

Catalogue of SSL Broadband Photometers

Comprehensive Product Family for photometers and colorimeters

- ✓ The photocurrent meters contain high-quality transimpedance amplifiers (TIA)
 - ✓ SSL L, range for photometers
 - ✓ SSL C, range for tristimulus colorimeter
- ✓ Photopic X,Y,Z measuring heads for different dynamic ranges and spectral quality
 - ✓ SSL LH for $V(\lambda)$ match CIE1924
 - ✓ SSL CH for X,Y,Z match CIE1931



SSL L-200 (Discontinued) Photocurrent meter



- ✓ 1-channel Transimpedance amplifier (TIA)
- ✓ Measurement quantities:
 - ✓ Illuminance E_v (lx)
 - ✓ Flicker Index FI
 - ✓ Percent flicker MI (%)
 - ✓ Flicker frequency (Hz)
 - ✓ Stroboscopic visual measure SVM
 - ✓ Short-term perceptibility light modulation P_{st}^{LM}
- ✓ Signal bandwidth:
 - ✓ Maximum: 15 kHz @ photocurrent $> 10 \mu\text{A}$
 - ✓ SVM requirement: $> 2 \text{ kHz}$ @ photocurrent $> 100 \text{ nA}$
- ✓ Sampling rate (12-bit)
 - ✓ Maximum: 100 kHz
 - ✓ SVM: 36 kHz (1s measuring time)
 - ✓ P_{st}^{LM} : 2 kHz (1-5min)
- ✓ Photocurrent measurement range: 50 pA – 20 mA
- ✓ Linearity $< 0.1\%$
- ✓ AC 90-240Vac 50/60Hz power supply, RS-232 communication
- ✓ Compatible with SSL photopic measuring heads (LH)

SSL L-210

Photocurrent meter

Advantages of new version of high-accuracy photocurrent meter

- 6 gains instead of previous 12 gains
 - wider dynamic range
 - larger bandwidth at smaller photocurrents
 - improved sampling rate
-
- ✓ 1-channel Transimpedance amplifier (TIA)
 - ✓ Measurement quantities:
 - ✓ Illuminance E_v (lx)
 - ✓ Effective Luminous Intensity
 - ✓ Flicker Index FI, Percent Flicker MI (%), Flicker Frequency (Hz)
 - ✓ Stroboscopic Visual Measure SVM
 - ✓ Short-term Perceptibility Light Modulation P_{st}^{LM}
 - ✓ Photocurrent measurement range: 30 pA – 30 mA
 - ✓ Linearity <0.1%
 - ✓ 5V power supply (USB B input), RS-232 communication (DB15)
 - ✓ Compatible with SSL photopic measuring heads (LH)
 - ✓ Package includes: L-210, 5V power supply, 1.8m RS-232 cable.

SSL L-210

Photocurrent meter

Signal bandwidth	Photocurrent range
15 kHz	0.6 μ A – 30 mA
5 kHz	40 nA – 1 μ A
1 kHz	30 pA – 50 nA
SVM requirement: > 2 kHz	40 nA – 30 mA

- ✓ Photocurrent measurement range: 30 pA – 30 mA
- ✓ Sampling rate
 - ✓ Maximum: 200 kHz (5 μ s)
 - ✓ SVM: 36 kHz (1s measuring time)
 - ✓ P_{st}^{LM} : 2 kHz (1-5min)

SSL L-40

Photocurrent meter



- ✓ Transimpedance amplifier (TIA)
- ✓ Measurement quantities:
 - ✓ Illuminance E_v (lx)
 - ✓ Effective Luminous Intensity
 - ✓ Flicker Index FI, Percent Flicker MI (%), Flicker Frequency (Hz)
 - ✓ Stroboscopic Visual Measure SVM
 - ✓ Short-term Perceptibility Light Modulation P_{st}^{LM}
- ✓ Photocurrent measurement range:
 - ✓ 0.5 nA – 30 μ A (L40)
 - ✓ 5 nA – 300 μ A (L40.2)
- ✓ Signal bandwidth:
 - ✓ Maximum: 15 kHz @ photocurrent > 10 μ A
 - ✓ SVM requirement: > 2 kHz @ photocurrent > 100 nA
- ✓ Sampling rate
 - ✓ Maximum: 100 kHz
 - ✓ SVM: 36 kHz (1s measuring time)
 - ✓ P_{st}^{LM} : 2 kHz (1-5min)
- ✓ Linearity <0.1%
- ✓ USB powered
- ✓ Compatible with SSL photopic measuring heads (LH)

SSL L-41

Photocurrent meter

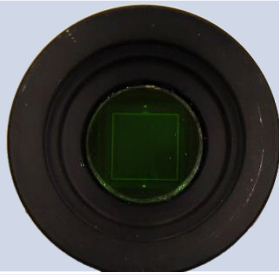
New enhanced version of L-40

- **Flicker measurements in the larger measuring range**
- **Bluetooth (BT) option**

- ✓ Transimpedance amplifier (TIA)
- ✓ Measurement quantities:
 - ✓ Illuminance E_v (lx)
 - ✓ Effective Luminous Intensity
 - ✓ Flicker Index FI, Percent Flicker MI (%), Flicker Frequency (Hz)
 - ✓ Stroboscopic Visual Measure SVM
 - ✓ Short-term Perceptibility Light Modulation P_{st}^{LM}
- ✓ Photocurrent measurement range: 1 nA – 100 μ A
- ✓ Signal bandwidth: 4 kHz
- ✓ Sampling rate
 - ✓ Maximum: 100 kHz
 - ✓ SVM: 36 kHz (1 s measuring time)
 - ✓ P_{st}^{LM} : 2 kHz (1-5min)
- ✓ Linearity <0.1%
- ✓ USB, RS232, BT (option), 12V DC power supplied
- ✓ Compatible with SSL photopic measuring heads (LH)

SSL Photopic measuring heads

Measuring ranges with different TIA

LH ^{*)}	Sensitivity (nA/lx)	TIA	Measuring range (lx)	
SSL LH1010-f3	30	L-40	0.05 lx – 1 000 lx	
		L-40.2	0.5 lx – 10 000 lx	
		L-210	0.001 lx – 500 000 lx	
SSL LH66-f3	10	L-40	0.15 lx – 3 000 lx	
		L-40.2	1.5 lx – 30 000 lx	
		L-210	0.003 lx – 800 000 lx	
SSL LH33-f3	1.7	L-40	1 lx – 15 000 lx	
		L-40.2	10 lx – 150 000 lx	
		L-210	0.02 lx – 5 000 000 lx	
SSL LH22-f10	2	L-40	0.5 lx – 10 000 lx	
		L-40.2	5 lx – 100 000 lx	
		L-210	0.01 lx – 3 000 000 lx	

^{*)} Spectral quality factor f_1' is 3% (LHxx-f3) and 10% (LHxx-f10).

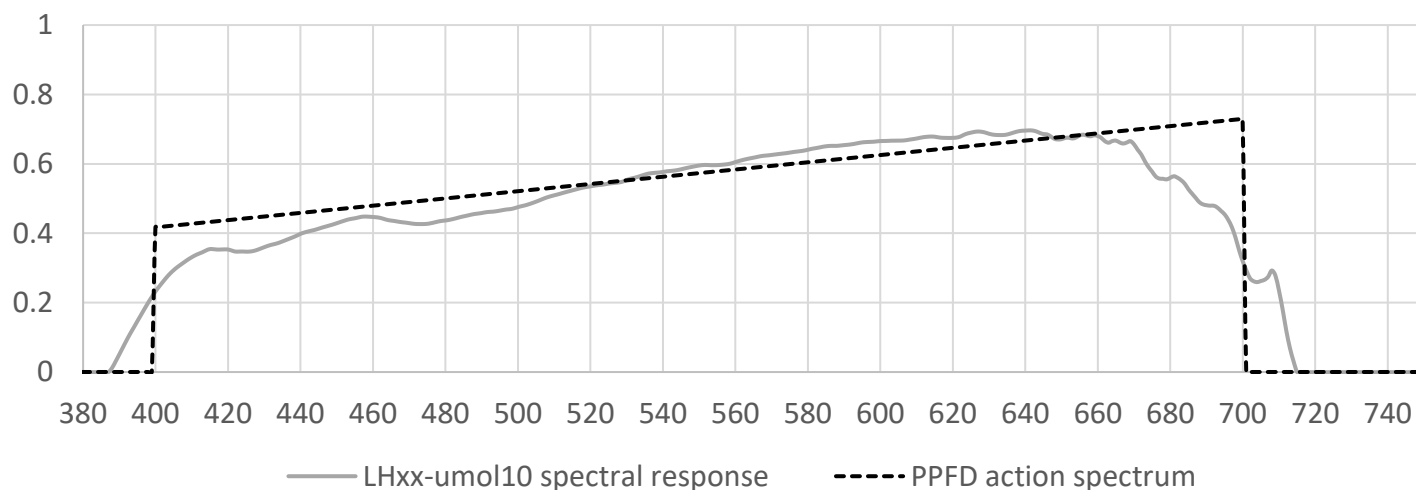
Options: PTFE diffuser for cosine corrector

SSL PPFD measuring heads

Measuring ranges with different TIA

LH	Sensitivity [$\mu\text{A}/(1000\mu\text{mol/s/m}^2)$]	TIA	Measuring range ($\mu\text{mol/s/m}^2$)	
SSL LH1010- umol10	370	L-40	0.004 – 70	
		L-40.2	0.04 – 700	
		L-200	0.000 1 – 35 000	
SSL LH66- umol10	120	L-40	0.01 – 200	
		L-40.2	0.1 – 2 000	
		L-200	0.000 2 – 60 000	
SSL LH33- umol10	21	L-40	0.1 – 1 000	
		L-40.2	1 – 10 000	
		L-200	0.002 – 350 000	

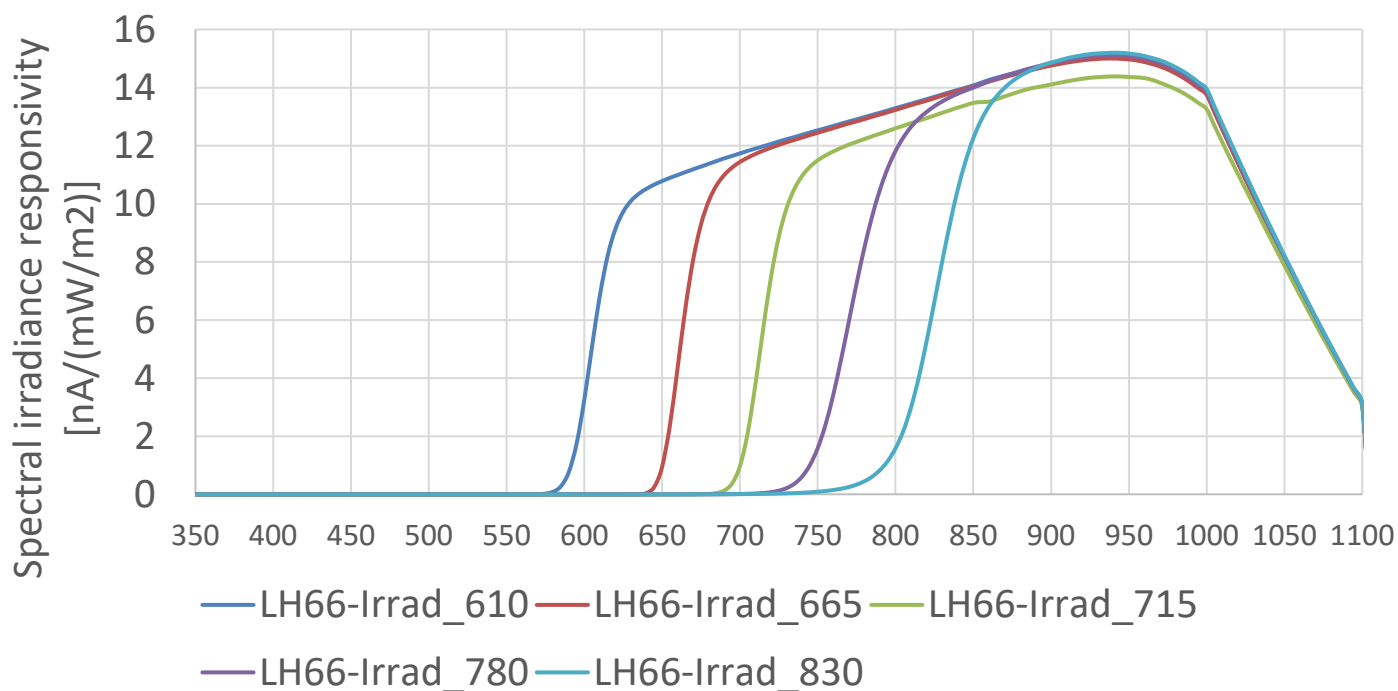
Options: PTFE diffuser for cosine corrector



SSL Irradiance measuring heads

Measuring ranges with different TIA

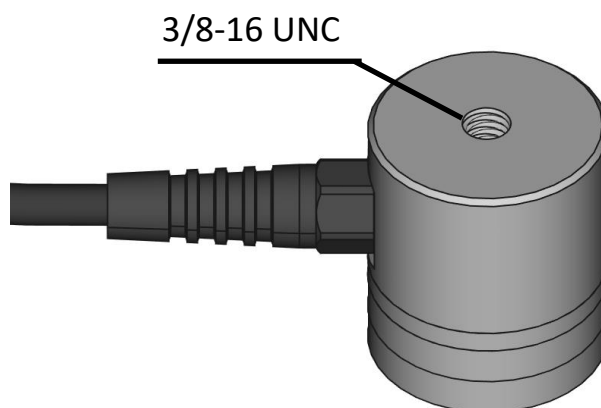
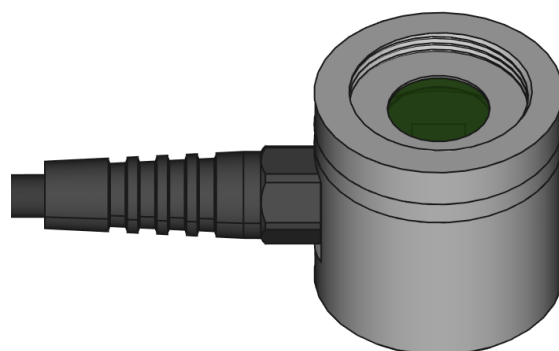
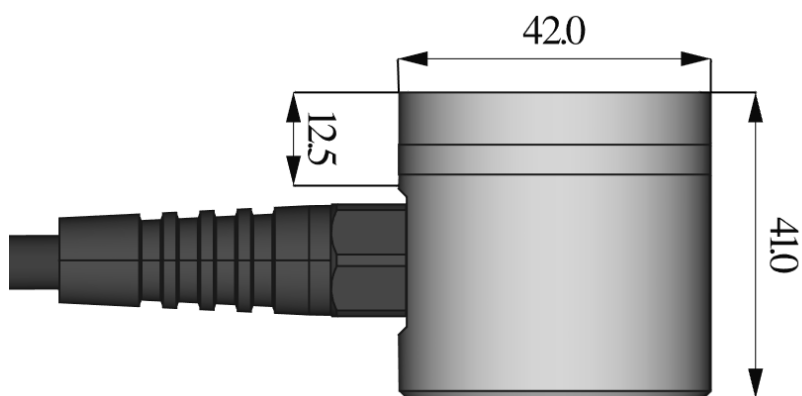
LH	Wavelength range (nm)	Peak Sensitivity [nA/(mW/m ²)]	Measurement range (mW/m ²)	
SSL LH66-Irrad_610	610 – 1050	15	L-40	3E-2 – 2E3
SSL LH66-Irrad_665	665 – 1050	15		
SSL LH66-Irrad_715	715 – 1050	14	L-40.2	3E-1 – 2E4
SSL LH66-Irrad_780	780 – 1050	15		
SSL LH66-Irrad_830	830 – 1050	15	L-200	3E-3 – 1E6



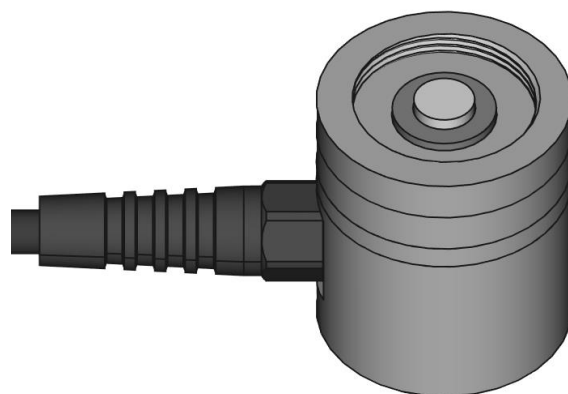
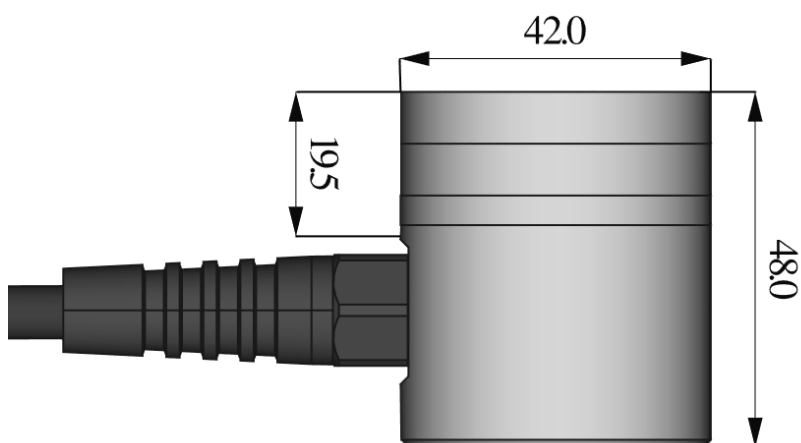
Options: PTFE diffuser for cosine corrector

LH Measuring heads - Dimensions

LHxx measuring heads without diffuser

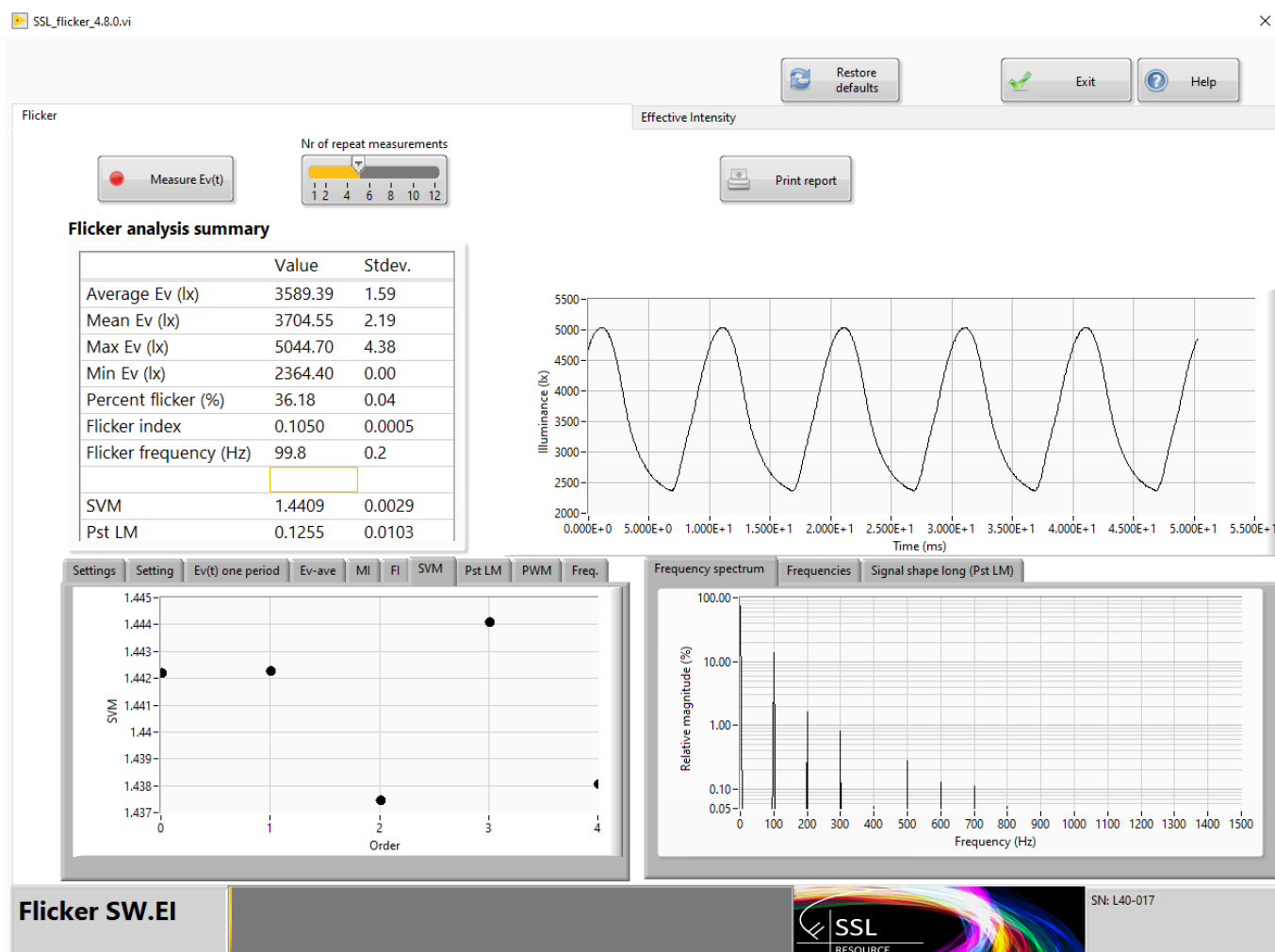


LHxx measuring heads with cosine diffuser



SSL Flicker-sw

Standalone test flicker software



Features:

- ✓ Measuring time: SVM 1s, PstLm 1-5min.
- ✓ Average values and standard deviation of repeat measurements
- ✓ Graphical representation of repeat measurements for each parameter
- ✓ Single time period signal waveform
- ✓ SVM: Frequency Harmonics in a graph and in a table
- ✓ Detects automatically if PWM is in use and shows its duty cycle (%) in the summary table.
- ✓ Pass/Fail analysis for SVM/ P_{st}^{LM} and flicker risk classification (IEEE 1789)
- ✓ Editable Reports in pdf/html formats
- ✓ Exporting of individual graphs into Excel/Clipboard/image file

SSL Flicker-sw.El Standalone Software for Effective Intensity

Features:

- ✓ Detects single light flash automatically
- ✓ Measures pulse duration (flash length) and the effective luminous intensity
- ✓ Analyze the effective luminous intensity with Blondel-Ray, Modified Allard, Modified Blondel-Ray
- ✓ Editable Reports in pdf/html formats
- ✓ Exporting of individual graphs into Excel/Clipboard/image file

SSL C-400



- ✓ 3-channel photocurrent meter
- ✓ Measurement quantities: Illuminance E_v (lx), Correlated Color temperature CCT (K), color coordinates CIE1931 xy , CIE1976 $u'v'$, Flicker Index, Percent flicker, Flicker frequency
- ✓ 4 measuring ranges in decades
- ✓ Self-color correction algorithm for xy , CCT and E_v based on initial integrated XYZ values
- ✓ Measurement range: 0.3 – 10 000 lx (C-400) / 3 - 100 000 lx (C-400.2)
- ✓ Accuracy: $E_v \pm 4\%$, CCT $\pm 100K$
- ✓ Repeatability: $E_v < 0.3\%$, CCT $< 20K$
- ✓ USB powered (drivers installed automatically in Win 8 and newer versions)
- ✓ Measuring head CH-400, Spectral match $< 10\%$ to CIE 1931 color matching functions x, y, z for each channel
- ✓ Standalone Executable testing software (.exe) and LabVIEW drivers for using C-400 in customer's own testing systems

SSL LC-800

Advantages of new version of for tristimulus colorimeter

- wider dynamic range of 9 decades
 - 4-channels for separation of X channel to X_{red} and X_{blue}
 - larger bandwidth at smaller photocurrents
 - improved sampling rate
-
- ✓ 1-4 Channel Transimpedance amplifier (TIA)
 - ✓ Measurement quantities:
 - ✓ Illuminance E_v (lx)
 - ✓ Effective Luminous Intensity
 - ✓ Flicker Index FI, Percent Flicker MI (%), Flicker Frequency (Hz)
 - ✓ Stroboscopic Visual Measure SVM
 - ✓ Short-term Perceptibility Light Modulation P_{st}^{LM}
 - ✓ Correlated Color temperature CCT (K), color coordinates CIE1931 xy, CIE1976 u'v'
 - ✓ Photocurrent measurement range: 30 pA – 30 mA
 - ✓ Linearity <0.1%
 - ✓ 5V power supply (USB B input), RS-232 communication (DB15)
 - ✓ Compatible with SSL tristimulus measuring heads (CH)
 - ✓ Package includes: LC-800, 5V power supply, 1.8m RS-232 cable.

SSL LC-800

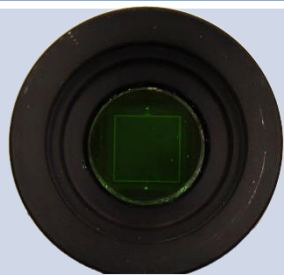
Photocurrent meter

Signal bandwidth	Photocurrent range
15 kHz	20 nA – 30 mA
3 kHz	1.5 nA – 170 nA
700 Hz	30 pA – 10 nA
SVM requirement: > 2 kHz	1.5 nA – 30 mA

- ✓ Photocurrent measurement range: 30 pA – 30 mA
- ✓ Sampling rate
 - ✓ Maximum: 200 kHz (5μs)
 - ✓ SVM: 36 kHz (1s measuring time)
 - ✓ P_{st}^{LM} : 2 kHz (1-5min)

SSL LH

Photopic measuring heads

LH ^{*)}	Sensitivity (nA/lx)	Spectral quality factor f_1'
SSL LH1010-f3	30	<3% 
SSL LH66-f3	10	<3% 
SSL LH33-f3	1.7	<3% 
SSL LH22-f10	2	<10% 

^{*)} Spectral quality factor f_1' is 3% (LHxx-f3) and 10% (LHxx-f10).

SSL CH

Colorimeter Measuring Heads

CH ^{*)}	Sensitivity (nA/lx)	Spectral quality factor f_1'
SSL CH66-4	10	<3%
SSL CH66-3	10	<3%
SSL CH33-4	1.7	<3%
SSL CH33-3	1.7	<3%



^{*)} Spectral quality factor f_1' is 3% (LHxx-f3) and 10% (LHxx-f10).