

PRODUCT DATASHEET

ABB Ability™ Smart Sensor for WirelessHART

Condition monitoring sensor for rotating machinery



ABB Ability™ Smart Sensor is a generic battery powered wireless condition monitoring sensor that collects and analyzes various measurements, optimized for most kind of machinery.

It provides very simple installation, commissioning and system integration (local or cloud based), while keeping the highest level of security standards.

Technical overview

Communication protocols	
Variant: BASA, BCHC	Bluetooth LE, 5
HCHC	WirelessHART (IEC 62591) (BLE for configuration)
Wakeup/config	NFC
Security:	
Encryption:	128-bit AES encryption
Authentication	IEC 62351 (role based access control)
Transducers:	
All variants	Low frequency vibration, 3D
BCHC, HCHC	High frequency vibration
All variants	Magnetic field, 3D
All variants	Acoustic and ultrasonic microphone
All variants	Temperature (machine skin, CPU, battery)
Battery lifetime	
Variant: BASA	Up to 5 years (use dependent)
BCHC, HCHC	Up to 15 years (use dependent)
Temperature range	-40 - +85 °C
Hazardous area installation	
ATEX / IECEx	Group I Ma (mines) Group IIC, zone 0 (gas) Group IIIC, zone 20 (dust)
NEC 500	Class 1, Division 1

Benefits and highlights

The ABB Smart Sensor enables all industries to transform their rotating machines into an intelligent asset collecting health data at very low installation and operation costs. A wide set of condition information is getting available online, providing high quality status information, enabling process support, maintenance and service planning and lifetime prediction.

Sensor is delivered with measurement and analytics profiles for most common machinery. In addition, additional customized profiles can be ordered and downloaded to the sensor runtime.

Time synchronized measurements can be done on multiple sensors in the same network (WirelessHART), enabling inspection of mechanical phase differences on various points on a machine train.

For machines operating at low duty cycle, the sensor can be configured to make measurements only when machine is running (armed mode)

For incident monitoring (for example accidents during transportation), the sensor can be set up to wake up and stream data upon incident.

Integrates with ABB provided Bluetooth gateway and standard WirelessHART gateways (version dependent)..

Specifications	
Temperature (Machine skin temperature)	
Measurement range	-40 °C . +85 °C
Resolution	0.1 °C
Accuracy	+/- 0.5 °C
Vibration	
Acceleration, low frequency (x,y,z direction)	
Amplitude range	0.03 – 157m/s ² (16g)
Frequency bandwidth	0Hz, 0.1Hz – 1.5kHz (configurable)
Accuracy	<-3%, <0.024% / °C (Calibration at 0Hz)
Acceleration, high frequency (z direction):	
Amplitude range	0.1 450 m/s ² (50g)
Frequency bandwidth	100Hz – 20kHz (configurable)
Accuracy	<-5%, < 0.29% / °C Calibration at appr. 300Hz
Magnetic field (x,y,z direction)	
Amplitude range	1 - 1600µT
Frequency bandwidth	0.1 - 250Hz (configurable)
Non linearity	+0.12% No factory calibration
Microphone	
Amplitude range	0,6mN/m ² – 20N/m ²
Frequency bandwidth	100Hz – 80kHz (configurable)
Wireless communication	
Communication standards	Bluetooth 5
(HCHC)	WirelessHART (HART 7.4)
Radio standard	IEEE 802.15.4
Frequency	2.4 GHz, license free ISM band
Range (nominal)	>200m @ line-of-sight
Environmental	
Temperature	Operation: -40 -+85 °C Storage: < 30 °C
IP class	IP46 (IP66), IP67
Certifications	
EX. ATEX, IECEx	Ex ia I Ma,(Mining)
	Ex ia IIC T4 Ga - 40°C≤Tamb≤+85°C (gas)
	Ex ia IIIC T135°C Da (dust)
Ex. NEC 500	Class 1, Division 1 Class 2, Division 1
Radio	EN 300 328 v.2.1.1 EN 301 330-v. 2.1.1 FCC / IC
EMC	
Immunity	EN/IEC 61000-6-2
Emission	EN/IEC 61000-6-4
Physical	
Weight (BCHC, HCHC)	180g (appr)
(BASA)	100g (appr)
Case material	Stainless steel / reinforced PBT
Mounting	M6 or UNF ¼" /28 screw
Dimensions (long life)	82x69*45mm (lxbxh)
(normal)	57x58*33mm (lxbxh)
Features:	

- Activation by NFC (touching with smart phone)

- Configuration from smart phone over Bluetooth
- Host communication options using Bluetooth or WirelessHART
- Cyclic or on demand of sensor reading and analytics
- Simultaneous reading of transducers (vibration, magnetic field, sound)
- Synchronized sensors, allowing simultaneous scheduled measurements from multiple points on ex. a machine train
- FFT calculation
- Overall values for
 - Vibration acceleration
 - Vibration velocity
 - Vibration displacement
 - Acceleration envelope peak to peak
 - Rotation speed
 - "Any" speed range is supported
 - Line frequency
 - Machine skin temperature
- Key performance indicators for
 - Unbalance
 - Misalignment
 - Looseness
 - Bearing trouble
 - Trouble indication
 - Missing bearing lubrication
 - Broken rotor bar
 - KPI's according to machine mechanical dependencies
- Customized profiles per machine type,
 - Optimized profiles for new machine types can be provided on request and downloaded online.
- Armed condition, measurement triggered upon startup of machine
- Flight mode, wakeup from deep sleep upon mechanical event, creating a timestamped "damage report" as a 3D acceleration waveform

Ordering information

Version	Description	Article number
BASA	Bluetooth, Standard version	4JNO000026R002
BCHC	Bluetooth, High performance	4JNO000026R004
HCHC	WirelessHART, High performance	4JNO000026R003

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