General Specifications

YTA510
Temperature Transmitter

YTA Series
ISA100 Wireless COMPLIANT

GS 01C50E01-01EN

The YTA510 is the high performance temperature transmitter that accepts Thermocouple, RTD, ohms or DC millivolt inputs. YTA510 transmit not only process variables but also the setting parameters using wireless signal. The transmitters run on internal batteries, and the installation cost can be decreased since hard-wiring is not required. The communication is compliant with ISA100.11a protocol specifications. These devices will be used with YFGW710, Field Wireless Integrated Gateway. As for YFGW710 specifications, refer to GS 01W01F01-01EN.

■ FEATURES

- **Long Life Battery Design**
  Ultra low current consumption design using two high capacity lithium-thionyl chloride batteries provide wireless operation for years.
- **Security Assured Wireless Network Joining**
  Infrared communication between the devices for wireless network configuration and parameter setting.
- **Quick Update Time**
  Selectable from 1 second to 60 minutes for measured process value to publish wirelessly.

■ STANDARD SPECIFICATIONS

■ WIRELESS SPECIFICATIONS

Communication protocol: ISA100.11a protocol
Data rate: 250 kbps
Frequency: 2400 - 2483.5 MHz license free ISM band
Radio security: AES 128 bit codified
RF Transmitter power: Max. 11.6 dBm (fixed)
Antenna: +2 dBi Omni directional monopole type

■ PERFORMANCE SPECIFICATIONS

Accuracy
See Table 1.

Cold Junction Compensation Accuracy
For T/C only
± 0.5°C (± 0.9°F)

Ambient Temperature Effect (per 1.0°C change)
See Table 2.

Battery Pack
Battery pack with long life lithium-thionyl chloride batteries. With the intrinsically safe type, the battery pack is replaceable in hazardous area. Typical battery life is 10 years at 30 seconds update time or 6 years at 10 seconds update time in the following conditions.*

- Ambient temperature: 23±2°C
- Device role: IO mode
- LCD display: off

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

■ FUNCTIONAL SPECIFICATIONS

Input
Input type is selectable: Thermocouples, 2-, 3-, and 4-wire RTDs, ohms and DC milivolts. See Table 1.

Input Signal Source Resistance (for T/C, mV)
1 kΩ or lower

Input Lead Wire Resistance (for RTD, Ohm)
10 Ω per wire or lower

Output
Wireless (ISA100.11a protocol) 2.4 GHz signal.

Range
See Table 1.

Update Period
1 to 3600 sec selectable.

Zero-gain Adjustment
Set the amount of zero-gain point adjustment.

Integral Indicator (LCD display)
5-digit numerical display, unit display and bar graph. The indicator is configurable to display the following variables periodically.
°C, K, °F, °R, mV and ohm, 0 to 100 % bar graph
See also “Factory Setting.”

Sensor Burnout
Select either HIGH or LOW as the configuration.

Self Diagnostics
Amplifier failure, sensor failure, configuration error, battery alarm, wireless communication alarm and over-range error for process variables.

Software Download Function
Software download function permits to update wireless field device software via ISA100.11a wireless communication.

YOKOGAWA

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GS 01C50E01-01EN

5th Edition Oct. 2011

Power Supply
2x primary lithium-thionyl chloride batteries
With battery case (batteries sold separately)

■ NORMAL OPERATING CONDITION

(Optional features or approval codes may affect limits.)

Ambient Temperature Limits
-40 to 85°C (-40 to 185°F)
-30 to 80°C (-22 to 176°F) LCD visible range

Ambient Humidity Limits
0 to 100% RH

■ REGULATORY COMPLIANCE STATEMENTS

This device contains the wireless module. The wireless module satisfies the following standards.

* The specific radio equipment (Approval Number:007WWCUL0480) which received the technicalstandard satisfied certification based on the Radio Law is used for this product.
* Please confirm that a installation region fulfills a standards, require additional regulatory information and approvals, contact to Yokogawa Electric Corporation.

EMC Conformity Standards
EN61326-1 Class A, Table 2 (For use in industrial locations), EN61326-2-3

R&TTE Conformity Standards CE
ETSI EN 300 328, ETSI EN 301 489-17, EN61010-1
- Indoor/Outdoor use

Regulation Conformity of the Wireless Module
- FCC Approval
- IC Approval

■ PHYSICAL SPECIFICATIONS

Enclosure

Housing

Low copper cast aluminum alloy with polyurethane, mint-green paint. (Munsell 5.6BG 3.3/2.9 or its equivalent)

Degrees of Protection

IP66/IP67, NEMA4X

Name plate and tag

304 SST tag plate wired onto transmitter.

Weight

2.8 kg (6.2 lb)

Without battery pack and mounting bracket.

Connections

Refer to “MODEL AND SUFFIX CODE.”

< Related Instruments >
Field Wireless System:
Refer to GS 01W01A01-01EN
Field Wireless Integrated Gateway YFGW710:
Refer to GS 01W01F01-01EN

Table 1. Sensor type, measurement range, and accuracy

Sensor Type		Standard	Measurement Range	Accuracy
T/C	B	IEC584	100 to 300°C (212 to 572°F)	± 5.0°C (± 9.0°F)
			300 to 400°C (572 to 752°F)	± 2.0°C (± 3.6°F)
			400 to 1820°C (752 to 3308°F)	± 1.5°C (± 2.7°F)
	E		-200 to 1000°C (-328 to 1832°F)	± 0.4°C (± 0.8°F)
	J		-200 to 1200°C (-328 to 2192°F)	± 0.5°C (± 0.9°F)
	K		-200 to 1372°C (-328 to 2502°F)	± 0.6°C (± 1.1°F)
	N		-200 to 1300°C (-328 to 2372°F)	± 0.6°C (± 1.1°F)
	R		-50 to 100°C (-58 to 212°F)	± 1.7°C (± 3.1°F)
			100 to 1768°C (212 to 3214°F)	± 0.8°C (± 1.5°F)
	S		-50 to 100°C (-58 to 212°F)	± 1.7°C (± 3.1°F)
			100 to 1768°C (212 to 3214°F)	± 0.8°C (± 1.5°F)
	T		-200 to 400°C (-328 to 752°F)	± 0.5°C (± 0.9°F)
RTD	Pt100	IEC751	-200 to 850°C (-328 to 1562°F)	± 0.3°C (± 0.6°F)
	Pt200		-200 to 850°C (-328 to 1562°F)	± 0.6°C (± 1.1°F)
	Pt500		-200 to 850°C (-328 to 1562°F)	± 0.5°C (± 0.9°F)
mV		-	-10 to 100 [mV]	± 0.03 [mV]
Ohm		-	0 to 2000 [Ω]	± 1 [Ω]

Note1: For T/C input, add Cold Junction Compensation Accuracy (± 0.5°C) to the total accuracy.
Note2: For RTD input of the 2-wire connection, add a corrected value (± 0.1°C) to the total accuracy.

Table 2. Effects of ambient temperature

Sensor Type		Temperature Effects per 1.0°C Change in Ambient Temperature	Measurement Range
T/C	B	0.2°C - (0.066% of (t - 100))	100°C ≤ t < 300°C
		0.07°C - (0.0057% of (t - 300))	300°C ≤ t < 1000°C
		0.037°C	t ≥ 1000°C
	E	0.0035°C - (0.00492% of t)	t < 0°C
		0.0035°C + (0.00146% of t)	t ≥ 0°C
	J	0.0039°C - (0.00529% of t)	t < 0°C
		0.0039°C + (0.00149% of t)	t ≥ 0°C
	K	0.00521°C - (0.00707% of t)	t < 0°C
		0.00521°C + (0.00182% of t)	t ≥ 0°C
	N	0.0077°C - (0.00918% of t)	t < 0°C
		0.0077°C + (0.00136% of t)	t ≥ 0°C
	R, S	0.04°C - (0.057% of t)	t < 0°C
		0.04°C + (0.0102% of t)	0°C ≤ t < 100°C
		0.0316°C - (0.001% of t)	100°C ≤ t < 600°C
		0.0175°C + (0.00173% of t)	t ≥ 600°C
	T	0.00513°C - (0.00631% of t)	t < 0°C
		0.00513°C + (0.0008% of t)	t ≥ 0°C
RTD	Pt100	0.0048°C + (0.0016% of absolute value t)	Entire Sensor Input Range
	Pt200	0.0038°C + (0.0015% of absolute value t)	t < 650°C
		0.0028°C + (0.0016% of t)	t ≥ 650°C
	Pt500	0.003°C + (0.0014% of absolute value t)	t < 650°C
		0.002°C + (0.0016% of t)	t ≥ 650°C
mV		0.2μV + (0.0015% of reading)	Entire Sensor Input Range
Ohm		0.001Ω + (0.0011% of reading)	Entire Sensor Input Range

Note1: The “t” on Table 2 means the value of the reading in °C.
Note2: The “absolute value t” on Table 2 means the absolute value of the reading in °C.
[Example of absolute value t]
When the temperature value is 250 Kelvin, abs reading is 23.15, absolute (250 - 273.15).

■ MODEL AND SUFFIX CODES

Model	Suffix Codes	Descriptions
YTA510	. . . . .	Temperature Transmitter
Output Signal	**-L**	Wireless communication (ISA100.11a)
Amplifier Housing	**7**	Always 7
Electrical Connection	**5**	G 1/2 female, two electrical connections with a blind plug
	7	1/2 NPT female, two electrical connections with a blind plug
	9	M20 female, two electrical connections with a blind plug
Integral Indicator	**D**	with digital indicator
Mounting Bracket	**B**	304 SST stainless steel 2-inch horizontal pipe mounting bracket *1
	D	304 SST stainless steel 2-inch vertical pipe mounting bracket *1
	J	316 SST stainless steel 2-inch horizontal pipe mounting bracket *1
	K	316 SST stainless steel 2-inch vertical pipe mounting bracket *1
	N	None
---	**A**	Always A
---	**A**	Always A
Option codes	/☐ Optional specifications	

*1: For flat-panel mounting, please prepare bolts and nuts.

■ OPTIONAL SPECIFICATION

Item	Description		Code
Painting	Color change	Amplifier cover only Munsell code; N1.5, black	**P☐**
	Coating change	High anti-corrosion coating	**X2**
Calibration unit	°F or °R		**D2**

■ OPTIONAL SPECIFICATION (For Explosion Protected type)

Item	Description	Code
Factory Mutual (FM)	FM Intrinsically safe Approval Applicable Standard: FM3600, FM3610, FM3611, FM3810, ANSI/NEMA 250 Intrinsically Safe for Class I, Division 1, Groups A, B, C & D, Class II, Division 1, Groups E, F & G and Class III, Division 1, Class I, Zone 0, in Hazardous Locations, AEx ia IIC Nonincendive for Class I, Division 2, Groups A, B, C & D, Class II, Division. 2, Groups F & G, and Class III, Division 1, Class I, Zone 2, Group IIC, in Hazardous Locations Enclosure: "NEMA 4X", Temp. Class: T4, Amb. Temp.: –50 to 70°C (–58 to 158°F) Sensor Circuit Parameter : Voc=6.6V, Isc=48mA, Po=78mW, Ca=5uF, La=30mH	**FS17**
CENELEC ATEX	CENELEC ATEX (KEMA) Intrinsically safe Approval Applicable Standard: EN60079-0, EN60079-11, EN60079-26 Certificate: KEMA 10ATEX0163 X II 1G Ex ia IIC T4 Ga Degree of protection: IP66 and IP67 Amb. Temp(Tamb).: –50 to 70°C (–58 to 158°F) Sensor Circuit Parameter : Uo=6.6V, Io=48mA, Po=78mW, Co=5uF, Lo=30mH	**KS27**
Canadian Standards Association (CSA)	CSA Intrinsically safe Approval Certificate: 2328785 [For CSA C22.2] Applicable Standard: C22.2 No.0, C22.2 No.0.4, C22.2 No.25, C22.2 No.94, C22.2 No.157, C22.2 No.213, C22.2 No.61010-1 Intrinsically Safe for Class I, Division 1, Groups A, B, C & D, Class II, Division 1, Groups E, F & G, Class III, Division 1, Nonincendive for Class I, Division 2, Groups A, B, C & D, Class II, Division 2, Groups F & G, Class III, Division 1 Enclosure: Type 4X , Temperature Code: T4 Ambient Temp.: –50 to 70°C (–58 to 158°F) [For CSA E60079] Applicable Standard: CAN/CSA E60079-0, CAN/CSA E60079-11,IEC60529 Ex ia II C T4, Enclosure: IP66 and IP67 Amb. Temp(Tamb).: –50 to 70°C (–58 to 158°F) Sensor Circuit Parameter : Uo=6.6V, Io=48mA, Po=78mW, Co=5uF, Lo=30mH	**CS17**
IECEx Scheme	IECEx Intrinsically safe Approval Applicable Standard: IEC60079-0:2007, IEC60079-11:2006, IEC60079-26:2006 Certificate: IECEx KEM 10.0073 X Ex ia IIC T4 Ga Enclosure: IP66 and IP67 Amb. Temp(Tamb).: –50 to 70°C (–58 to 158°F) Sensor Circuit Parameter : Uo=6.6V, Io=48mA, Po=78mW, Co=5uF, Lo=30mH	**SS27**

■ OPTIONAL ACCESSORIES

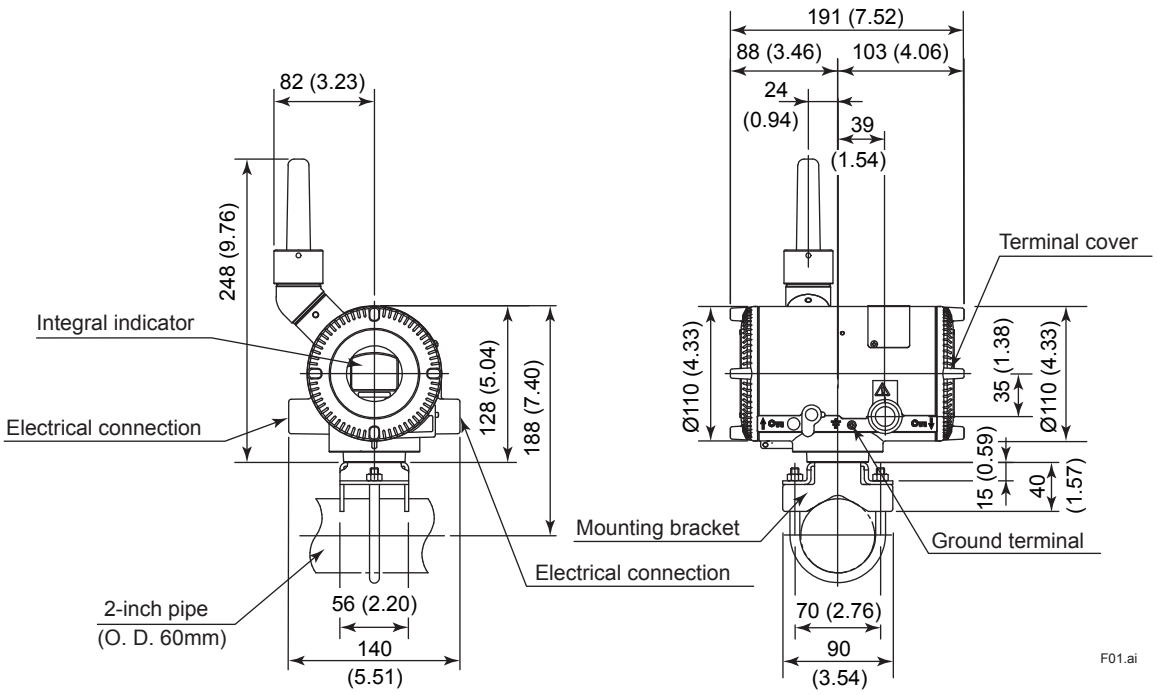
Product	Part number	Specification
Battery pack assembly	F9915NQ	Battery case, Lithium-thionyl chloride batteries 2 pieces
Batteries*1	F9915NR	Lithium-thionyl chloride batteries, 2 pieces
Battery case	F9915NK	Battery case only

*1: Alternatively, Tadiran SL-2780/S or TL-5930/S batteries can be purchased from your local distributer.

■ DIMENSIONS

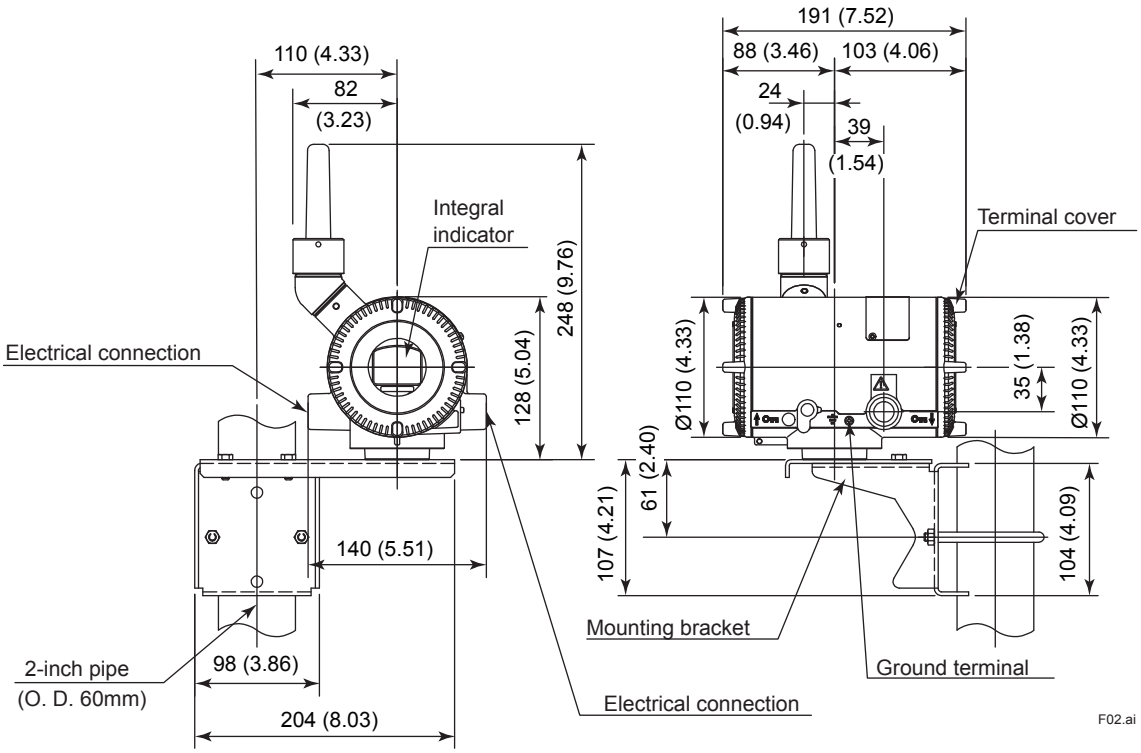
● 2-inch horizontal pipe mounting

Unit: mm (approx. inch)

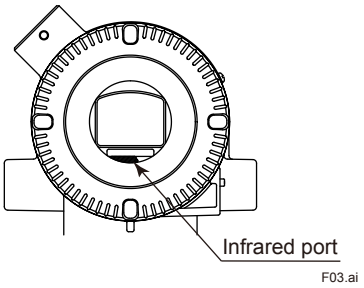


• 2-inch vertical pipe mounting

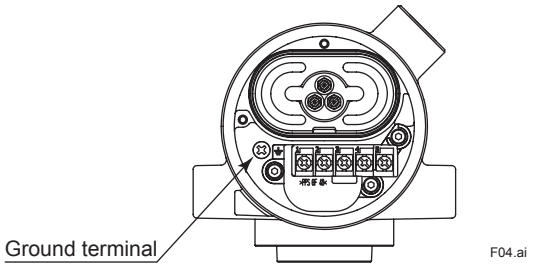
Unit: mm (approx. inch)



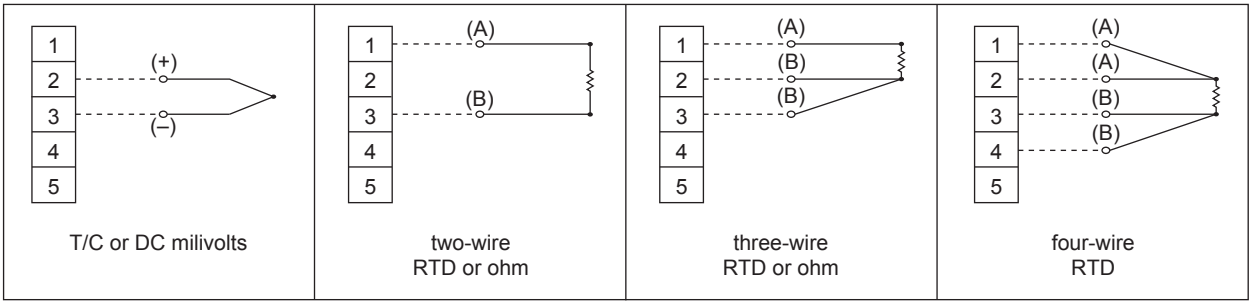
• Infrared Configuration



• Terminal Configuration



• Input Wiring



< Ordering Information >

Specify the following when ordering Model, suffix codes, and optional codes. The instrument is shipped with the settings shown in Table A. Specify the following when necessary.

1. Sensor type.
   For RTD and resistance input, specify the number of wire as well. (Example; Pt100 3-wire system)
2. Calibration range and unit
   1) Calibration range can be specified within the measurement range shown in Table 1. Also, set the upper limit is larger than the lower limit.
   2) Specify one range from °C, K, °F or °R for temperature input. °F and °R are available when Optional code D2 is specified. It is not necessary to specify the unit of mV and ohm inputs, for these units automatically will be mV or Ohm.
3. Tag Number (if required)
   Specify Tag number (up to 16 letters) to be engraved on the tag plate. The specified letters are written on TAG_Name (16 letters) in the amplifier memory.
4. Software tag
   Specify this software tag when tag number which is different from the tag number specified in the “TAG NUMBER” is required. The tag number specified in “SOFTWARE TAG” will be entered on “TAG” (up to 16 letters) in the amplifier memory.

< Factory Setting >

Table A. Settings upon shipment

Tag No.	“Blank” or as specified in order
Calibration range and unit	See Table 1. Measurement Range or as specified in order