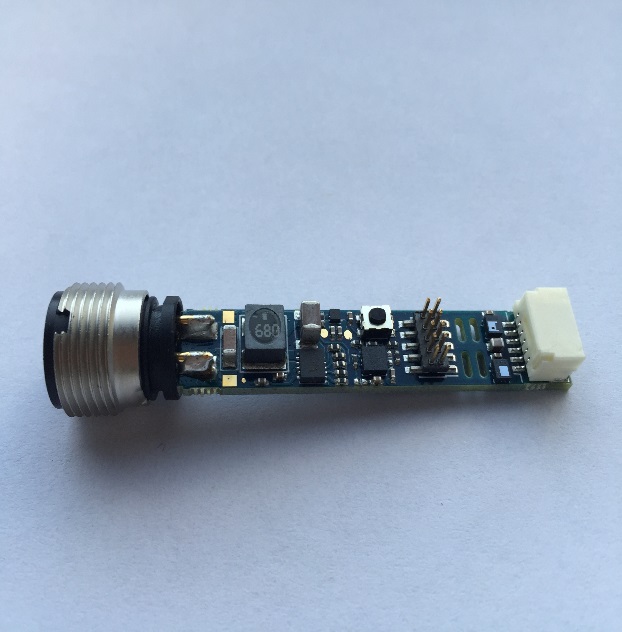
#### STEVAL-IDP005V1



Industrial Sensor Board for Predictive Maintenance

**Data Brief**



*Figure 1 STEVAL-IDP005V1*

# Features

* Compact solution for condition monitoring and predictive maintenance based on 3D digital accelerometer, environmental and acoustic MEMS sensors.
* Main supply voltage: 18V-32V
* Main components:
* 32-bit ARM® Cortex®-M4 core for signal processing and analysis (STM32F469AI)
* 3D digital accelerometer (ISM330DLC)
* Absolute Digital Pressure (LPS22HB)
* Relative Humidity and temperature sensors (HTS221)
* Digital Microphone sensors (IMP34DT05)
* IO-Link PHY device (L6362A)
* EEPROM (M95M01-DF) for data Storage
* Step-down switching regulator and LDO regulator (L6984 and LDK220)
* Software library and tools:

The package comes with a complete set of firmware demo examples based on 3D accelerometer library with advanced frequency and time domain signal processing for predictive maintenance including:

* Programmable FFT size (512, 1024, 2048)
* Programmable FFT averaging
* Programmable overlapping
* Programmable windowing (Flat Top, Hanning, Hamming)
* Speed RMS moving average, acceleration max peak.
* Programmable threshold for warning and alarm condition in spectral band
* Microphone algorithms for:
* PDM to PCM
* Sound pressure
* Audio FFT
* IO-Link PHY using the L6362A Device transceiver for data communication with host unit
* M12 industrial connector
* SWD connector for debugging and programming capability
* Reset button
* Expansion connector with GPIO, ADC, I2C bus
* Designed to meet IEC industrial standard requirements
* RoHS compliant

# Description

The STEVAL-IDP005V1 is an industrial reference design with a very compact form factor suitable for condition monitoring (CM) and predictive maintenance (PdM).

The hardware development kit consists of:

- Industrial sensor board (STEVAL-IDP005V1)

- Adapter for ST-LINK/V2-1 programming and debugging tool (STEVAL-UKI001V1)

- 0.050” 10-pin flat cable

The firmware package includes dedicated algorithms for advanced time and frequency domain signal processing and analysis of the 3D digital accelerometer with 3 kHz flat bandwidth; drivers for pressure, relative humidity and temperature sensor monitoring. Audio algorithms for acoustic emission (AE) are also part of the package. The firmware runs on the high performance STM32F469AI, ARM® Cortex®-M4, 32-bit microcontroller and the sensors data analysis results are sent through wired connectivity based on IO-Link device transceiver (IO-Link stack protocol not included).

The features above make this reference design suitable for monitoring motors, pumps and fans, and for speeding up development of predictive maintenance solutions.

A connection to an external evaluation board (the STEVAL-IDP004V1, IO-Link master multi-port evaluation board) is also available as a feature of this package (a PC GUI included in the package, displays the algorithms output data and sensors data). The data can also be displayed on a PC, using a common terminal emulator like Tera Term, just connecting the STEVAL-IDP005V1 to a PC through the adapter (STEVAL-UKI001V1) and the ST-LINK/V2-1 (part of any "STM32 Nucleo-64” development board).

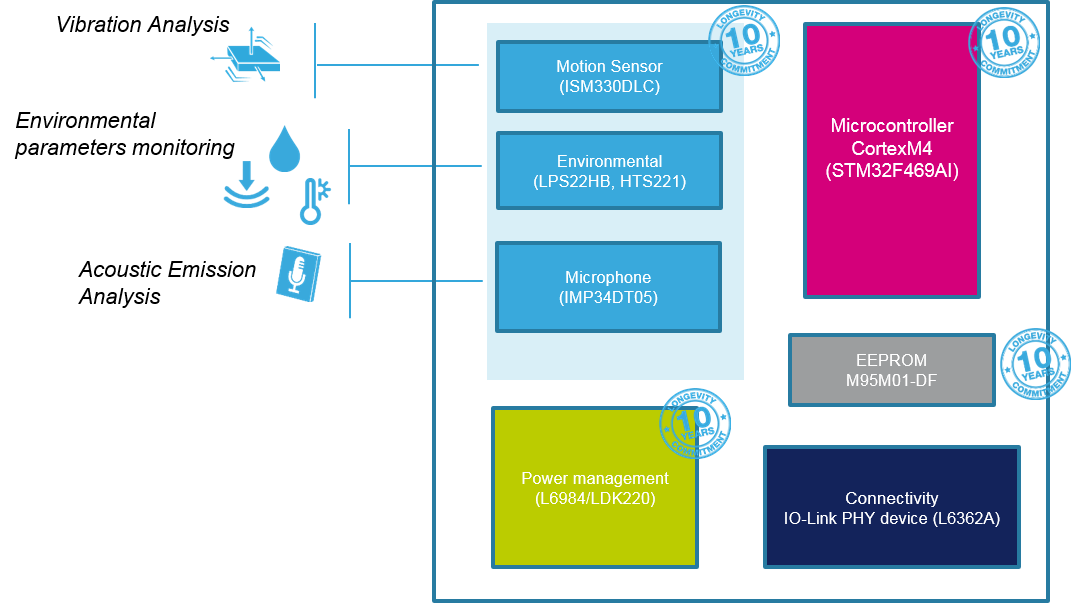
The evaluation board is equipped with an industrial M12 for physical connection with a master port. The connection is managed using a standard multipolar cable; with one wire used for IO-Link data, one for the L+ line (positive supply voltage pole) and one for the L- line (negative supply voltage pole).

The layout is designed to meet IEC61000-4-2/4 and EN60947 requirements for the industrial application.

The physical dimensions of the STEVAL-IDP005V1 (50mm x 9mm x 9mm) have been designed to be close to the real industrial applications and needs.

The firmware is freely available on [www.st.com](http://www.st.com).

# STEVAL-IDP005V1- Schematic Diagram



*Figure 2: STEVAL-IDP005V1 Block Diagram*

# Revision history

| Revision | Date of modification | Description of modification |
| --- | --- | --- |
| 0.1 | 09-Feb 2018 | Preliminary draft |
| 0.2 | 13-Feb 2018 | Minor changes |

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