MEMS SENSORS FOR INDUSTRY 4.0

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Performance, accuracy and reliability with 10-year longevity

Ultra-low-power sensing solutions for Industry 4.0 with a minimum longevity commitment of 10 years

ST's industrial MEMS sensors offer superior accuracy, performances, flexibility and high quality required to satisfy Industry 4.0 requirements and are part of ST's 10-year product longevity commitment program. ST's broad range of sensors includes vibration sensors, inclinometers, 3-axis accelerometers, 6-axis inertial modules, magnetometers/eCompass, pressure, humidity and temperature sensors.

Scalable modules with up to 6 axis (3-axis accelerometer + 3-axis gyroscope or 3-axis magnetic, 3-axis magnetic, 1 pressure or temperature) with drivers as well as ST's Open MEMS catalog of free and easy- to-use software libraries and the STM32 Open Development Environment.

KEY APPLICATIONS

- Vibration/Condition/Structural health monitoring, anomaly detection and predictive maintenance
- Precision/dynamic inclinometers and leveling instruments
- Robotics, automation and drones
- Industrial IoT and connected devices
- Power saving and motion-activated functions
- Building automation and appliances
- Inertial navigational, position and motion tracking
- Antenna and platform pointing, leveling and stabilization
- Optical image and lens stabilization
- Anti-tampering in smart meters
- Positional and distance sensor
- Presence detection, magnetic switch
- Variable magnetic field monitoring
- Asset and parcel tracking, monitoring and shock detection and logging

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Benefits of ST's 10-year product longevity commitment program

10-year longevity from product introduction date	Design and manufacturing for higher robustness	Calibration & testing for higher accuracy & quality	Higher endurance to shock and vibration	Extended temperature range

LONGEVITY 10 YEARS COMMITMENT

Industry 4.0 sensors

Part number	Description	Full scale	Noise density (Typ.)	Package size (mm)
Vibration sensor				
IIS3DWB	Ultra-wide bandwidth, low-noise, 3-axis digital vibration sensor	±2; ±4; ±8; ±16	60 µg/√Hz	2.5 x 3 x 0.86 LGA-14
Inclinometers				
IIS2ICLX	High-accuracy, high-resolution, low-power, 2-axis digital inclinometer with embedded machine-learning core	±0.5; ±1; ±2; ±3	15 µg/√Hz	5 x 5 x 1.7 LGA-16
IIS3DHHC	High-resolution, high-stability 3-axis digital inclinometer	±2.5 g	45 µg/√Hz	
Accelerometers				
IIS2DLPC	High-performance, high versatility, ultra-low-power 3-axis accelerometer	±2, ±4, ±8, ±16 g	90 µg/√Hz	2 x 2 x 0.7 LGA-12
IIS2DH	Ultra-low-power 3-axis accelerometer with digital output		250 µg/√Hz	2 x 2 x 1 LGA-12
IIS328DQ	3-axis accelerometer with digital output		220 µg/√Hz	4 x 4 x 1.8 QFN-24
iNEMO-Inertial Modules				
ISM330DHCX	IMU with embedded machine-learning core: always-on 3D accelerometer and 3D gyroscope	±2, ±4, ±8, ±16 g from ±125 up to ±4000 dps	60 µg/√Hz (AXEL) 0.005 °/s/√Hz (GYRO)	2.5 x 3 x 0.83 LGA-14
ISM330DLC	IMU: 3D accelerometer and 3D gyroscope with digital output	±2, ±4, ±8, ±16 g from ±125 up to ±2000 dps	75 µg/√Hz (AXEL) 0.0038 °/s/√Hz (GYRO)	
I3G4250D	3-axis gyroscope with digital output	±250/±500/±2000	0.03 °/s/√Hz	4 x 4 x 1.1 LGA-16
Magnetometers				
IIS2MDC	High-accuracy, ultra-low-power, 3-axis digital output magnetometer	±50 gauss	3 mgauss rms	2 x 2 x 0.7 LGA-12
e-Compass				
ISM303DAC	High-performance, low-power, compact 3D accelerometer and 3D magnetometer module	±2, ±4, ±8, ±16 g ±50 gauss	120 µg/√Hz (AXEL) 3 mgauss	2 x 2 x 1 LGA-12
Temperature sensors				
STTS22H	Low-voltage, ultra-low-power, 0.5 °C accuracy I²C/SMBus 3.0 temperature sensor	-40 to +125 ºC	Accuracy: ±0.5 ºC max -10 ºC to +60 ºC ±1 ºC max -40 ºC to +125Cº	2 x 2 x 0.55 UDFN-6L
Pressure sensors				
LPS22HH*	High-performance MEMS pressure sensor	260 - 1260 hPa	ABS accuracy: ±0.5 hPa	5 x 5 x 1.7 LGA-16
LPS27HHW*	Smallest 10 Bar waterproof pressure sensor			
LPS33W*	IP6x water resistant pressure sensor with robust package		ABS accuracy: ±3 hPa	2 x 2 x 1 LGA-12
Humidity sensor				
HTS221*	Capacitive digital sensor for relative humidity and temperature	0 - 100% rH -40 to +120 ºC	Accuracy: ±3.5% rH Accuracy: ±0.5 ºC	2 x 2 x 0.9 HLGA-6L
MEMS Microphones				
Part number	Description	SNR/Sensitivity/AOP	Current consumption (µA)	Package size (mm)
IMP23ABSU	Single ended analog bottom port High performance MEMS microphone. Frequency response up to 80 kHz for ultrasound analysis	64 dB/-38 ±1 dBV/130 dB	120	Bottom port 3.5 x 2.65 x 0.98
IMP34DT05	Digital (PDM) top port MEMS microphone with enhanced ESD protection, High SNR and Acoustic Overload Point	64 dB/-26 ±3 dBV/122.5 dB	650	Top port 4 x 3 x 1

Eval tools

Order code	Description
STEVAL-MKI109V3	Professional MEMS tool: ST MEMS adapters motherboard based on the STM32F401VE and compatible with all ST MEMS adapters
X-NUCLEO-IKS02A1	Motion MEMS and microphone MEMS expansion board
STEVAL-STWINKT1B	STWIN SensorTile Wireless Industrial Node development kit and reference design for industrial IoT applications
STEVAL-BFA001V2B	Multi-sensor predictive maintenance kit with IO-Link stack v.1.1

Note: * Not part of the 10y longevity program

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