SERVICE NOTE

ABB Ability™ Smart Sensor
Condition monitoring solution for low voltage motors

ABB Ability™ Smart Sensor is a condition monitoring solution that makes predictive maintenance possible for almost all low voltage motors. By monitoring and analyzing data on motor operating parameters, it enables motor users to optimize their maintenance. The solution helps to reduce downtime by as much as 70 percent, extend motor lifetimes by up to 30 percent and reduce energy consumption by up to 10%.

Making condition monitoring the new standard for LV motors

In the past, permanently installed condition monitoring was too expensive to use with the majority of LV motors. As a result most of these motors were run until they failed. ABB's new cost-efficient solution changes all that. With a payback time estimated at less than one year, it makes remote monitoring possible for practically all LV motors – plants can even implement condition monitoring for their entire LV motor fleet. 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 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 LV 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 matter of minutes. They are compatible with almost all LV motors, whether new or old, 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 (in future releases) ABB gateway and ultimately 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 then sends this information directly to the user's smartphone and to a dedicated ABB Ability™ Smart Sensor portal. Data is also tracked over time for trend analysis.

Intuitive interface
Once users have downloaded the ABB Ability™ Smart Sensor app they can check the status of their motors at any time with their smartphone. The interface includes a straightforward '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.

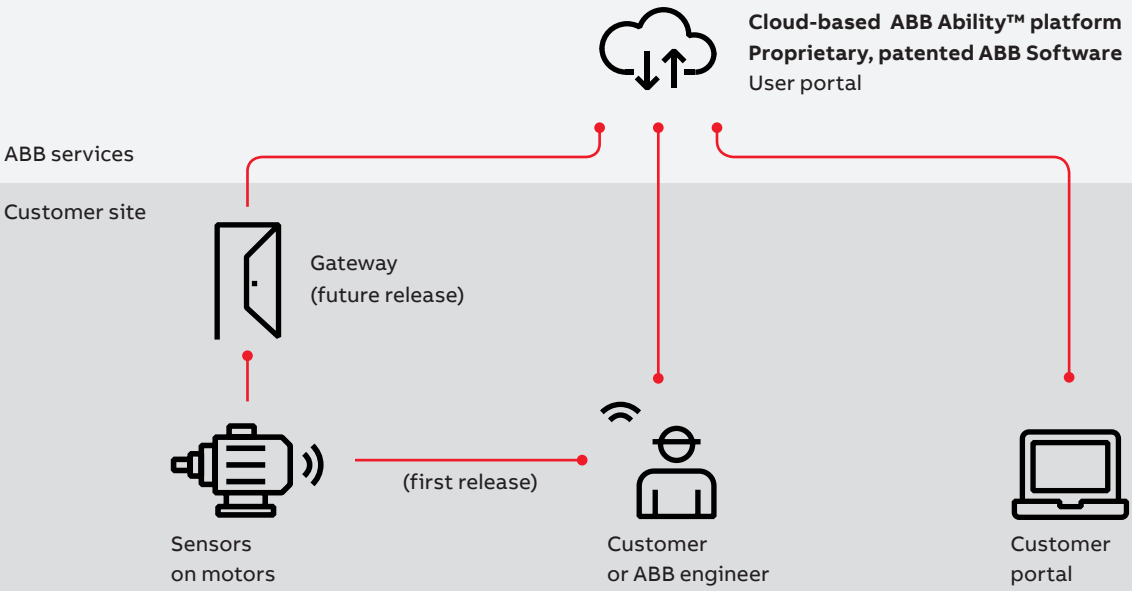
RED
critical issue – failure likely soon. Take action as soon as possible.

YELLOW
operation can continue but the motor should be watched closely and serviced at the next available opportunity.

GREEN
motor fine – operation can continue.

The traffic light display gives a quick overview of motor status. When a yellow or red signal is triggered the user can drill down to identify the cause, e.g. bearing related data has exceeded preset limits.

Condition monitoring solution for low voltage motors



ABB's condition monitoring solution for LV motors. The ABB Ability™ Smart Sensor transmits data via a smartphone (first release) or gateway to a secure cloud service. Algorithms in the cloud analyze the data and convert it into meaningful information, which is then sent to the user's smartphone and customer portal.

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 therefore supports plant operators' efforts to reduce their overall cost of motor ownership.

Internet of Things
ABB Ability™ Smart Sensor is an important part of ABB's offering for the Internet of Things (IoT). ABB has been advancing technologies for the IoT for more than a decade via its control systems, communication solutions, sensors and software. Its technologies allow industry, utility and infrastructure customers to make more intelligent use of data to optimize their operations, increase productivity and achieve greater flexibility. For further information about the IoT please visit: **new.abb.com/abb-ability**

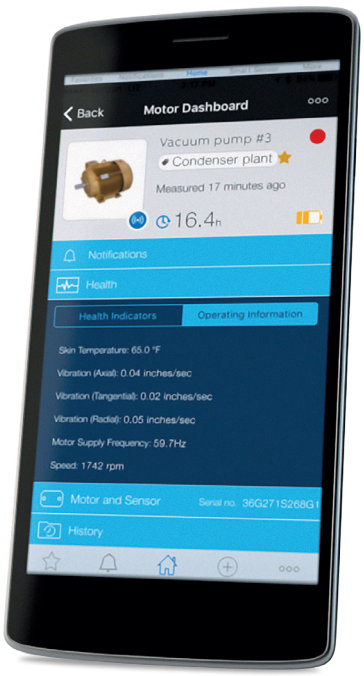
Accurate monitoring of key parameters
The solution monitors motors' key operational and health parameters, collecting data accurately and at regular intervals – far more frequently than conventional methods based on plant walk-downs.

Parameters supported	Problem or operating characteristic	DOL or Softstarter, S1 operation
Vibration parameters		
Overall Vibration	Unbalance, loose mass, coupling management, load effects, soft foot, etc.	●
Axial Vibration		●
Radial Vibration		●
Tangential Vibration		●
Health parameters		
Bearing Condition	Bearing damage	●
Cooling Condition	Overheating due to blocking of air flow	●
Airgap Eccentricity	Soft foot / bent shaft / thermal bow	●
Rotor Winding Health	Cracked rotor bar/ring detection	●
Operating parameters		
Skin Temperature / °C or °F	Operating information	●
Energy Consumption / kWh	Process change, replacement decision	●
Operating Hours / h	Operating information	●
Operating Power / kW and Loading / %	Process change, reliability (overloading)	●
Number of Starts	Operating information	●
Speed / rpm	Operating information	●
Motor Supply Frequency / Hz	Operating information	●
Maintenance Advice		
Notifications		●
Regreasing		●
Sensor unit status		
Battery indicator		●
Certifications		
IP 66		●
CE		●
FCC, UL, C-UL		●
NEMA Class 1, Div. 2		●
IEC Intrinsically Safe ATEX (Ex iA T4 –40 °C / +85 °C)		●

● = AVAILABLE IN FIRST RELEASE
● = AVAILABLE IN FUTURE RELEASE (SOFTWARE UPDATES / CERTIFICATION PROCESS)
DOL INTERMITTENT AND VFD OPERATION AVAILABLE IN FUTURE RELEASE (SOFTWARE UPDATES)

Functionality and compatibility of early releases.
First release: The sensors are initially available as retrofit kits for already installed IEC motors (in limited quantities). They will then be introduced as a factory-fitted option on severe duty NEMA motors manufactured by Baldor, ABB's unit in the US, and supplied via distributors in North America. In the next stage the sensors will be available as a factory-fitted option on certain IEC motors. The sensors are compatible with standard cast iron fin cooled induction motors in frame sizes 140-449 (NEMA) and 160-450 (IEC) that are connected Direct-On-Line (DOL) and operate in continuous duty (S1). The solution uses a smartphone to relay data from the sensor to the internet. Parameters monitored are surface temperature, bearing condition and overall vibration.

Later releases: Compatibility will be expanded to cover other motor types, DOL intermittent operation, and VFD (variable frequency drive) controlled motors. The range of monitored parameters will be increased on a staged basis to cover the full list shown above. A dedicated gateway will be introduced for automated data communications between the sensor and internet, eliminating the need to periodically pass by with a smartphone to collect the data.



For more information please visit:

www.abb.com/smartsensor
or contact **support.smartsensor@abb.com**

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