

# KMSENSE

A KARAKAMLAR BRAND

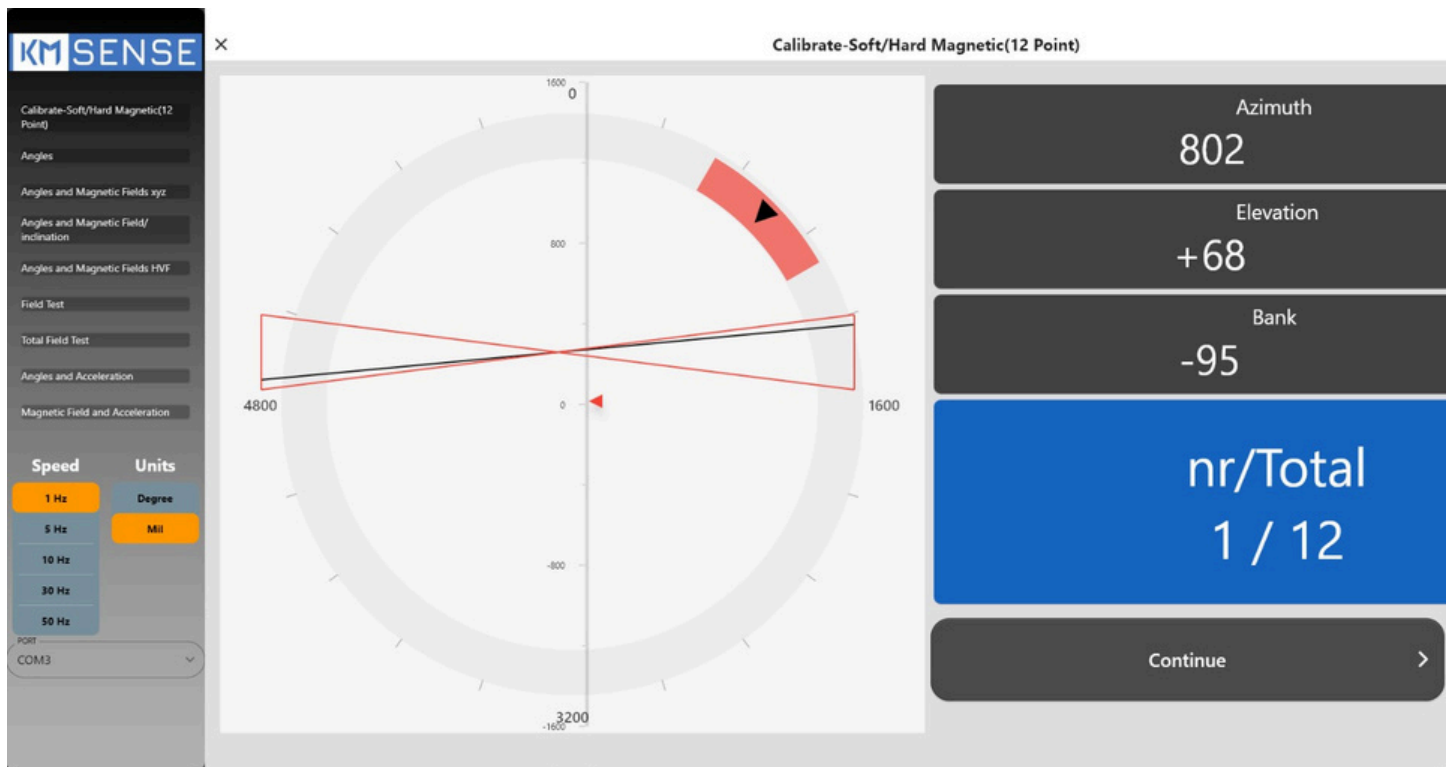
## K-PUS-MICRO DIGITAL MAGNETIC COMPASS **COMPENSATION AND PERFORMANCE MEASUREMENT PROCEDURE**





This document introduces the compensation procedure and performance measurement of a KMSense K-PUS digital magnetic compass sensor via using test and validation table. This procedure can be repeated for any system in which K-Pus sensor is integrated.

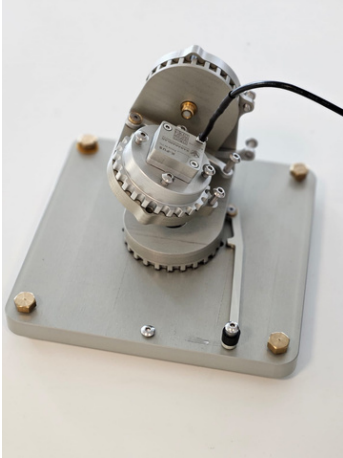
Validation table has pre-defined angles to determine the accuracy of the system connected on. First of all, 12 point magnetic compensation procedure should be applied to eliminate the fixed local magnetic disturbances around the sensor. Please read carefully the user manual before using K-PUS digital magnetic compass. Connect the sensor to the system where it will be used, you can run the compensation procedure either by using the K-PUS User interface software or by the sending bytes via a serial interface using commands given in the user manual. In this document user interface is used to run the procedure. Click the compensation button on the menu and start.



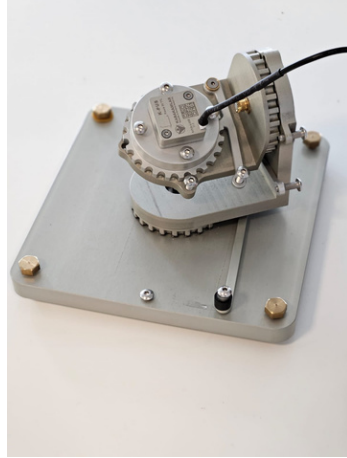
**K-PUS user interface compensation start screen**

Rotate the all system at the angles given below and click the continue after each step.

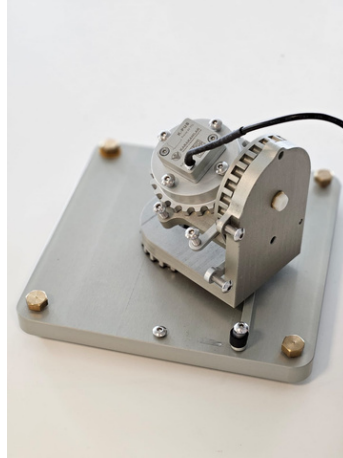
Step-1  
Azimuth : 0 degree  
Elevation : 30 degree  
Bank : 0 degree



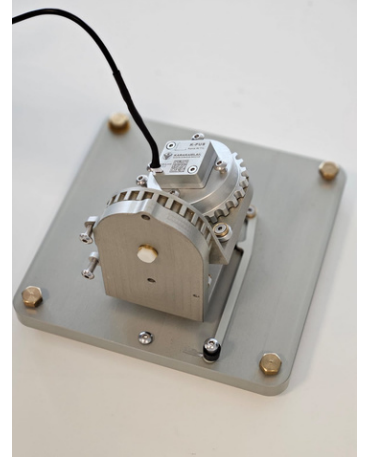
Step-2  
Azimuth : 60 degree  
Elevation : 30 degree  
Bank : 0 degree



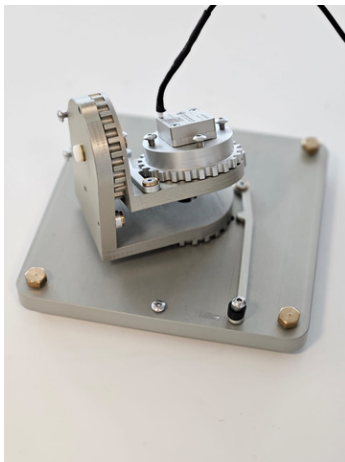
Step-3  
Azimuth : 120 degree  
Elevation : 30 degree  
Bank : 0 degree



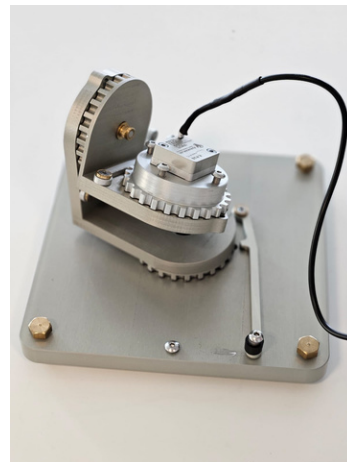
Step-4  
Azimuth : 180 degree  
Elevation : 30 degree  
Bank : 0 degree



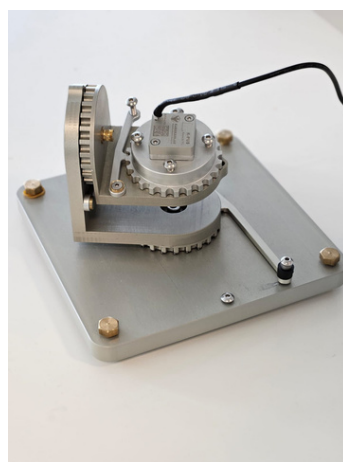
Step-5  
Azimuth : 240 degree  
Elevation : 30 degree  
Bank : 0 degree



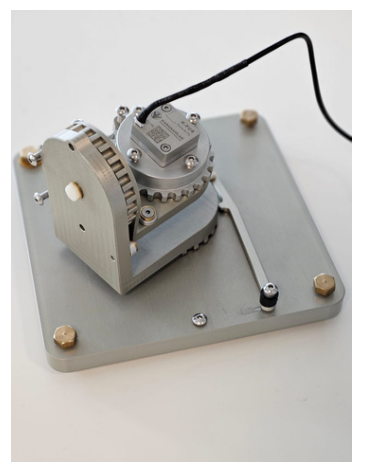
Step-6  
Azimuth : 300 degree  
Elevation : 30 degree  
Bank : 0 degree



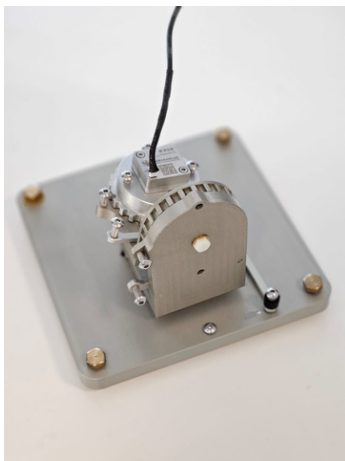
Step-7  
Azimuth : 3000 degree  
Elevation : -30 degree  
Bank : 0 degree



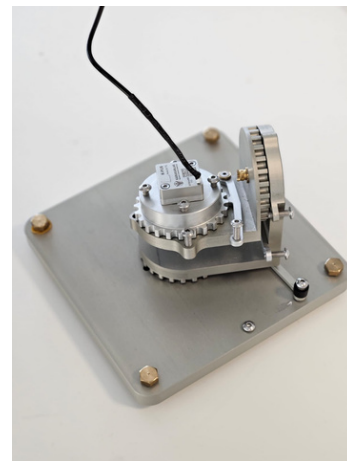
Step-8  
Azimuth : 240 degree  
Elevation : -30 degree  
Bank : 0 degree



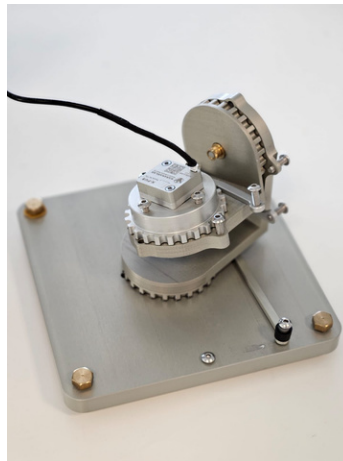
Step-9  
Azimuth : 180 degree  
Elevation : -30 degree  
Bank : 0 degree



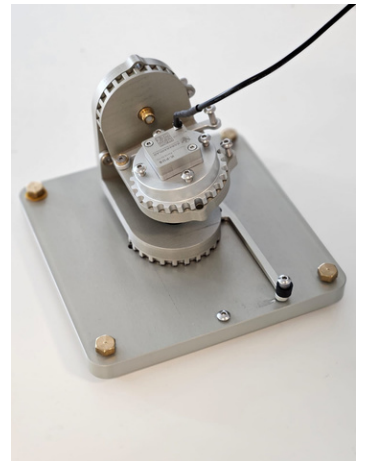
Step-10  
Azimuth : 120 degree  
Elevation : -30 degree  
Bank : 0 degree



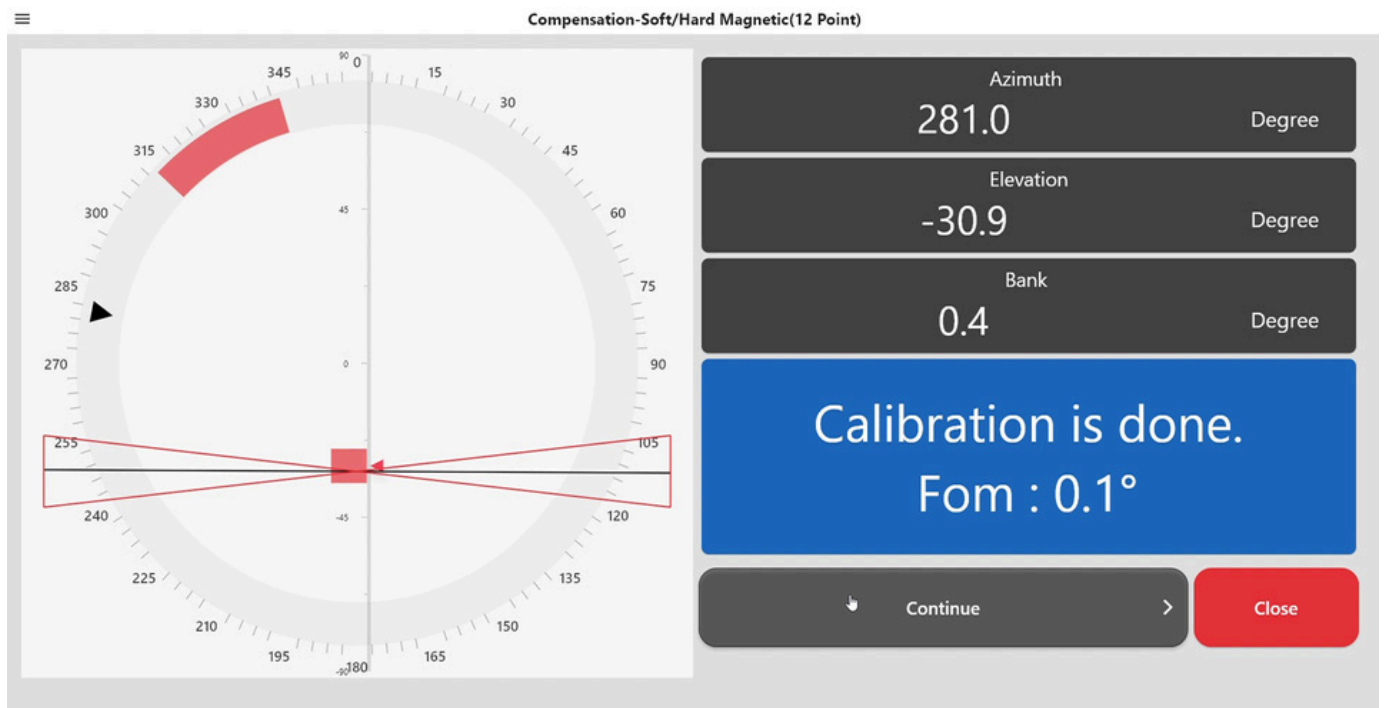
Step-11  
Azimuth : 60 degree  
Elevation : -30 degree  
Bank : 0 degree



Step-12  
Azimuth : 0 degree  
Elevation : -30 degree  
Bank : 0 degree



When compensation process finished FOM( figure of merit) number will be calculated to give information about the health of process. FOM value is expected to be lower than 0.3 after a successful compensation.



**K-PUS user interface compensation finished screen**

Then the sensor is rotated to pre-defined angles on the validation table to measure the performance data for roll, pitch and yaw angles. Here is the results as degrees :

Measurement	Expected YAW	Difference
5.79°	0°	5.79°
35.78°	30°	5.78°
65.76°	60°	5.76°
95.79°	90°	5.79°
125.83°	120°	5.83°
155.70°	150°	5.70°
185.46°	180°	5.46°
215.55°	210°	5.55°
245.59°	240°	5.59°
275.57°	270°	5.57°
305.55°	300°	5.55°
335.70°	330°	5.70°
	Offset	5.67°
	<b>S.Deviation</b>	<b>0.12°</b>

**Yaw Axis Performance Results**

<b>Expected ROLL</b>	<b>Measured</b>	<b>Difference</b>
0 °	0.0 °	0.0 °
15°	15.0°	0.0°
30°	30.1°	0.1°
60°	59.9°	0.1°
-60°	-60.1°	0.1°
-30°	-30.1°	0.1°
-15°	-15.0°	0.0°
<b>S.DEVIATION</b>		<b>0.05°</b>

### **Roll Axis Performance Results**

<b>Expected PITCH</b>	<b>Measured</b>	<b>Difference</b>
0 °	0.0 °	0.0 °
15°	15.0°	0.0°
30°	30.1°	0.1°
60°	59.9°	0.1°
-60°	-60.1°	0.1°
-30°	-30.1°	0.1°
-15°	-15.0°	0.0°
<b>S.DEVIATION</b>		<b>0.05°</b>

### **Pitch Axis Performance Results**

As seen in the results the K-PUS digital magnetic compass sensor can easily reach accuracy lower than 0.25 degree in YAW axis and lower than 0.1 degree in both roll and pitch axis.

For more information please read user manual or contact us from [info@kmsense.com](mailto:info@kmsense.com)