Laser Displacement Sensors **A2**

Accessory of the KLIPPEL R&D SYSTEM

FEATURES

- Static and dynamic measurements of displacement (measures also DC)
- High accuracy
- Different measurement ranges
- Visible red type class 1 & 2 laser
- Calibration by user possible
- Measurement of the reflected light intensity
- Good cost-performance ratio
- Ideal for loudspeaker measurements

The Distortion Analyzer equipped with a Laser displacement sensor allows the measurement of electrical and mechanical states. Transducer measurements are thereby simplified and shortened considerably.

The Laser displacement sensors based on optical triangulation measures not only AC components but also a DC-part of the displacement accurately. A variety of Laser sensor heads are provided to get optimal performance in the particular application.

The combination with a Driver Stand allows the easy mounting of the sensor heads and allows also calibrating the sensor by the user. Management for multiple laser sensor heads is provided by dB-Lab and allows choosing a specific laser according to measurement demands (e.g. small signal, large signal measurements, woofers or tweeters).

CAUTION! Laser Radiation!

Avoid direct or indirect (e.g. reflection) exposure of human eyes to beam.

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Components

Distortion Analyzer

The Distortion Analyzer hardware provides a special laser sensor input and a built in power supply (for ANR sensor series only). A buffered output (BNC) provides the analog displacement signal for any post processing such as visualizing on an oscilloscope. Each laser sensor can be calibrated using the Laser Displacement Meter functionality of the Distortion Analyzer Hardware (Spec. S9). Calibration data for multiple sensor heads can be stored permanently and easily selected within the Analyzer frame software dB-Lab.

Laser Sensor Heads

A variety of different laser heads is provided to customize the Displacement Meter for the particular application. The following criteria should be considered for the selection of the sensor head:

- High resolution (0.5 μm, 44 kHz) required for measurement of tweeter, headphones and micro speakers.
- Large peak to peak (up to 60mm peak) measurement range for woofer systems.

ANR 1282

Laser Controller

All of the laser sensor heads require a controller.

All heads of the ANR-series are operated with the controller ANR5131. This controller is powered by the Distortion Analyzer. An additional extension cable may be used between sensor head and controller.

The laser head LK-H52 is operated by the controller LK-G5001P. It comes with an external power supply.

The laser head IL-030 is operated by the controller IL-10000. It can be powered by the Distortion Analyzer, For QC LST measurements it needs an external power supply.

ANR 5132

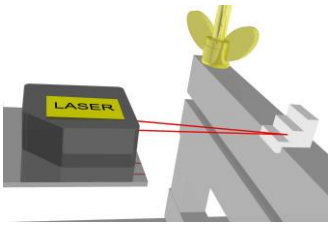
Spacer for calibration

(Art. 2201-001)

Laser displacement sensors with +/- 12.5 mm working range and more may be calibrated using a special spacer (10 mm stair part) having diffuse reflecting surfaces of required preciseness. It is part of the laser stand package.

May be used for calibrating:

- HL-G112, IL-030
- ANR 1282, ANR 1215
- LK-H82



Translation stage for positioning and calibration

(Art. 2300-001)

Laser displacement sensors providing high resolution in a working range less than +/- 12.5 mm may be calibrated by accurate positioning with the translation stage. Equipped with a high resolution micrometer (adjustable to 1μm) the calibration process can be easily performed.

May be used for calibrating:

- LK-H52, LK-H82
- LD 1605-x, LD1607-x

Could also be used for (not recommended):

- HL-G112, ANR 1282, ANR 1215

Class 2 Laser Heads and positioning aid			
	LK-H052	**LK-H082**	**LK-G32** (discontinued)
ARTICLE NUMBER	**2102-030**	**2102-050**	**2102-020**
Maximal displacement (mm peak for a linearity error < 3 %)	**±10** (@ >= 20 µs sample rate)	**±18** (@ >= 20 µs sample rate)	**±5** (@ 50 µs sampling rate)
Minimal displacement (mm peak for a linearity error < 3 %)	**± 0.05**		**± 0.02**
Linearity Error absolute (µm):	**±2**		**±3**
Linearity Error relative:	**±0.02% of F.S. (F.S. = 20 mm)**		**±0.05% F.S. (F.S. = 20 mm)**
Resolution (Noise in µm , no averaging *)	**0.5**		**0.5**
Max. Signal Frequency (in kHz @ 3dB)	**44** (limited by Distortion Analyzer 2)		**25**
Center Point Distance (mm)	**50**	**80**	30
Light source	visible laser diode (650 nm)		
Laser Class	Class 2 / IEC60825-1 (closing the eyelids will protect the eyes, avoid the laser beam)		
Max. Output	0.95 mW		
Beam Spot Diameter (µm) @ Center Point Distance	50	70	30
Ambient Light Level	Max. 10,000 lx		
Indication	LED: Range, OK		
Weight (with cable in g)	260	280	280
Length of the cable	2 m extension cable (between sensor head and controller) is part of set Art.-No.: 2102-030 Other length or extension cable between laser controller and measurement device on request		
Translation Stage	needed or SCN hardware used for calibration	recommended or calibration spacer used	needed or SCN hardware used for calibration
	max. travel: 13mm, Scaling resolution: 1µm		
Calibration Spacer	Cannot be used, sensor working range too small for 10 mm stairs	May be used	Cannot be used, sensor working range too small for 10 mm stairs

* can be improved by averaging with measurement software

Class 2 Laser Heads and positioning aid

	IL-030	ANR 1282 (discontinued)	ANR 1215 (discontinued)	HL-G112
ARTICLE NUMBER	**2102-041**	**2102-001**	**2102-003**	
Maximal displacement (mm peak for a linearity error < 3 %)	**±12.5**	**±20**	**±50**	**±60**
Minimal displacement (mm peak for a linearity error < 3 %)		**± 0.5**	**± 1.5**	**± 1.0**
Linearity Error absolute (µm):	**±2**	**±80**	**±200**	
Linearity Error relative:	**±0.1% F.S.**	**±0.2 % F.S.**		**±0.1% F.S.**
Resolution (Noise in µm , no averaging *)	**20**	**40**	**200**	**8**
Max. Signal Frequency (in kHz @ 3dB)	**3**	**1**		**2.5**
Center Point Distance (mm)	**32.5**	**80**	**130**	**120**
Light source	visible laser diode (655 nm)	visible laser diode (685 nm)		visible laser diode (655 nm)
Laser Class	Class 1 / IEC60825-1	Class 2 / IEC60825-1		
	(closing the eyelids will protect the eyes, avoid the laser beam)			
Max. Output	0.22 mW	1.6 mW (peak values)		1 mW (peak v.)
Beam Spot Diameter (mm) @ Center Point Distance	0.2 x 0.75	0.7 x 1.2	0.7 x 1.4	1.0 x 1.5
Ambient Light Level	Max. 5,000 lx	Max. 3,000 lx		
Indication	LED: Range, OK, ON/OFF	LED: Range, OK		Display: distance LED:
Weight (with cable in g)	60 g	240 g		110 g
Length of the cable	2.5 m extension cable (between sensor head and controller)	1.2 m extension cable (between sensor head and controller) (5 or 10 m available on request)		0.5 m cable at the senor head + 4 m adapter to analog output and power supply connectors
Calibration Spacer	Recommended (included with SPM or LST bench)	Recommended (included with Standard and Pro Driver Stand)		
Translation Stage	can only be mounted on SPM/MPM laser plate	not included (available on request with higher travel distance)		

* can be improved by averaging with measurement software

	Laser Controller		
	LK-G5001P for LK-H052 or LK-H082	**IL-1000** for IL-030	**ANR 5132** for ANR 1282 and ANR 1215
ARTICLE NUMBER	**PART OF 2102-030**	**PART OF 2102-041**	**2110-001**
Analog Output	± 10V/F.S. (Max. 10 mA)	± 5V/F.S. (Max. 10 mA)	± 5V/F.S. (Max. 2 mA)
Output Impedance	approx. 100 Ohm	100 Ohm	50 Ohm
Temperature Drift	0,01 %/^{0}C	0.05% F.S./°C	Max. ± (0.03 % of F.S.)/^{o}C
Zero-Point Adjustment	adjustable	adjustable	± 10% of F.S.
Response Frequency (-3dB)	-		1 kHz / 100 Hz / 10 Hz (switchable)
Response Time (10-90 %)	-		0.4 / 4 / 40ms (switchable)
Sampling Rate (µs)	2.55/5/10/20/50/100/200/500/1000	330/1000/2000/5000	-
Intensity Output	-	-	± 5V
Indication	LED: Operation	Display: voltage + displ.	LED: Operation
Gain Selection	Switchable	-	AUTO, LOW (switchable)
Operating Ambient Temp.	0 to 50 ^{o}C (+32 to +122^{o}F)	-10 to 50 °C (+14 to +122^{o}F)	0 to 50 ^{o}C (+32 to +122^{o}F)
Operating Ambient Humidity	35 % to 85 % RH (no condensation)	35 % to 85 % RH (no condensation)	35 % to 85 % RH
Safety Certificate	Complies with CDRH 1040.10 / IEC 60825 / JIS C6802	Complies with FDA CDRH 1040.10 / IEC 60825-1	Complies with 21 CFR 1040.10 and 1040.11
Length of the cable	2 m extension cable (between sensor head and controller) is part of set Art.-No.: 2102-030 Other length or extension cable between laser controller and measurement device on request		
Power Supply	Input: 24 Vdc ± 10 % max. 500 mA	Input: 10 to 30 Vdc / max. 77 mA according class II or LPS RnD: powered by Distortion Analyzer QC: external PSU	Input: 12 to 24 Vdc -15%, + 10% max. 250 mA @ 12V powered by Distortion Analyzer
External Power Supply	Input: 90 – 264 V~ / 47 –63 Hz / max. 1.6 A @ 90 V Output 24 Vdc / 1.25 A / class II		

	Application Guide **X** = best performance, **a** = applicable, * = not supported by SCN system yet						
	MODULES	**LK-H052**	**LK-H082**	**IL-030**	**ANR 1282**	**ANR 1215**	**HL-G112**
ARTICLE / **APPLICATION**		**2102-030**	**2102-050**	**2102 - 041**	**2102 - 001**	**2102 - 003**	
Long throw Woofer							
Small signal analysis	**LPM**	**X**	**X**		**X**	**a**	
Large signal analysis	**LSI Woofer, DIS, TRF**		**a**			**X**	**X**
Woofer							
Small signal analysis	**LPM**	**X**	**X**		**a**		
Large signal analysis	**LSI Woofer, DIS, TRF**	**a**	**X**		**X**	**X**	**X**
Midrange Driver/ Exciter							
Small signal analysis	**LPM**	**X**	**X**				
Large signal analysis	**LSI Woofer, DIS, TRF**	**X**	**X**		**X**		
Tweeter							
Small signal analysis	**LPM**	**X**	**a**				
Large signal analysis	**LSI Tweeter, DIS, TRF**	**X**	**X**				
Headphone							
Small signal analysis	**LPM**	**X**					
Large signal analysis	**LSI W. or T., DIS, TRF**	**X**	**a**				
Horn Compression Driver							
Small signal analysis	**LPM**	**X**	**a**				
Large signal analysis	**LSI Woofer, DIS, TRF**	**X**	**X**				
Micro-speakers							
Small signal analysis	**LPM**	**X**					
Large signal analysis	**LSI Woofer, DIS, TRF**	**X**	**a**				
Suspension Part Measurement	**SPM Pro**	**a**	**X**		**X**		
	SPM Lite	**X**	**X**	**X**			
Material Parameter Measurement (E- Modulus)	**MPM**	**X**	**X**	**X**			
Cone Vibration Measurement	**SCN, TRF**	**X**	*				
Enclosure Vibration	**SCN, TRF**	**X**					
QC – LST Linear Suspension Test	**QC LST**			**X**			

Find explanations for symbols at http://www.klippel.de/know-how/literature.html

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