

General Specifications

XS770A
Wireless Vibration Sensor

Sushi Sensor

GS 01W06E01-01EN

■ GENERAL

The Wireless Vibration Sensor XS770A is a compact battery-powered, measures vibration and temperature, and targets Industrial IoT (IIoT) applications.

With this sensor, you can detect an indication of abnormalities of the assets and the equipment by monitoring long term trends of the vibration and the surface temperature. Visualization of the long term trend achieves condition-based maintenance and effective asset management.

LPWA (Low Power Wide Area) offers long-range reachability to low power devices, allowing wide area coverage and easy installation.

■ FEATURES

● Battery-powered Compact Wireless Sensor

The XS770A is compact and has excellent environment resistance characteristics. It can be installed in a plant where wiring is difficult. With a number of sensors, you can collect various data for plant maintenance by early detection and prediction of equipment failure.

● Installable in Hazardous Location

This sensor can be installed in Zone 2 areas, such as petrochemical plants, paint plants, drug plants, where flammable gas or vapor may exist.

● Long-Distance Communication on License-free Bands

This sensor has adopted LoRaWAN. LoRaWAN has excellent sensitivity reception, good radio interference resistance, and offers a communication distance of 10 km or more in an ideal communication environment. You can install this sensor anywhere you want over vast area.

● Configuration And Status Monitoring Using Smartphone

Using an Android-based smartphone with NFC (Near Field Communication) interface makes configuration and status monitoring of sensors simple and intuitive.



■ STANDARD SPECIFICATIONS

□ WIRELESS SPECIFICATIONS

Communication Protocol:

LoRaWAN class A

For detail on channel plan, refer to Table 1.

Modulation Method:

LoRa modulation

Data Rate:

250 to 11000 bps*

*: Available data rate vary depending on the country.

Frequency:

Refer to Table 1.

Radio Security:

AES 128 bit encryption

RF Transmitter Power:

Max. 7 dBm

Antenna:

Built-in Omni-directional antenna

□ POWER SUPPLY SPECIFICATIONS

Battery:

Lithium thionyl chloride battery: 1 unit
(dedicated product)

Rated voltage: 3.6 V

Rated capacity: 2.6 Ah

PERFORMANCE SPECIFICATIONS

Measurement:

	Item	Specifications
Vibration	Measurement	Acceleration (peak), Velocity (RMS)
	Axis	X, Y, Z axes and 3-axis composite
	Range *1	Acceleration: 0 to 130 m/s ² (0 to 13.26 g) Velocity *2: 0 to 20 mm/s (0 to 0.79 in/s)
	Frequency range	10 to 1,000 Hz (± 3 dB)
	Accuracy (100 Hz)	X, Y, Z axes : ±10% FS 3-axis composite: ±20% FS
Temperature	Measurement	Temperature
	Range	-20 to 85°C (-4 to 185°F)
	Resolution	0.1°C
	Measurement part	Base

*1: Peak value of the input vibration. For the relation between the measurement frequency band and measurable range, refer to the following figure.

*2: The 20 mm/s pk value is equivalent to 14 mm/s RMS when input is based on a sine wave.

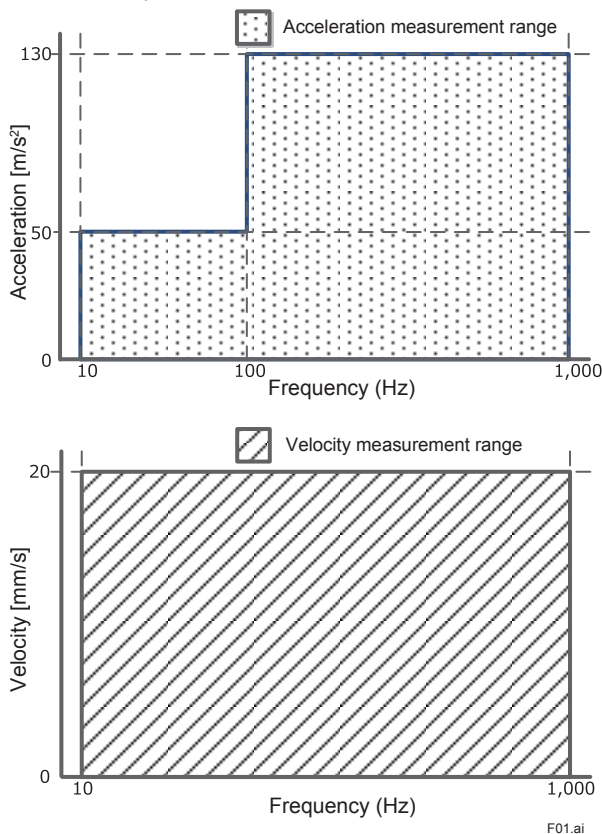


Figure: Measurable Range

Battery Characteristics:

The typical battery life is 4 years in the following conditions*.

- Update period: 1 hour
- Ambient temperature: 23±2°C (73.4±3.6°F)

*: Environmental condition such as vibration and the type of the connected device may affect battery life.

Update Time:

1 minute to 3 days

FUNCTIONAL SPECIFICATIONS

Output:

LoRaWAN

For detail on channel plan and available countries and regions, refer to Table 1.

NFC Interface:

NFC Forum Type 2 Tag

Diagnostic Function:

Battery alarm, internal temperature, wireless communication failures, sensor over-range, sensor failures, memory failures

Software Download Function:

Allows the user to update the software of the sensor via the NFC interface.

INSTALLATION ENVIRONMENT

Ambient Temperature Limits:

Operating: -20 to 85°C (-4 to 185°F)

Ambient Humidity Limits:

Operating: 0 to 100% RH (non-condensation)

Altitude (Atmospheric pressure):

[Type Code: 00] Up to 3000 m

[Type Code: K2,S2,F1,P1,U1] 80 to 110 kPa (Up to 2000 m*)

*: Ta : over 10 °C

Shock Resistance:

100 G

REGULATORY COMPLIANCE STATEMENTS

This device satisfies the following standards.

*: Please confirm that an installation region fulfills an applicable standard. If additional regulatory information and approvals are required, contact a Yokogawa representative.

Telecommunication Compliance:

- RE Directive (EEA and EFTA Countries),
- FCC Approval (United States),
- ISED Approval (Canada),
- KC Marking (Korea)
- RCM (Australia and New Zealand)

CE Conformity:

RoHS Directive:

EN50581

RE Directive:

Safety: EN61010-1 (Indoor/Outdoor use), EN62479

EMC: EN 301 489-1, EN 301 489-3,

EN61326-1 Class A Table 2, EN61326-2-3,

EN55011 Class A Group 1

Radio Spectrum: EN 300 220-2 (Band h1.3 in the table 1 of CEPT ERC Rec. 70-03), EN 300 330

Canadian Safety Standards:

CAN/CSA-C22.2 No.61010-1

CSA-C22.2 No.94.2

IEC 60529

Degrees of Protection:

[Housing material Code: 1] IP66/IP67

[Housing material Code: 2] IP66/IP67 and Type 4X

KC Marking

Trade Name: Yokogawa Electric Corp.

Equipment Name: Wireless Vibration Sensor

Manufacturer: Yokogawa Electric Corp.

PHYSICAL SPECIFICATIONS

Housing Material:

For detail, refer to “MODEL AND SUFFIX CODES.”

Weight:

260 g (0.57 lb)

Mounting:

Mounting on the measurement target using the screw*

*: Can also mount using the magnetic holder supplied as an accessory. Note that, when using the magnetic holder, the vibration measurement frequency band drops.

SOFTWARE SPECIFICATIONS

SUSHI SENSOR APP

This software is used to perform the setting and status check of this product via the NFC interface.

Operating Environment:

Item	Recommended System Requirements
OS	Android 5.1.1 or higher
CPU	Snapdragon 800 or equivalent or higher
Resolution	1280x720 dots or more
NFC	Reader, writer
GPS	Optional

Note of Available Android Device:

When using Sushi Sensor APP to intrinsically safe explosion devices, the Android device must comply with the following.

- When using an NFC link in a non-hazardous area, the maximum magnetic field strength generated by the Android device is 18 A/m (r.m.s.) or less (Compliant with ISO / IEC 14443).
- When using an NFC link in a hazardous area, only an Android device confirmed by Yokogawa Electric Corporation can be used.
- If additional information and approvals for Android devices are required, contact a Yokogawa representative.

Table 1. Area code, frequency and LoRaWAN regional parameter

Area Code	Frequency	Channel Plan	Countries and Regions
2	863 to 870 MHz *1	EU868	Europe
3	902 to 928 MHz *2	US915	North America
4	919 to 925 MHz *2	AS923-1	Malaysia, Singapore, Thailand
5	915 to 928 MHz	AU915	Australia, Chile
6	915 to 928 MHz	AS923-1	New Zealand
7	920.9 to 923.3 MHz	KR920	Korea
9	915 to 928 MHz	AU915	Brazil
C	920 to 923 MHz	AS923-2	Indonesia
G	915 to 928 MHz	AU915	Argentina

*1: This wireless frequency can be used throughout Europe, although there are some restrictions in Sweden and Greece.

*2: Available frequency bands vary depending on the country.

Table 2. Specification for explosion protected type

Item	Description	Type code
IECEX Intrinsic safety	Certificate number: IECEX DEK 19.0072 Applicable Standards: IEC 60079-0:2017, IEC 60079-11:2011 Ex marking: Ex ic IIB T4 Gc Ambient temperature: -20 to 80°C (-4 to 176°F)	S2
ATEX Intrinsic safety	Applicable Standards: EN IEC 60079-0:2018, EN 60079-11:2012 Ex marking: II 3 G Ex ic IIB T4 Gc Enclosure: IP66/IP67 in accordance with EN 60529 Ambient temperature: -20 to 80°C (-4 to 176°F)	K2
FM Nonincendive	Certificate number: FM19US0205 Applicable Standards: FM 3600:2018, FM 3611:2018, FM 3810:2018, ANSI/UL 121201 Ed.9 (2017), ANSI/UL 61010-1 Ed.3 (2012), NEMA 250:1991 Ex marking: Nonincendive for Class I, Division 2, Groups A, B, C, D; Class II, Division 2, Groups F, G; Class III, Division 1; Class I, Zone 2, Group IIC Temperature Class: T4 Ambient temperature: -20 to 85 °C (-4 to 185 °F) Enclosure: Type 4X	F1
Korea Energy-limited safety	Certificate number: 20-AV4BO-0300 Applicable Standards: Notice of Ministry of Labor 2020-33 Harmonized with IEC 60079-0:2017, IEC60079-11:2011 Ex marking: Ex nL IIB T4 Ambient temperature: -20 to 80°C	P1
INMETRO Intrinsic safety	Certificate number: DEKRA 20.0010 Applicable standards: ABNT NBR IEC 60079-0:2013 Versão Corrigida 2:2016 ABNT NBR IEC 60079-11:2013 Versão Corrigida:2017 Ex marking: Ex ic IIB T4 Gc Ambient temperature: -20 to 80 °C	U1

■ MODEL AND SUFFIX CODES

Model	Suffix Codes	Description
XS770A *1	Wireless Vibration Sensor
---	-A	Always A
Area	2	Europe EU868
	3	North America US915*2
	4	Malaysia, Singapore, Thailand AS923-1
	5	Australia, Chile AU915
	6	New Zealand AS923-1
	7	Korea KR920
	9	Brazil AU915
	C	Indonesia AS923-2
	G	Argentina AU915
Type	00	General Purpose*3
	K2	ATEX Intrinsic safety*4
	S2	IECEx Intrinsic safety*5
	F1	FM Nonincendive*6
	P1	Korea Energy-limited safety*7
	U1	INMETRO Intrinsic safety*8
---	-A	Always A
Housing material	1	Plastic (PBT), Stainless steel*9
	2	Plastic (PC), Stainless steel*10
Power source	C	Battery powered (battery included)
---	A	Always A

- *1: A hexagon socket set screw is attached.
- *2: Conversion screw is included when area code is 3.
- *3: Applicable when area code is 2 or 3.
- *4: Applicable when area code is 2, 4 or C.
- *5: Applicable when area code is 4, 5, 6 or G.
- *6: Applicable when area code is 3 and sales country is United States.
- *7: Applicable when area code is 7.
- *8: Applicable when area code is 9.
- *9: Applicable when area code is 2, 4 or C.
- *10: Applicable when area code is 3, 5, 6, 7, 9 or G.

■ OPTIONAL ACCESSORIES

Item	Parts Number	Description
Magnetic holder	F9096DA	Magnet for mounting (M6 female screw)
Hexagon socket set screw	B1137BS	Screw for mounting (M6)
Conversion screw	F9096CM	Screw for mounting (M6 to 1/4-28UNF)*1

- *1: Conversion screw is attached when area code is 3.

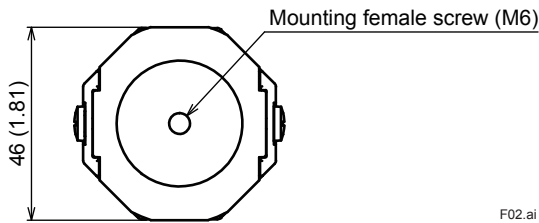
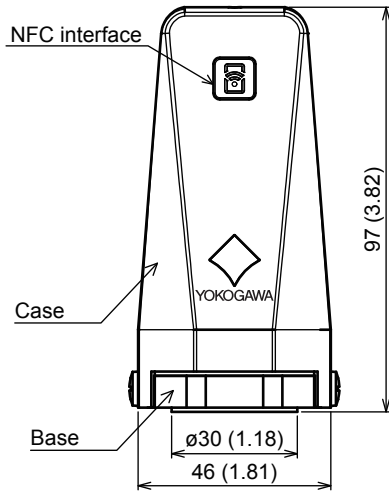
Model	Suffix Codes	Description
XS70BT *1	Lithium battery
Battery type	-A	Dedicated battery for XS770A
---	A	Always A
Number of Unit	-C004	4 units
	-C012	12 units

- *1: The XS70BT is a dedicated product (model: LS14500 C5SY) with a battery connector incorporated to SAFT battery

■ DIMENSIONS

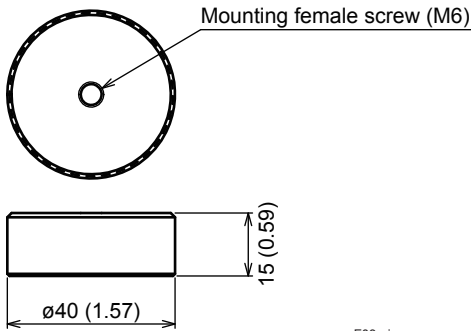
● **Main unit**

Unit: mm (approx. inch)



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● **Magnetic holder**
Parts No.: F9096DA



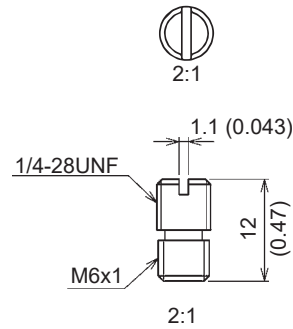
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● **Hexagon socket set screw (M6)**
Parts No.: B1137BS



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● **Conversion screw*1 (M6 to 1/4-28UNF)**
Parts No.: F9096CM



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*1: Conversion screw is attached when area code is 3

<Ordering Information>

1. Model, suffix codes, and option code

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