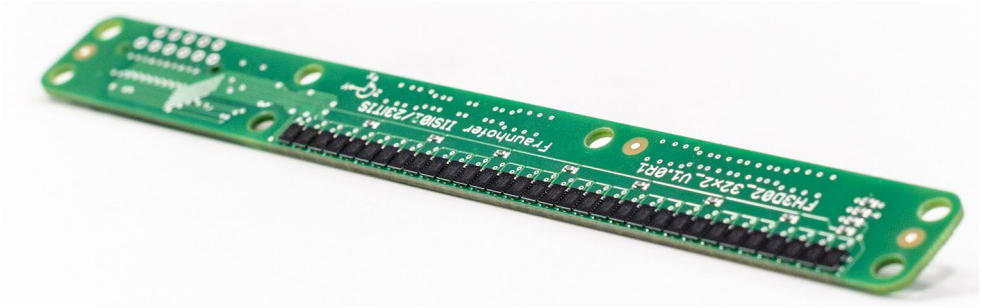
HALLINSIGHT® KEY SPECIFICATIONS

AC&DC TRUE 3-AXIS MAGNETIC FIELD MAPS

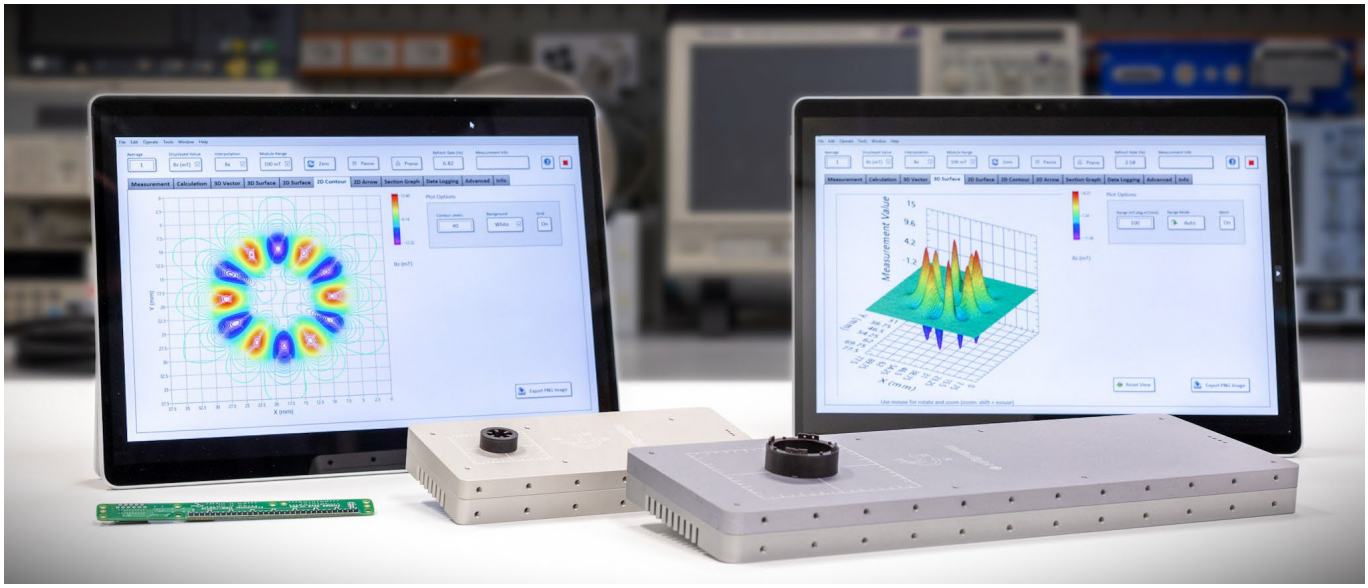
1- HALLINSIGHT® SENSOR MODULES INTRODUCTION

Three-axis Hall Magnetometers are used to measure magnetic flux density. Simultaneous measurement of all three components of the magnetic field provides the total field no matter the probe's orientation, which significantly facilitates many measurement tasks such as field mapping.

Different HallinSight® Sensor Modules are available. Hardware geometrics, coordinate systems and technical features are specified below. All geometric measures are in mm; coordinate systems (CS) are right-handed (order: x-y-z).



HallinSight® 32X2 pixels sensor array



HallinSight® 32x2, 16x16 and 32X32 pixels sensor arrays

HallinSight® is a technology developed by the Fraunhofer Institute for Integrated Circuits.

2- SOFTWARE

Data output	Bx, By, Bz, Babs, Phi, Theta and derivatives Temperature in the raw data Further data output - Plot graphics - Section data - Single, continuous and transfer log function Internal time stamp
Protocol	Custom protocol using ASCII commands for operation and ASCII as well as binary feedback
Hardware requirements	USB 2.0 or higher Dual-core processor with 2 GHz or higher Minimum 2 GB internal RAM Monitor with screen resolution of at least 1280 x 800 Recommended: Dedicated GPU
Software functions	Meter mode: • Cartesian coordinates Bx, By and Bz • Spherical coordinate system, B_{abs}, Phi and Theta Mapping mode: • 3D vector plot • 3D surface plot • 2D surface plot • 2D contour plot • 2D arrow plot • Section graph Control of range, trigger, acquisition rates, oversampling Hold, Max, and Alarm functions Zero offset correction Save memory or disk Help
COM port	Automated or manual COM port selection Possibility to connect multiple HallinSight® sensor arrays on the same PC using different COM ports
OS requirements	Windows 7 (32bit or 64bit) Windows 10 (32bit or 64bit)
Maintenance	Firmware and software upgradeable by end-user

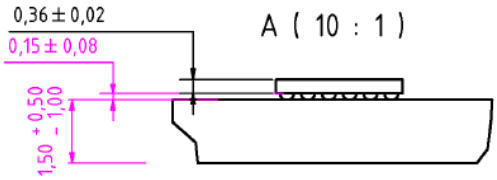
3- OPERATING CONDITIONS AND MAGNETIC SPECIFICATIONS

Parameter	Value	Unit	Note
Operating Temperature*	10 - 30	°C	ambient
Storage Temperature	0 - 50	°C	
Global Power Supply	5	V	max. 6
USB Power Supply (USB 2.0)	5	V	max. 5.25
Supply Voltage of Sensors	3.3	V	max. 3.6
Current Consumption per Sensor	10	mA	max. 15
Trigger In/Out Level	3.3	V	max. 5
Magnetic Resolution	4	µT	no avg.
Magnetic Accuracy	0.1	%	typ.
Magnetic Offset	25	µT	typ.
Magnetic Remanence	<1	µT	typ.
Magnetic Noise	25	µT	RMS
Measurement Integration Time	2	ms	no avg.
Sensor Lateral Position Error on PCB	<50	µm	typ.
Sensor Vertical Position Error on PCB	<10	µm	typ.
Sensor Rotational Position Error on PCB	<0.1	°	corrected
Warranty	2	years	

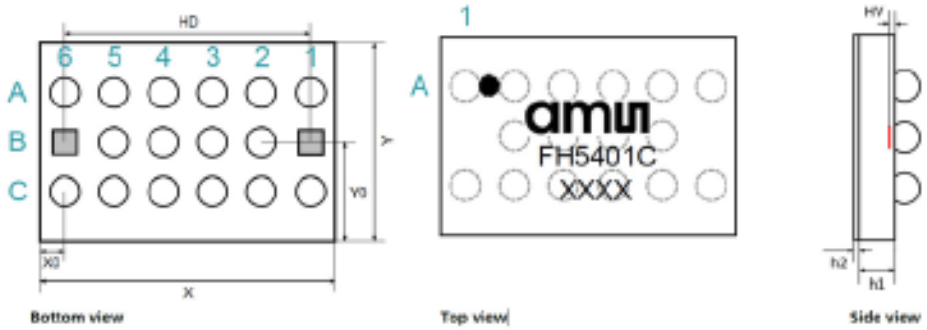
*The HallinSight® Magnetic Measurement System is designed for indoor use in laboratories and under moderate conditions, not designed for outdoor use or rough conditions. The magnetic sensors are calibrated for use at ambient temperature, 10 °C to 30 °C. The sensors heat up during measurement. If the sensors heat up above 55 °C a temperature warning is displayed because the best metering precision cannot be guaranteed.

4- GEOMETRIC SENSOR DETAILS

The actual sensitive area is located on the bottom side of the soldered IC. The circuit board thickness is highly variable depending on the system. In contrast, the chip thickness has very low tolerance.



Every FH5401c sensor contains two 3-D Hall sensors (pixels) for vectorial measurement of magnetic fields. Geometrical dimensions of the sensor and the position of the actual sensitive sensor area can be extracted from following figure and table.

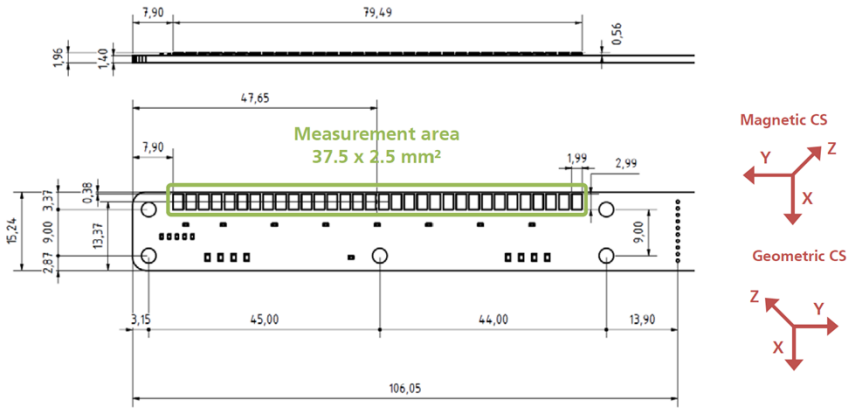


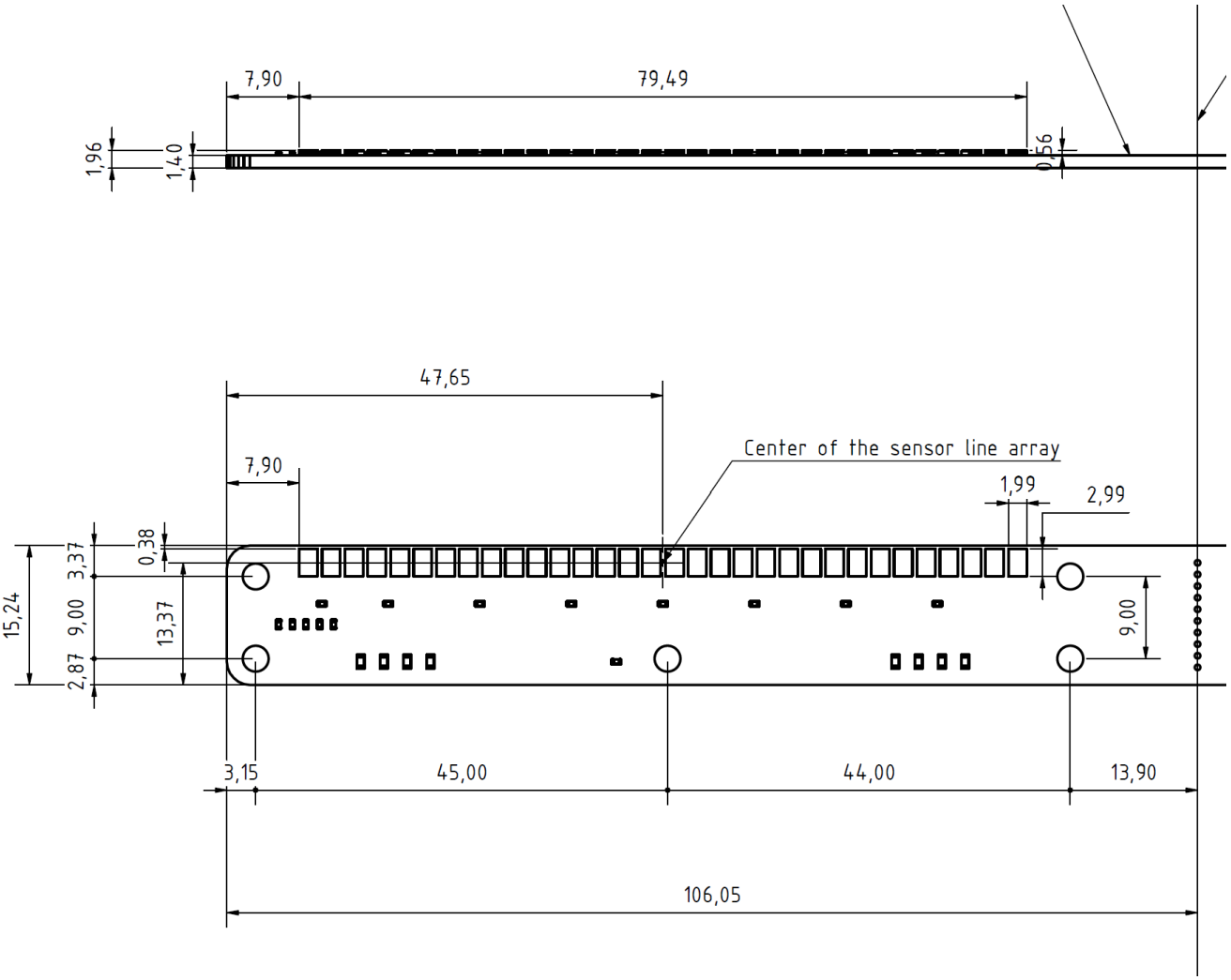
Parameter	Symbol	Typ	Unit
Chip Length	X	3035	*µm*
Chip Width	Y	2035	*µm*
Hall Sensor Distance	HD	2500	*µm*
x-Distance Edge-Sensor	X0	285	*µm*
y-Distance Edge-Sensor	Y0	1035	*µm*
Hall Sensor Vertical	HV	30	*µm*
Active sensor volume	L x W x H	200 x 200 x 5	*µm*
Total Chip Thickness	h1 + h2	360	*µm*

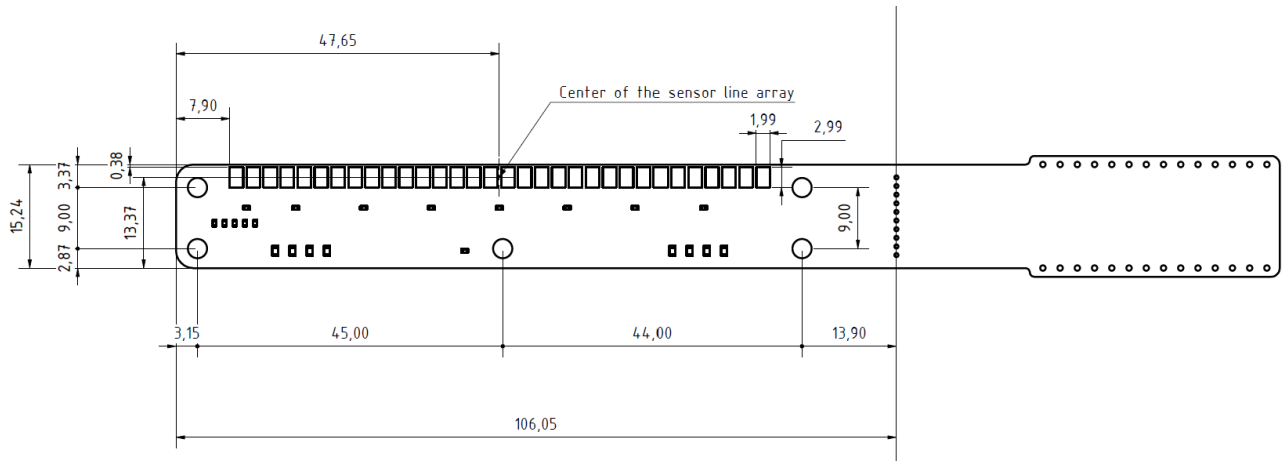
5- HALLINSIGHT® LINEAR SENSOR ARRAY 32X2 PIXEL ARRAY

The sensor spacing in X- and Y-direction is 2.5 mm. The measuring distance in Z-direction is given by the sensor package and amounts about 360 µm . The 32x2 HallinSight Pixel Line Array is delivered without a case for flexible integration in systems. The PCB provides mounting holes for fixation in customer applications. For dimensions of PCB and mounting see following drawings (all dimensions in mm).

This HallinSight system is split in two parts: The PCB containing sensors, and the interface box that is connected to the sensor PCB with a ribbon cable and provides the USB connector for power supply and communication.

Scope of delivery	64 sensor array PCB – 6.5 grams Interface box Flat ribbon cable (2 m) USB cable (1.8 m) USB stick with documentation and software
Sensor	64 3-axis Hall sensors Integrated temperature sensor
Sensor Field sensitive volume	77.5 mm x 2.5 mm x 100 µm (100 µm due to PCB flatness)
Ranges	100 mT, 400 mT, 800 mT, 2 T You should try to use the lower ranges whenever possible
Measurement rate	Max 250 Hz, no sampling, no interpolation
Units	mT (µT in rawdata log files)
Resolution	4 µT (not avg)
Axis orientation relative to the sensor array	


7,90
79,49
1,96
1,40
0,56
47,65
7,90
Center of the sensor line array
1,99
2,99
0,38
3,37
15,24
9,00
13,37
2,87
9,00
3,15
45,00
44,00
13,90
106,05

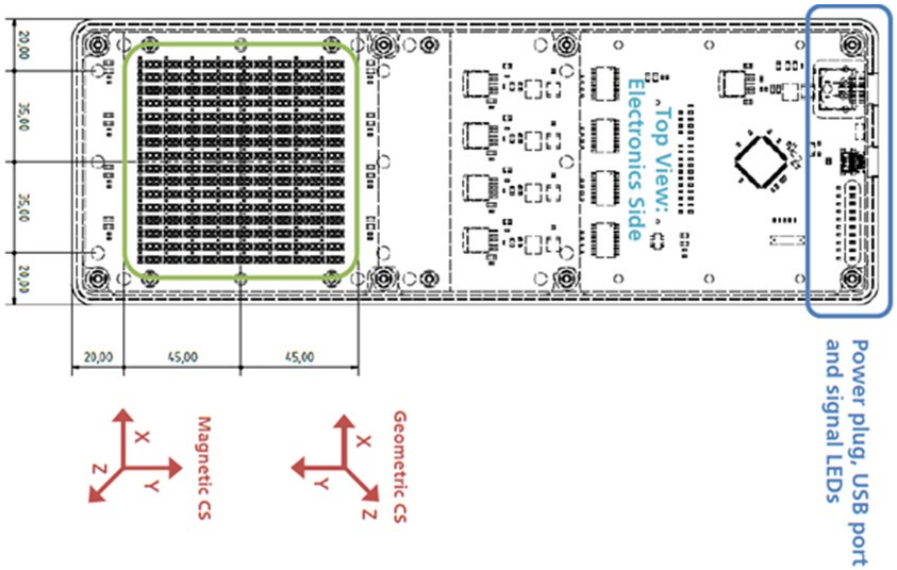

47,65
7,90
Center of the sensor line array
1,99
2,99
0,38
3,37
15,24
9,00
13,37
2,87
9,00
3,15
45,00
44,00
13,90
106,05

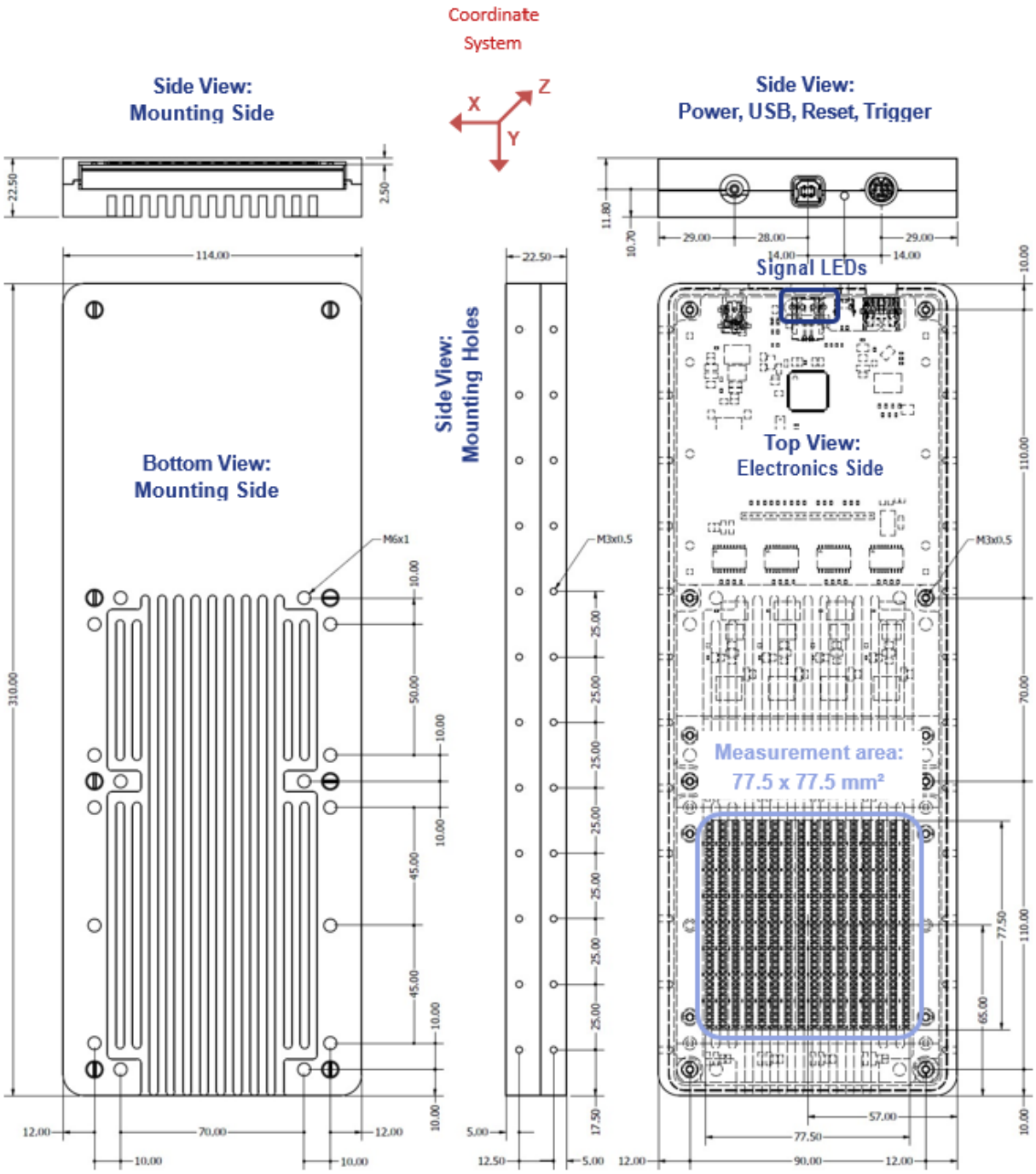

1,96
1,40

6- HALLINSIGHT® PLANAR SENSOR ARRAY 32X32 PIXEL

The sensor spacing in X- and Y-direction is 2.5 mm. Measuring distance in Z-direction (distance between active sensor and case) is also 2.5 mm.

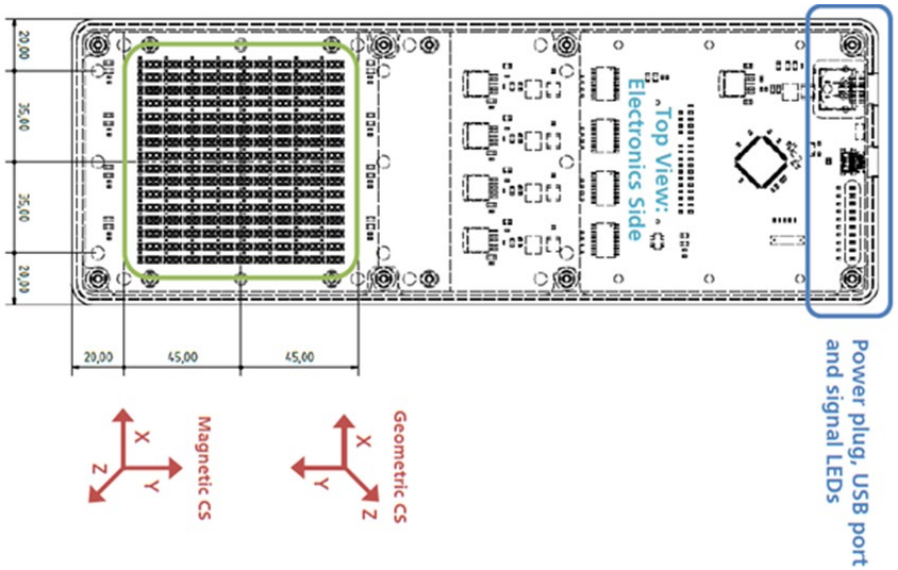
The 32x32 HallinSight Pixel Array is delivered with an aluminum case. The case provides mounting holes for integration in customer applications. For dimensions of case and mounting see following drawings (all dimensions in mm).

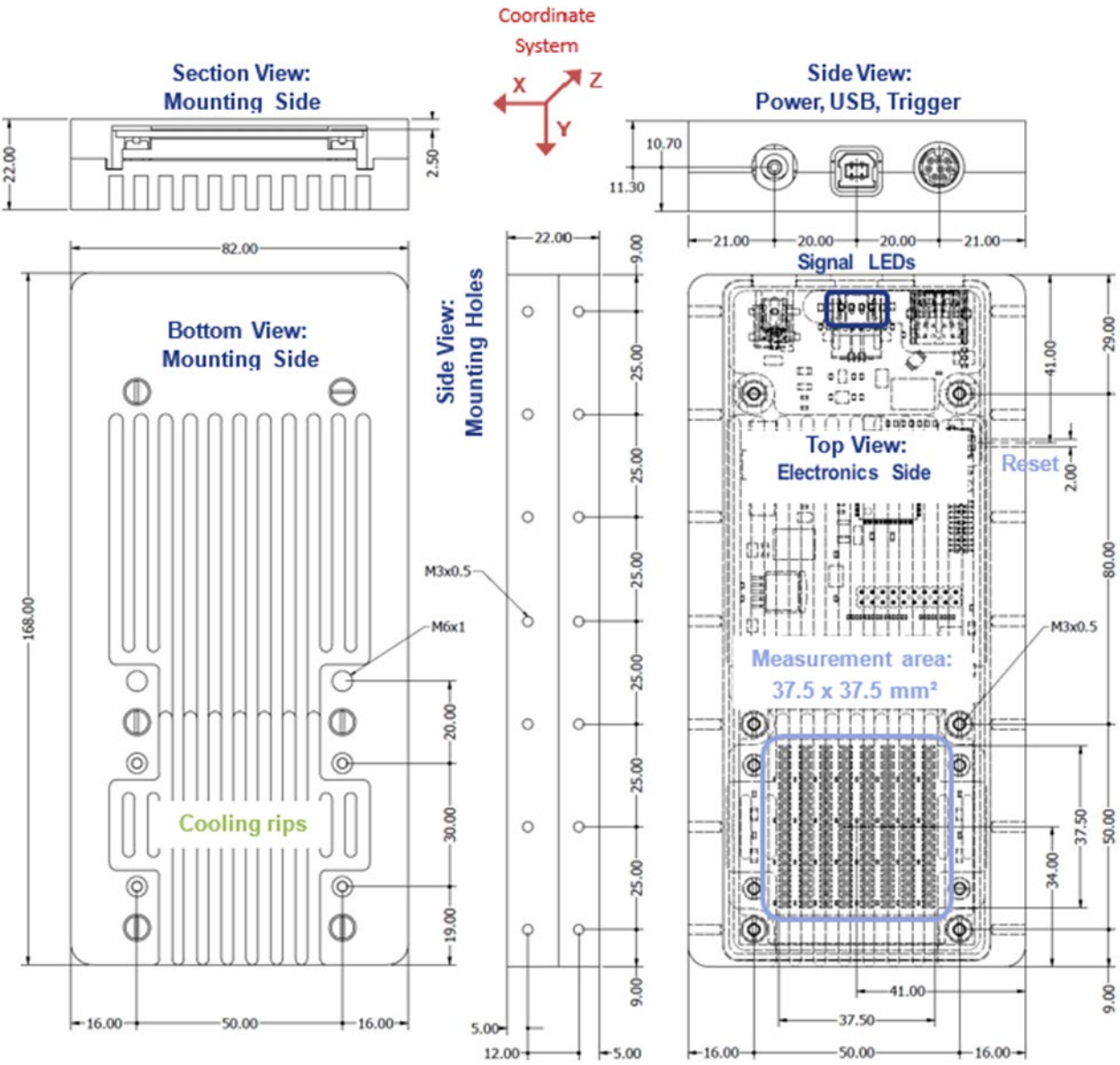
Scope of delivery	1024 sensor array in aluminium case – 1.250 kg USB cable (1.8 m) Suitable power supply (5 V) USB stick with documentation and software
Sensor	1024 3-axis Hall sensors Integrated temperature sensor
Measurement area	77.5 x 77.5 mm^2 x 100 µm
Ranges	100 mT, 400 mT, 800 mT, 2 T use the lower ranges whenever possible
Acquisition rate	25 Hz, no sampling, no interpolation
Units	mT (µT in rawdata log files)
Resolution	4 µT (not avg)
Axis orientation relative to the sensor array	


Coordinate System
X
Y
Z
Side View: Mounting Side
Side View: Power, USB, Reset, Trigger
Signal LEDs
Side View: Mounting Holes
Bottom View: Mounting Side
Top View: Electronics Side
Measurement area: 77.5 x 77.5 mm²
M6x1
M3x0.5
M3x0.5
22.50
2.50
114.00
310.00
22.50
11.80
10.70
29.00
28.00
29.00
14.00
14.00
10.00
110.00
70.00
110.00
10.00
10.00
50.00
10.00
10.00
45.00
45.00
10.00
10.00
25.00
25.00
25.00
25.00
25.00
25.00
25.00
17.50
77.50
65.00
57.00
77.50
12.00
70.00
12.00
10.00
10.00
5.00
12.50
5.00
12.00
90.00
12.00

7- HALLINSIGHT® PLANAR SENSOR ARRAY 16X16 PIXEL

The sensor spacing in X- and Y-direction is 2.5 mm. Measuring distance in Z-direction (distance between active sensor and case) is also 2.5 mm. The 16x16 HallinSight Pixel Array is delivered with an aluminum case. The case provides mounting holes for integration in customer applications. For dimensions of case and mounting see following drawings (all dimensions in mm).

Scope of delivery	256 sensor array in aluminium case – 0.500 kg USB cable (1.8 m) Suitable power supply (5 V) USB stick with documentation and software
Sensor	256 3-axis Hall sensors Integrated temperature sensor
Measurement volume	37.5 x 37.5 mm^2 x 100 µm
Ranges	100 mT, 400 mT, 800 mT, 2 T You should try to use the lower ranges whenever possible
Acqusisition rate	100 Hz, no sampling, no interpolation
Units	mT (µT in rawdata log files)
Resolution	4 µT (not avg)
Axis orientation relative to the sensor array	


Coordinate System
X
Z
Y
Section View: Mounting Side
22.00
2.50
Side View: Power, USB, Trigger
10.70
11.30
21.00
20.00
20.00
21.00
Signal LEDs
82.00
Bottom View: Mounting Side
168.00
Cooling rips
M6x1
20.00
30.00
19.00
16.00
50.00
16.00
Side View: Mounting Holes
22.00
M3x0.5
25.00
25.00
25.00
25.00
25.00
25.00
9.00
9.00
5.00
12.00
5.00
Top View: Electronics Side
Reset
2.00
41.00
29.00
80.00
M3x0.5
Measurement area: 37.5 x 37.5 mm²
37.50
34.00
50.00
41.00
37.50
16.00
50.00
16.00
9.00