BROCHURE

ABB Ability™ Smart Sensor

Condition monitoring for motors

ABB Ability Smart Sensor for motors

Changes in temperature and vibration can indicate potential problems in equipment. Yet monitoring low voltage motors is considered expensive and often overlooked, leaving problems unnoticed until the motor fails. ABB now makes it easier and safer to know how your motor feels.

The ABB Ability Smart Sensor converts traditional motors into smart, wirelessly connected devices. It enables users to monitor the health of their motors and to plan maintenance in advance. Unplanned downtime can be avoided, efficiency optimized and safety improved.

ABB Ability connects you to the power of the Industrial Internet of Things (IIoT). ABB offers a unique digital advantage by combining connectivity and data analytics with our expertise to make your operations efficient, predictable and safe.

Increased safety

Increased productivity

Reduced maintenance

Eliminated unplanned stops

Easy to use

Do you know how your motors feel?
This is why you should

Traditional way	Routine maintenance introduces safety hazards as employees are working around rotating equipment or trying to reach motors that are difficult or dangerous to access.	Not knowing the health of your motors leaves you at risk for untimely equipment failure, which can lead to process interruption, unplanned downtime, and lost revenue.	Maintenance is a routine schedule based on a combination of experience, training and "this is how we always do it".	The user has little visibility of when component failure may occur.
With ABB Ability Smart Sensor	**Increased safety** The ability to monitor motors remotely allows maintenance and other relevant personnel to safely get a health check of the motor without touching equipment.	**Increased productivity** Trending data helps to develop patterns for monitoring of performance and ability to predict replacement.	**Reduced maintenance** Maintenance can now be planned according to actual needs rather than based on generic schedules.	**Eliminate unplanned stops** Warnings on decreasing health status allow you to plan maintenance before there is a problem and the system is down.

Easy to use

Wireless
The ABB Ability Smart Sensor for motors is designed for quick and easy installation and activation. The sensor is battery operated, no wiring, special tools or special software required.

Easy installation
The ABB Ability Smart Sensor for motors is easily attached to motors without the need for wiring. Mounting and configuring the sensors takes only a few minutes to mount on rib cooled or round steel motors.

Easy activation
The sensor is easily activated using NFC protocol.

ABB Ability cloud access
ABB Ability can combine data collected by the motor sensor with data from other connected equipment, such as variable-speed drives and pumps. This data can be accessed and analyzed remotely, providing deeper insight into the health of the entire process.

Easy to use
No matter where you are

Machinery is working even when you are not. Advanced conditional monitoring is now hand held through the Smart Sensor App. Designed with ease in mind, the app allows you to get up to date information on all motors at any time, no matter where you are. Simply download ABB Ability Smart Sensor App for any iOS or Android based device.

Intuitive interface
The simple, graphical interface is easy to use and understand.

Traffic light system
Motor health is displayed with a traffic light icon to quickly show users the state of that motor.

Push notifications
When conditions change, you want to be the first to know. ABB Ability allows you to get notifications based on your preferences.

Constant communication
When events happen, everyone in the organization can know. This also allows records of who closes the events and what comments are made.

Event log
All maintenance performed on a motor can be scheduled and recorded in the app, providing an easy to access record of service for each Motor.

Asset identification
Each motor is registered through a part number, which provides a reference when it comes time to replace.

Access in remote locations
locations, out of mobile device range, sensor data can be automatically sent thru Bluetooth Low Energy to the ABB Ability platform using a Gateway.

Twenty Smart Sensors can be connected to one Gateway.

Safe to use
Cyber security

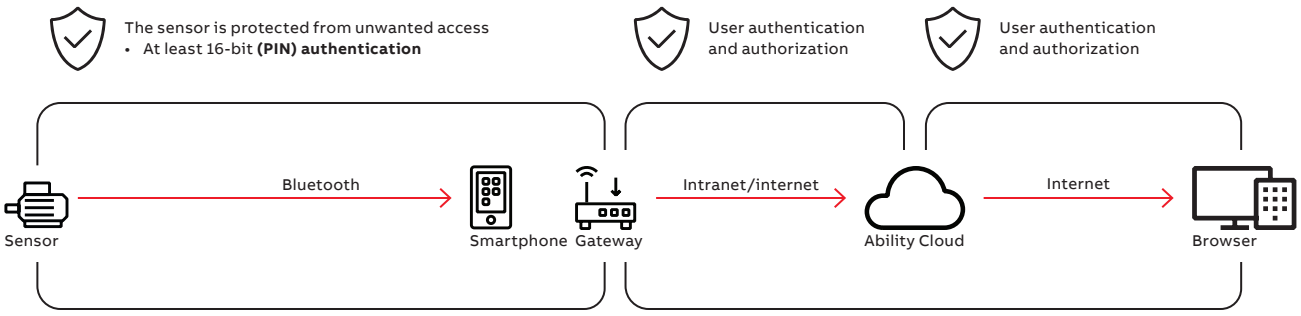
ABB understands the importance of protecting your data, and we take this responsibility seriously. The ABB Ability Smart Sensor for motors adheres to strict security measures to ensure that the health of your motor is all you need to worry about.

Data ownership
- You own all of your data.
- Your data cannot be accessed by anyone outside your company unless you have authorized them in the portal.

The sensor is protected from unwanted access
- 16-bit Personal Identification Number (PIN) authentication
- PIN is changeable during commissioning as well as during normal sensor usage (Default PIN is 0000)
- PIN throttling prevents brute-force attacks

All sensor measurements are encrypted
- By recommendation of National Institute of Standards and Technology (NIST)
- Decryption key is protected by authentication PIN

Secure communication system overview



All sensor measurements are encrypted
- **Standardized 128-bit Advanced Encryption Standard (AES)**
- **Satisfies National Institute of Standards and Technology (NIST) recommendation**
- Decryption key protected by authentication PIN

Standard **Transport Layer Security (TLS) version 1.2**
Transport Layer Security (TLS), are cryptographic protocols designed to provide communications security over a computer network. The protocols are used in applications such as web browsing, email, instant messaging, and voice over IP (VoIP). Websites can use TLS to secure all communications between their servers and web browsers.

Safe to use
Hazardous duty certificates

Third-party hazardous location certified (intrinsically safe)
When it comes to applications in hazardous environments, there's no reason for customers to assume any risk by using a product which is self certified. That's why the Smart Sensors for motors in hazardous applications is third party NEC certified for worry-free use in hazardous environments. All required product markings and documentation are included with each sensor at no additional charge. When it comes to hazardous environments, you can trust ABB Ability Smart Sensor for motors.

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 T157oC 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 -40oC ≤ Tamb ≤ +85oC
Radio	EN 300 328 v.2.1.1
	EN 301 330 v.2.1.1
	FCC/IC

ABB Ability portal

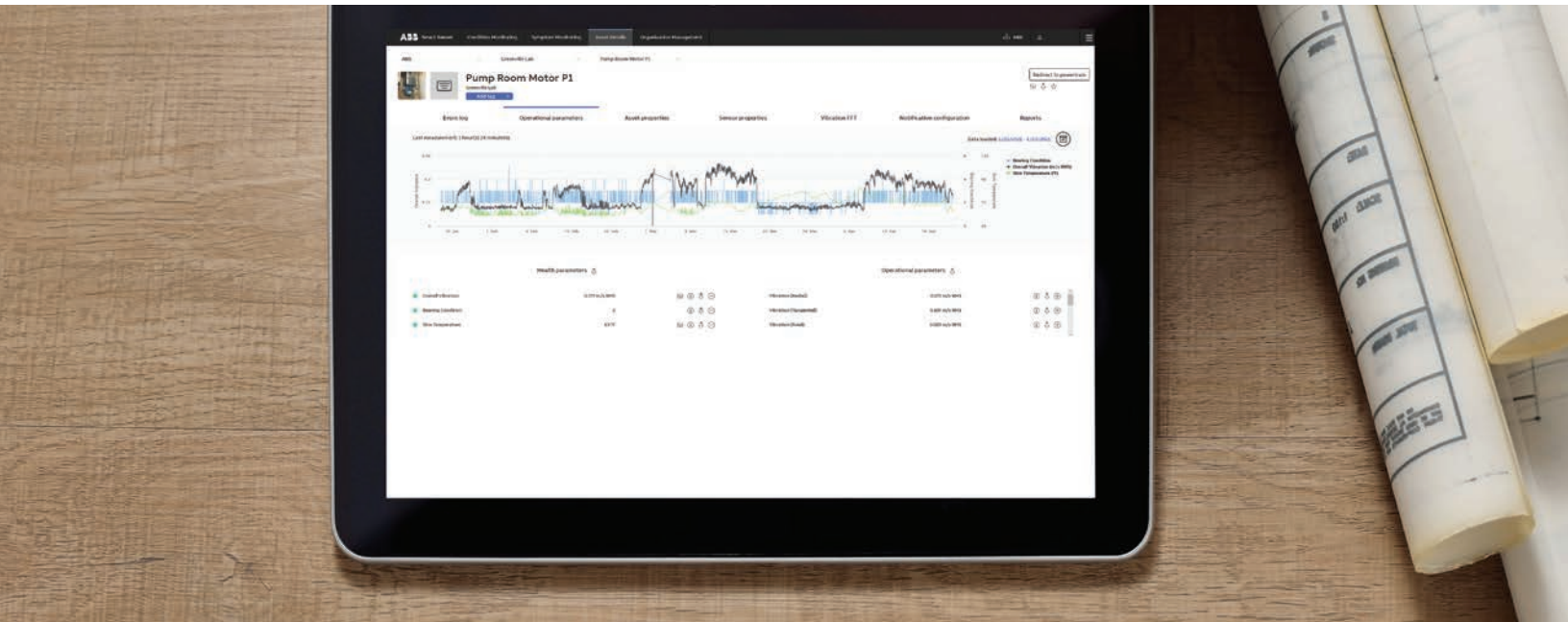
The Smart Sensor for motors includes access to the ABB Ability digital platform. This portal allows you to monitor motor function and analyze data trends, leading to better uptime and ensuring that critical operations run smoothly and consistently.

The sensor uses Bluetooth Low Energy to wirelessly communicate information about the motors operational health via your smartphone or bluetooth-gateway to a secure server. Data from the sensor can be displayed graphically on a smart phone, tablet or the ABB Ability web portal.

Trending data
Allows users the ability to zoom in and pin point certain events. Users can customize preferences and plot data relevant to them. This data is available to download to Microsoft Excel.

Advanced algorithms are loaded into ABB Ability to help direct proper maintenance and decrease unexpected down time.

https://smartsensor.abb.com/Login



Part information

Part information: Smart Sensors for motors (for non-hazardous areas only)

Part number	Description	Application
EM5001GW	Smart Sensor Gateway	-
EM5001A04SP-1	Motor Smart Sensor with 2 year subscription and mounting hardware	Finned/rib cooled motor
EM5001A01SP	Motor Smart Sensor with 2 year subscription and mounting hardware	Finless/round steel motor
3AFP9127705	Motor Smart Sensor without mounting hardware and subscription	-
EM5001HWKIT	Mounting hardware for finned/rib cooled motor	-
EM5001RSPKIT	Mounting hardware for rolled steel motor/pump	-
EM5001A05PSP	Smart Sensor for pumps	-

Part information: Smart Sensors for motors in hazardous areas

Part number	Description	Application
3AFP9234751	Motor Smart Sensor for hazardous areas with Aluminum bracket mounting tool. Does not include subscription.	Ribbed cooled or finned motor
3AFP9225986	Motor Smart Sensor for hazardous areas with flat mount mounting tool. Does not include subscription.	Rolled steel/ round body motor
3AFP9234757	Motor Smart Sensor for hazardous areas without mounting tool and subscription	-
3AFP9253862	Flat mount mounting tool	-
3AFP9253864	5 year subscription	-
3AFP9191436	2 year subscription*	-
3AFP9127707	1 year subscription*	-

*Also applicable for Motor/Pump in Non-Hazardous areas

Technical data

Smart Sensor for motors - for non-hazardous area only

Specifications			Remarks
Temperature measurement (machine skin temperature)			
Measurement range		-40° C to +85° C	-
Resolution		0.05° C	-
Accuracy		+/-0.5° C	Baseplate temperature
Vibration measurement			
Amplitude range		0.04 - 700 mm/s (25 Hz)	
Frequency range		10 Hz - 1 kHz	
Detection type		RMS	
Wireless communication			
Network standard		Bluetooth® 4.0	
Radio standard		IEEE 802.15.1	
Frequency		2.4 GHz, license free ISM band	
Range (nominal)		>10 m @ line of sight	
Power			
Battery type		3.0 V Lithium Permanganate	CR2477N
		(LI-Mn04) button cell	This battery is not user replaceable.
Motor body temperature (°C) at ambient temperature of 40° C	0° C to 40° C	40° C to 70° C	
Battery life in years	5	3	
	Default configuration. Sensor measures once per hour and stores data to memory. Stored data must be collected at least monthly with a Bluetooth® mobile device or gateway.		
Environmental			
Temperature		Operation: -40° C to +85° C	
		Storage: 40° C maximum	
IP class		IP66 (dust-tight and resistant to powerful water jetting)	
Vibration (of mounted surface)		< 15g at 100 Hz	
Specifications			
Immunity		EN/IEC 61000-6-2	
Emission		EN/IEC 61000-6-3	
Physical			
Weight		0.56 lbs	
Case material		Stainless steel/Thermoplastic [PA6-GF30 FR(17)]	
Mounting		On cooling ribs of motor frame at 3, 9, or 12 o'clock position.	

Technical data
Smart Sensors for motors in hazardous areas

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)
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.

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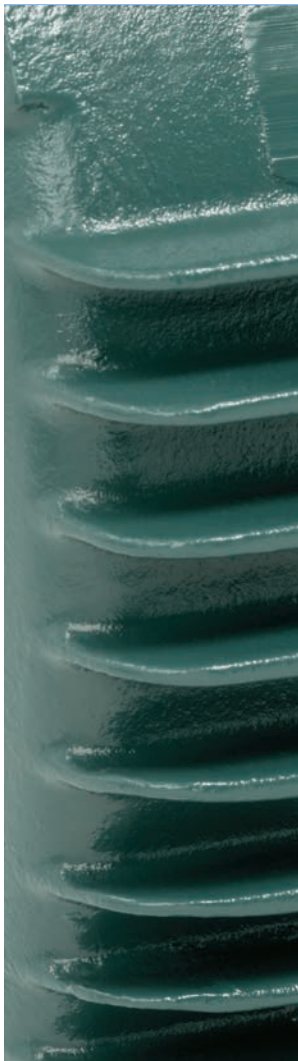
new.abb.com/motors-generators



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