B-Field Scanner A11

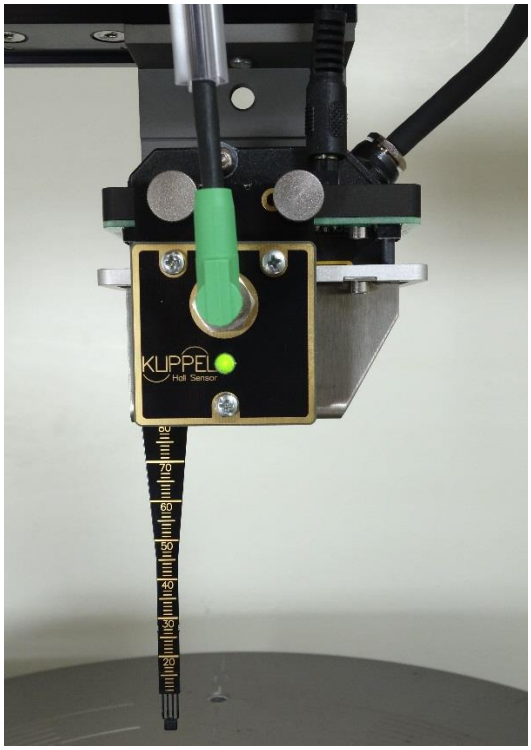
Accessory of the KLIPPEL R&D SYSTEM (Document Revision 1.4)

FEATURES

- Robust & accurate Hall Probe
- One of the smallest Hall sensors (0.65mm thickness) available
- Stand-alone Gauss meter (with DA)
- Full automatic measurements (with Robotics)
- Flexible sensor can be straightened if bent during measurement

BENEFITS

- Easy to use
- Fits to a wide range of voice coil gaps
- Fully supported by Klippel RnD System
- Dedicated measurement software



DESCRIPTION

The B-Field Scanner is an add-on to the Klippel Scanning Vibrometer and when used in combination with the dedicated B-Field Scanner Software provides a fully automated 3D-B-Field Scanner. It can also be used as a hand-held Gauss meter.

Article number	2510-211

CONTENT

1 Requirements

1.1 Hardware

Product	Article	Spec
DA (hardware version 2.0 or higher)	2000-002	H1

1.2 Software

Product		
DA firmware (version. 4.0 or higher)	*could be updated by the customer*	

1.3 License

Product		
No license required for Hand-held Gauss meter		

2 Hardware Configuration

2.1 Signal conditioning

The B-Field Scanner contains a circuit board with a voltage regulator and a constant current supply to drive the sensor chip. The measurement results derived from the sensor chip are enhanced and stabilized by an instrumentation amplifier before the Distortion Analyzer reads them.

If the BFS Sensor is connected to the Distortion Analyzer the green LED indicated readiness for action.

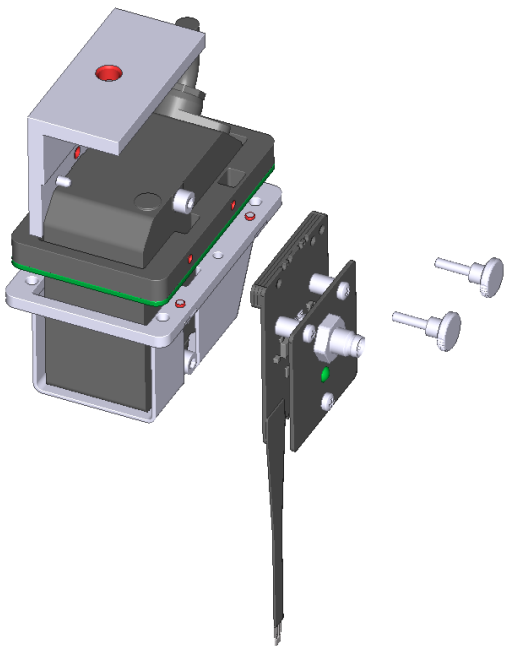
The sensor chip is mounted at the end of a 80 mm long, thin strip, so that the magnetic flux density can be measured both in small and deep magnetic gaps of loudspeaker magnets.

2.2 Mounting for automatic measurements with Klippel Scanner

The BFS Sensor is designed to be mounted at the Collision Sensor of the Scanning Vibrometer laser sensor.

Required mounting threads are included in the latest LK-H052 lasers Collision Sensor rev.1.2.

Earlier LK-H052, LK-G32 and LK-G82 Collision Sensors can easily be modified by the user to mount directly to the BFS Sensor. Instructions on how to modify the Collison Sensor are included in the manual.



3 Calibration

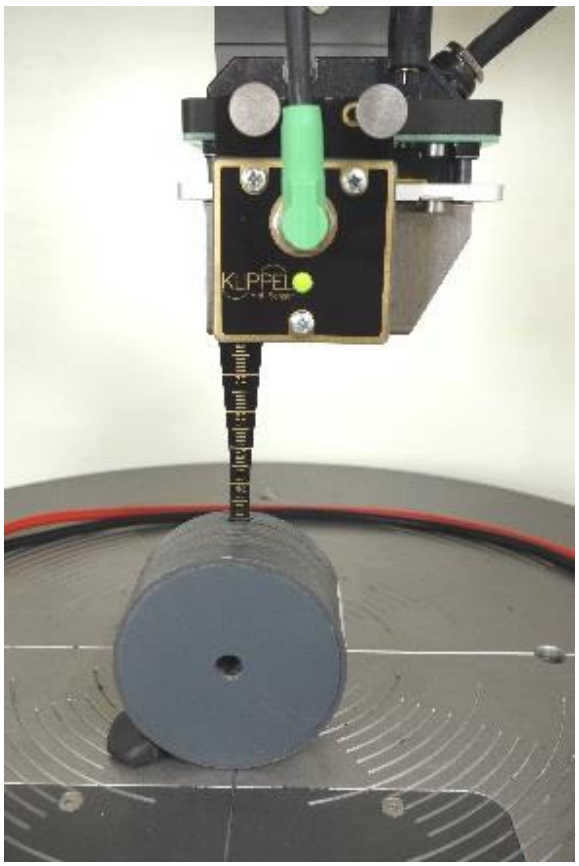
3.1 Option 1: Calibration with Reference Magnet

Klippel offers a solid and precise Reference Magnet. In a simple 2-step procedure it can be used to calibrate the B-Field-Sensor.

Step 1: Measure the environmental magnetic field outside of the Reference Magnet.

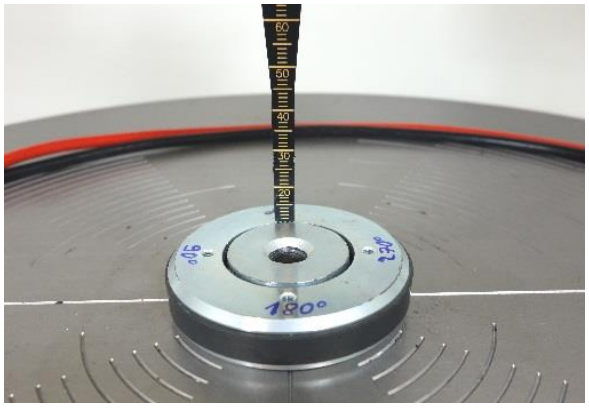
Step 2: Measure the known B-Field inside the Reference Magnet.

The whole measurement chain will then be calibrated to those absolute values. The calibration procedure is controlled from the Distortion Analyzer with the stand-alone B-Field meter.



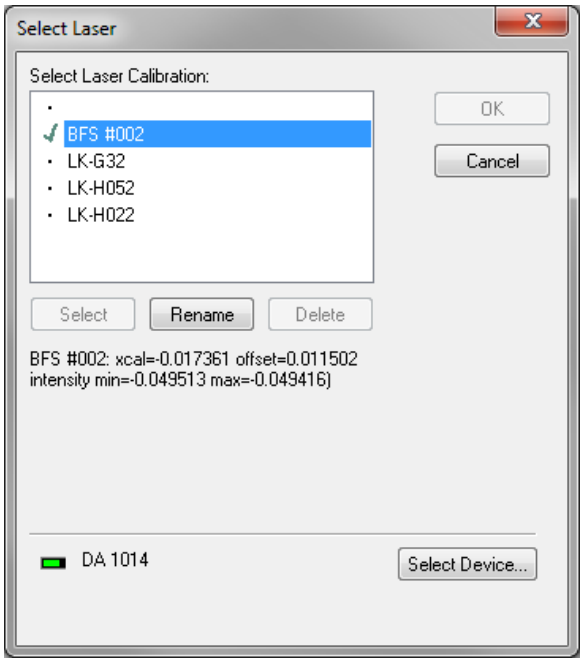
3.2 Option 2: Calibration with own magnet of known magnetic field strength

Similarly to option 1 the measurement chain can be calibrated by using your own magnet of known magnetic field strength. If a separate Gauss meter is available any loudspeaker magnet can be utilised as self-made reference magnet. Typically, loudspeaker magnets are also very stable as long as they are not heated to the point of demagnetising.



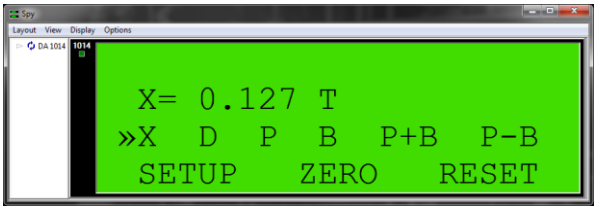
3.3 Option 3: Calibrated by Klippel

If BFS Sensors are ordered together with a Distortion Analyzer the whole measurement chain is calibrated by Klippel. The calibration parameter is stored inside the Distortion Analyzer. It is handled in the same way like laser sensor calibration factors. 5 different factors can be stored in the device and organized by the dB-Lab software. With the factory calibrated BFS Sensor your own magnets can be measured and declared as Reference Magnets.



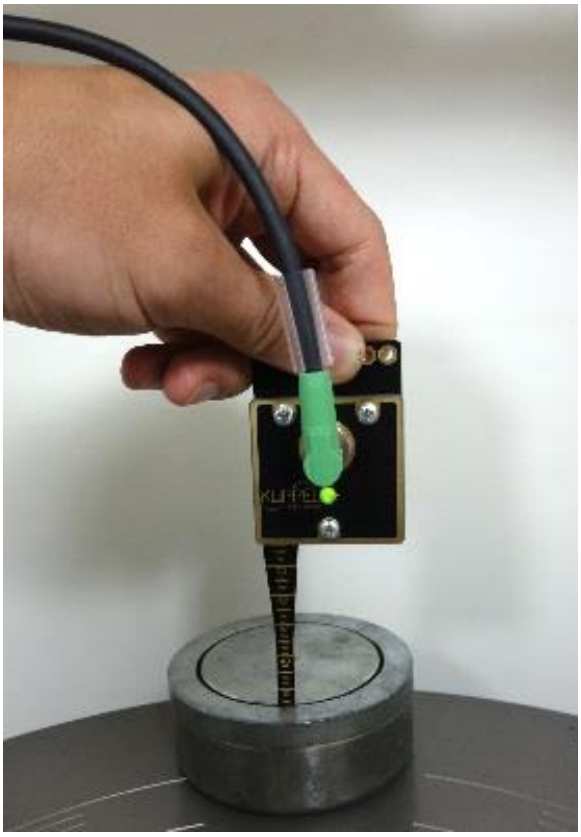
4 Hand-held Gauss meter

Once calibrated the BFS Sensor can be used as hand-held Gauss meter. The measurement values are displayed on the Distortion Analyzer display.



The Distortion Analyzer's stand-alone mode B-Field Meter offers the following operational modes:

- Absolute values displayed in T (Tesla) measured from the BFS Sensor.
- Relative values displayed in T (Tesla) after an offset is removed.
- Peak hold
- Bottom hold
- Peak - Bottom (peak to peak)
- Mean value



5 Connection

5.1 Connection at BFS Sensor

The BFS Sensor is equipped with a robust 4-pin M8-Sensor connector

1 = $+V_{DC}$	2 = Signal OUT	3 = Signal GND	4 = Supply GND	Housing = Shield

5.2 Connection at data acquisition device side

The provided 5m sensor cable comes with LEMO connector suitable for the DA Laser Sensor input.

1 = $+V_{DC}$	4 = Signal OUT	6 = Signal GND	7 = Supply GND	Housing = Shield

6 Limits

Parameter	Symbol	Min	Typ	Max	Unit
Mechanical (total device)					
Height total (with Sensor Strip)	h_{total}	137.8	138	138.2	mm
Height (without Sensor Strip)	h		58		mm
Width	w		43.5		mm
Depth total (including connector)	d		26		mm
Weight	M		30		g
Mechanical (Sensor Strip only)					
Height (Sensor Strip only)	h	79.8	80	80.2	mm
Width Sensor Strip max	w_{max}		12		mm
Width Sensor Strip min	w_{min}		5.5		
Width Sensor Chip	$w_{Sensor-Chip}$	3.05	3.1	3.15	mm
Depth Sensor Strip	d_{Strip}		0.3		mm
Depth Sensor Strip + Chip Pins	$d_{Strip+Chip}$			0.65	mm
Depth Sensor Chip	$d_{Sensor-Chip}$	0.6	0.65	0.7	mm
Electrical					
Supply Voltage (depending on DA version)	U_{DC}	12		24	V_{DC}
Output Voltage (referenced to +5V)	U_{Hall}	1.2	5	8.8	V
Magnetics					
Sensor measurement center (from bottom)	h_{meas}	0.54	0.55	0.56	mm
Magnetic Flux Density minimum	$B_{min(z,\phi)}$		0.02		T
Magnetic Flux Density maximum(*1)	$B_{max(z,\phi)}$	2.2	2.5	3	T
DUT					
Voice coil gap height (measurement range)	z	79.8	80	80.2	mm
Voice coil gap width (diameter depending)	W_{coil}	0.65			mm
Voice coil gap width (examples)	W_{coil} @ d_{coil} = 40mm	0.75			mm
Voice coil gap width (examples)	W_{coil} @ d_{coil} = 20mm	0.8			mm
Voice coil gap width (examples)	W_{coil} @ d_{coil} = 10mm	0.9			mm

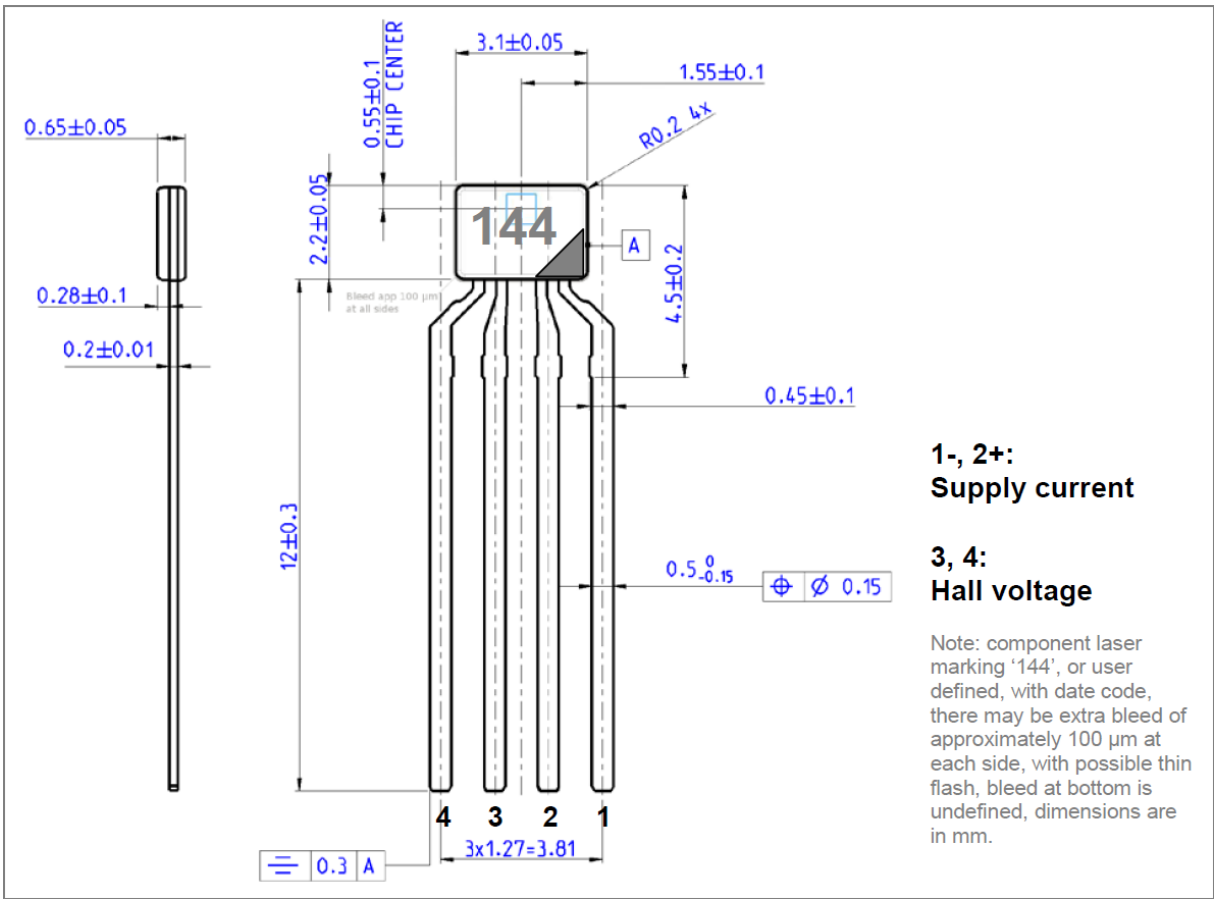
(*1) Depending on the particular hall sensor of the BFS-Sensor.

B_{max} min. value is guaranteed on all delivered BFS-Sensors

B_{max} typ. value BFS-Sensors can be selected.

B_{max} could be enlarged by exchanging a resistor at the BFS-Sensor output stage.

(lowering the internal amplifier gain)



Dimensions of the sensor chip itself

Find explanations for symbols at:

http://www.klippel.de/know-how/literature.html

Last updated: 20.7.2016