ABB Ability™ Smart Sensor
Condition monitoring for motors

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.

Predictive maintenance for motors

In the past, permanently installed condition monitoring was too expensive to use with the majority of motors. As a result, most of the motors were run until they failed. ABB's cost-efficient solution changes all that. With a payback time estimated at less than one year, it brings remote condition monitoring to a much wider range of motors – plants can even implement condition monitoring for entire motor fleets. Condition monitoring means that maintenance activities can be planned in advance, which reduces downtime and supports longer motor lifetimes.
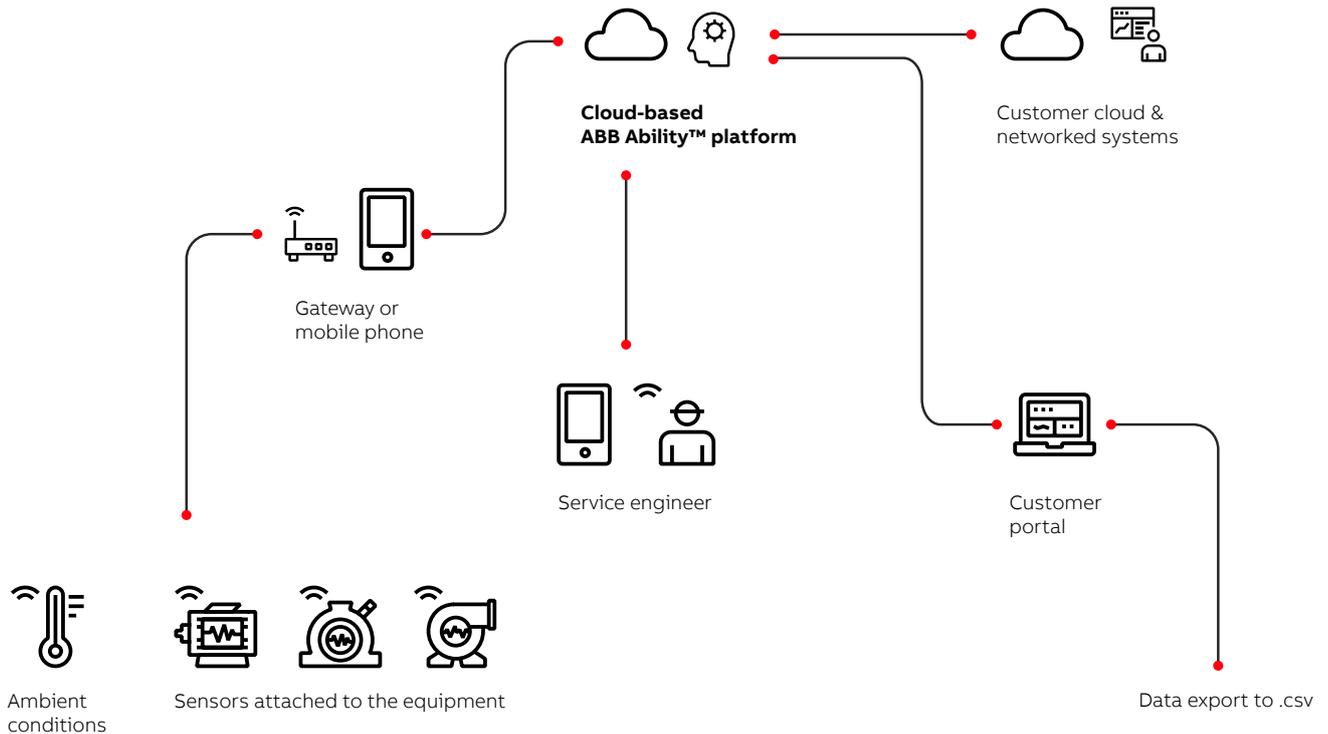
At the same time the solution generates 'big data' on the status of large numbers of motors, paving the way for predictive maintenance and plant-wide optimization of operations and energy consumption.

Easy-to-fit smart sensing technology

At the heart of the solution is a compact sensor unit that is easily attached to motors without the need for wiring. Selected ranges of ABB motors can be factory fitted with the sensors as an option. For already installed motors, retrofit kits are available that enable motors to be field upgraded with sensors. Mounting and configuring the sensors takes only a few minutes. They are compatible with new and old motors, from ABB or other vendors.

The sensor monitors signals from the motor, accurately measuring key parameters at regular intervals. It transfers the data using built-in Bluetooth® Low Energy technology to a smartphone or gateway and to a secure cloud-based server. Data communications use industry standard encryption protocols, and all data are stored in the cloud in an encrypted form.

Advanced algorithms based on ABB's extensive know-how analyze the data and produce meaningful information. The server sends this information directly to the user's smartphone and to a dedicated ABB Ability™ Smart Sensor web portal. Data is also tracked over time for trend analysis.

**Cloud-based
ABB Ability™ platform**

Customer cloud &
networked systems

Gateway or
mobile phone

Service engineer

Customer
portal

Ambient
conditions

Sensors attached to the equipment

Data export to .csv

Intuitive interface
Users can check the status of their motors at any time with their smartphone via the ABB Ability™ Smart Sensor app. The interface includes a 'traffic light' display to give a quick overview of all the motors that are being monitored. Users also receive clear recommendations on how to optimize maintenance and save costs.

🔴 **RED**
Critical issue – failure likely soon. Take action as soon as possible.

🟡 **YELLOW**
Operation can continue but the motor should be watched closely and serviced at the next possible opportunity.

🟢 **GREEN**
Motor fine – operation can continue.

Smart motors and intelligent maintenance
ABB Ability™ Smart Sensor converts machines that have always been rather simple into smart, wirelessly connected devices. It provides meaningful information on motor condition and performance, enabling users to put intelligence into their maintenance. Plants can now plan maintenance according to actual needs rather than on the basis of time intervals or operating hours alone. This cuts maintenance costs and reduces or even eliminates unplanned stops.

There are also opportunities to optimize motors' energy consumption. By combining data on the energy consumption levels of individual motors with plant operating information, it is possible to select the most appropriate motors to cut energy costs. The solution supports plant operators' efforts to reduce their overall cost of motor ownership.

Factory of the future with digital powertrains
Smart, connected factories are the future of manufacturing. ABB Ability™ connects users to the power of the Industrial Internet of Things (IIoT). ABB Ability™ can combine data collected by the motor sensor with data from other connected equipment, such as mounted bearings, gearing, variable-speed drives and pumps. This data can be accessed and analyzed remotely, providing deeper insight into the health of the entire process. ABB offers a unique digital advantage by combining connectivity and data analytics with industrial expertise to make operations efficient, predictable and safe.

Parameters	Description	Availability
Measured parameters		
Vibration: axial, radial, tangential	mm/s or inch/sec, rms	●
Skin temperature	°C or °F	●
Magnetic field	(Data not shown; used in calculations)	●
Accoustic signals	(Data not shown; used in calculations)	●
Time	MM:dd:hh:mm:ss	●
Vibration fft and time waveform	Special report	○
Calculated health parameters		
Overall motor condition	Traffic light for consolidated status	●
Overall vibration	Traffic light, mm/s or inch/sec, rms	●
Bearing condition	Traffic light, integer value	●
Misalignment	Traffic light, %	●
Unbalance	Traffic light	○
Bent shaft	Traffic light	○
Rotor winding health	Traffic light	○
Calculated operating parameters		
Output power	kW	●
Operating hours	Hours	●
Number of starts	Integer value	●
Speed	Revolutions per minute (rpm)	●
Motor supply frequency	Hz	●
Loading	% of name plate full load power	○
Torque	Nm	○
Direction of rotation	Clockwise / counterclockwise	○
Maintenance advice		
Alerts, alarms, reminders	In app, per e-mail, push, webhook	●
Regreasing	Remaining hours until next regreasing	●
Sensor unit and battery status		●
Certifications		
IP 66		●
CE, IC, RCM, EAC, FCC, UL, C-UL, SRE, SUBTEL		●
NEC Intrinsically Safe	Class 1, Div. 2	○
IECEx Intrinsically Safe	Ex iB IIB T4 Gb, -40 ºC to +80 ºC	○
Compatibility		
Induction motors	Frame sizes IEC: 56 - 500 NEMA: 42 - 449, non-standard motors equivalent to IEC 500	●
Permanent magnet/synchronous reluctance motors		●
Safe area motors		●
Hazardous area motors		○
Continuous and intermittent duty		●
Fixed speed and variable speed		●
Old and new motors		●
ABB and non-ABB motors		●

● = AVAILABLE
○ = AVAILABLE IN FUTURE RELEASE (2020)

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For more information please visit:

www.abb.com/smartsensor