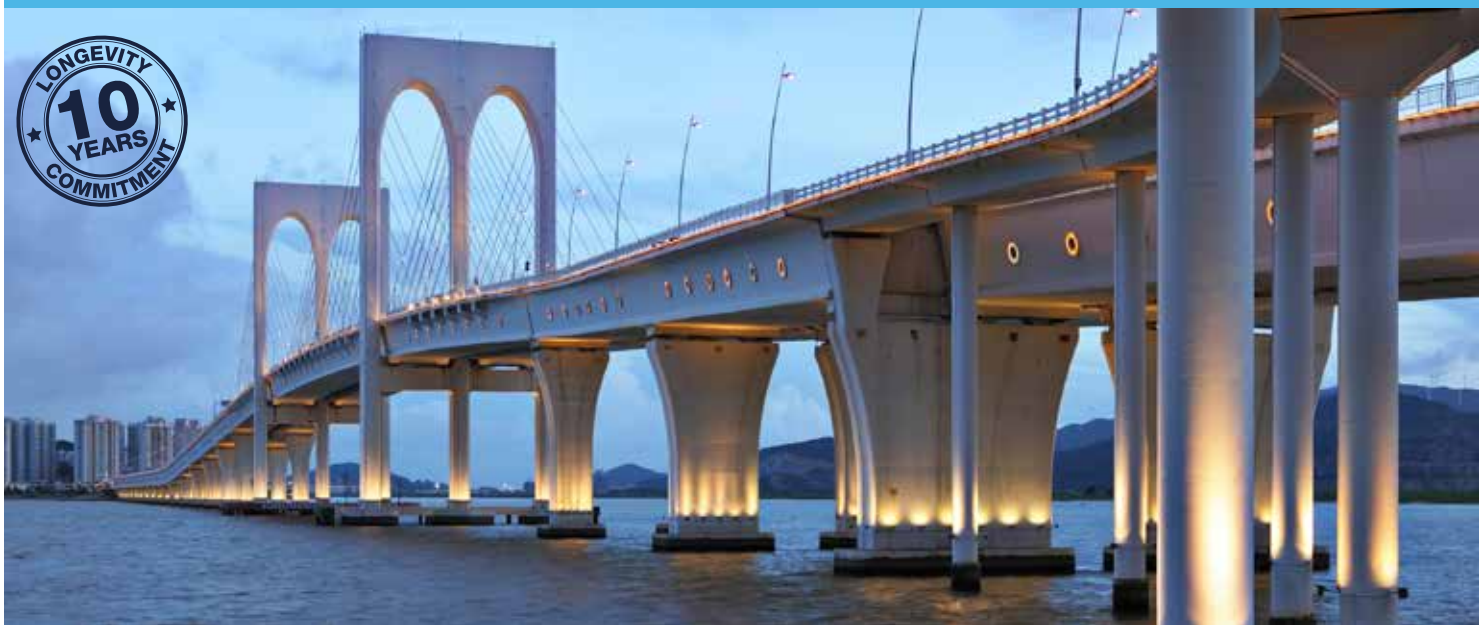
IIS2ICLX

2-axis, high-accuracy inclinometer with embedded machine-learning



High accuracy, high-resolution, low-power, 2-axis digital inclinometer with embedded machine-learning core

The high-accuracy IIS2ICLX two-axis digital accelerometer is ideal for structural health monitoring and inclination measurements in Industry 4.0 applications, combining high stability and repeatability, low noise, and ultra-low-power with support for Artificial Intelligence at the Edge. It is included in ST's 10-year longevity program.

The IIS2ICLX features:

- A 2-axis digital plug-and-play inclinometer
- Highest performance in terms of resolution, accuracy, stability, and power consumption
- Ultra-low noise (15 µg/√Hz)
- Programmable machine-learning core to integrate AI algorithms and reduce power consumption at system level.

KEY FEATURES & BENEFITS

- 2-axis, I²C/SPI digital output interface
- Selectable full scale: ±0.5/±1/±2/±3 g
- Ultra-low noise (15 µg/√Hz)
- Programmable bandwidth, up to 260 Hz
- Low power (0.4 mA)
- Programmable machine-learning core & finite state machines, sensor hub and FIFO
- Extended range: from -40 to +105 °C

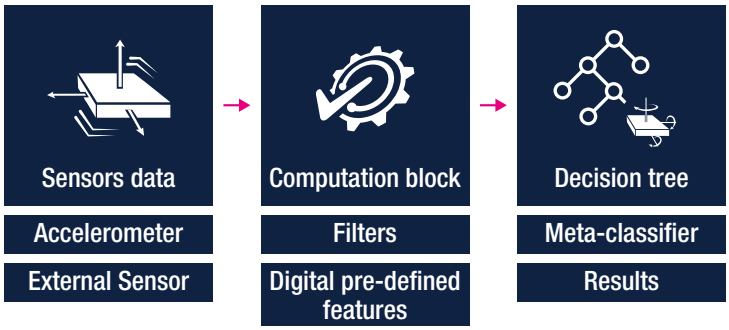
KEY APPLICATIONS

- Structural health monitoring
- High accuracy inclinometers
- Antenna pointing and monitoring
- Platform leveling
- Installation and monitoring of equipment
- Robotics and industrial automation

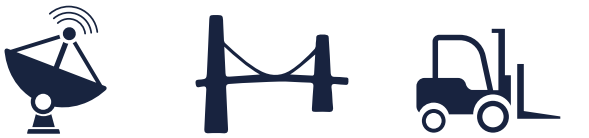
Advanced features

The IIS2ICLX inclinometer is tailored for monitoring structural health and Industry 4.0 applications. Its design and calibration processes are optimized for a superior accuracy, stability, repeatability and extremely low noise, and it embeds temperature compensation for out of the box stability in temperature (from -40°C up to 105 °C).
The unparalleled set of features, such as machine learning core (MLC), programmable Finite State Machines (FSM), FIFO, sensor hub capabilities, event decoding and interrupts, provide fundamental support for low power intelligent sensor nodes able to reduce data transfer rates and volumes to the cloud.
Thanks to its decision-tree classifiers algorithms, the IIS2ICLX significantly increase the autonomy of battery-operated applications by allowing nodes to remain in very low power standby until the sensor autonomously detects and classifies movement or vibration events.

Sensor with Machine Learning Core



Applications Examples



Antenna pointing, platform leveling and stabilization

Building and infrastructure condition monitoring

Inclinometers for industrial vehicles

Ordering information

Order code	Description	Temperature range (°C)	Package	Packing
IIS2ICLXTR	2-axis digital inclinometer with embedded machine-learning core	-40 to +105	CLGA-16	Tape and reel

Evaluation Tools

Purpose	Motherboard	Sensor Board	Software
Evaluation	STEVAL-MKI109V3 Professional MEMS motherboard	STEVAL-MKI209V1K MEMS inclinometer kit based on IIS2ICLX	Unico-GUI
Prototype	STM32 Nucleo development board (like NUCLEO-F401RE or NUCLEO-L152RE or NUCLEO-L476RG or NUCLEO-L073RZ)	X-NUCLEO-IKS02A1 X-NUCLEO industrial motion MEMS sensor expansion board for STM32 Nucleo board + STEVAL-MKI209V1K MEMS inclinometer kit based on IIS2ICLX	Unicleo-GUI Algobuilder X-CUBE-MEMS1

Software Tools

Order code	Description	Usage
Unico-GUI	Cross-platform graphical user interface for MEMS sensors	Evaluation / MLC development
Unicleo-GUI	GUI for X-CUBE-MEMS1, motion MEMS and environmental sensor software expansion for STM32Cube	Prototype
Algobuilder	Graphical design application to build and use algorithms	Prototype
X-CUBE-MEMS1	Sensor and motion algorithm software expansion for STM32Cube	Evaluation / Prototype / Production
MotionAC2, MotionTL2	Software libraries, included into X-CUBE-MEMS1 software expansion for STM32Cube, for inclinometer calibration and real-time tilt computation	Evaluation / Prototype / Production