



Rethinking Sensing Technology

Inclinometer Sensor (Beandevic[®] Wilow[®] HI-INC) – Repeatability Tests with Static Data Acquisition Mode - Shimon Abadi, Technical Support Engineer
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Berlin, Germany

Tests Description:

The improvement of inclinometer repeatability is available on the following products:

- Beandevic[®] Wilow[®] HI-INC $\pm 15B/\pm 30B$
- Beandevic[®] Wilow[®] X-INC

for Low Duty Cycle and Alarm measurement mode (Firmware version V4.1).

To evaluate the reproductibility of this test, we have tested on 10 x Beandevic[®] Wilow[®] HI-INC .

Test session 1: Static Test on Granite Plate

To decrease as much as possible all the external vibrations and shocks, the sensors were tested on a Granite table certified DIN 871.

9 sensors were tested on the granite plate and 1 sensor was tested on the sine table with an inclination of 14.1 degree

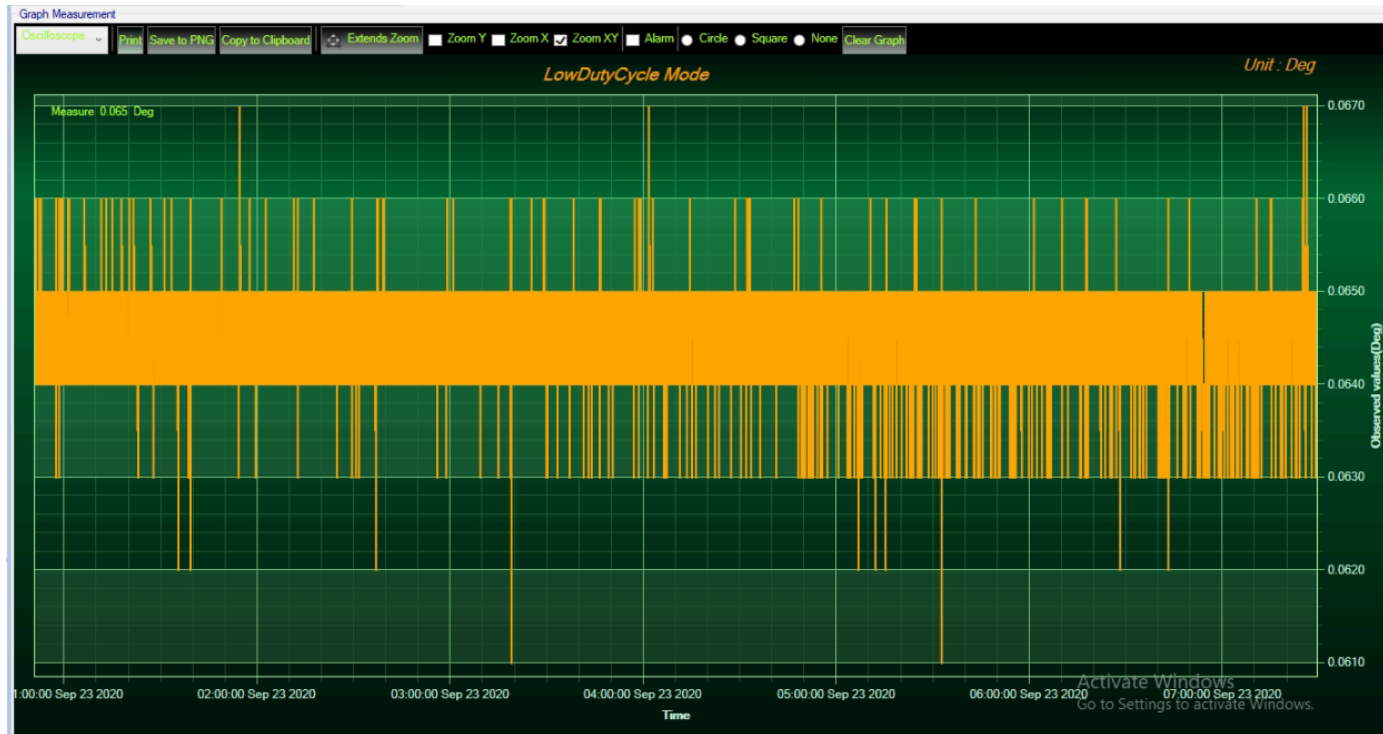


List of Equipment used:

- **10 x Beandevic[®] Wilow[®] HI-INC 15B , SW version 4.1**
- **10 x Beandevic[®] Wilow[®] HI-INC 30B , SW version 4.1**
- **3 x Beandevic[®] Wilow[®] HI-INC 15B, SW version 4.0**
- **Granit Plate (DIN861 certified)**
- **Sine Table (DIN 861 certified) calibrated at 14.1°**

Sensor Repeatability tests on Beandevise® Wilow® HI-INC ±15B and ±30B with SW 4.1

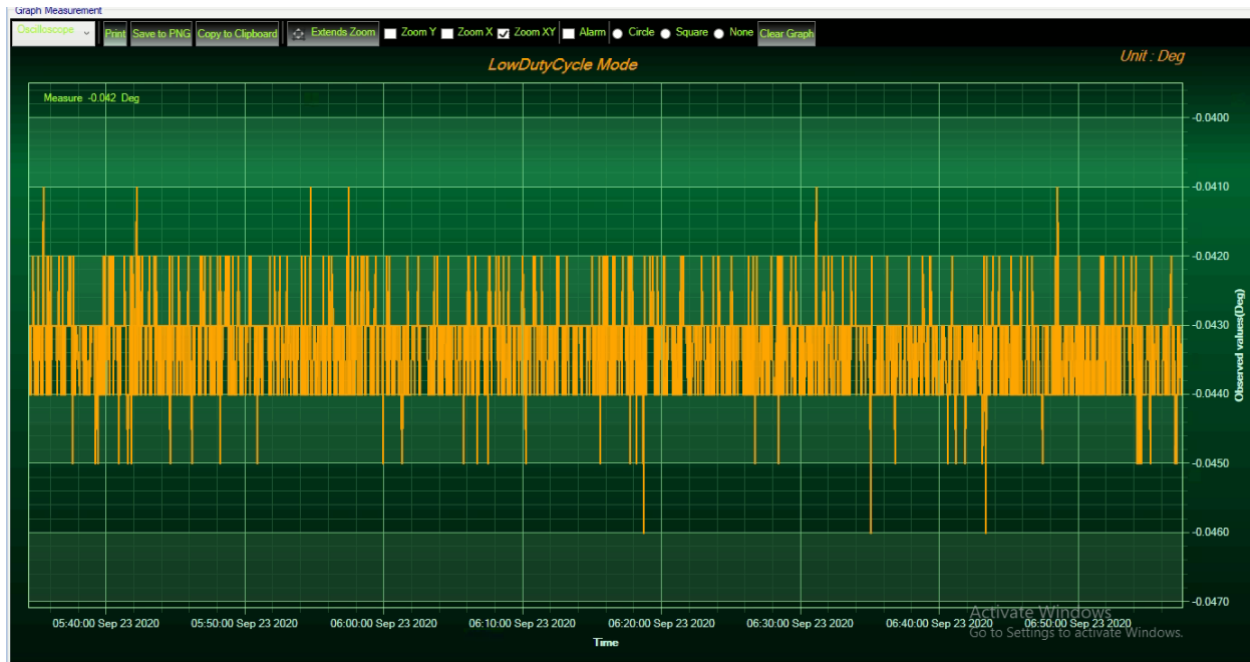
Example: On the X Axis , the sensor (**±15B version**) repeatability is **±0.003** degree (observation period: 6 hours)



Sensor X Axis	Repeatability Results on 6 hours of Tests ±15B	Repeatability Results on 6 hours of Tests ±30B
Sensor 1	±0.0023	±0.0035
Sensor 2	±0.0028	±0.0037
Sensor 3	±0.0029	±0.0038
Sensor 4	±0.0030	±0.0034
Sensor 5	±0.0028	±0.0037
Sensor 6	±0.0027	±0.0035
Sensor 7	±0.0025	±0.0035
Sensor 8	±0.0028	±0.0036
Sensor 9	±0.0024 (evaluated on Sine Table)	±0.0032 (evaluated on Sine Table)
Sensor 10	±0.0030	±0.0035

Sensor Repeatability tests on Beandevic[®] Wilow[®] HI-INC $\pm 15B$ with SW 4.1

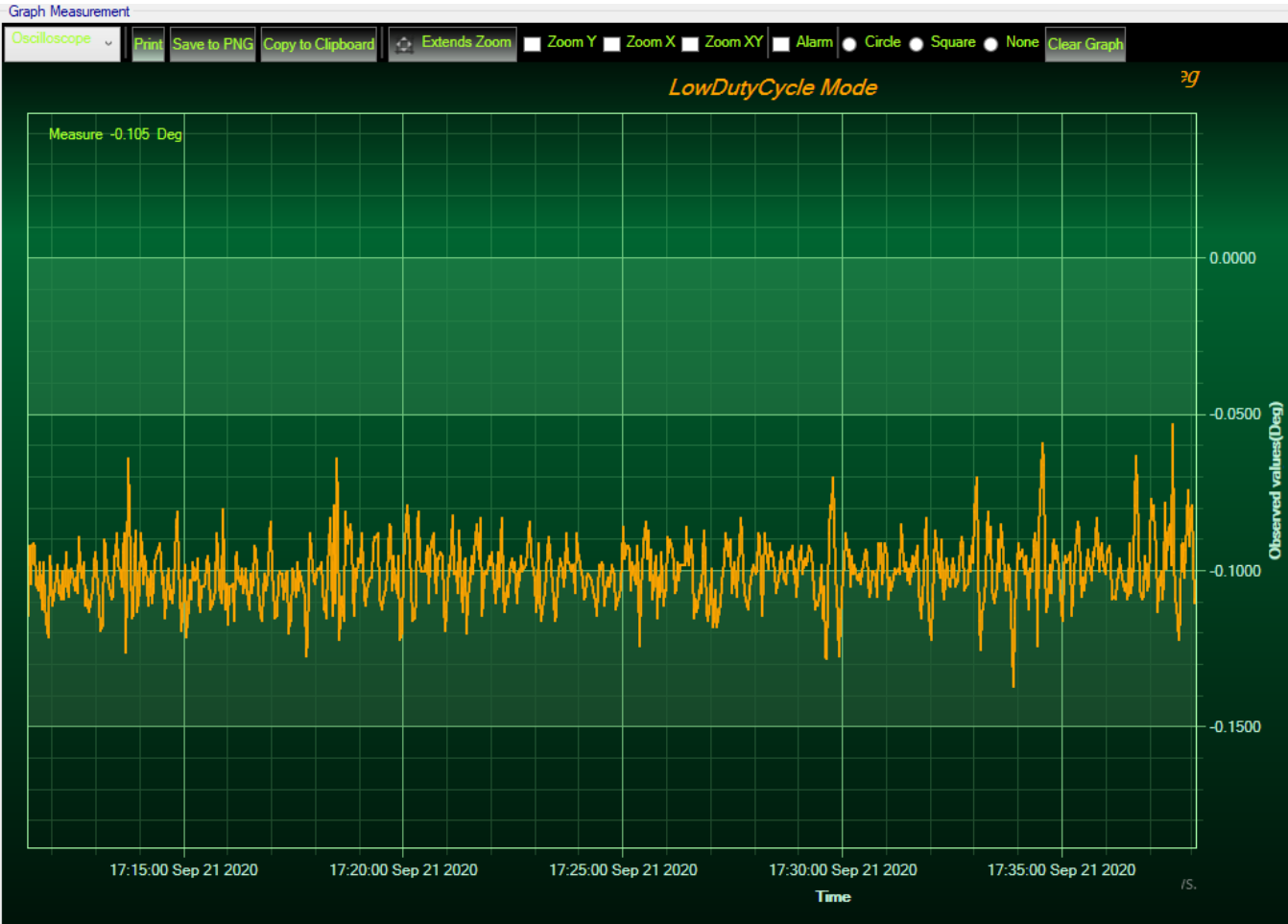
Example: On the Y Axis, the sensor repeatability is ± 0.0027 degree (observation period: 6 hours)



Sensor Y Axis	Repeatability Results on 6 hours of Tests	Repeatability Results on 6 hours of Tests $\pm 30B$
Sensor 1	± 0.0029	± 0.0032
Sensor 2	± 0.0031	± 0.0035
Sensor 3	± 0.0027	± 0.0035
Sensor 4	± 0.0023	± 0.0034
Sensor 5	± 0.0028	± 0.0036
Sensor 6	± 0.0024	± 0.0040
Sensor 7	± 0.0025	± 0.0039
Sensor 8	± 0.0026	± 0.0038
Sensor 9	± 0.0027 (evaluated on Sine Table)	± 0.0032 (evaluated on Sine Table)
Sensor 10	± 0.0025	± 0.0033

Sensor Repeatability on Beandevice® Wilow® HI-INC $\pm 15B$ with SW 4.0

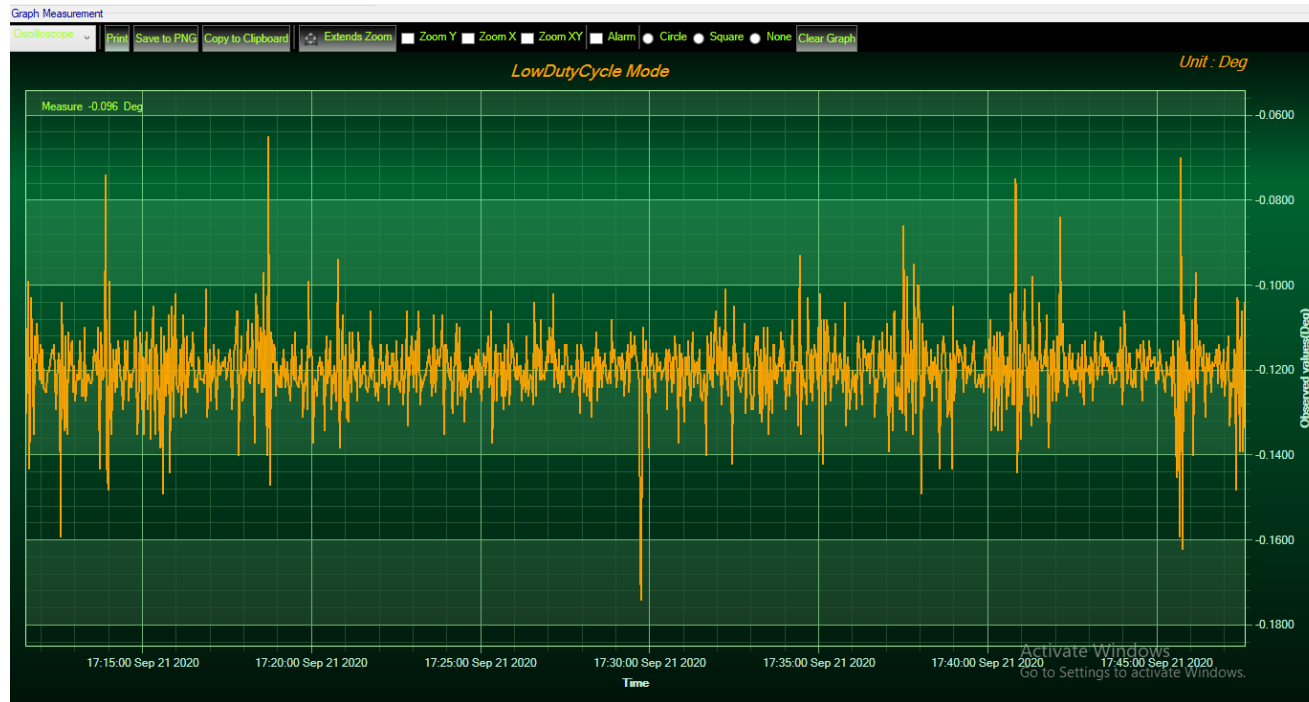
– Tests on X Axis



Sensor X Axis	Repeatability Results on 30 minutes of Tests
Sensor 1	± 0.042
Sensor 2	± 0.028
Sensor 3	± 0.039
Sensor 4	± 0.027
Sensor 5	± 0.036
Sensor 6	± 0.045
Sensor 7	± 0.047
Sensor 8	± 0.049
Sensor 9	± 0.045 (evaluated on Sine Table)
Sensor 10	± 0.046

Example (Sensor 6) : On the X Axis, the sensor repeatability is ± 0.045 degree (observation period: 30 minutes)

Sensor Repeatability on Beandevic[®] wilow HI-INC 15B with SW 4.0 – Tests on Y Axis



Example (Sensor 6) : On the Y Axis, the sensor repeatability is ± 0.051 degree (observation period: 30 minutes)

Sensor X Axis	Repeatability Results on 30 minutes of Tests
Sensor 1	± 0.047
Sensor 2	± 0.027
Sensor 3	± 0.024
Sensor 4	± 0.028
Sensor 5	± 0.037
Sensor 6	± 0.05
Sensor 7	± 0.051
Sensor 8	± 0.052
Sensor 9	± 0.051 (evaluated on Sine Table)
Sensor 10	± 0.047

Conclusion:

Beandevise Wilow HI-INC $\pm 15B$ the Inclinator sensor repeatability is ± 0.003 degree at 25°C , with Low Duty Cycle and Alarm measurement modes.

Beandevise Wilow HI-INC $\pm 30B$ the Inclinator sensor repeatability is ± 0.004 degree at 25°C , with Low Duty Cycle and Alarm measurement modes.

Recommendations:

To avoid any wrong movement, the devices need to be screwed correctly (or magnetically mounted) on the structure. You can also use our 90 degree bracket or

When the sensor is mounted on the structure, do a Zero-offset : tracking the inclination evolution over the time is what you need on your monitoring system



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