LUMILOOP

LASER-POWERED SENSOR SYSTEMS

Datasheet

LSProbe 1.2 | LSProbe 2.0

10Hz – 8.2GHz | 9kHz – 18GHz

LASER-POWERED

Electric - Field Probes

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The LSProbe Field Probes are next-generation, high-speed, high accuracy and high dynamic range electric-field sensors. Their laser power supply enables reliable, high-performance measurements according to international standards and beyond.

LSProbe Field Probes employ fine-grained compensation of linearity, frequency, and temperature. They guarantee accurate measurements from less than 1 V/m to at least 1 kV/m and exceed this guaranteed range at many frequencies. Please see the field strength data and the dynamic range plots on the next page for details.
Please contact LUMILOOP support to find out how LSProbe can satisfy your measurement needs.

LSProbe sensors exist in two hardware versions:
LSProbe 2.0 (9 kHz ... 18 GHz) and
LSProbe 1.2 (9 kHz ... 8.2 GHz).

The LSProbe 2.0 six-monopole antenna design with a spherical body ensures superior isotropic operation at all frequencies. LSProbe 2.0 is the ONLY 18 GHz laser-powered probe that comes without a "stick" – a high-impedance line between antennas and electronics. Say No to repeated measurements to eliminate the influence of the stick!

The LSProbe 1.2 established three-monopole design offers an economical solution for lower frequencies. Based on the **standard variant E**, two hardware-modified variants F and G can be configured:

LSProbe 1.2 Variant F shifts the lower frequency from 9 kHz to 10 Hz. This enables measurements at line frequencies like 50/60 Hz or $16\frac{2}{3}$ Hz. One application is to monitor field strength near high-voltage ceramic isolators.

LSProbe 1.2 Variant G shifts the dynamic range towards higher field strengths of up to 15 kV/m. Measure radar pulses down to 1 μs at the highest field strengths!

Field Strengh Range and Dynamic Range: LSProbe 1.2 G-Variant

9 kHz ... 30 MHz	<1 V/m ... >10 kV/m, >80 dB
30 MHz ... 3 GHz	<1 V/m ... >15 kV/m, >84 dB
3 GHz ... 6 GHz	<10 V/m ... >15 kV/m, >64 dB
6 GHz ... 8.2 GHz	<15 V/m ... >10 kV/m, >56 dB

LSProbe Field Probes contain a low-frequency and high-frequency detector for each of the six or three monopoles. The detectors can be operated continuously at 500 kSamples/s or in burst mode at 2 MS/s. This enables **direct radar pulse measurements** and accelerated, frequency sweep-based measurements.

A single axis, continuous sampling mode, operating at 2 MS/s, can be used for **EIRP** (Equivalent Isotropically Radiated Power) measurements of IoT products without antenna connectors in accordance with EN 300 328 and EN 301 893.

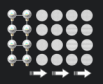
Extensive **factory calibration** data is provided with each field probe and is handled automatically by the LUMILOOP TCP Server Software. LUMILOOP offers an all-round carefree service of **accredited calibration according to ISO 17025**. This includes checking your measuring equipment and performing the accredited calibration for you.

LSProbe 2.0 Field Probe is backward compatible with LSProbe 1.2, supporting the same SCPI commands. LSProbe is supported by third-party **EMC-software**: RS EMC32, RS ELEKTRA, Emcware, BAT-EMC, Tepto, Tile, Win6000, Compliance5/6, ProveEMC, Radimation and RADLAB.

All LSProbe models share the same Computer Interfaces. CI-250+ comes with touchscreen control and Ethernet connection for easy integration. CI-250 connects to a PC via USB.

Four and Six Probes Setup
ISO 11451-2

Eight Probes Setup
ISO 11451-5, 11452-11
IEC 61000-4-21



Field Uniformity Setup
IEC 61000-4-3

Multiple LSProbes can operate hardware-synchronized, building the perfect data basis for statistical evaluation. Combine multiple LUMILOOP devices in a reverberation chamber for easy **ISO 11451-5** closed-loop E-field control!

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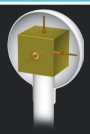
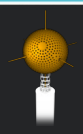
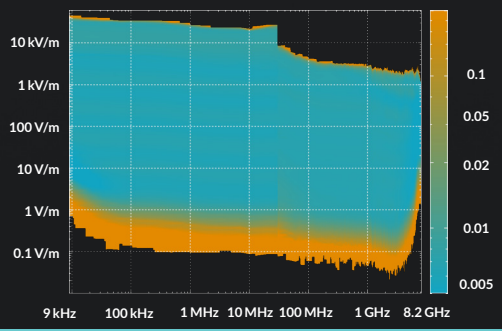
Specifications	LSProbe 1.2 	LSProbe 2.0 
Frequency Range		
Low Band	(10 Hz) 9 kHz ... 400 MHz,	9 kHz ... 1 GHz
High Band	30 MHz ... 8.2 GHz	700 MHz ... 18 GHz
Analog Rise Time		
Low Band, low BW	1.9 ms	2.0 ms
Low Band, high BW	770 ns	<1.5 μs
High Band	330 ns	<7 ns
Sampling Rate & Minimum Pulse Width		
Low Band Modes	500 kSamples/s, 2 μs	500 kSamples/s, 2 μs
High Band Continuous Modes	500 kSamples/s, 2 μs	1 MSamples/s, 1 μs
High Band Burst and Single Axis Continuous Modes	2 MSamples/s, 500 ns	2 MSamples/s, 500 ns
Field Strength Range	<4 V/m ... >7 kV/m (F), 10 Hz - 30 MHz <1 V/m ... >10 kV/m (E), 9 kHz - 30 MHz <0.1 V/m ... >1.5 kV/m, 30 MHz - 4 GHz <0.5 V/m ... >1 kV/m, 4 GHz - 6 GHz <3 V/m ... >1 kV/m, 6 GHz - 8.2 GHz	<1 V/m ... >5 kV/m, 9 kHz - 1 GHz <1 V/m ... >1 kV/m, 700 MHz - 18 GHz
Amplitude Accuracy Accr. Cal. at LUMILOOP		
9 kHz ... 1 GHz	±1.2 dB	±1.2 dB
1 GHz ... 18 GHz	±1.5 dB (up to 8.2 GHz)	±1.5 dB
Typical Worst-Case Isotropy Error		
@1 GHz	±1.0 dB	±0.5 dB
@3 GHz	±1.7 dB	±1.0 dB
@6 GHz	Please see Application Note 8.	±1.0 dB
@18 GHz	Not applicable.	± 1.0 dB
Linearity Error	±0.2 dB relating to 10 V/m	±0.2 dB relating to 10 V/m
Resolution	<0.01 dB	<0.05 dB
Temperature Stability	<0.1 dB	<0.1 dB
Ambient Temperature	10 ... 40 °C	10 ... 40 °C
Damage Level		
9 kHz ... 1 GHz	>25 kV/m (CW)	>25 kV/m (CW)
1 GHz ... 18 GHz	>25 kV/m (CW, up to 8.2 GHz)	>5 kV/m (CW)
Fiber Optic Connectors	FC/ ST	FC/ ST
Standard Fiber Optic Cables	5 m permanently attached, 15 m FC/ST extension, two E2000 Sacrificial Cable Kits	5 m permanently attached, 15 m FC/ST extension, two E2000 Sacrificial Cable Kits
Max. Fiber Optic Cable Length	1,000 m	500 m
Fiber Cable Bending Radius	>40 mm	>40 mm
Dimensions (W × D × H)	46 × 46 × 114 mm^3	46 × 46 × 114 mm^3
Application Software	LUMILOOP TCP Server + GUI, CalImport	LUMILOOP TCP Server + GUI, CalImport

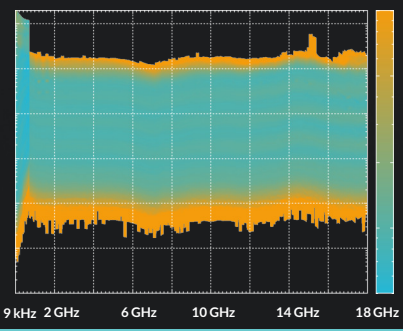
Selected International Standards

ISO	11451-2, 11451-5, 11452-2, 11452-11
IEC	61000-4-3, 61000-4-21
EN	300 328, 301 893
Other	RTCA/DO-160

Field Strength Resolution LSProbe 1.2 in dB



Field Strength Resolution LSProbe 2.0 in dB



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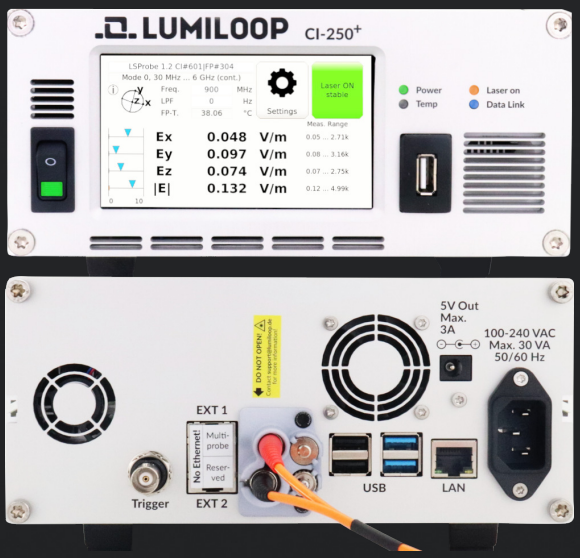
Computer Interface

	CI-250	CI-250+
PC Interface	USB 2.0	Gigabit Ethernet
Application Software	LUMILOOP TCP Server, LUMILOOP GUI	LUMILOOP TCP Server, LUMILOOP GUI
Trigger Voltage	5 V	5 V
Trigger Connector	BNC	BNC
Laser Wavelength	830 nm	830 nm
Laser, Max. Output Power	1,000 mW	1,000 mW
Laser Class	1M	1M
Laser Shutdown Time	6 ms	6 ms
Fiber Optic Connectors	FC/ST	FC/ST
Number of Fiber Optic Couplers	>6	>6
Input Voltage	5 V ±5 %	85-305 V, 50/60 Hz
Input Current	<3 A	
Output Voltage		5 V DC (max. 3 A)
Output Current		<3 V
Ambient Temperature	10 °C ... 40 °C	10 °C ... 40 °C
Dimensions (W × D × H)	135 × 120 × 38 mm³	200 × 88 × 150 mm³
Certifications	CE, IEC 60825-1:2014	CE, IEC 60825-1:2014



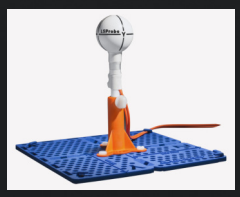
Computer Interface CI-250+ Front and Rear Side View

Computer Interface CI-250 Front and Rear Side View

LSProbe E-Field Probe Accessories

Fiber Connector Cleaning Kit

LSProbe Stands, example



Rack Mount Kits, examples

Accredited Calibration

ACCREDITED ISO 17025 CALIBRATION LAB

Watch: First Inspect then Connect! How-to keep your glass fiber clean

Watch: This is LUMILOOP!

LUMILOOP

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Made in Germany

QUALITY SYSTEM CERTIFICATION DNV·GL ISO 9001

+1 warranty

Register your LUMILOOP device and get a free one year warranty extension!

lumiloop.de/support/register