



## ABB Ability™ Smart Sensor EX User Manual

### Smart Sensor XYZW

Smart Sensor variant XYZW	Description	Article number	Product revision
Smart Sensor BASA	Bluetooth®, Standard Performance	4JNO000026R002	A
Smart Sensor HCHC	WirelessHART, High performance, Long life	4JNO000026R003	A
Smart Sensor BCHC	Bluetooth®, High performance, Long life	4JNO000026R004	A

ABB Ability™ Smart Sensor product coding XYZW:

X: Host comm. type	Y: Power / battery	Z: Sensor & IO	W: Encapsulation type
B: Bluetooth	A: 2.4 Ah battery	S: Standard performance	A
H: WirelessHART	C: 8.5 Ah battery	H: High performance	C

Smart Sensor is certified for mounting in mines (group I), gas hazard zone 0 (group IIC) and dust hazard zone 20, indoor and outdoor, according to standards as defined below. For full standard compliance see "Declaration of Conformity".

EN/IEC60079-0: 2018/2017, Explosive atmospheres:	Equipment – General requirements
EN/IEC60079-11:2012/2011, Explosive atmospheres:	Equipment protection by intrinsic safety "I"
EN 50303:2000	Group I, Category M1 equipment intended to remain functional in atmospheres endangered by firedamp and/or coal dust



Figure 1: ABB Ability™ Smart Sensor enclosure

#### 1. Marking on modules

Ⓔ I M1 Ex ia I Ma  
Ⓔ II 1 G Ex ia IIC T4 Ga  
Ⓔ II 1 D Ex ia IIC T200 157°C Da  
-40°C ≤ T<sub>amb</sub> ≤ +85°C  
PRESAFE 19 ATEX 14930X  
IECEx PRE 19.0044X  
DNV 20.0171 X

**PS**  
CERTIFIED  
LR1608-1

CI I, Zn 0, AEx ia I Ma  
CI I, Zn 0, AEx ia IIC T4 Ga  
Zn 20, AEx ia IIC T200 157°C Da  
CI I, Div 1, Gr A, B, C and D T4  
CI II, Div 1, Gr E, F and G T4  
CI III, Div 1

WARNING – POTENTIAL ELECTROSTATIC CHARGING HAZARD – SEE INSTRUCTIONS  
AVERTISSEMENT – RISQUE DE CHARGE ÉLECTROSTATIQUE – VOIR LES INSTRUCTIONS  
ATENÇÃO - RISCO POTENCIAL DE CARGA ELETROSTÁTICA – VER INSTRUÇÕES

CE 0470  
Contained  
FCC ID: 2ANYT-SSPM00XAA  
IC no: 23283-SSPM00XAA

KTL 22-KA4BO-xxxxX  
KTL 22-KA4BO-xxxxX  
KTL 22-KA4BO-xxxxX

CCFA21LP00XXXX

218-XXXXXX PESO No: P512180

Smart Sensor xxxx  
Article No: 4JNO000026R00x  
ABB Oy FI-00380 Helsinki  
Hiomotie 13

Serial number: C2xxxxxxx  
BT MAC: 50:31:AD:XX:XX:XX  
WH MAC: 001B1E1A9AXXXXXX  
YYYY.MM

TD0100DR

#### 2. Feasible locations for use of Smart Sensor

ABB Ability Smart Sensor is feasible for use in the following hazardous areas:

- In-door and outdoor
- Mines
- Locations with danger for explosive gas
- Locations with conductive or non-conductive dust

#### 3. Special conditions for mounting hazardous areas

##### 3.1 Earthing of sensor

To avoid possibility for buildup of charge on sensor, it is required to connect the sensor to a metallic surface (with threaded hole for M6 or 1/4" 28 UNF screw) which is connected to earth.

##### 3.2 Avoidance of electrostatic discharge

Under dry conditions, the surface of the Smart Sensor may accumulate electrostatic discharge. To avoid this to happen, the following precautions shall be done:

- Avoid using a dry cloth when cleaning, or touching with other isolating objects (use wet cleaning equipment)
- Avoid high charging conditions which, as an example, occurs in air flow containing insulating dusts or powders

##### 3.3 Mechanical damages

If enclosure is damaged by mechanical or chemical reasons, the sensor shall be removed from Ex zone as soon as reasonable possible.

#### 4. Installation

##### 4.1 Mechanical

Installation is done by using M6 or 1/4" 28 UNF socket head screws. Installation is done on dedicated points with threaded holes pre-prepared on machine, or by using mounting adapters for machine cooling ribs or for gluing on flat or curved surfaces. For good connection to bearing vibrations, mounting on metal surface in direct connection to bearing outer ring is recommended.

For best possible pickup of motor magnetic field, motor side mounting is recommended.

When installation in Ex zone, make sure that there is electric connection between sensor metal base and machine below.

For detailed mounting instructions see "Smart Sensor Installation Manual" available on the Smart Sensor product website.



##### WARNING:

Use a torque wrench, torque approximately 10 Nm applied on the screw, to give sufficient pressure between machine and sensor. This gives good pickup of vibration and reduces risk for loosening sensor by unintentional twisting.

##### 4.2 Sensitivity to electric fields

Avoid having unshielded power cables crossing in the immediate proximity of the Smart Sensor. This may create false high frequency vibration signals.

##### 4.3 Sensitivity to impacts

The Smart Sensor is very robust for static and dynamic forces, but sensitive to powerful impacts. This means that the sensor should not be dropped, as this could cause damage to sensor and/or impact sealing.

#### 5. Environment

- The operating temperatures are from -40 °C to +85 °C
- IP degree IP66, dust tight and protected against powerful jets of water
- Pollution degree 4 according to definition in IEC 61010-1, continuous conductivity due to conductive dust, rain or other wet conditions
- There are no restrictions on installation altitude

#### 6. Radio performance

- Aim for free line of sight for optimal communication
- Aim for installation with distance to ground (if possible >1 m)
- See Smart Sensor User Manual available on product web page for detailed information on how to achieve best possible radio performance
- With WirelessHART, improved distance and performance can be achieved by adding repeater sensors at good locations

#### 7. Radio certification statements

##### Modification Statement:

Changes or modifications to the equipment will void the user's authority to operate the equipment.

##### Compliance Statement

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

##### Class A Interference Statement

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications.

Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

##### Taiwan NCC

取得審驗證明之低功率射頻器材，非經核准，公司、商號或使用者均不得擅自變更頻率、加大功率或變更原設計之特性及功能。低功率射頻器材之使用不得影響飛航安全及干擾合法通信；經發現有干擾現象時，應立即停用，並改善至無干擾時方得繼續使用。前述合法通信，指依電信管理法規規定作業之無線電通信。低功率射頻器材須忍受合法通信或工業、科學及醫療用電波輻射性電機設備之干擾。

##### Brazil ANATEL

Este equipamento não tem direito à proteção contra interferência prejudicial e não pode causar interferência em sistemas devidamente autorizados.

Para maiores informações, consulte o site da ANATEL [www.gov.br/anatel/pt-br](http://www.gov.br/anatel/pt-br)

## 8. Measurements

- 3 axis vibration measurement
- High frequency vibration on z axis (BCHC, HCHC)
- 3 axis magnetic field measurement
- Acoustic / Ultrasonic microphone
- Machine skin temperature

## 9. Activation

Activation of sensor: Sensor is activated by using the NFC interface on a smart phone. Make sure it is enabled on the phone, and tap the phone on top of the sensor, on **left** side of the screw hole, see Figure 2 below.  
**NB!** Sensor will return to deep sleep after two minutes, if no connection over Bluetooth is done, see chapter "Commissioning below".

Deactivation of sensor: Deactivation of sensor is done from smart phone app.



Figure 2: Location of NFC antenna in sensor, below axis cross

## 10. Commissioning

After activation, the sensor shall be commissioned by using the Smart Sensor app to be downloaded from "Google Play" or "iTunes Store". Follow the instructions given by the Smart Phone app to complete the activation and / or commissioning procedure.

Detailed documentation on commissioning process can be found by following the link:  
[www.abb.com/smartsensor](http://www.abb.com/smartsensor)

## 11. Service

Product website:  
URL: [www.abb.com/smartsensor](http://www.abb.com/smartsensor)

Upon need for service, contact ABB.

Alternatively contact local ABB Sales office for Smart Sensor.



**WARNING:**  
Contact with aggressive chemicals may cause severe damage to the sensor's mechanical construction.  
For details on chemical resistance, information can be found on Chemical Resistance Charts for PBT (Polybutylene Terephthalate), for example the one below made by Pisco:

<https://gizmo-engineering.com/wp-content/uploads/2019/10/chemical-resistance-chart-PBT3.pdf>



**WARNING:**  
Sensors that have mechanical damage should be removed from hazardous areas as soon as possible.

### 11.1 Batteries

When approaching end of battery life, the Smart Sensor will report "battery failure" over its wireless interfaces.  
The sensor must then be decommissioned and delivered for recycling.



**WARNING:**  
Heating battery above 100 °C may promote the fire or explosion hazard.

Battery is not replaceable, no attempt on replacement shall be made.  
This will destroy the sensor and violate its Ex-protection.

## 12. Contact information

ABB Oy  
Department Motion Service  
Hiomotie 13  
FI-00380 Helsinki  
Finland

## 13. Product disposal

After decommissioning of Smart Sensors, they shall be delivered to local ABB office or authorized receivers of electronic waste for recycling.  
If returned to ABB, there is no waste fee to be paid.

Under no circumstance decommissioned Smart Sensor shall be mixed with general household waste.

## 14. Country specific standard references

Japan: JNIOH-TR-46-1:2015, JNIOH-TR-46-6:2015

## 15. Compliance marks



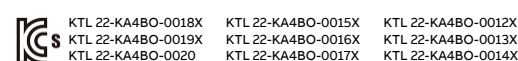
### Brazil



### Japan:



### Korea



### Taiwan



## EU Declaration of Conformity

We ABB Oy  
Hiomotie 13  
FI-00380 Helsinki  
Finland

declare under our sole responsibility that the following products

Device type: Condition Monitoring Sensor

Type names: Smart Sensor BASA, Smart Sensor BCHC,  
Smart Sensor HCHC

are in compliance with the following European directives and regulations:

Directive	Official Journal	Harmonized standards	
2014/34/EU	ATEX directive	IEC/EN 60079-0 IEC/EN 60079-11 EN 50303	:2017/2018 :2011/2012 :2000
2014/53/EU	Radio Equipment Directive (RED)	EN 300 328 V.2.2.1, EN 300 330 V2.1.1 EN 301 489-1/3/17 V2.1.1/2.1.1/3.1.1 EN61000-6-2 EN61000-6-3 EN60945 IEC/EN 61010-1	:2016 :2006, A1:2011 :2002 :2010
2011/65/EU	Restriction of Hazardous Substances Directive	NA	

Reference: Presafe 19 ATEX 14930X

The manufacturing process ensures the compliance of the product according to the technical construction files.

Helsinki 2023.06.30

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Vice President ABB Oy

Antti Jussi Salminen  
Life Cycle Management and Support Manager ABB Oy