BeanDevice®

Version 1.0

TECHNICAL NOTE

WILOW® PRODUCTS RECALIBRATION PROCESS

BeanAir

Rethinking Sensing Technology

Wilow

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1. TECHNICAL SUPPORT

For general contact, technical support, to report documentation errors and to order manuals, contact ***Beanair Technical Support Center*** (BTSC) at:

tech-support@Beanair.com

For detailed information about where you can buy the Beanair equipment/software or for recommendations on accessories and components visit:

www.Beanair.com

To register for product news and announcements or for product questions contact Beanair's Technical Support Center (BTSC).

Our aim is to make this user manual as helpful as possible. Keep us informed of your comments and suggestions for improvements.
Beanair appreciates feedback from the users of our information.

2. VISUAL SYMBOLS DEFINITION

Symbols	*Definition*
	***Caution or Warning** – Alerts the user with important information about Beanair wireless sensor networks (WSN), if this information is not followed, the equipment /software may fail or malfunction.*
	***Danger** – This information MUST be followed if not you may damage the equipment permanently or bodily injury may occur.*
	***Tip or Information** – Provides advice and suggestions that may be useful when installing Beanair Wireless Sensor Networks.*

3. ACRONYMS AND ABBREVIATIONS

AES	Advanced Encryption Standard
CCA	Clear Channel Assessment
CSMA/CA	Carrier Sense Multiple Access/Collision Avoidance
GTS	Guaranteed Time-Slot
kSps	Kilo samples per second
LLC	Logical Link Control
LQI	Link quality indicator
LDCDA	Low duty cycle data acquisition
MAC	Media Access Control
PAN	Personal Area Network
PER	Packet error rate
RF	Radio Frequency
SD	Secure Digital
WSN	Wireless sensor Network

4. DOCUMENT ORGANIZATION

AX-3D & AX-3DS Recalibration Process	• Factory calibration • How often to recalibrate the BeanDevice • Recalibration Process
Hi-Inc Recalibration Process	• Factory calibration • How often to recalibrate the BeanDevice • Recalibration Process

5. BEANDEVICE® AX-3D AND AX-3DS RECALIBRATION PROCESS

5.1 FACTORY CALIBRATION PROCESS

A static calibration method is used to calibrate the sensor

5.2 HOW OFTEN TO RECALIBRATE THE BEANDEVICE®?

Depending on the operating environmental conditions, a recalibration process should be done to rectify the aging drift due to a long duration of the sensor usage and a temperature drift due to a high temperature environment.

The following table summarize how often user should recalibrate the sensor.

Table 1: BeanDevice Recalibration duration

BeanDevice® Wilow® version	*Operating temperature < 40°C*	*Operating temperature > 40°C*
BeanDevice® Wilow® AX-3D	**6 years**	**3 years**
BeanDevice® Wilow® AX-3DS	**3 years**	**2 years**

5.3 RECALIBRATION PROCESS

A static calibration should be done on a table using a reference accelerometer sensor or using a flat desk/table (you can use marble desk or granite desk), but make sure to use a table with a good flatness.

Then follow the instructions below

- ***First Step***

Firstly, you have to back up the previous calibration values (Ratio + Offset), then, reset ratio value to 1 and offset to 0 from the sensor calibration tab on your BeanScape® software.

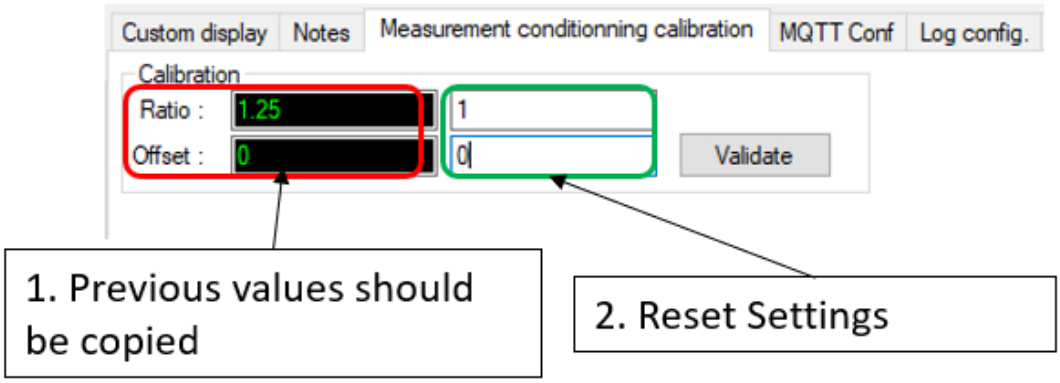

Figure 1: Reset settings

- ***Second Step***

Point the Positive Z axis to point to the ground to obtain 1g, then do the same thing with the Negative Z.

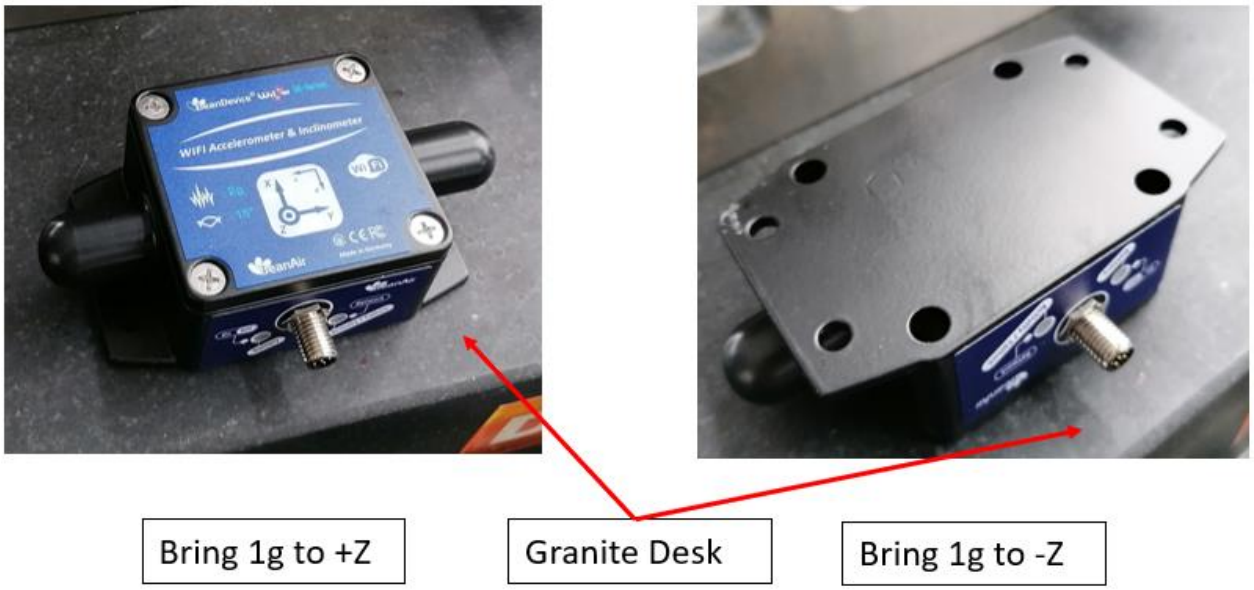

Figure 2: Obtention of 1g on the Z axis

Each Axis (Positive and Negative) should point to the ground to have the 1g, redo the same instructions with X and Y axis.

The best way to obtain the 1g on the X and Y axis, is to use very accurate 90° bracket.

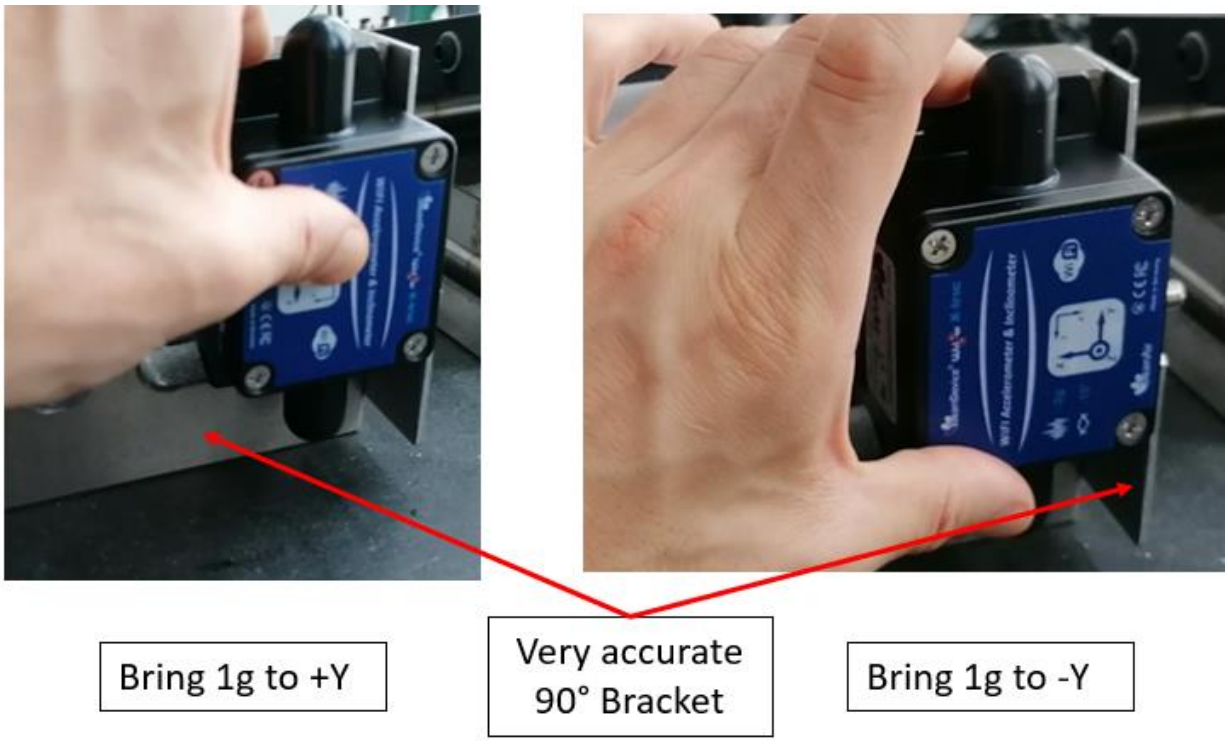

Figure 3: Obtention of 1g on the Y axis

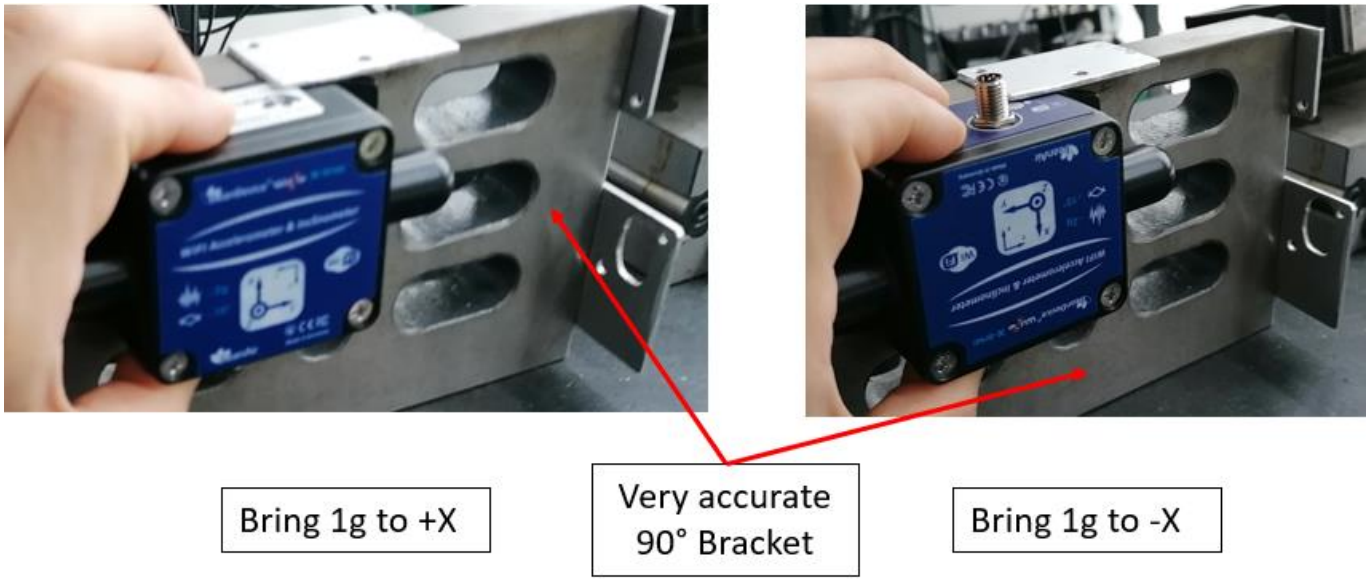

Figure 4: Obtention of the 1g on the X axis

- ***Third Step:***

Use the Recalibration Excel sheet, and put the obtained values in the blue field for each axis.

Do not change the values in the red field otherwise you will get a faulty calibration value.

Table 2: Recalibration values calculation

X					Target X
Positive X axis	Obtained +X value		**Ratio**	1.413	1
Negative X axis	Obtained -X value		**Offset**	-0.079	-1

DO NOT CHANGE THESE VALUES

ENTER YOUR SETTINGS IN BLUE AREA

- ***Fourth step:***

Enter the new obtained Ratio and offset on the red field, on the BeanScape software sensor calibration settings.

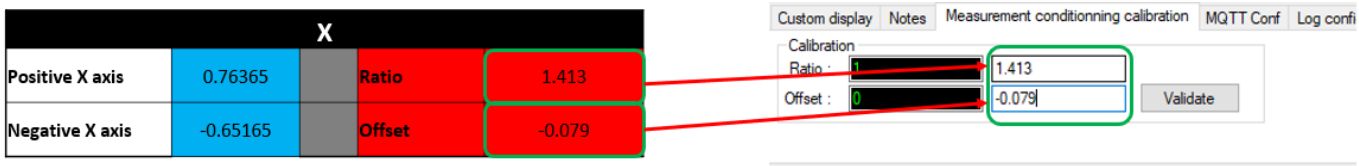

Figure 5: Recalibration values

Don’t forget to validate.

6. BEANDEVICE® WILOW® HI-INC

6.1 FACTORY CALIBRATION PROCESS

The calibration procedure is based on a side-by-side comparison with a reference tilt meter. For better measurement stability, the two tilt meters are mounted on a sinus table.

6.2 HOW OFTEN TO RECALIBRATE THE BEANDEVICE®?

Depending on the operating environmental conditions, a recalibration process should be done to rectify the aging drift due to a long duration of the sensor usage and a temperature drift due to a high temperature environment.

The following table summarize how often user should recalibrate the sensor.

Table 3: BeanDevice Recalibration duration

BeanDevice® Wilow® version	*Operating temperature < 40°C*	*Operating temperature > 40°C*
BeanDevice® Hi-Inc.	**6 years**	**3 years**

6.3 RECALIBRATION PROCESS

A static calibration should be done using a granite desk a sinus table and which is already fixed on a preconfigured position.

Then follow the instructions below

- ***First Step***

Firstly, you have to back up the previous calibration values (Ratio + Offset), then, reset ratio value to 1 and offset to 0 from the sensor calibration tab on your BeanScape® software.

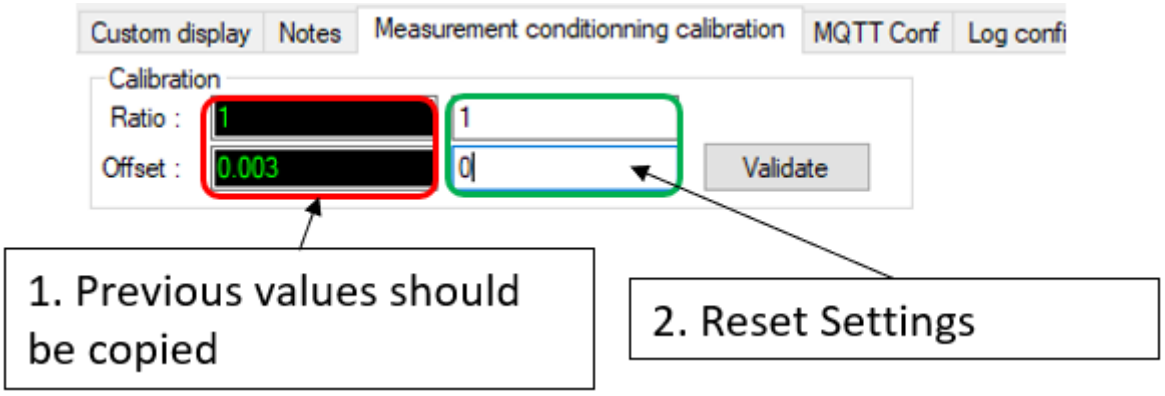

Figure 6: Reset settings

- ***Second Step***

Put the BeanDevice Hi-Inc on the sinus table on the +X axis to obtain 14° (just an example, you can predefine any other angle), then reverse the BeanDevice on the -X axis.

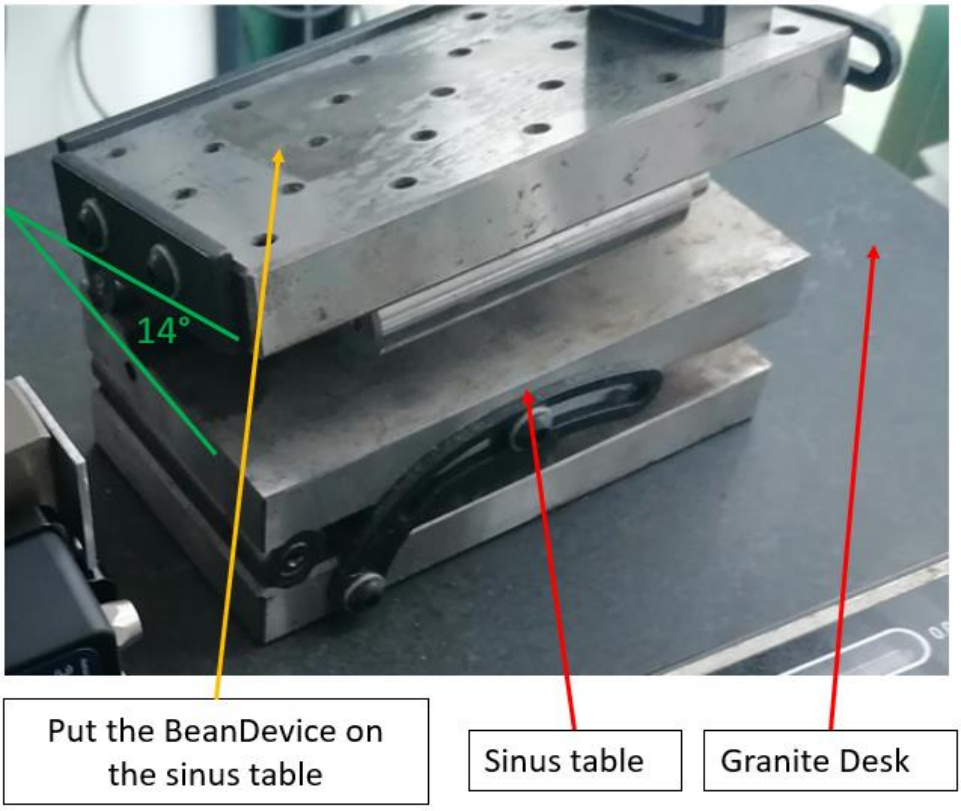

Figure 7: Sinus table

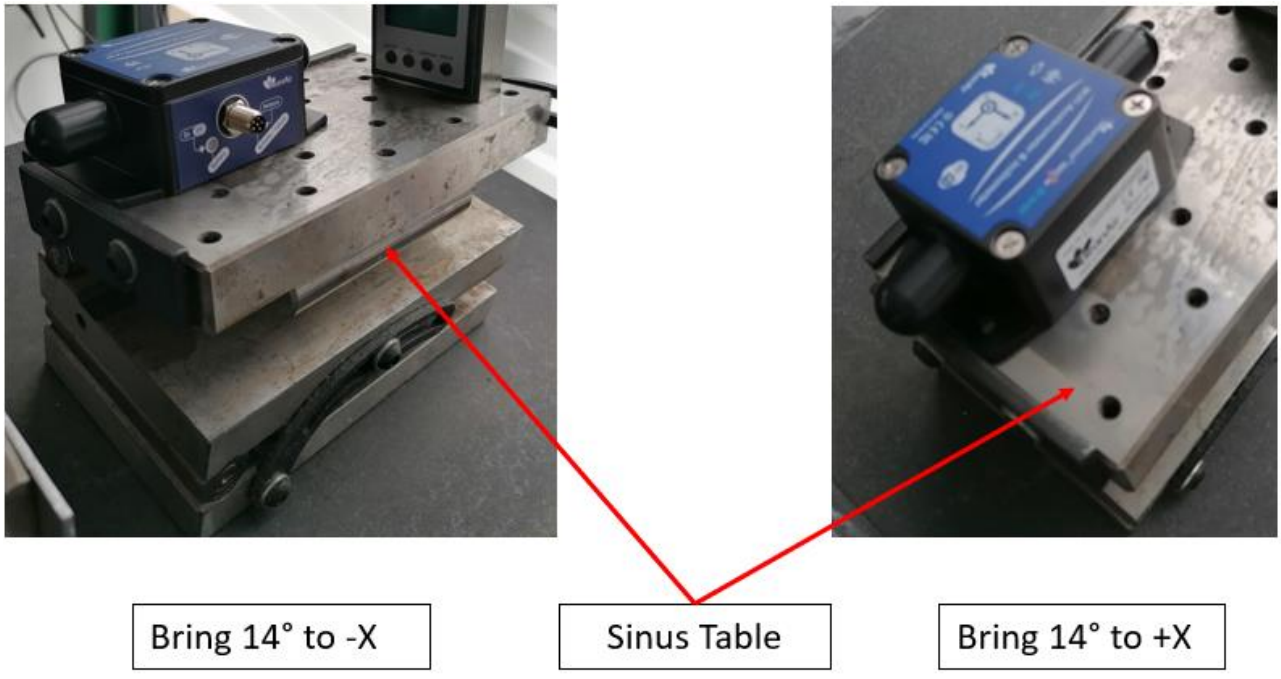

Figure 8: Bringing 14° on X axis

Redo the same instructions with Y axis.

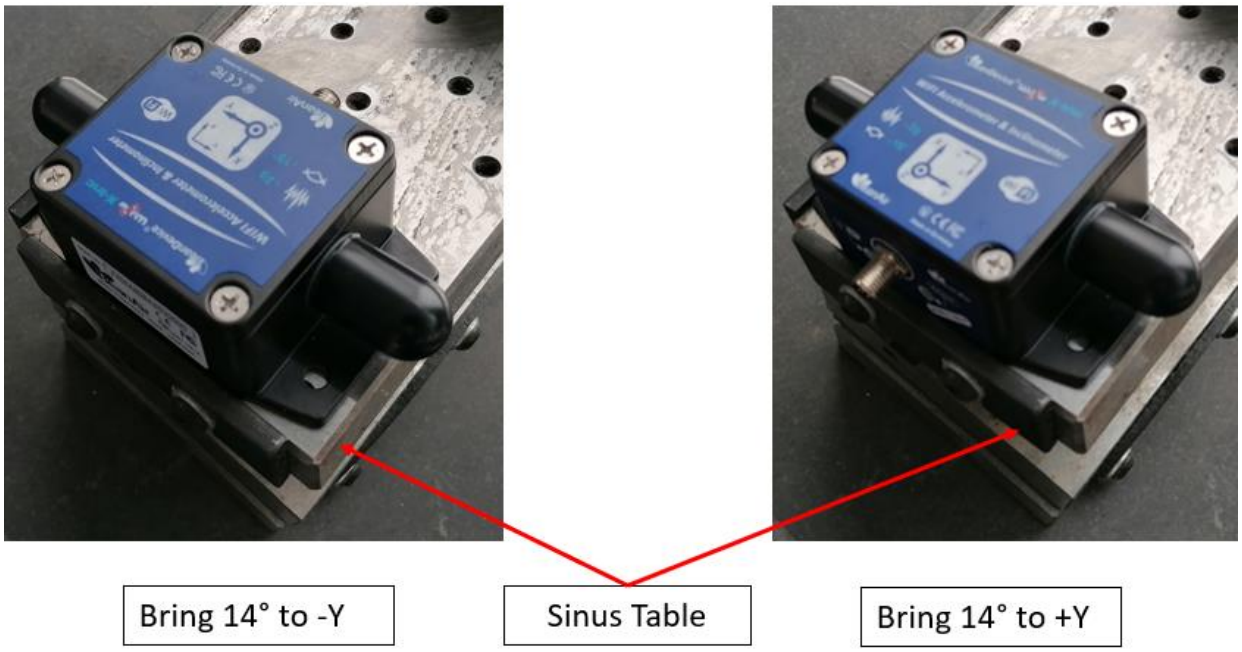

Figure 9: Bring 14° on the Y axis

- ***Third Step:***

Use the Recalibration Excel sheet, and put the obtained values in the blue field for each axis.

Do not change the values in the red and yellow fields otherwise you will get a faulty calibration value.

Table 4: Recalibration values calculation

	X		
Positive axis	14.058	**Ratio**	1
Negative axis	-14.002	**Offset**	0.000

- ***Fourth step:***

Enter the new obtained the offset on the yellow field, on the BeanScape software sensor calibration settings.

The ratio value is always equal to 1, it doesn't change ever.

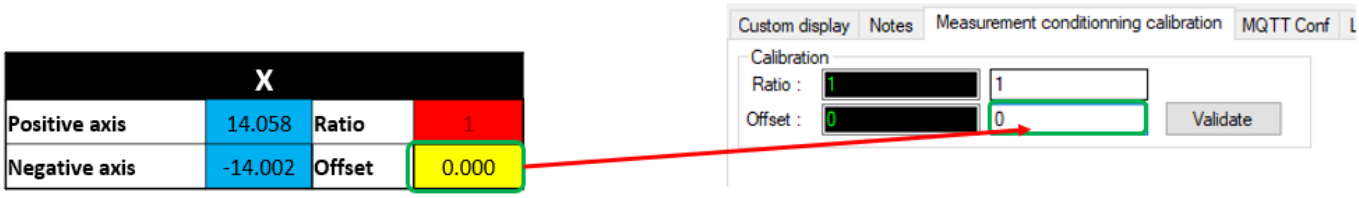

Figure 10: New recalibration values

Don’t forget to validate.