

MEMS SENSORS FOR INDUSTRY 5.0



Connected future: STMicroelectronics opens the potential of smart industry



Revolutionary MEMS sensors paving the way for a human-centric and sustainable industry 5.0

Industry 5.0 is the new phase of the industrial revolution set to create a more collaborative and sustainable manufacturing environment with a human orientation.

Sensors are contributing immensely to this transformation: optimizing efficiency, enabling safe and effective human-machine interaction, improving the effectiveness of workers, and supervising their security and well-being. ST is about to revolutionize industry 5.0 with **smart, open, and accurate** MEMS sensors, combined with **machine learning core (MLC)** and **intelligent sensor processing unit (ISPU)** technologies, which enable local signal processing inside sensors.

ST industrial MEMS sensors are part of our **10-year product longevity commitment program**.

KEY APPLICATIONS

- Vibration/condition monitoring, anomaly detection, and predictive maintenance
- Robotics, automation, and drones
- Inertial navigation and position and motion tracking
- Industrial IoT and connected devices
- Structural health monitoring
- Precision/dynamic inclinometers and leveling instruments
- Antenna and platform pointing, leveling, and stabilization
- Optical image and lens stabilization
- Asset and parcel tracking, monitoring, shock detection, and logging
- Presence and motion detection
- Building automation and appliances
- Antitempering in smart meters and gas pressure measurement in gas meters

Industry 5.0 sensors

Part number	Description	Full scale	Noise density (Typ.)	Package size (mm)
Vibration sensor				
IIS3DWB	Ultrawide 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 and stability, 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, ultralow-power 3-axis accelerometer	±2, ±4, ±8, ±16 g	90 µg/√Hz	2 x 2 x 0.7 LGA-12
Inertial measurement units				
ISM330DHCX	High stability 6-axis IMU with embedded machine learning core:	±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
ISM330IS/ ISM330ISN	6-axis IMU with ISPU - intelligent sensor processing unit	±2, ±4, ±8, ±16 g from ±125 up to ±2000 dps	70 µg/√Hz (axel) 0.0034°/s/√Hz (gyro)	
ISM330BX	6-axis IMU with wide bandwidth, low-noise accelerometer, embedded AI and sensor fusion	±2/±4/±8 g from ±125 up to ±4000 dps	70 µg/√Hz (axel) 0.005 °/s/√Hz	2.5 x 3 x 0.71 LGA-14
Magnetometers				
IIS2MDC	High-accuracy, ultra-low-power, 3-axis digital magnetometer	±50 gauss	3 mG rms	2 x 2 x 0.7 LGA-12
Pressure sensors				
ILPS22QS	Dual full-scale, 1260 hPa and 4060 hPa, absolute digital output barometer with embedded Qvar electrostatic sensor	260 ~ 1260 hPa 260 ~ 4060 hPa	ABS accuracy: 0.5 hPa	2.0 x 2.0 x 0.73 HLGA-10
ILPS28QSW	Dual full-scale, 1260 hPa and 4060 hPa, absolute digital output barometer with Qvar detection in a water-resistant package			2.8 x 2.8 x 1.95 CCLGA-7
Temperature sensors				
STLM20	Ultralow current 2.4 V precision analog temperature sensor	-55°C to 130°C	Accuracy: ±0.5°C	1.00 x 1.30 UDFN-4L / SOT323-5 L
STTS22H	Low-voltage, ultralow-power, 0.5°C accuracy I2 C/SMBus 3.0 temperature sensor	-40 to +125°C	Accuracy: ±0.5°C (max)	2 x 2 x 0.55 UDFN-6L
STTS751	2.25 V low-voltage local digital temperature sensor	-40°C to +125°C	Accuracy: ±0.5°C	
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
IMP24DT05	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

Evaluation 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 MEMS microphone expansion board
STEVAL-STWINBX1	STWIN.box - SensorTile wireless industrial node development kit
STEVAL-BFA001V2B	Multisensor predictive maintenance kit with IO-Link stack v.1.1
STEVAL-PROTEUS1	Industrial sensor evaluation kit for condition monitoring based on the 2.4 GHz STM32WB5MMG module



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