

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 temperature 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 hazardous 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 Period: 1 hour

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

Update Period:

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, F1, C1, P1, U1]
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:

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

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)
C	-200 to 400°C (-328 to 752°F)	± 1°C (33.8°F)		
			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
IECEx intrinsic safety	<p>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</p>	S2
ATEX intrinsic safety	<p>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</p>	K2
FM intrinsic safety	<p>Certificate number: FM20US0109X Applicable standards: FM 3600:2018, FM 3610:2018, FM 3810:2018, ANSI/UL 60079-0 Ed. 7 (2019), ANSI/UL 60079-11 Ed. 6 (2018), ANSI/UL 61010-1 Ed. 3 (2012), ANSI/UL 61010-2-030 Ed. 2 (2018), NEMA 250:1991 Ex marking: IS CL I/II/III DIV 1 GP ABCDEFG T4, CL I ZN 0 AEx ia IIC T4 Ga 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: Type 4X when combined with XS110A. Dielectric strength (Terminals to Enclosure): 500 V AC, r.m.s., 1 minute</p>	F1
CSA intrinsic safety	<p>Certificate number: CSA21CA80063719X Applicable standards: C22.2 No. 60079-0:19, CAN/CSA-C22.2 No. 60079-11:14, CAN/CSA-C22.2 No. 61010-1-12, CAN/CSA-C22.2 No. 61010-2-030-12, C22.2 No. 94.2-15 Ex marking: Ex ia IIC T4 Ga, IS CL I/II/III DIV 1 GP ABCDEFG T4 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: Type 4X when combined with XS110A. Dielectric strength (Terminals to Enclosure): 500 V AC, r.m.s., 1 minute.</p>	C1
South Korea intrinsic safety	<p>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</p>	P1
INMETRO intrinsic safety	<p>Certificate number: DEKRA 20.0013X Applicable standards: ABNT NBR IEC 60079-0:2020 ABNT NBR IEC 60079-11:2013 Versão Corrigida:2017 Ex marking: Ex ib [ia Ga] IIC T4 Gb Ambient Temperature: -40 to 75°C 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 ABNT NBR IEC 60529 when combined with XS110A. Dielectric strength (Terminals to Enclosure): 500 V AC, r.m.s., 1 minute.</p>	U1

■ 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, Chile AU915
	6	New Zealand AS923-1
	7	South Korea KR920
	9	Brazil AU915
	G	Argentina AU915
Type	00	General Purpose*1
	K2	ATEX intrinsic safety*2
	S2	IECEx intrinsic safety*3
	F1	FM intrinsic safety*4
	C1	CSA intrinsic safety*8
	P1	South Korea intrinsic safety*5
	U1	INMETRO intrinsic safety*6
—	-A	Always A
Housing material	6	Stainless Steel
Electrical connection	2	1/2 NPT female*7
	4	M20 female*7
—	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 2 or 3.

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

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

*4: Applicable when area code is 3 and sales country is United States.

*5: Applicable when Area Code is 7.

*6: Applicable when Area Code is 9.

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

*8: Applicable when area code is 3 and sales country is Canada.

■ OPTIONAL ACCESSORIES

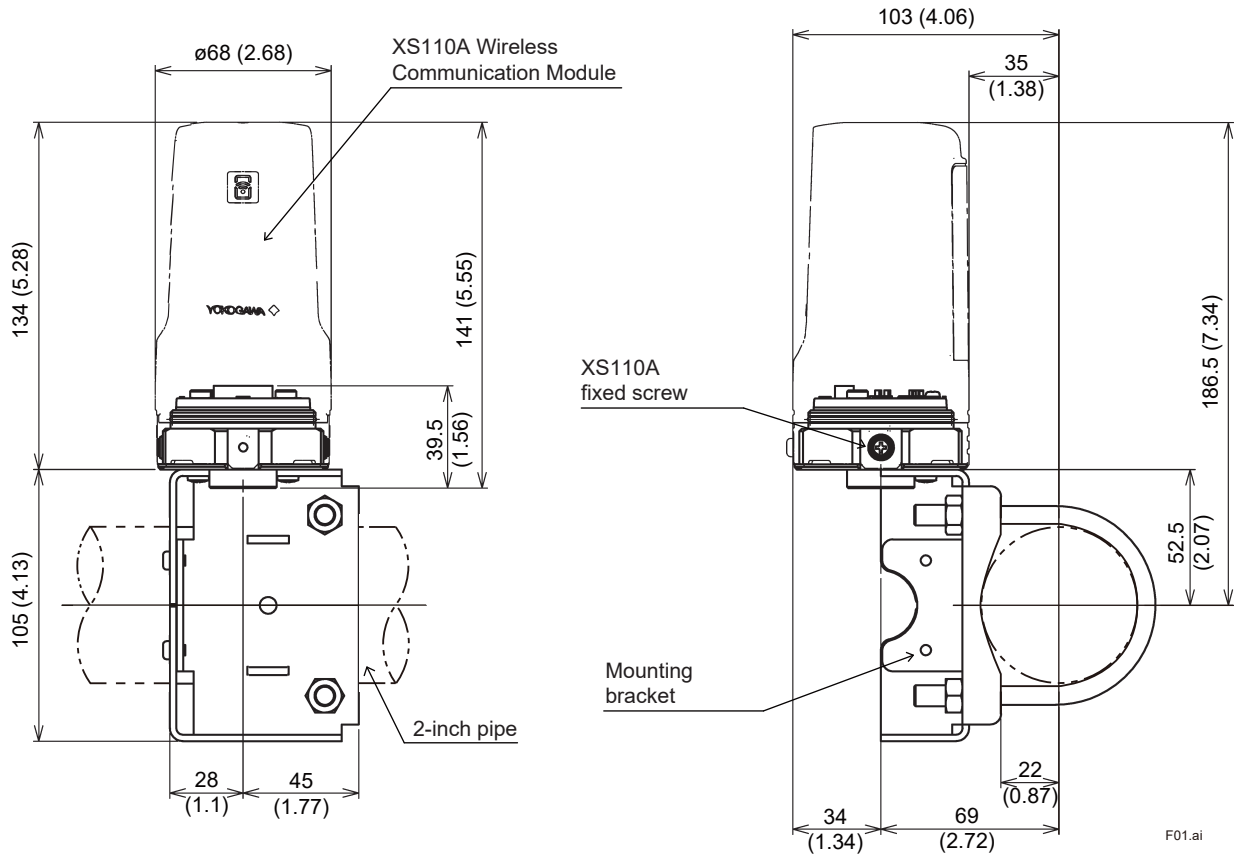
Item	Parts Number	Description
Protection Cap	F9097ND	Rubber protective cap *

* 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.

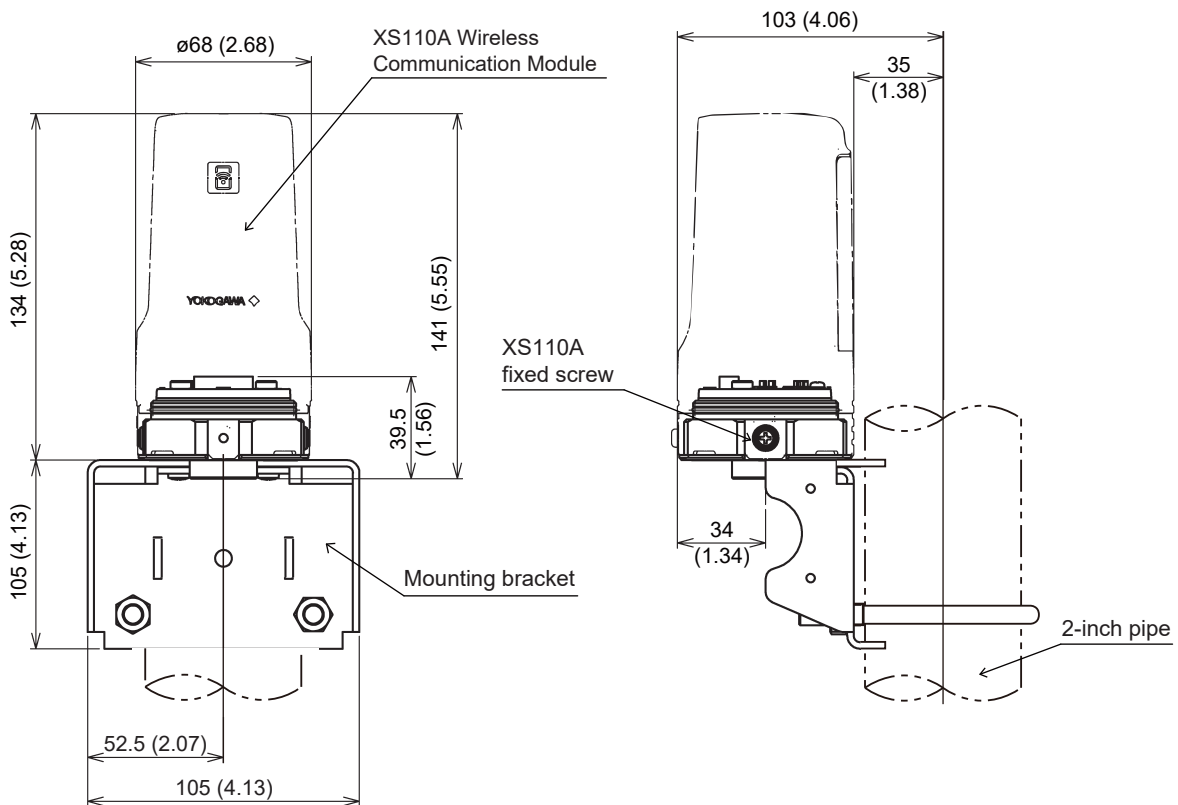
■ DIMENSIONS

● **2-inch Horizontal Pipe Mounting**

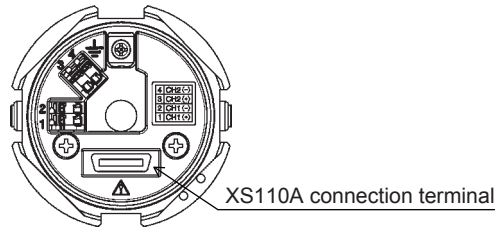
Unit: mm (approx. inch)



● **2-inch Vertical Pipe Mounting**

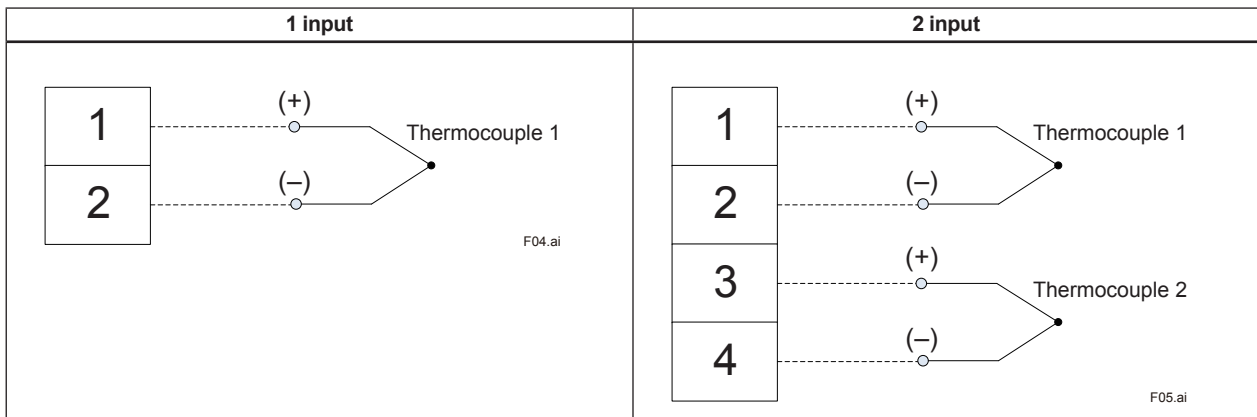


● Terminal Layout



F03.ai

● Connection of input terminal



<Ordering Information>

1. Model, suffix codes, and option code

<Trademarks>

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<Related Products General Specifications>

XS110A Wireless Communication Module:

Refer to GS 01W06D01-01EN

<Information on EU WEEE Directive>

EU WEEE (Waste Electrical and Electronic Equipment) Directive is only valid in the EU.

This instrument is intended to be sold and used only as a part of equipment which is excluded from WEEE Directive, such as large-scale stationary industrial tools, a large-scale fixed installation and so on, and, therefore, subjected to the exclusion from the scope of the WEEE Directive. The instrument should be disposed of in accordance with local and national legislation/regulations.