

Distortion Analyzer 2 (Rev. 2.0 / 2.1)

H1

Digital Processor Unit of the KLIPPEL ANALYZER SYSTEM

FEATURES

- Two-channel line input (with Phantom or ICP[®] microphone power supply)
- Two channel line output (AC switch for DC blocking)
- Two channel voltage and current measurement for loudspeakers
- High performance SNR > 100 dB
- Sampling rate up to 96 kHz
- Platform for laser sensor heads
- Hosting various measurement modules
- Stand-alone operation
- Computer-controlled operation Fast, hot plug USB interface
- Automatic firmware update
- Memory for long-term measurements
- 19" / 1U rack mountable



Distortion Analyzer 2 is the hardware platform for the measurement modules performing the generation, acquisition and digital signal processing in real time. The analyzer can be operated as a stand-alone unit by using the key pad and the display. Connecting a computer via USB-interface the computer software dB-Lab can be used to control the unit and visualize the results. The hardware hosts a high performance digital signal processor for demanding calculations and a two channel accurate 24 Bit AD/DA converter with a sampling frequency up to 96 kHz. In addition two power signal lines for driving loudspeakers can be analyzed using current / voltage sensors for up to 240V / 50A. To the hardware a variety of displacement sensors may be connected to analyze excursion signals in parallel to voltage and current of the driver under test.

The Distortion Analyzer 2 has a built in microphone power supply for direct connection of Phantom or ICP[®] powered microphones. The current routing of the input circuit is visualized with LEDs on the front.

Article Number: 2000-002

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Front

| | |
|--------------|---|
| Display | Alphanumeric LCD display (Back-lighted) |
| ←, →, ↑, ↓ | Arrow keys for cursor navigation (left, right, up and down) |
| ENTER | Key for starting an operation, confirming data, or going to a sub menu |
| ESC | Key for quitting a sub menu and loading the upper menu level |
| RED KEY | Key to stop the current measurement |
| USB | Connector to USB port of Windows compatible PC or hub. If a computer is connected to the USB port at the front side, the USB port at the rear side is disabled. |
| Power Switch | Main power switch (switch off/on, hardware reset) |

Rear



| | |
|--------------------|---|
| Power | Input from switching mode power supply |
| Laser | To the 8 pin-coax socket at the rear side a Laser Displacement Sensor can be connected. Power is provided by the Distortion Analyzer hardware. |
| X | The BNC connector at the rear side provides the displacement output signal if a Laser Displacement sensor is connected to the Distortion Analyzer 1. |
| ICP 1,2 | External Microphone input with built in ICP compatible power supply. Microphone Power switch must be pressed. If any BNC plug is connected to the ICP input, the routing is automatically changed to the ICP input. IN 1 or 2 is switched off in this case. |
| IN 1,2 | External analog line input 1 can receive signals by using pin 2 (+) and 3 (-) for symmetric signals and pin 1 for ground. For supplying an asymmetric input signal to one of the signal pins the other input pin must be connected to ground. |
| Mic Power switch | Press to power the input for connected microphones. If pressed, 48V phantom powered microphones may be connected to IN1 as well as ICP® powered microphones to the BNC socket. A indicator LED on the front side is representing the state of the Mic Power Switch and the routing to IN1 or to the ICP input. Note: If a BNC plug is connected to the ICP® input, the input routing is automatically switched to the ICP® signal path. You must disconnect the BNC plug from the ICP® input to get the signal from a phantom powered microphone. Attention: Be sure that all equipment is capable of withstand 48V DC if using microphone power. |
| Ground Lift switch | If pressed, the ground (Pin1) is not connected to the system ground. This is good for breaking ground loops. |
| OUT 1,2 | The XLR line output connector OUT 2 provides a symmetric analog output signal at pin 2 (+) and 3 (-) and ground at pin 1. If asymmetric output is required use pin 2 for signal (positive) and Pin 3 as ground. Short Pin3 to Pin1 to obtain the same output voltage as in balanced mode and for best noise suppression. |
| AC switch | Press AC switch for blocking DC output voltages. By default the outputs are DC coupled. |
| Speaker 1 | The SPEAKON® output connector SPEAKER 1 is to be connected to the terminals of the first loudspeaker under test by using pins 1+ and 1- of the loudspeaker cable. The pins 2- and 2+ of the connector are used to sense the voltage at the loudspeaker terminals. |
| Speaker 2 | The SPEAKON® output connector SPEAKER 2 is to be connected to the terminals of the second loudspeaker under test by using pins 1+ and 1- of the loudspeaker cable. The pins 2- and 2+ of the connector are used to sense the voltage at the loudspeaker terminals. Speaker 2 channel is configured as sensitive current channel with a maximum rms current (continuously) of 5A. |
| Amplifier | The SPEAKON® input connector AMPLIFIER is to be connected with the output of the power amplifier. The signals supplied to pins 1- and 1+ will be provided to the Speaker 1 connector. The signal at the pins 2- and 2+ provide the signal to the Speaker 2 connector. |

Electrical Characteristics

| Parameter | Symbol | Min | Typ. | Max | Unit |
|--|-------------------|-----|-------|------|------------|
| Analog Inputs | | | | | |
| Input voltage (peak to peak, symm.) | U_{in} | | | 16 | V |
| Input voltage swing | $U_{in,sw}$ | -4 | | 4 | V |
| Input impedance | R_{in} | | 10 | | k Ω |
| Input frequency range | f_{in} | DC | | 43.6 | kHz |
| Frequency Response (at 40kHz) | | | -0.2 | -0.3 | dB |
| THD+Noise at 1 kHz (BW: 24 kHz) | | 94 | 100 | | dB |
| Input crosstalk attenuation | | 100 | | | dB |
| Analog Outputs | | | | | |
| Output Voltage (peak to peak, symm.) | U_{out} | | | 20 | V |
| Output Voltage swing (peak) | $U_{out,sw}$ | -5 | | 5 | V |
| Output Impedance | R_{out} | | 50 | | Ω |
| Output Frequency Range | f_{out} | DC | | 43.6 | kHz |
| Frequency Response (at 22.05 kHz) | | | -0.4 | -0.5 | dB |
| THD+Noise at 1 kHz (BW: 24 kHz) | | 94 | 100 | | dB |
| Output Crosstalk Attenuation | | 100 | | | dB |
| AC Switch -3 dB cutoff (-6 dB roll off) | $f_{AC,Out}$ | | 0.15 | | Hz |
| Speaker 1 and Speaker 2 | | | | | |
| Speaker 1: | | | | | |
| Current, peak | $I_{peak,CH1}$ | | | 50 | A |
| Current, rms 10s max. (sine) | $I_{rms,10s,CH1}$ | | | 25 | A |
| Current, rms (sine, continuous) | $I_{rms,CH1}$ | | | 15 | A |
| Resistance primary (current sensor) | $R_{p,CH1}$ | | | <0.5 | m Ω |
| SNR, current (1 kHz) | SNR_I | 60 | 70 | | dB |
| THD, current (10A / 1kHz) | $THD_{I,CH1}$ | -70 | -75 | | dB |
| Speaker 2: | | | | | |
| Current, peak (best SNR below 1A _{peak}) | $I_{peak,CH2}$ | | 1 | 5 | A |
| Resistance primary (current sensor) | $R_{p,CH2}$ | | | <12 | m Ω |
| SNR, current (1 kHz) | SNR_I | 75 | 85 | | dB |
| THD+N, current (0.5A / DC ... 1 kHz) | $THDN_{I,CH2}$ | -65 | -70 | | dB |
| THD+N, current (0.5A / DC ... 44 kHz) | $THDN_{I,CH2}$ | -55 | -60 | | dB |
| Speaker 1 & 2: | | | | | |
| Current accuracy (1kHz) | | | | ±0.1 | % |
| Frequency response (DC ... 10 kHz) | | | | -0.2 | dB |
| Frequency response (DC ... 44 kHz) | | | | -1 | dB |
| Voltage, peak (balanced input) | U_{peak} | | | 240 | V |
| Frequency response (DC ... 10 kHz) | | | -0.05 | -0.1 | dB |
| Frequency response (DC ... 20 kHz) | | | -0.25 | -0.3 | dB |
| Frequency response (DC ... 44 kHz) | | | | -1 | dB |
| SNR, voltage (20V / 1 kHz) | SNR_U | 75 | 80 | | dB |
| Laser Interface | | | | | |
| Positive power supply voltage | U_{+DC} | | 12 | | V |
| Power current (12V laser supply voltage) | I_{DC} | | 50 | 250 | mA |
| Analog output laser sensor | U_{analog} | -12 | | 12 | V |
| Intensity output laser sensor | U_{int} | -12 | | 12 | V |
| Output impedance | $R_{L,out}$ | 470 | | 500 | Ω |

General Specifications

| | |
|------------|---|
| Dimensions | 483 mm x 252 mm x 44 mm (59 mm with feet) 19"/1U |
| Weight | 3 kg |
| EMC | IEC 61326:1997 + A1:1998 + A2:2000 (EN 61326:1997 + A1:1998 + A2:2001) |
| Safety | IEC 61010-1:2001 (EN 61010-1:2001) |

Recommended Operating Conditions

| Parameter | Symbol | Min | Typ. | Max | Unit |
|-------------------------------|----------|-----|------|-----|------|
| Power supply voltage | V_{AC} | 100 | | 240 | V |
| Power AC-frequency | f_{AC} | 47 | | 63 | Hz |
| Operating ambient temperature | T_A | 0 | 25 | 50 | °C |
| Input power | P | | 10 | 50 | W |

Components of Distortion Analyzer Package

The Distortion Analyzer Package (Article Number 2000-002) includes:

- 1 DISTORTION ANALYZER 2,
- 1 Speaker Cable,
- 1 Amplifier Cable,
- 1 USB-Cable,
- 1 Power Supply with Power Cable,
- 1 User Handbook (Manual).

Find explanations for symbols at <http://www.docs.klippel.de/symbols.pdf>

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