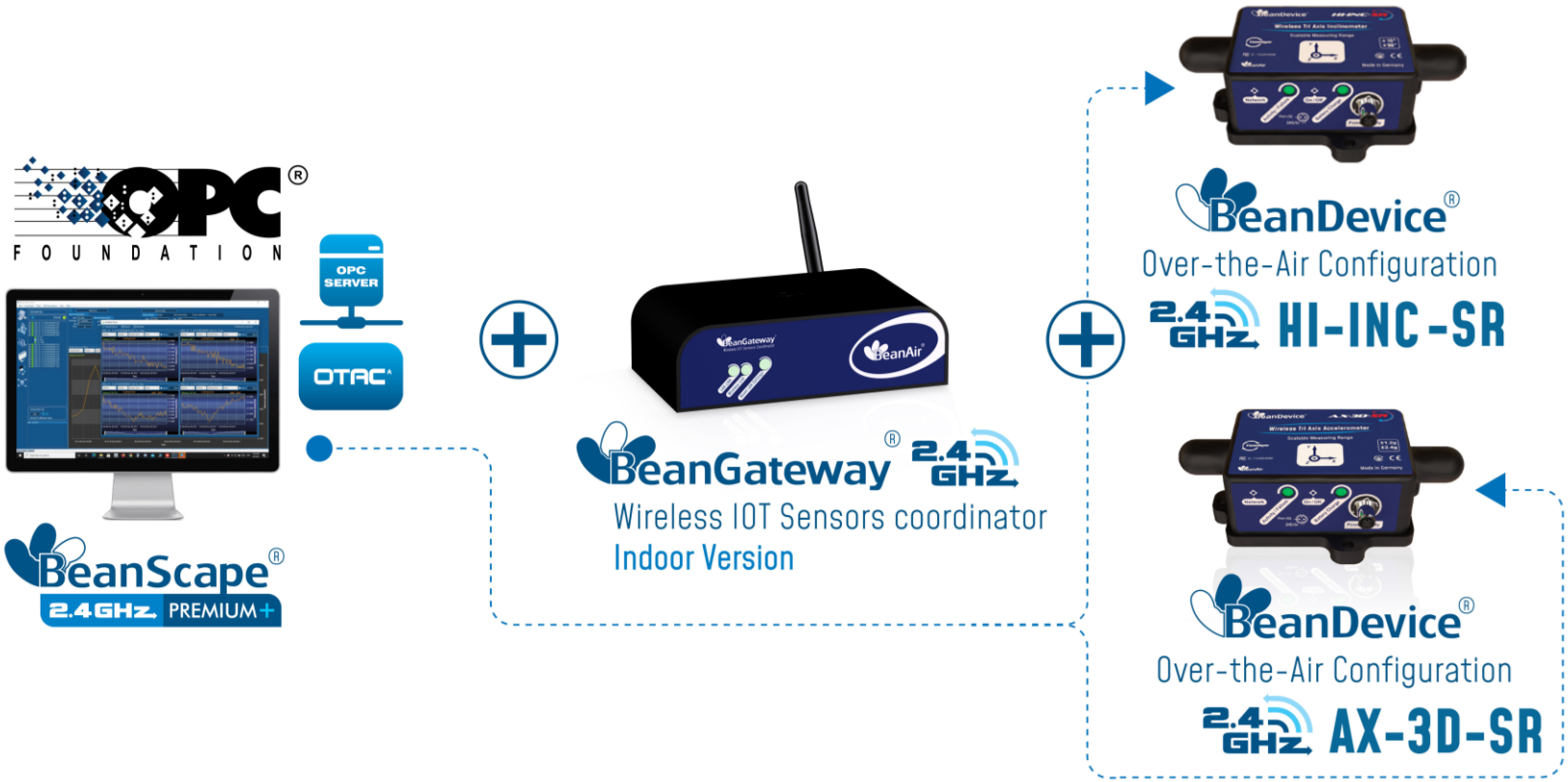
Wireless Vibration and Inclinometer Sensors with Scalable Range



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BeanAir

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2.4GHZ Sensor series – SR (Scalable Range) Version

BeanDevice®

HI-INC-SR

Inclinometer ±10° & ±90°

For more technical info : click here

BeanDevice®

AX-3D-SR

Vibration Sensor ±1.2g & ±2.4g

For more technical info : click here

Integrated Temperature sensor on the base for structure/Equipment Monitoring

Main applications

Structural Health Monitoring (SHM)

Test & Measurement

Beandevice® 2.4GHZ HI-INC SR

HI-INC-SR

BeanDevice 2.4 GHz

- High resolution 0.0055° and a High precision (±0.01° for ±10° range, ±0.02° for ±90° range)
- MEMS inclinometer with scalable measuring range (±10° and ±90°)
- Embedded data logger , up to 8 millions data points (with events dating)
- Rugged and Waterproof aluminum casing (IP67)

- Ultra Low Power with Integrated 2Ah Lithium-Polymer battery
- Lightning and Over-voltage protection
- Integrated Temperature sensor for Equipment/Structure temperature monitoring
- Excellent radio link budget thanks to our antenna diversity innovative designed by Beanair®
- Time-synchronized wireless sensor networks (±2.5ms of accuracy)

Beandevice® 2.4GHZ AX-3D SR

AX-3D-SR

BeanDevice 2.4 GHz

- Ultra Low Noise vibration sensor (+/-1mg for +/-1.2g RANGE)
- Scalable Range, ±1.2g or ±2.4g with automatic range adjustment
- Embedded data logger , up to 8 millions data points (with events dating)
- Rugged and Waterproof aluminum casing (IP67)

- Ultra Low Power with Integrated 2Ah Lithium-Polymer battery
- Lightning and Over-voltage protection
- Integrated Temperature sensor for Equipment/Structure temperature monitoring
- Excellent radio link budget thanks to our antenna diversity innovative designed by Beanair®
- Time-synchronized wireless sensor networks (±2.5ms of accuracy)

Difference between AX-3D and AX-3D SR

Main Features	AX-3D	AX-3D SR
Measuring Range	Fixed range ±2g and ±10g	Scalable Range ±1.2g and ±2.4g with auto range function
Sensor noise density	45 µg/√Hz for ±2g 100 µg/√Hz for ±10g	20 µg/√Hz for ±1.2g 32 µg/√Hz for ±2.4g
Max sensor bandwidth	DC to 800 Hz	DC to 40 Hz, Range ±1.2g DC to 70Hz, Range ±2.4g
Equipement/Structure temperature Monitoring	No	Yes, accurate temperature sensor mounted on the device base
Max Sampling rate	1 KSPS	800 SPS, Range ±2.4g

The BeanDevice® AX-3D SR is more adapted to low vibration, low frequency applications

Difference between HI-INC and HI-INC SR

Main Features	HI-INC	HI-INC SR
Measuring Range	Fixed range ±30°	Scalable Range ±10° and ±90° with auto range
Sensor precision	±0.006°	±0.01° for ±10° ±0.02° for ±10
Number of Axis	2 Axis , X and Y	3 Axis , X/Y/Z
Max sensor bandwidth	DC to 28Hz	DC to 10 Hz for ±10° range DC to 40 Hz for ±90° range (Auto. Range) DC to 70 Hz for ±90° range
Equip./ Structure temperature Monitoring	No	Yes, accurate temperature sensor mounted on the device base
Max Sampling rate	100 SPS	20 SPS for ±10° 80 SPS for ±90° range (static)

The BeanDevice® HI-INC SR offers more flexibility (scalable range) and easier installation (tri-axis sensor)

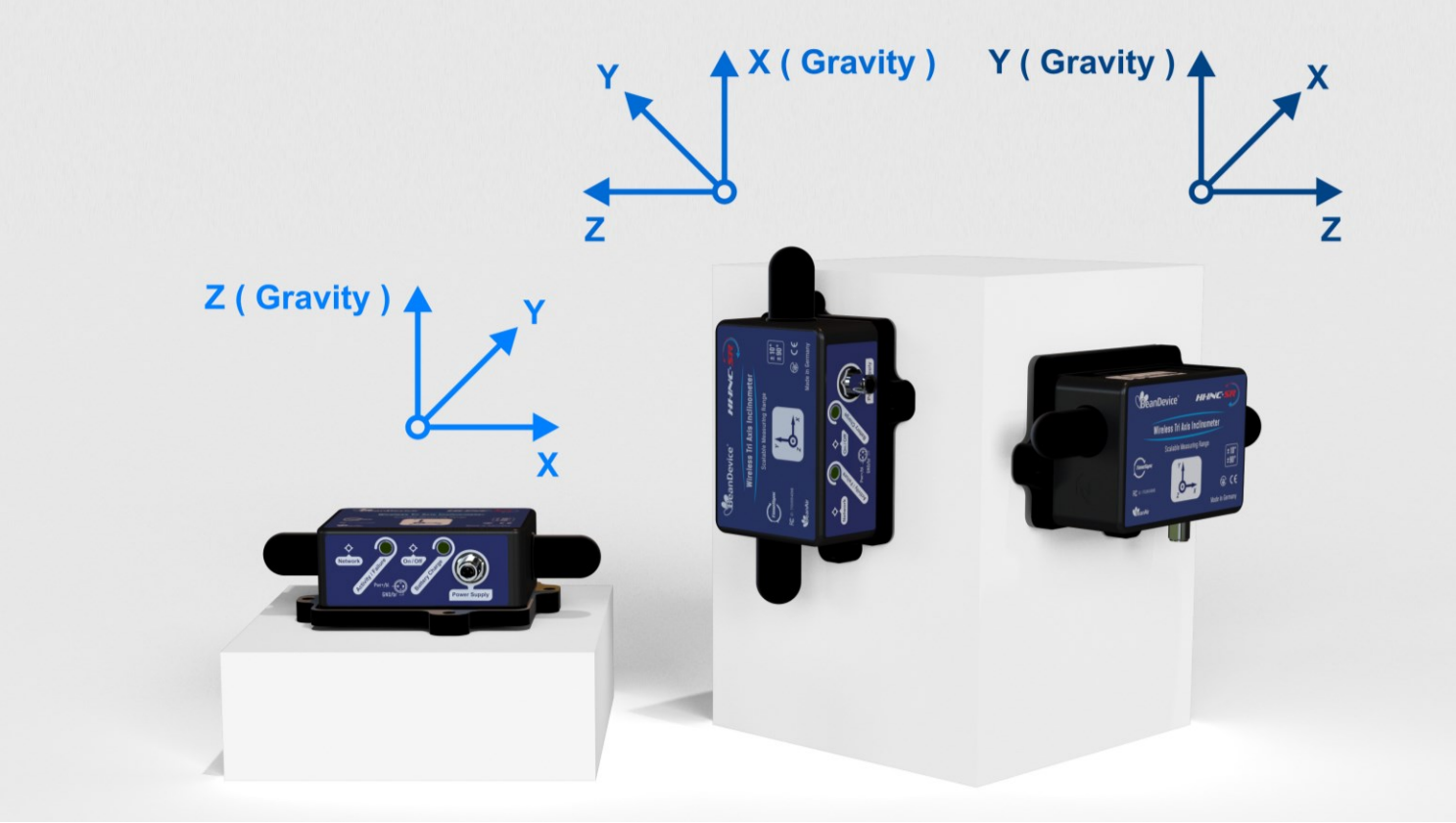
Scalable measuring range : advantages and user settings

Diversity of customer applications :

Sensor Configuration	Sensor Configuration	Examples of Applications
HI-INC SR	Low Inclination ±10°	Structural Monitoring, Antenna Base Station Monitoring
	High Inclination ±90°	Test and Measurement (Rolling Stock, Robotic, Vessels, Cranes), Moving structures (Lift Bridge)
AX-3D SR	Very Low Vibration ±1.2g	Bridges, Dams and Building monitoring
	Low Vibration ±2.4g	Structures with high level of vibration (Highway Bridges), Test and Measurement on Rolling stock

Effortless mounting (mostly for the Inclinometer)

The device mounting becomes much easier as the inclinometer can detect on which xxis the Gravity is present.



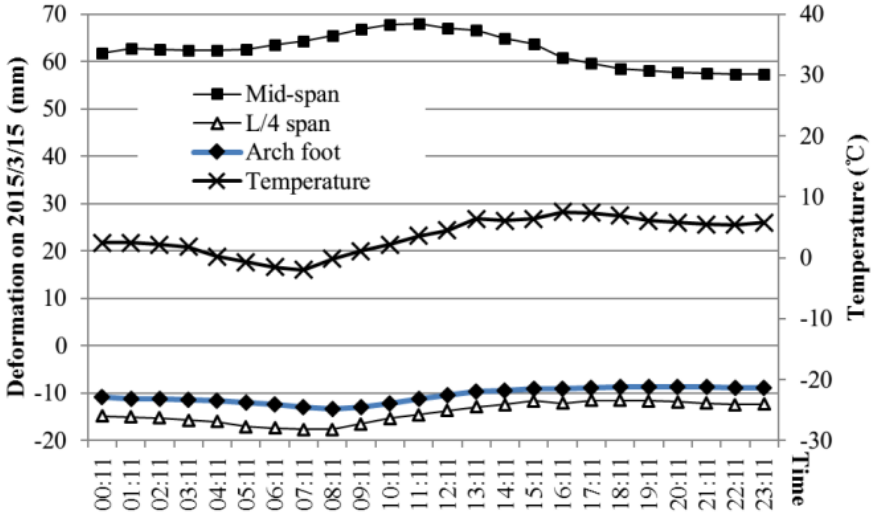
The Axis with the Gravity is not taken into account in the Automatic Range

How the Automatic Measuring range works ?

Sensor Configuration	Conditions to switch to Higher Range	*Conditions to switch to Lower Range*
HI-INC SR –X Axis on the same axis than Gravity	High Inclination(> 12°) on Y OR Z axis	Low Inclination (<12°) on Y AND Z axis.
HI-INC SR –Y Axis on the same axis than Gravity	High Inclination(> 12°) on X OR Z axis	Low Inclination (<12°) on X AND Z axis
HI-INC SR –Z Axis on the same axis than Gravity	High Inclination(> 12°) on X OR Y axis	Low Inclination (<12°) on X AND Z axis
AX-3D SR	High Vibration (>1.2g) on X or Y or Z Axis	Low Vibration (<2.4g) on X AND Y AND Z Axis

Why an integrated temperature sensor ?

Temperature and Structure deformation are connected



Example of Monitoring of Daily Temperature Effect on Deck Deformation of Concrete Arch Bridge

Temperature and Equipment failure are connected

A bad lubrifaction on bearings can lead to temperature increase

Compatibility with Modbus Protocol

Easier data conversion than previous Inclinometer:

Angle (Degree) = (angle_pts - 32767) / 2^14 * 90,

Temperature_Deg = -273 + (Temperature Number of Points / 18.9)

More info about Modbus Protocol: click here

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