDC, 2.08A, necessary for AvaLight-HAL-Mini
<b>DONGLE-Mini-H</b>	• Dongle for high power setting
<b>DONGLE-Mini-L</b>	• Dongle for long life setting



# AvaLight-DH-S Deuterium-Halogen Light Source

## AvaLight-DH-S



In need of more power than the AvaLight-DHc? The AvaLight-DH-S is Avantes' most powerful deuterium halogen source. Like the DHc it is also a combined deuterium and halogen light source, capable of transmitting light in the UV/VIS/NIR-range, but has 35 times more halogen output and up to 300 times more deuterium power. The source has a prominent 656 nm deuterium peak which can limit dynamic range (see AvaLight-DH-S-BAL as an alternative). It includes a focusing lens assembly, to fully utilize the possibilities and size of your fiber.

The AvaLight-D-S is a deuterium light source only, making it a great option for measurements in the UV range, 190-400 nm. The AvaLight-D-S-DUV version starts even lower at 175 nm, for your deep-UV experiments. This version also offers twice the intensity at 200nm.

The output of the AvaLight-DH-S is optimized for fibers or bundles up to 600 micrometers. For larger fibers the focal point is manually adjustable to optimize the light coupling into your fiber.

The AvaLight-D(H)-S features an integrated TTL-shutter and filter holder for filters of up to 50x50x5.0 mm.

- Combined Deuterium-Halogen
- UV-VIS-NIR
- Deep-UV optional
- Powerful

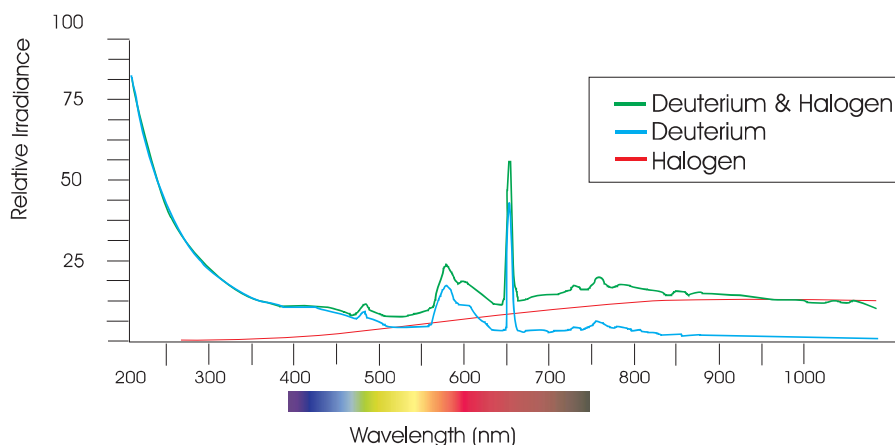


Figure 10 Spectral output AvaLight-DH-S

## Technical Data

	Deuterium (Deep-UV) Long life	Deuterium (Standard) Long life	Halogen
<b>Wavelength Range</b>	175-400 nm	190-400 nm	360-2500 nm
<b>Warm-up Time</b>	30 min.		20 min.
<b>Lamp Power</b>	78W / 0.75A		5W /0.5A
<b>Lamp Lifetime</b>	2000 h		1000 h
<b>Noise (AU)</b>	$2 \times 10^{-5}$		$10^{-4}$
<b>Max. drift</b>	$\pm 0.5\%/h$		$\pm 0.1\%/h$
<b>Color Temperature</b>	-	-	3000 K
<b>Optical Power* in 200µm fiber</b>	11 µW	11 µW	43 µW
<b>Optical Power* in 600µm fiber</b>	72 µW	72 µW	239 µW
<b>Optical Power* in 1000µm fiber</b>	206 µW	206 µW	354 µW
<b>Power consumption</b>	90 Watt (190Watt for heating D-Lamp 4-5 sec.)		
<b>Power Requirements</b>	100-240VAC 50/60 Hz		
<b>Dimensions / Weight</b>	315 x 165 x 140 mm / ca 5 kg.		
<b>Lifetime shutter</b>	1,000,000 cycles (typical)		

\* total power for the specified wavelength range

For a table of separate 50x50 mm filters to install in AvaLight-D(H)-S see AvaLight-HAL.

## Ordering Information

<b>AvaLight-D-S</b>	• Deuterium light source, 190-400 nm, incl. TTL shutter, -SR fibers needed
<b>AvaLight-DH-S</b>	• Deuterium-Halogen light source, 190-2500 nm, incl. TTL shutter, -SR fibers needed
<b>AvaLight-D-S-DUV</b>	• Deep-UV deuterium light source, 175-400 nm , TTL shutter, -SR fibers needed, 2000h
<b>AvaLight-DH-S-DUV</b>	• Deep-UV deuterium-halogen light source, 175-2500 nm , TTL shutter, -SR fibers needed
<b>IC-DB26-2</b>	• Interface cable AvaSpec-USB2/EVO platform to AvaLight-D(H)S-BAL
<b>AvaLight-D-B</b>	• Replacement deuterium bulb for AvaLight-D/AvaLight DH-BAL light source
<b>AvaLight-D-B-DUV</b>	• Replacement deep-UV deuterium bulb for AvaLight-D/AvaLight DH-BAL light source
<b>AvaLight-DH-B</b>	• Replacement halogen bulb for AvaLight-DH-BAL light source
<b>CUV-DA-DHS</b>	• Direct-attach cuvette holder for AvaLight-D(H)S-BAL

# AvaLight-DH-S-BAL Balanced Power

## AvaLight-DH-S-BAL



The AvaLight-DH-S is a powerful deuterium halogen source, but like any unbalanced deuterium halogen source it does have a very dominant alpha peak at 656 nm. This is why Avantes developed the DH-S-BAL, in which this peak is drastically reduced by a dichroic filter. This means less power, but an increase in the dynamic range of a factor 20. A comparison spectrum, which is taken with a standard AvaSpec-ULS2048CL, is shown on the next page.

The light source delivers a continuous spectrum with high efficiency. The highest stability is in the ultraviolet, visible and near infrared range, from 215 to 2500 nm. An integrated TTL-shutter and filter holder for filters of up to 50x50x5.0 mm are included. The TTL-shutter can be controlled from any AvaSpec spectrometer, which means the auto-save dark-option in AvaSoft software can be used (please note: IC-DB26-2 cable needed).

Connection to the fiber is done through an SMA-905 connector, which features an adjustable focusing lens assembly. This ensures you getting the maximum possible power into your fiber. For all deuterium light sources solarization resistant fibers are recommended. The output of the AvaLight-DH-S-BAL is optimized for fibers or bundles up to 600  $\mu\text{m}$ .

The filter holder can be easily replaced by a direct-attach cuvette holder CUV-DA-DHS (see section accessories) useful for fluorescence or absorbance measurements.

- Balanced light source
- Wide spectrum: 215-2500 nm
- Integrated TTL shutter
- High efficiency
- Increased dynamic range

### Technical Data

	Balanced Deuterium (Standard)	Balanced Halogen Lamp
<b>Wavelength Range</b>	215-500 nm	500-2500 nm
<b>Warm-up Time</b>	30 min.	20 min.
<b>Lamp Power</b>	78 W / 0.75 A	5 W / 0.5 A
<b>Lamp Lifetime</b>	2000 hrs	1000 hrs
<b>Noise (AU)</b>	$2 \times 10^{-5}$	$10^{-4}$
<b>Max. drift</b>	$\pm 0.5\%/hr$	$\pm 0.1\%/hr$
<b>Color Temperature</b>	-	3000 K
<b>Optical Power in 200 <math>\mu\text{m}</math> fiber</b>	6 $\mu\text{W}$	17 $\mu\text{W}$
<b>Optical Power in 600 <math>\mu\text{m}</math> fiber</b>	33 $\mu\text{W}$	160 $\mu\text{W}$
<b>Optical Power in 1000 <math>\mu\text{m}</math> fiber</b>	90 $\mu\text{W}$	448 $\mu\text{W}$
<b>Power consumption</b>	90 Watt (190 Watt for heating D-Lamp 4-5 sec.)	
<b>Power Requirements</b>	100-240VAC 50/60 Hz	
<b>Dimensions / Weight</b>	315 x 165 x 140 mm / ca 5 kg.	
<b>Lifetime shutter</b>	1,000,000 cycles (typical)	

For a table of separate 50x50 mm filters to install in AvaLight-D(H)-S see AvaLight-HAL.

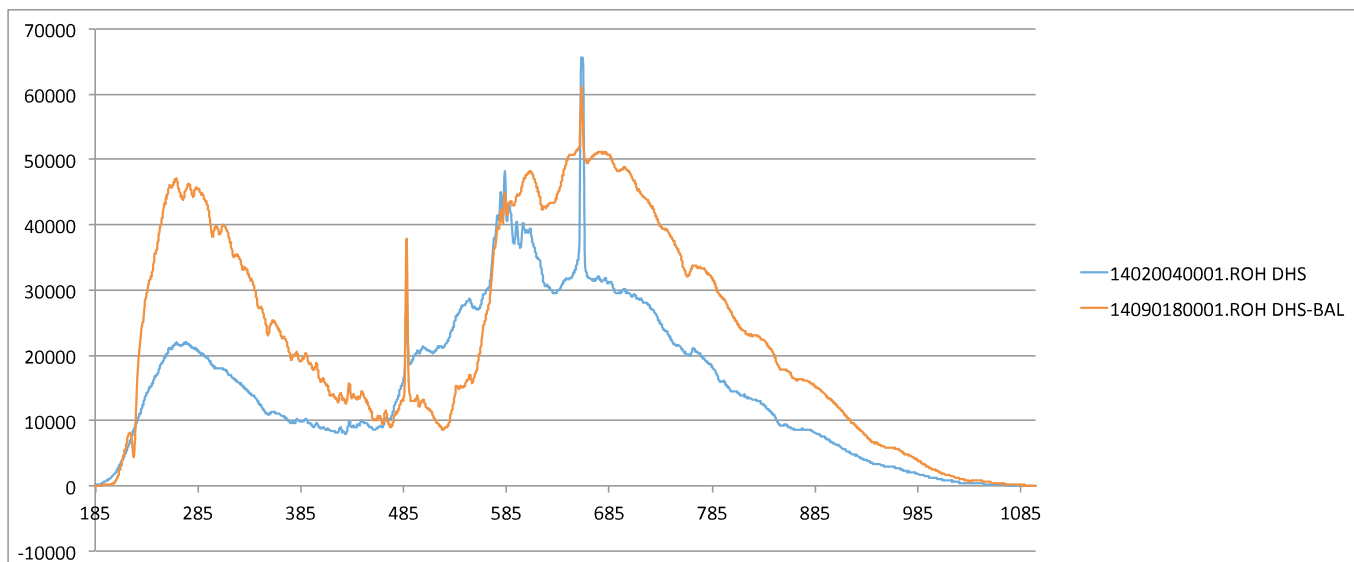


Figure 11 Spectral output AvaLight-DH-S-BAL (red) vs. AvaLight-DH-S (blue). (RAW data)

### Ordering Information

<b>AvaLight-D-S-BAL</b>	• Balanced Deuterium light source, 215-500nm, incl. TTL shutter, -SR fibers needed
<b>AvaLight-DH-S-BAL</b>	• Balanced Deuterium-Halogen light source, 215-2500 nm, incl. TTL shutter, -SR fibers needed
<b>IC-DB26-2</b>	• Interface cable AvaSpec-USB2/EVO platform to AvaLight-D(H)S-BAL
<b>AvaLight-D-B</b>	• Replacement deuterium bulb for AvaLight-D/AvaLight DH-BAL light source
<b>AvaLight-DH-B</b>	• Replacement halogen bulb for AvaLight-DH-BAL light source
<b>CUV-DA-DHS</b>	• Direct-attach cuvette holder for AvaLight-D(H)S-BAL

# AvaLight-XE Pulsed Xenon

## AvaLight-XE



Perfect for ultraviolet applications like fluorescence, the AvaLight-XE is a pulsed xenon light source. When connected to your AvaSpec spectrometer through the IC-DB26-2 cable (sold separately), the flashes are synchronized with the data collected by the spectrometer. In AvaSoft the number of flashes per scan can be selected.

With a special DUV bulb the AvaLight-XE can be used for deep ultraviolet application (below 200 nm). A special direct-attach cuvette holder is available for your fluorescence applications. For transmission measurements, the Avalight-XE can be used in conjunction with the CUV-ATT-DA which has an iris attenuator to limit the light output and to avoid saturation.

- Pulsed light source
- Perfect for fluorescence
- Cuvette holder available
- Long lifetime

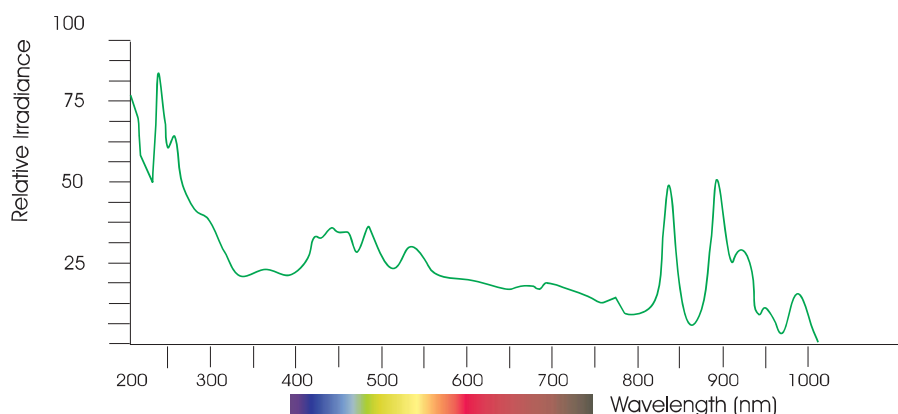


Figure 12 Spectral output of the AvaLight-XE

## Technical Data

<b>Spectral Output</b>	200 nm to 1000 nm
<b>Total Optical Power output</b>	39 $\mu$ J per pulse (average 66 mW)
<b>Optical Power in 200 <math>\mu</math>m fiber</b>	0.66 $\mu$ J per pulse (average 20 $\mu$ W)
<b>Optical Power in 600 <math>\mu</math>m fiber</b>	3.2 $\mu$ J per pulse (average 320 $\mu$ W)
<b>Optical Power in 1000 <math>\mu</math>m fiber</b>	7.4 $\mu$ J per pulse (average 744 $\mu$ W)
<b>Synchronization Input</b>	15 pin sub-D connector, TTL level
<b>Pulse Duration</b>	5 $\mu$ s (at 1/3 height)
<b>Pulse delay</b>	6 $\mu$ s
<b>Pulse rate (max.)</b>	100 Hz
<b>Bulb Life</b>	min. 10 <sup>9</sup> pulses
<b>Connector</b>	SMA-905 connector
<b>Power requirement</b>	12 VDC/550 mA
<b>Dimensions, weight</b>	175 x 110 x 44 mm, 540 grams

## Ordering Information

<b>AvaLight-XE</b>	• Xenon Light Source (200-1000 nm), needs interface cable and power supply
<b>AvaLight-XE-DUV</b>	• DUV (160-1000 nm) version of the AvaLight-XE, needs interface cable and power supply
<b>AvaLight-XE-B</b>	• Spare bulb for the AvaLight-XE (200-1000 nm)
<b>AvaLight-XE-B-DUV</b>	• Spare bulb for the AvaLight-XE-DUV (160-1000 nm)
<b>IC-DB26-2</b>	• Interface cable AvaSpec-USB2/EVO platform to AvaLight-XE
<b>CUV-DA</b>	• Direct-attach cuvette holder for AvaLight-DHc/XE/LED
<b>ATT-DA</b>	• Direct-attach attenuator for AvaLight-DHc/XE/LED
<b>CUV-ATT-DA</b>	• Direct-attach cuvette holder and attenuator for AvaLight-DHc/XE/LED
<b>PS-12V/1.0A</b>	• Power supply 100-240VAC/12VDC, 1.0A for AvaLight-XE

# AvaLight-XE-HP High Power Pulsed Xenon

Perfect for ultraviolet applications like fluorescence, the AvaLight-XE-HP is a pulsed xenon light source. When connected to your AvaSpec spectrometer through the Y- cable, the flashes are synchronized with the data collected by the spectrometer. In AvaSoft the number of flashes per scan can be selected.

Compared to the Avalight-XE (2W), the XE-HP can provide significant more power. The AvaLight-XE-HP comes in a compact housing and is ideal for OEM integration.

## AvaLight-XE-HP



### Technical Data

Spectral Output	200 nm to 1000 nm
Total Optical Power output	max 6W / 39mJ per flash
Synchronization Input	9 pin sub-D connector, TTL level
Pulse rate (max.)	150 Hz
Long Life	1,0 x 10 <sup>9</sup> flashes
Connector	SMA-905 connector
Power requirement	11 -28 VDC/2.08A
Dimensions, weight	98 x 44 x 35 mm, 192 grams

### Ordering Information

AvaLight-XE-HP	• 6W Xenon Light Source (200-1000 nm), with Y-cable for power and trigger connection. Needs extra PS-12V/2.08A power supply
PS-12V/2.08A	• Power supply 100-240VAC/12VDC, 2.08A for AvaLight-XE-HP

# AvaLight-HAL-CAL-Mini and AvaLight-DH-CAL Calibrated Light Sources

## AvaLight-HAL-CAL-Mini



Calibrating your spectrometer has never been easier: the AvaLight-HAL-CAL-Mini and AvaLight-DH-CAL are NIST traceable calibrated light sources which measure absolute spectral intensity.

The AvaLight-HAL-CAL-Mini is a compact, affordable light source. It is calibrated for the visible range (350-1095 nm). Optionally, an extended calibration for the near-infrared spectral range (1100-2500 nm) can be ordered. It has a built-in diffuser, a cosine corrector with SMA adapter and comes with a calibration file in ASCII format. Calibration can be done using the AvaSoft software.

The AvaLight-HAL-CAL-ISPxx-Mini is a special version of the AvaLight-HAL-CAL-Mini, which enables coupling any of Avantes' AvaSphere-xx-IRRAD integrating spheres to the light source (xx=30, 50 or 80) for calibration. This source is supplied with a special bottom plate to stabilize the AvaSphere. The AvaLight-HAL-CAL-Mini and AvaLight-HAL-CAL-ISPxx-Mini include a power supply.

- Field calibration
- Visible and optional NIR range
- Built-in diffuser
- Versatile

## AvaLight-DH-CAL



For calibrations in the ultraviolet and visible range (200-1099 nm), the AvaLight-DH-CAL is the best solution. This source can be used with all AvaSpec spectrometers to calibrate for absolute spectral intensity. It is supplied with a built-in diffuser, a cosine corrector (CC-VIS/NIR) with SMA adapter and the calibration files in ASCII format.

Two calibration files are included: one for irradiance calibration over the full range (200-1099 nm) and one over the visible and near infrared range (350-1099 nm). For the first file, both the deuterium and the halogen bulb should be used during calibration. The second file is to be used with only the halogen light. The halogen only spectrum provides a smoother black body calibration spectrum for the longer wavelengths.

For a more balanced spectrum across the 200-1100 nm range, Avantes offers the AvaLight-DH-BAL-CAL. For ultraviolet range calibration only (200-400 nm), the AvaLight-D-CAL is the right choice.

The calibration files can be imported in the AvaSoft-IRRAD application software, for intensity calibration which turns your spectrometer into a spectroradiometer.

The AvaLight-DH-CAL-ISPxx is a special version of these calibrated light sources, meant to facilitate coupling of the AvaSphere-xx-IRRAD integrating spheres to the light source. (xx is 30, 50 or 80).

- Flexible calibration
- Ultraviolet and visible range
- Built-in diffuser and cosine corrector



## Technical Data

	AvaLight-HAL-CAL-Mini	AvaLight-DH-(BAL)-CAL
<b>Calibration use</b>	Irradiance $\mu\text{W cm}^{-2} \text{ nm}^{-1}$	Irradiance $\mu\text{W cm}^{-2} \text{ nm}^{-1}$
<b>Calibrated surface</b>	CC-VIS/NIR or AvaSphere	CC-VIS/NIR or AvaSphere
<b>Wavelength Range</b>	350-1095 nm / 1100-2500 nm*	200-1099 nm
<b>Calibration Repeatability</b>	$\pm 0.5 \%$	$\pm 1.0\%$
<b>Calibration Relative Uncertainty to NIST standard</b>	$\pm 5.0\%$ (350-1100 nm) $\pm 3.5\%$ (1100-1950 nm) $\pm 5.0\%$ (1950-2500 nm)	$\pm 10\%$ (200-240 nm) $\pm 9\%$ (240-350 nm) $\pm 10\%$ (350-400 nm) $\pm 9.5\%$ (400-1100 nm)
<b>Calibration valid for</b>	60 hrs	60 hrs
<b>Warm-up Time</b>	Ca. 15 min.	Ca. 30 min.
<b>Bulb Output</b>	170 $\mu\text{W cm}^{-2} \text{ nm}^{-1}$ (@800 nm)	80 $\mu\text{W cm}^{-2} \text{ nm}^{-1}$ (@215 nm) 5 $\mu\text{W cm}^{-2} \text{ nm}^{-1}$ (@800 nm)
<b>Power requirement</b>	12 V / 2.08A	100-240 VAC
<b>Dimensions</b>	150 x 78 x 37 mm	315 x 165 x 140 mm

\* optional extended range NIR calibration

## Ordering Information

<b>AvaLight-HAL-CAL-Mini</b>	• NIST traceable Halogen Lamp with CC- VIS/NIR diffuser, incl. PS-12V/2.08A
<b>AvaLight-HAL-CAL-ISP30-Mini</b>	• NIST traceable Halogen Lamp for use with AvaSphere-30-IRRAD, incl. PS-12V/2.08A and special sphere holder bottom plate
<b>AvaLight-HAL-CAL-ISP50-Mini</b>	• As AvaLight-HAL-CAL-ISP30-Mini for use with AvaSphere-50-IRRAD
<b>AvaLight-HAL-CAL-ISP80-Mini</b>	• As AvaLight-HAL-CAL-ISP30-Mini for use with AvaSphere-80-IRRAD
<b>HL-Recal</b>	• AvaLight-HAL-CAL recalibration service 350-1095 nm
<b>HL-Recal-NIR</b>	• AvaLight-HAL-CAL extended or recalibration service 1100-2500 nm
<b>AvaLight-D-CAL</b>	• NIST traceable UV Deuterium Lamp with CC-VIS/NIR diffuser, -SR fibers recommended
<b>AvaLight-DH-CAL</b>	• NIST traceable UV/VIS Deuterium/Halogen Lamp with CC-VIS/NIR diffuser, -SR fibers recommended
<b>AvaLight-DH-BAL-CAL</b>	• As AvaLight-DH-CAL, but balanced UV/VIS Deuterium/Halogen
<b>AvaLight-DH-CAL-ISP30</b>	• NIST traceable UV/VIS Deuterium/Halogen Lamp for use with AvaSphere-30-IRRAD, incl. special sphere holder bottom plate, -SR fibers recommended
<b>AvaLight-DH-CAL-ISP50</b>	• As AvaLight-DH-CAL-ISP30 for use with AvaSphere-50-IRRAD
<b>AvaLight-DH-CAL-ISP80</b>	• As AvaLight-DH-CAL-ISP30 for use with AvaSphere-80-IRRAD
<b>DH-Recal</b>	• AvaLight-DH-CAL recalibration service 200-1099 nm
<b>AvaSoft-IRRAD</b>	• Irradiance add-on software, to be ordered with AvaSoft-Full

When creating your setup, don't forget to add a fiber-optic cable!

# AvaLight-CAL Spectral Calibration Source

## AvaLight-CAL-Mini



The AvaLight-CAL-xxx is a spectral calibration lamp. It's available in Mercury-Argon (253.6-922.5 nm), Neon (337-1084.5 nm), Argon (696.5-1704 nm) Zinc (202.5-636.2 nm) and Cadmium (214.4-643.8 nm) versions. The major lines including their relative intensity and structures are shown below.

The standard SMA-905 connector supplies an easy connection between the lamp and optical fibers, making the AvaLight-CAL-xxx a low cost wavelength calibration system for any fiber-optic spectrometer. AvaSoft-Full spectroscopy software includes an automatic recalibration procedure.

The AvaLight-CAL-Mini, AvaLight-CAL-AR-Mini, AvaLight-CAL-Neon-Mini all come in the Mini-housing. They are equipped with a connector at the rear enabling to switch the unit on/off remotely with a TTL signal.

The AvaLight-CAL can also be delivered in rack-mountable version, to be integrated in Avantes 19" Rack-mount or the 9.5" desktop housing. The PS-12V/1.0A power supply should be ordered separately.

- Calibration light source
- Available in a variety of wavelength ranges (UV to NIR)

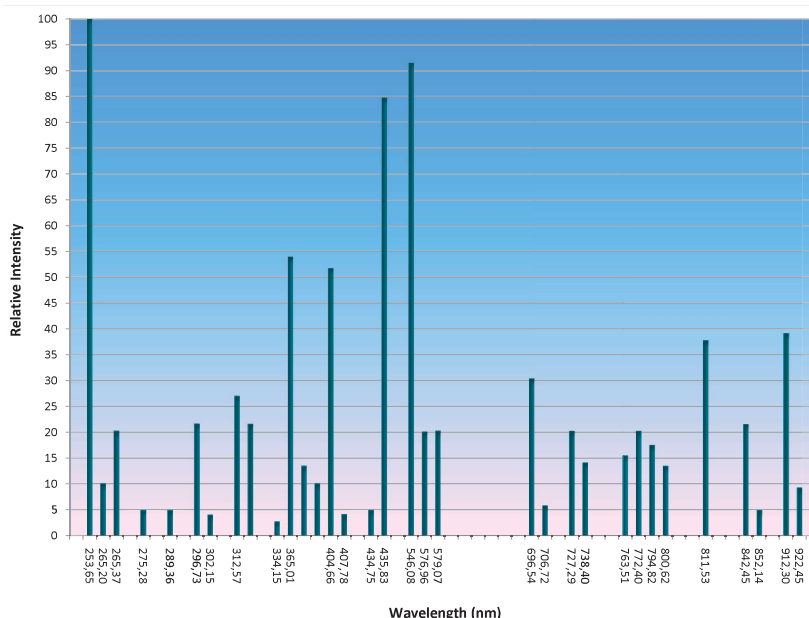


Figure 14 Spectral lines AvaLight-CAL-Mini

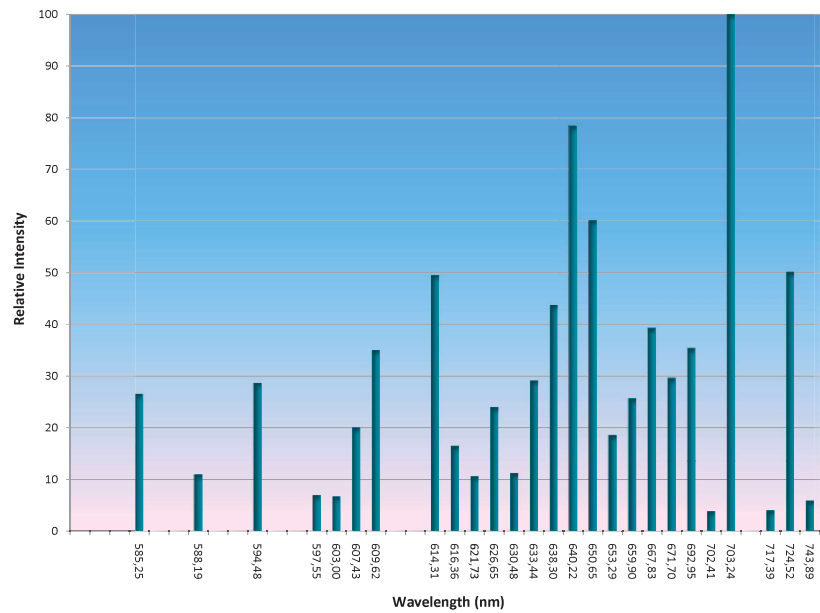


Figure 15 Spectral lines AvaLight-CAL-Neon-Mini

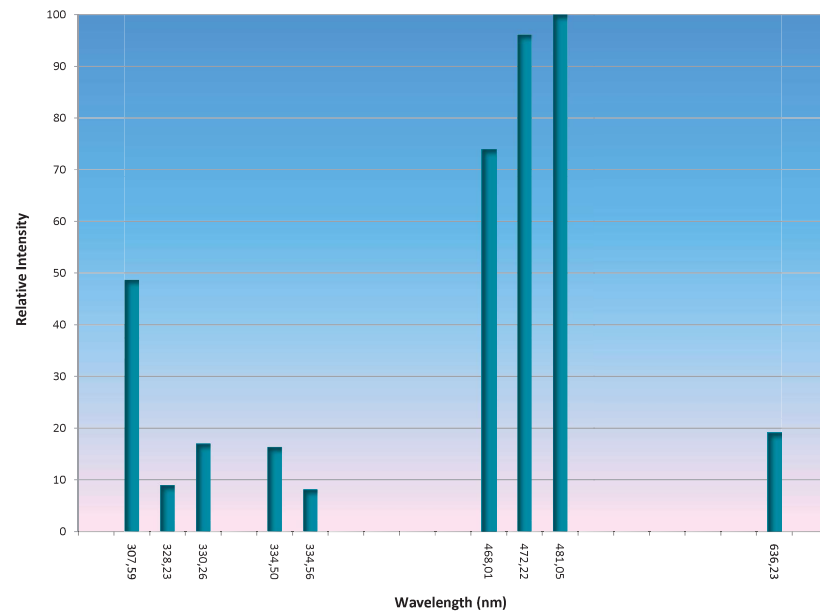


Figure 16 Spectral lines AvaLight-CAL-Zinc

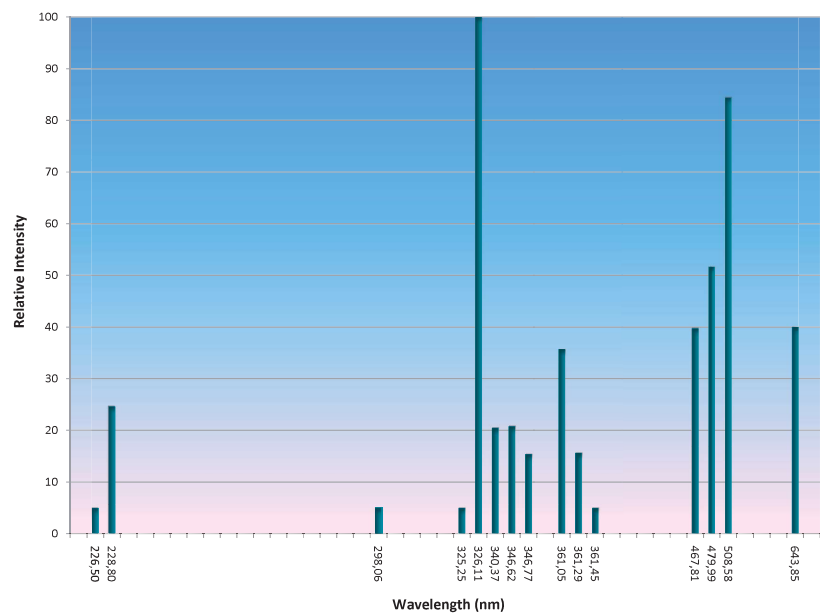


Figure 17 Spectral lines AvaLight-CAL-CAD

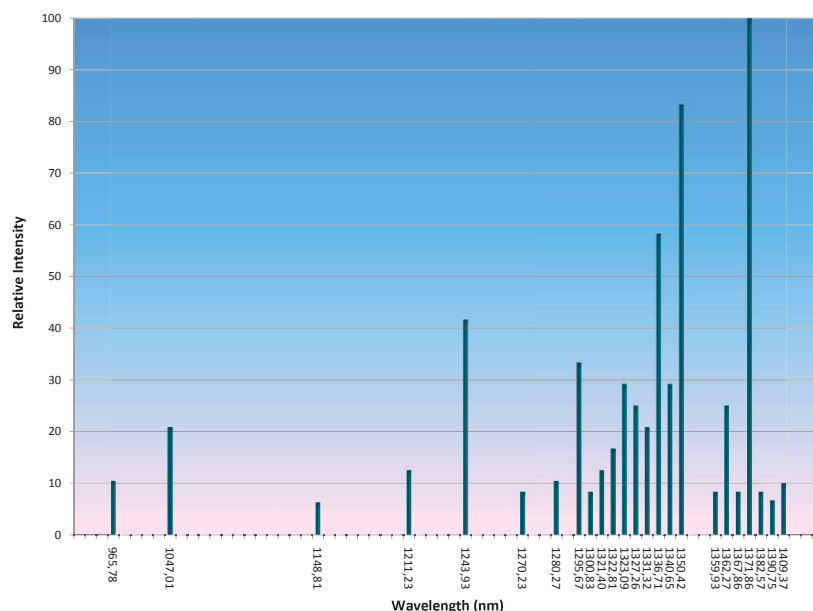


Figure 18 Spectral lines AvaLight-CAL-AR-Mini

### Technical Data

Lamp	HgAr	Neon	Ar	Zinc	Cadmium
Output	253.6–922.5 nm	337–966 nm	950–1704 nm	202.5–636.2 nm	214.4–643.8 nm
Optical power in 600 µm fiber	1.6 µW				
Connector	SMA-905 connector				
Internal Voltage	1200 Volts AC at 30 kHz, 10 mA		1500 Volts AC at 27 kHz, 47.5 mA		
Warm up	1 minute for vapor stabilization		< 10 min.		
Lamp lifetime	5000 hrs.		1000 hrs.		
Power requirement	12VDC supply, 240 mA		85–240 VAC, 1.0A		
Dimensions, weight	150 x 78 x 37 mm, 480 grams		Lamp unit : 175 x 110 x 44 mm, 480 grams Power supply unit : 102 x 167 x 58 mm, 450 grams		

### Ordering Information

<b>AvaLight-CAL-Mini</b>	• Mercury Argon Calibration source needs extra PS-12V/1.0A power supply, SMA
<b>AvaLight-CAL-NEON-Mini</b>	• Neon Calibration source needs extra PS-12V/1.0A power supply, SMA
<b>AvaLight-CAL-AR-Mini</b>	• Argon Calibration source needs extra PS-12V/1.0A power supply, SMA
<b>AvaLight-CAL-RM</b>	• Rack-mounted version of AvaLight-CAL
<b>AvaLight-CAL-B-Mini</b>	• Replacement bulb, Mercury-Argon
<b>AvaLight-CAL-NEON-B-Mini</b>	• Replacement bulb, Neon
<b>AvaLight-CAL-AR-B-Mini</b>	• Replacement bulb, Argon
<b>AvaLight-CAL-ZINC</b>	• Zinc Calibration Light source, including power supply
<b>AvaLight-CAL-CAD</b>	• Cadmium Calibration Light source, including power supply
<b>AvaLight-CAL-ZINC-B</b>	• Zinc replacement bulb
<b>AvaLight-CAL-CAD-B</b>	• Cadmium replacement bulb
<b>PS-12V/1.0A</b>	• Power supply 100–240 VAC/12 VDC, 1.0 A for AvaLight-CAL-Mini series

# AvaLight-HPLED High-Power Light Sources for Fluorescence Applications

The Avalight-HPLED is a compact, affordable LED light source meant for fluorescence applications. This high-power version was made for more demanding applications compared to our regular LED light source.

The AvaLight-HPLED light sources produce continuous or pulsed spectral output at different wavelengths. All sources have an SMA-905 connector to connect fiber optics and come with a 5V/1.6A power supply.

This high-power LED light source can be used as a DC source or pulsed with a programmable Pulse Width Modulation (PWM), supplied by an AvaSpec-USB2 or EVO spectrometer (IC-DB26-2 cable needed).

Benefits of the AvaLight-HPLED:

- Compact
- High power levels
- Fluorescence excitation
- Several excitation wavelengths

## AvaLight-HPLED



## Technical Data for AvaLight-HPLED

	AvaLight-HPLED-385	AvaLight-HPLED-405	AvaLight-HPLED-470	AvaLight-HPLED-530	AvaLight-HPLED-625	AvaLight-HPLED-White
<b>Peak wavelength</b>	385 nm	405 nm	470 nm	530 nm	625 nm	N.A.
<b>FWHM (nm)</b>	15 nm	15 nm	25 nm	35 nm	25 nm	N.A.
<b>Optical power 600 µm fiber</b>	3.4 mWatt					
<b>Connector</b>	SMA-905					
<b>Power supply</b>	5V, 500 mA					
<b>Dimensions, weight</b>	150 x 78 x 37 mm, 420 grams					

## Ordering Information

**AvaLight-HPLED-XXX**

- High-power light-emitting diode light source, specify wavelength XXX = 385, 405, 470, 530, 625, White. Includes 5V/1.6A power supply

**IC-DB26-2**

- Interface cable AvaSpec-USB2/EVO platform to AvaLight-HPLED for PWM

# AvaLight-LED Light Source for Fluorescence Applications

## AvaLight-LED



The Avalight-LED is a compact, low-cost light source meant for fluorescence applications. It produces continuous or pulsed spectral output at different wavelengths. Some standard excitation wavelengths are shown in the table on this page, but other wavelengths are available upon request. The sources have an SMA-905 connector to couple to fiber-optics. Please note that the power supply (PS-12V/1.0A) has to be ordered separately.

The AvaLight-LED can be used as a DC source or pulsed with a programmable Pulse Width Modulation (PWM), supplied by an AvaSpec-USB2 spectrometer (IC-DB26-2 cable needed).

The CUV-DA is a cuvette cell holder that has an integrated LED for direct illumination of the cell. This provides greater excitation energy for fluorophores with low quantum efficiency.

Other accessories include the CUV-FL and CUV-ALL cuvette holders and the FCR-UV fluorescence probes. They can be found in the accessories and fiber-optics chapters of this catalog. At the end of the catalog, an example fluorescence setup can be found.

- Fluorescence excitation
- Compact
- Flexible excitation wavelength

## Technical Data

	AvaLight-LED 355/380	AvaLight-LED 400/410/430	AvaLight-LED 450/470/490	AvaLight-LED 530/590/780
<b>Spectral Range*</b>	355/380 nm	400/410/430 nm	450/470/490 nm	530/590/780 nm
<b>FWHM (nm)</b>	15 nm	11 nm	30 nm	30 nm
<b>Optical power 600 µm fiber</b>	10 µWatt	25 µWatt	25 µWatt	25 µWatt
<b>Connector</b>	SMA-905			
<b>Power supply</b>	12 VDC, 40 mA			
<b>Dimensions, weight</b>	175 x 110 x 44 mm, 480 grams			

\* other wavelengths available on request

## Ordering Information

<b>AvaLight-LED-XXX</b>	• Light Emitting Diode Lightsource, specify wavelength XXX
<b>AvaLight-LED-XXX-RM</b>	• Rackmount version of the Light Emitting Diode Lightsource, specify wavelength XXX
<b>AvaLight-LED-CON</b>	• LED lightsource control unit with electrical connector to LED, needs extra PS-12V/1.0A and interface cable.
<b>CUV-LED-XXX</b>	• LED holder for Cuvette, specify LED wavelength XXX.
<b>CUV-DA</b>	• Direct-attach cuvette holder for AvaLight-DHc/XE/LED
<b>IC-DB26-2</b>	• Interface cable AvaSpec-USB2/EVO platform to AvaLight-LED for PWM
<b>PS-12V/1.0A</b>	• Power supply 100-240 VAC/12VDC, 1.0 A for AvaLight-LED