

General Specifications

XS550
Temperature Measurement Module

Sushi Sensor

GS 01W06F02-01EN

■ GENERAL

This General Specifications (GS) describes the specifications for Temperature Measurement Module.

The XS550 Temperature Measurement Module converts thermocouple electromotive force to temperature value. This product acts as a wireless temperature sensor in combination with "XS110A Wireless Communication Module" and it is suitable for Industrial IoT (IIoT) applications. The electrical power of the XS550 Temperature Measurement Module is supplied through the XS110A.

Monitoring temperature from a remote location reduces operator rounds.

Refer to General Specifications of "XS110A Wireless Communication Module" for details of wireless.

■ FEATURE

● Temperature Sensors for Industrial IoT

In combination with XS110A Wireless Communication Module, this product module acts as a battery-powered wireless pressure sensor with an environmental resistance for industrial use. This product designs to realize easy installation for production sites. Maximum 2 inputs of IEC standard thermocouples (9 types including Type B, E, J) can be connected to the module.

● Modular Structure

The module structure enables replacing the battery without removing the measurement module from thermocouples, and it makes smooth maintenance of the sensor.

● Supporting in Hazardous Location Installation

The XS550 in combination with XS110A can be installed in Zone 1 areas, such as petrochemical plants, paint plants, steel plants, where flammable gas or vapor may exist.

● 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

□ MEASUREMENT RANGE

Refer to Table 1

□ PERFORMANCE SPECIFICATIONS

Measurement Accuracy:

Refer to Table 1

Reference Contact Compensation Accuracy:

$\pm 1.0^{\circ}\text{C}$

Ambient Temperature Effect:

Refer to Table 2

Battery Characteristics:

Battery life is 10 years under the following conditions*.

• Ambient temperature: $23 \pm 2^{\circ}\text{C}$

• Update Time: 1 hour

* Environmental condition such as vibration may affect the battery life.

Update Time:

1 minute to 3 days

□ FUNCTIONAL SPECIFICATION

Input:

Input number and type: 2, non-insulated
Thermocouples: B, E, J, K, N, R, S, T, C

Input Signal Source Resistance:

1 k Ω or less

Zero Point Adjustment:

Conducted by Sushi Sensor App.

Diagnostic Function:

Terminal block temperature error, memory failure
Input adjustment error

□ INSTALLATION ENVIRONMENT

Ambient Temperature Limits:

Operating: -40 to 85°C (-40 to 185°F)
Storage: -40 to 85°C (-40 to 185°F)

Ambient Humidity Limits:

0 to 100% RH (non-condensation)

Temperature Gradient:

Operating: Within ± 10°C/h
Storage: Within ± 20°C/h

Altitude:

[Type Code: 00] Up to 3000 m
[Type Code: K2, S2, P1]
80 to 110 kPa (Up to 2000 m*)
*: Ta : over 10 °C

Vibration Resistance:

0.21 mm P-P (10 to 60 Hz),
3 G (60 to 2 kHz)

Shock Resistance:

50 G 11 ms

Degrees of Protection:

IP66/IP67, Type 4X
Apply when connected to the XS110A.

KC Marking:

Trade Name: Yokogawa Electric Corp.
Equipment Name: Temperature Measurement Module
Manufacturer: Yokogawa Electric Corp.

□ PHYSICAL SPECIFICATIONS

Electrical Connection:

M20 female, 1/2 NPT female

Housing:

Stainless steel

Wight:

400 g (0.88 lb)

Mounting Bracket:

Refer to "MODEL AND SUFFIX CODES."

□ 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.

CE Conformity:

RoHS Directive:
EN50581
Other Normative Standards:
Safety: EN61010-1, EN61010-2-030 (Indoor/
Outdoor use)
EMC Directive:
EN61326-1 Class A Table 2, EN61326-2-3,
EN55011 Class A
ATEX Intrinsic Safety:
Refer to Table 3.

Canadian Safety Standards:

CAN/CSA-C22.2 No.61010-1
CAN/CSA-C22.2 No.61010-2-030
CSA-C22.2 No.94.2
IEC 60529
Pollution degree 2
Overvoltage category I

Table 1 Sensor Type, Measurement Range, and Accuracy

Sensor Type		Standard	Measurement Range	Accuracy
T/C	B	IEC60584	100 to 300°C (212 to 572°F)	± 8.0°C (46°F)
			300 to 400°C (572 to 752°F)	± 3.0°C (37°F)
			400 to 1820°C (752 to 3308°F)	± 2.5°C (36.5°F)
	E		-200 to 1000°C (-328 to 1832°F)	± 0.6°C (33°F)
	J		-200 to 1200°C (-328 to 2192°F)	± 0.75°C (33.4°F)
	K		-200 to 1372°C (-328 to 2502°F)	± 1.5°C (34.7°F)
	N		-200 to 1300°C (-328 to 2372°F)	± 1°C (33.8°F)
	R		-50 to 100°C (-58 to 212°F)	± 3°C (37°F)
	S		100 to 1768°C (212 to 3214°F)	± 2°C (35.6°F)
T	-50 to 1768°C (-58 to 3214°F)	± 2°C (35.6°F)		
T	-200 to 400°C (-328 to 752°F)	± 1°C (33.8°F)		
C	0 to 2315°C (32 to 4199°F)	± 1.5°C (34.7°F)		

Note: Measurement Accuracy will be changed when electromagnetic noise applied.

Table 2 Effects of Ambient Temperature

Sensor Type	Temperature Effects per 1.0°C Change in Ambient Temperature	Measurement Range	
T/C	B	0.092°C – (0.032% of (t – 100))	100°C ≤ t < 300°C
		0.025°C – (0.0010% of (t – 300))	300°C ≤ t < 1000°C
		0.029°C	1000°C ≤ t < 1820°C
	E	0.00099°C – (0.0040% of t)	–200°C ≤ t < 0°C
		0.00099°C + (0.0019% of t)	0°C ≤ t < 1000°C
	J	0.0012°C – (0.0041% of t)	–200°C ≤ t < 0°C
		0.0012°C + (0.0019% of t)	0°C ≤ t < 1200°C
	K	0.0015°C – (0.0048% of t)	–200°C ≤ t < 0°C
		0.0015°C + (0.0023% of t)	0°C ≤ t < 1372°C
	N	0.0023°C – (0.0056% of t)	–200°C ≤ t < 0°C
		0.0023°C + (0.0019% of t)	0°C ≤ t < 1300°C
	R, S	0.013°C – (0.020% of t)	–50°C ≤ t < 0°C
		0.013°C + (0.0021% of t)	0°C ≤ t < 100°C
		0.0093°C + (0.0012% of t)	100°C ≤ t < 600°C
		0.0030°C + (0.0021% of t)	600°C ≤ t < 1768°C
	T	0.0016°C – (0.0044% of t)	–200°C ≤ t < 0°C
0.0016°C + (0.0015% of t)		0°C ≤ t < 400°C	
C	0.0046°C + (0.0014% of t)	0°C ≤ t < 400°C	
	0.00013°C + (0.0024% of t)	400°C ≤ t < 1400°C	
	–0.023°C + (0.0041% of t)	1400°C ≤ t < 2000°C	
	–0.11°C + (0.0085% of t)	2000°C ≤ t < 2315°C	

Note1: The “t” on Table 2 means the value of the reading in °C.

Table 3 Specification for explosion protected type

Item	Description	Type
ATEX intrinsic safety	Certificate number: DEKRA 20ATEX0024 X Applicable standards: EN IEC 60079-0:2018, EN 60079-11:2012 Ex marking: Ⓜ II 2 (1) G Ex ib [ia Ga] IIC T4 Gb Ambient temperature: –40 to 75°C (–40 to 167°F) Electrical parameters: Interface circuit (Connector) Ui = 6.88 V, li = 1.54 A, Pi = 0.3 W, Ci = 4.1 μF, Li = 0 μH Sensor circuit (Terminals 1, 2, 3 and 4 for thermocouples) Uo = 6.88 V, lo = 14 mA, Po = 25 mW, Co = 16 μF, Lo = 150 mH Enclosure: IP66/IP67 in accordance with only EN 60529 when combined with XS110A. Dielectric strength (Terminals to Enclosure): 500 V AC, r.m.s., 1 minute	K2
IECEx intrinsic safety	Certificate number: IECEx DEK 19.0027X Applicable standards: IEC 60079-0 Ed. 7.0 (2017), IEC 60079-11 Ed. 6.0 (2011) Ex marking: Ex ib [ia Ga] IIC T4 Gb Ambient temperature: –40 to 75°C (–40 to 167°F) Electrical parameters: Interface circuit (Connector) Ui = 6.88 V, li = 1.54 A, Pi = 0.3 W, Ci = 4.1 μF, Li = 0 μH Sensor circuit (Terminals 1, 2, 3 and 4 for thermocouples) Uo = 6.88 V, lo = 14 mA, Po = 25 mW, Co = 16 μF, Lo = 150 mH Enclosure: IP66/IP67 in accordance with only IEC 60529 when combined with XS110A. Dielectric strength (Terminals to Enclosure): 500 V AC, r.m.s., 1 minute	S2
Korea intrinsic safety	Certificate number: 20-AV4BO-0551X (XS110A+XS550) Applicable standards: Notice of Ministry of Labor 2020-33 Harmonized with IEC 60079-0 Ed.7.0 (2017), IEC 60079-11 Ed.6.0 (2011) Ex marking: Ex ib [ia] IIC T4 Ambient temperature: –40 to 75°C Electrical parameters: Sensor circuit (Terminals 1, 2, 3 and 4 for thermocouples) Uo = 6.88 V, lo = 14 mA, Po = 25 mW, Co = 16 μF, Lo = 150 mH Enclosure: IP66/IP67 in accordance with only IEC 60529 when combined with XS110A. Dielectric strength (Terminals to Enclosure): 500 V AC, r.m.s., 1 minute	P1

■ MODEL AND SUFFIX CODES

Model	Suffix Codes	Description
XS550		Temperature Measurement Module
Inter-module communication	-A	Digital communication for XS-series
Area	2	Europe EU868
	3	North America US915
	4	Singapore, Malaysia, Thailand AS923-1
	5	Australia AU915
	6	New Zealand AS923-1
	7	Korea KR920
Type	00	General Purpose*1
	K2	ATEX intrinsic safety*2
	S2	IECEX intrinsic safety*3
	P1	Korea intrinsic safety*4
—	-A	Always A
Housing material	6	Stainless Steel
Electrical connection	2	1/2 NPT female*5
	4	M20 female*5
—	A	Always A
Mounting bracket	-J	316 SST 2-inch Horizontal Pipe Mounting
	-K	316 SST 2-inch Vertical Pipe Mounting
	-N	None
—	A	Always A

*1: Applicable when Area Code is 3.

*2: Applicable when Area Code is 2 or 4.

*3: Applicable when Area Code is 4, 5 or 6.

*4: Applicable when Area Code is 7.

*5: Cable gland is not included. When 4 (M20 female) is selected, prepare the cable gland with a flat gasket.

■ OPTIONAL ACCESSORIES

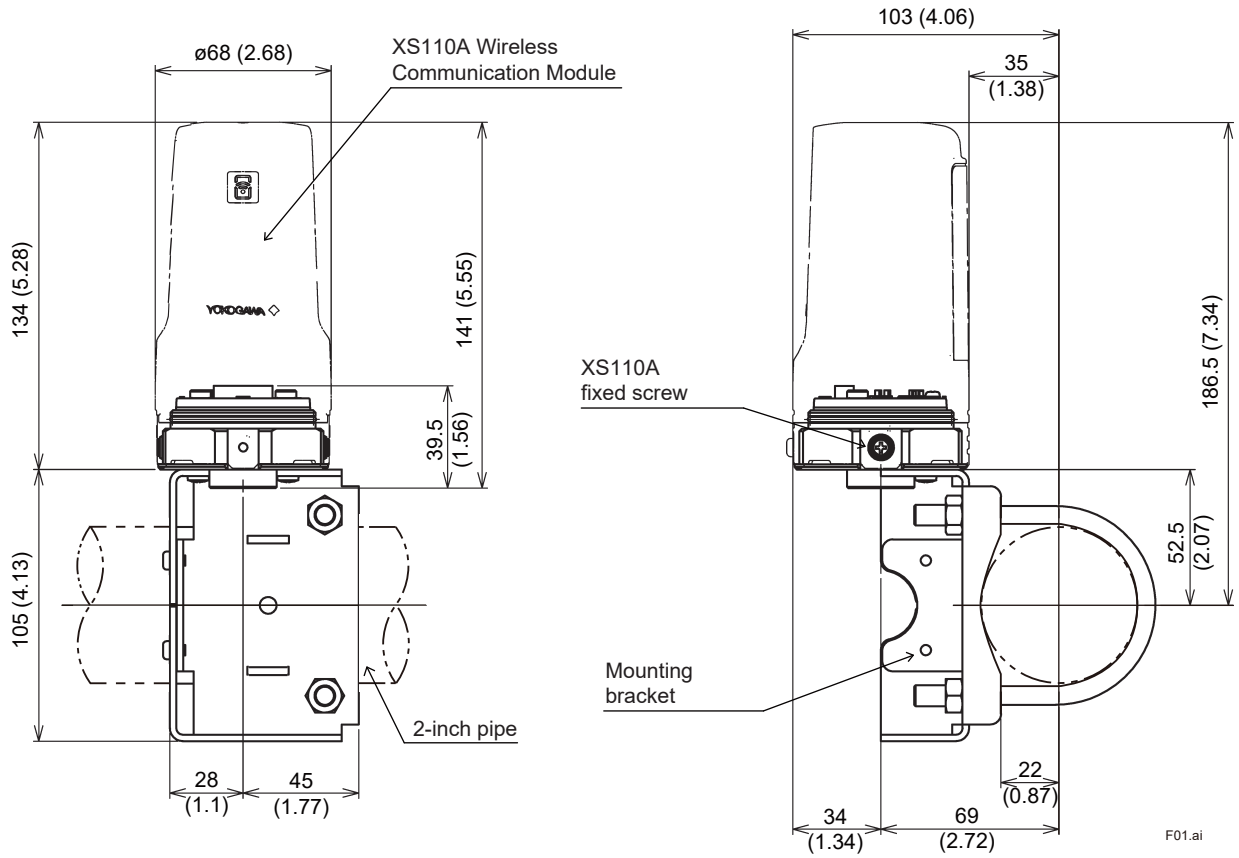
Item	Parts Number	Description
Protection Cap	F9097ND	Rubber protective cap *

* The protective cap is used to temporarily protect the connector of the product when the XS110A is removed from XS550 for battery replacement, etc. When the XS110A is removed from the product, waterproof and dustproof performance cannot be guaranteed.

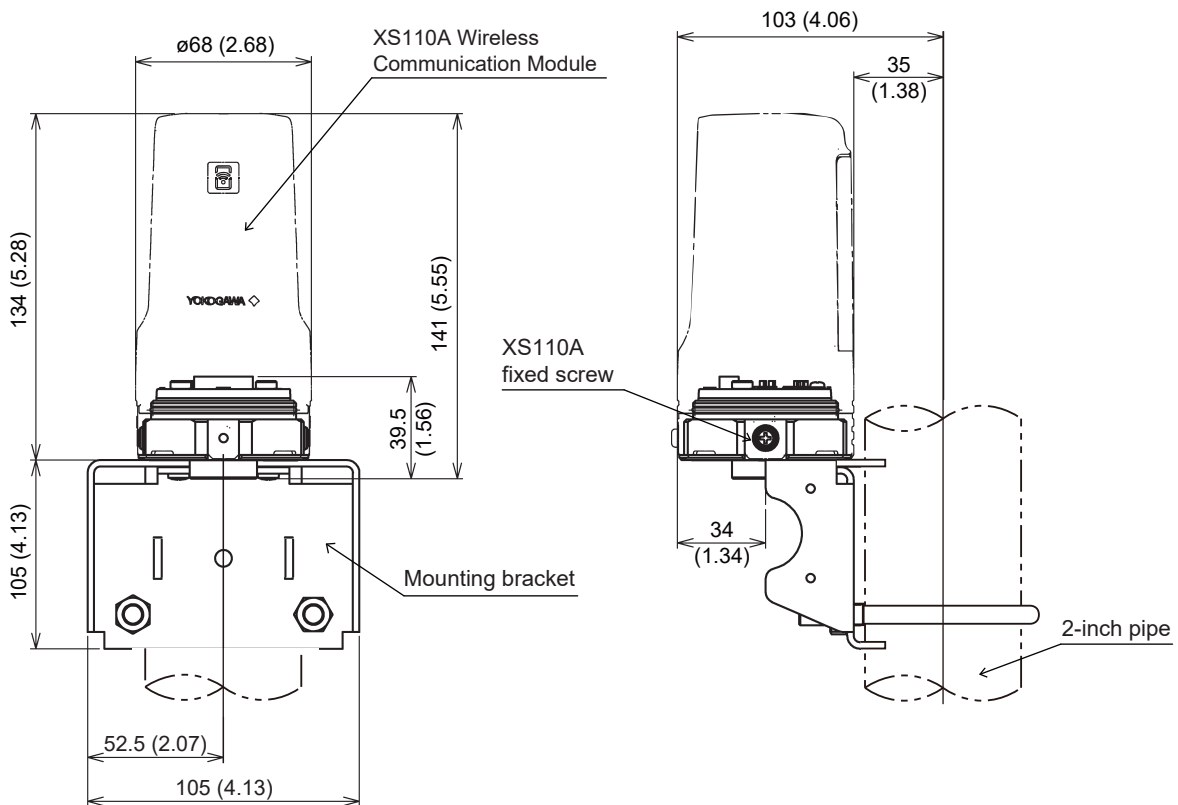
DIMENSIONS

2-inch Horizontal Pipe Mounting

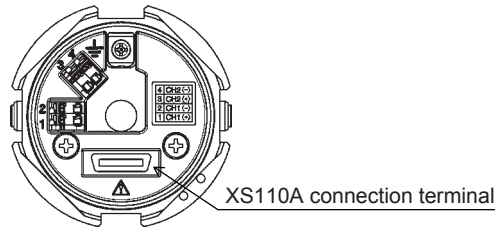
Unit: mm (approx. inch)



2-inch Vertical Pipe Mounting

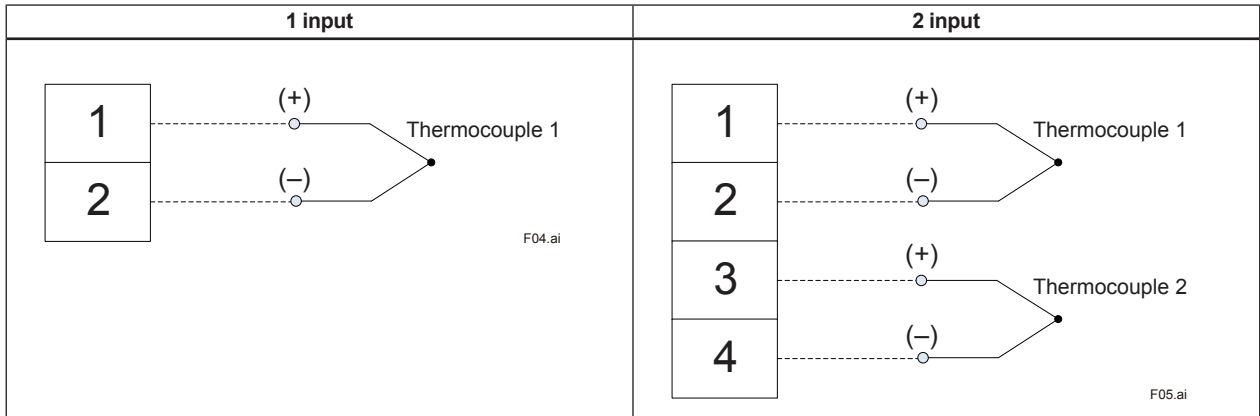


● Terminal Layout



F03.ai

● Connection of input terminal



<Ordering Information>

1. Model, suffix codes, and option code

<Related Products General Specifications>

XS110A Wireless Communication Module:

Refer to GS 01W06D01-01EN

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