About

The smartPREDICT is a multi sensor system based on iNDTact's high-bandwidth vibration sensor iMPactXS that enables highly sensitive vibration based condition monitoring of structures, products and processes. Alongside the high-bandwidth, high-sensitivity vibration sensor, a micro-electromechanical system (MEMS) offers the opportunity for additional motion information (acceleration and angular velocity). The temperature sensor on the bottom of smartPREDICT allows for internal reference temperature measurement next to the iMPact XS. The device was designed for exact capturing of vibrations on surfaces (such as machines, buildings, power plants etc.) with the capability of data aggregation and feature (parameter) extraction as well as the transmission of parameters to devices.

The smartPREDICT can be used for direct parameter measurement and transmission to machines (PLCs) or edge devices for IIoT via Modbus RTU.

Key Features

- Output of 10 vibration features (parameters) via Modbus (Range, Abs. Peak, Mean, RMS, etc.)
- Output of Raw Data Sample via Modbus
- Digital adjustment of signal amplification
- Digital signal filtering for adjustment of bandwidth

Applications (examples)

- Condition monitoring of production machines and processes (and e.g. direct input for PLC)
- Monitoring and trending of vibrational parameters of high value assets (wind turbines, CHP systems, etc.)
- Shock and vibration monitoring for construction machine/vehicle or agricultural machine/vehicle
Built in Sensors

<table>
<thead>
<tr>
<th>Sensor</th>
<th>Name/Label</th>
<th>Range</th>
<th>Accuracy</th>
<th>Sampling/max. Res.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vibration</td>
<td>iMPact XS</td>
<td>0.06 Hz ... 48 kHz</td>
<td>SNR &gt; 99 dB</td>
<td>96 kHz/24 bit</td>
</tr>
<tr>
<td>Acceleration*</td>
<td>PCM1808*</td>
<td>+/- 2;4;8;16 g</td>
<td>+/- 30 mg</td>
<td>1.6 kHz/16 bit</td>
</tr>
<tr>
<td>Angular Velocity*</td>
<td>PCM1808*</td>
<td>+/- 2000 °/s</td>
<td>+/- 0.5 °/s</td>
<td>3.2 kHz/16 bit</td>
</tr>
<tr>
<td>Temperature</td>
<td>LMT01LPG</td>
<td>- 40 ... 85 °C</td>
<td>+/- 1 °C</td>
<td>&lt; 1 Hz/16 bit</td>
</tr>
</tbody>
</table>

*Both acceleration and angular velocity are measured by the 6-axis MEMS PCM1808 (not implemented yet).

Other Main Components

<table>
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<th>Details</th>
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<tr>
<td>Microcontroller Unit (MCU)</td>
<td>ARM Cortex M7, 2 MB Flash, 512 kB RAM</td>
</tr>
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<td>Flash Memory (external)</td>
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Properties

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Interface Description

**Modbus** is a serial communications protocol for industrial electronic devices. It enables communication among many devices connected to the same network. The basic architecture is based on a single master device and up to 247 slave devices. Many hardware interfaces and software libraries provide APIs for Modbus communication.

**Further information:**

See smartPREDICT „Application Note: Modbus Communication“ for detailed configuration instructions of the smartPREDICT Modbus communication. Datasheets, User Guides and Application Notes are available on our website www.indtact.de.
Accessories

- Cable (optional): CAT 7+, 8-pin X-Coded
- Mounting frame: see technical drawings
- Screws for mounting frame (not included in delivery): see technical drawings, max. Ø 6 mm
- Glue for coupling of sensor system (not included in delivery): contact iNDTact specialists for consultation

Technical Drawings

- View without mounting frame
- If used without mounting frame, adhesive is required for coupling to surface
- Keep clearance above maximum height of sensor system (depending of use: with/without mounting frame)

- View with mounting frame
- Mounting frame with 4x Ø 6.6 mm holes
- Mounting with coupling adhesive or adhesive tape possible (get advice from iNDTact specialists)
Pin Allocation and Examples

smartPREDICT - pin allocation M12 (plug female, on device)

1. USB D+ / GPIO
2. USB D- / GPIO
3. RS485 Con B
4. RS485 Con A
5. GND
6. + 5 V
7. + 5 V
8. GND

Cable M12 (plug male) to RJ45 (plug male)
M12 Connector, 8-pin, twisted pair

open cable ends

smartPREDICT unit

smartPREDICT mounting adaptor

USB D+ / GPIO
OG-WH
OG
GN-WH
GN
BN-WH
BN
BU-WH
BU
USB D- / GPIO
RS485 Con B
RS485 Con A
GND
+ 5 V
GND
+ 5 V

Open cable ends to Modbus-Gateway (example)
Legal Disclaimer

Pre-Series Versions (engineering samples)

Herein described is a pre-series version of the smartPREDICT product. These versions are seen as engineering samples and may vary from the valid technical specifications of the product series contained in this data sheet. They are therefore not intended or fit for resale to third parties or for use in end products. Their sole purpose is internal client testing. The testing of an engineering sample may in no way replace the testing of a product series. INDTact assumes no liability for the use of samples. The purchaser shall indemnify iNDTact from all claims arising from the use of pre-series versions.

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Application Examples

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Declaration of Conformity

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