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PRODUCT NOTE

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, and NEC certified, it detects potential machine disturbances before they impact on reliability, productivity and safety.

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01 ABB Ability™ Smart Sensor for rotating machines operating in explosive atmospheres

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 acutal 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
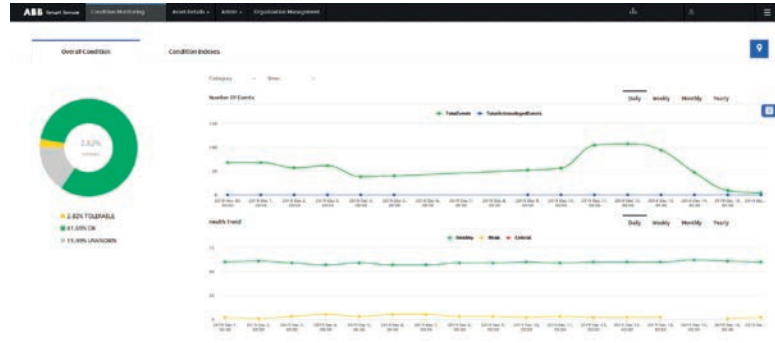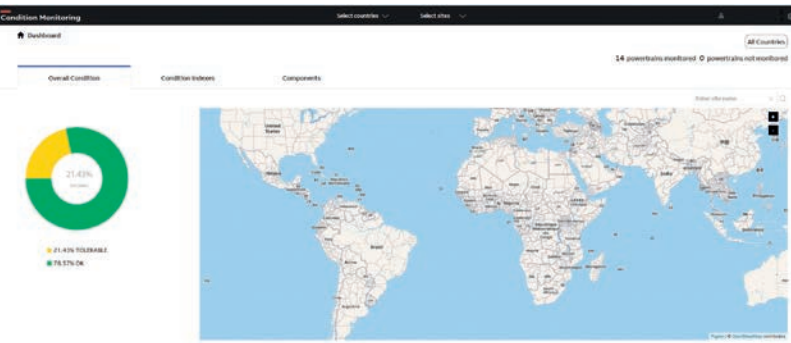
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01 ABB Ability™ Smart Sensor web portal

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02 ABB Ability™ Smart Sensor condition monitoring solution: The sensor transmits the data via a smartphone or gateway to a secure cloud service. Advanced algorithms analyze the data and convert it into meaningful information, which is sent to the user's smartphone and customer portal.

The solution can also be integrated into the customer's own systems.

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®.

Accessing 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.

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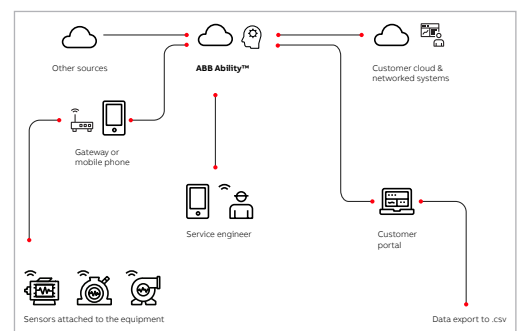
SPECIFICATIONS

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 bandwith	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	Cl I, Zn 0, AEx ia I Ma Cl I, Zn 0, AEx ia IIC T4 Ga Zn 20, AEx ia IIIC T157°C Da Cl I, Div I Gr A, B, C and D T4 Cl II, Div I Gr E, F and G T4 Cl III, Div I -40°C ≤ Tamb ≤ +85°C
Radio	EN 300 328 v.2.1.1 EN 301 330 v.2.1.1 FCC/IC

EMC

SPECIFICATIONS

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 ¼" / 28 screw

Part information

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

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