ABB Ability™ Smart Sensor for hazardous areas
Condition monitoring for rotating machines in explosive atmospheres

The ABB Ability™ Smart Sensor for hazardous areas monitors the health and performance of rotating machines operating in explosive atmospheres. ATEX, IECex, CSA and NEC certified, it detects potential machine disturbances before they impact on reliability, productivity and safety.

Overview
The ABB Ability™ Smart Sensor for hazardous areas extends the reach of condition-based maintenance for rotating machines, such as motors and pumps. The remote condition monitoring solution tracks the health and performance of equipment operating in potentially explosive environments such as chemical plants, mines and mills.

Equipment installed in hazardous or remote locations may be difficult to inspect regularly and, therefore, operated until failure. Using the ABB Ability™ Smart Sensor, equipment can be remotely monitored, anticipating any problems and scheduling preventive maintenance.

The Smart Sensor can be used with ABB and third-party machines. It is simply attached to the equipment’s housing or frame. No wiring or machining is required. The quick installation and activation allows monitoring and data collection to begin immediately.

Benefits
• Condition-based maintenance for lower servicing costs – maintenance can be planned according to actual needs rather than generic schedules
• Process optimization for lower operating costs
• Extended equipment lifetime
• Increased personnel safety by enabling remote maintenance inspections
• ATEX, IECex and NEC certified – compliant with strictest requirements for equipment operating in potentially explosive atmospheres
• Quick installation and activation for instant monitoring
• Easily retrofitted to ABB or third-party equipment
Sensor features

Certified for hazardous areas
The ABB Ability™ Smart Sensor for hazardous areas is designed for harsh environments. Its enclosure withstands high vibration levels and protects the sensor from total dust ingress (IP66/67). The sensor is certified for ATEX, IECEx, and NEC500, making it compliant with the strictest requirements for equipment operating in explosive atmospheres.

Pinpoint detection accuracy
The Smart Sensor features the latest sensor technology including accelerometers, magnetometer and ultrasonic microphone. Even slight anomalies in the equipment’s condition can be detected at a very early stage.

The sensor mechanical design allows the transducers to pick up the true machine vibrations independent of resonances that may occur.

Long battery life
The sensor’s battery life is up to three times longer than that of most competing designs.

Same hardware for different assets
The same sensor can be optimized for different rotating machines, such as motors and pumps. Reconfiguration is done within minutes, saving time and reducing stock holding.

Connectivity
The Smart Sensor supports Bluetooth®.

Accessibility information
Various levels of details on the equipment’s health and performance can be obtained through the following interfaces:

ABB Ability™ Digital Powertrain

- **Web portal** – complete dashboard for operators to view condition and performance trends, access historical data, manage user access rights and set alerts and alarm.
- **App** – interface to the equipment’s status for technicians on the factory floor. A ‘traffic light’ display gives an easy overview of the condition of all the monitored equipment.
- **User’s own system** – the Smart Sensor data can be integrated into a user’s own system via the Smart Sensor Cloud Interface.
### SPECIFICATIONS

**Temperature measurement (machine skin temperature)**
- **Measurement range**: -40°C to +85°C
- **Resolution**: 0.1°C
- **Accuracy**: ±0.5°C

**Vibration measurement**
- **Acceleration, low frequency (x, y, z direction)**
  - **Amplitude range**: 0.03 - 157 m/s² (16g)
  - **Frequency bandwidth**: 0.1 Hz – 1.5 kHz
- **Acceleration, high frequency (z direction)**
  - **Amplitude range**: 0.1 - 450 m/s² (50g)
  - **Frequency bandwidth**: 100 Hz – 20 kHz

**Magnetic field measurement**
- **Magnetic field (x, y, z direction)**
  - **Amplitude range**: 1 – 1600 μT
  - **Frequency bandwidth**: 0.1 – 250 Hz

**Ultrasonic sound measurement**
- **Microphone**
  - **Amplitude range**: 0.6 mN/m² – 20 N/m²
  - **Frequency bandwidth**: 100 Hz – 80 kHz

**Wireless communication**
- **Communication standards**: Bluetooth® 5.0, Bluetooth® Low Energy
- **Radio standard**: IEEE 802.15.4
- **Frequency**: 2.4 GHz, license free ISM band
- **Range (nominal)**: >200 m @ line of sight
- **Security**
  - **Encryption**: 128-bit AES encryption
  - **Authentication**: IEC 62351 (role-based access control)

**Power**
- **Battery type (not replaceable)**: Lithium Thionylchloride
- **Battery design life**: 15 years operation under standard conditions

**Environmental**
- **Temperature**
  - **Operation**: -40°C to +80°C
  - **Storage**: <30°C
- **IP class**: IP66/67 (dust-tight and resistant to powerful water jetting and submersion)
- **Chemical tolerance**: See chemical tolerance sheet for PBT (Polybutylene terephthalate)

**Certifications**
- **EX. ATEX, IECEx**
  - Ex ia I Ma -40°C ≤ Tamb ≤ +85°C (Mining)
  - Ex ia IIC T4 Ga -40°C ≤ Tamb ≤ +85°C (Gas)
  - Ex ia IIIC T157 Da -40°C ≤ Tamb ≤ +85°C (Dust)
- **NEC**
  - CI I, Div 1, Gr A, B, C and D T4
  - CI II, Div 1, Gr E, F and G T4
  - CI III, Div 1
  - -40°C ≤ Tamb ≤ +85°C
- **Canada**
  - CAN/CSA C22.2 No. 60079-0 2015
  - CAN/CSA C22.2 No. 60079-11 2011
  - CAN/CSA C22.2 No. 61010-1 2010
- **USA**
  - ANSI/UL 60079-0 7th Ed
  - ANSI/UL 60079-11 6th Ed
  - ANSI/UL 61010-1 2012
  - EN 300 328 v.2.1.1
  - EN 301 330 v.2.1.1
  - FCC/IC
SPECIFICATIONS

EMC
Immunity EN/IEC 61000-6-2
Emission EN/IEC 61000-6-3

Physical
Dimensions 82 mm x 69 mm x 45 mm (W x D x H)
Weight 185 g
Case material Stainless steel/reinforced PBT
Mounting On equipment housing or frame. Please consult installation manuals. M6 or UNF 1/4" / 28 screw

Part information

<table>
<thead>
<tr>
<th>Part number</th>
<th>Description</th>
<th>Application</th>
</tr>
</thead>
<tbody>
<tr>
<td>3AFP9234751</td>
<td>Motor Smart Sensor for hazardous areas with Aluminium bracket mounting tool</td>
<td>Ribbed cooled or finned motor</td>
</tr>
<tr>
<td>3AFP9225986</td>
<td>Motor Smart Sensor for hazardous areas with flat mount mounting tool</td>
<td>Rolled steel/round body motor</td>
</tr>
<tr>
<td>3AFP9234757</td>
<td>Motor Smart Sensor for hazardous areas without any mounting tool</td>
<td>Flat mount mounting tool</td>
</tr>
<tr>
<td>3AFP9253862</td>
<td>Flat mount mounting tool</td>
<td>5 year subscription</td>
</tr>
<tr>
<td>3AFP9253864</td>
<td>5 year subscription</td>
<td>2 year subscription</td>
</tr>
<tr>
<td>3AFP9191436</td>
<td>2 year subscription</td>
<td>1 year subscription</td>
</tr>
<tr>
<td>3AFP9127707</td>
<td>1 year subscription</td>
<td></td>
</tr>
</tbody>
</table>

ABB Inc.

Head office
800 boul. Hymus
Saint-Laurent, QC H4S 0B5
Tel.: 1 438-843-6000

Sales offices
Eastern region (QC & Maritimes)
5155 J-A Bombardier
St-Hubert, QC J3Z 1G4
Tel.: 1 514-933-2711

Central region (ON & MB)
3450 Harvester Road
Burlington, ON L7N 3W5
Tel.: 1 905-829-3301

Western region (AB & SK)
4053 - 92 Street
Edmonton, AB T6E 6R8
Tel.: 1 403-806-1700
Tel.: 1 888-434-4661

Pacific region (BC & YT)
1538 Kebet Way
Port Coquitlam, BC V3C 5M5
Tel.: 1 604-421-2822

We reserve the right to make technical changes or modify the contents of this document without prior notice. With regard to purchase orders, the agreed particulars shall prevail. ABB does not accept any responsibility whatsoever for potential errors or possible lack of information in this document.