

General Specifications

YTA110 Temperature Transmitter



GS 01C50B01-00EN

[Style: S3]

The YTA110 is the high performance temperature transmitter that accepts Thermocouple, RTD, ohms or DC millivolts inputs and converts it to a 4 to 20 mA DC signal for transmission. The YTA110 supports either BRAIN or HART communication protocol.

The YTA110 in its standard configuration is certified by TÜV as complying with SIL2 for safety requirement.



■ FEATURES

High performance

Microprocessor-based sensing technology ensures long-term accuracy and high reliability.

High reliability

Dual-compartment housing realizes high resistance capability to harsh environments, and YTA110 has SIL2 capability for safety requirement.

Variety of sensor inputs

The type of sensor input is user-selectable from thermocouples (T/C), RTDs, ohms, or DC millivolts.

Digital communication

BRAIN or HART® communication protocol is available. The instrument configuration can be changed by the user with using the BT200 or HART communicator.

Self-diagnostics function

Continuous self-diagnostics capability ensures longterm performance and lower cost of ownership.

LCD display with bargraph

The LCD display provides both a digital readout and percent bargraph simultaneously.

■ STANDARD SPECIFICATIONS

■ PERFORMANCE SPECIFICATIONS

Accuracy

(A/D accuracy/span + D/A accuracy) or $\pm 0.1\%$ of calibrated span, whichever is greater. See Table 1. on page 3.

Cold Junction Compensation Accuracy

(For T/C only)
 $\pm 0.5^\circ\text{C}$ ($\pm 0.9^\circ\text{F}$)

Ambient Temperature Effect (per 10°C change)

$\pm 0.1\%$ or \pm (Temperature Coefficient /span), whichever is greater. See Table 2. for Temperature Coefficient.

Stability

RTD:

$\pm 0.1\%$ of reading or $\pm 0.1^\circ\text{C}$ per 2 years, whichever is greater at $23\pm 2^\circ\text{C}$.

T/C:

$\pm 0.1\%$ of reading or $\pm 0.1^\circ\text{C}$ per year, whichever is greater at $23\pm 2^\circ\text{C}$.

5 Year Stability

RTD:

$\pm 0.2\%$ of reading or $\pm 0.2^\circ\text{C}$, whichever is greater at $23\pm 2^\circ\text{C}$.

T/sC:

$\pm 0.4\%$ of reading or $\pm 0.4^\circ\text{C}$, whichever is greater at $23\pm 2^\circ\text{C}$.

Power Supply Effect

$\pm 0.005\%$ of calibration span per volt

Vibration Effect

10 to 60 Hz 0.21 mm peak displacement
60 to 2000 Hz 3G

Position Effect

None

■ FUNCTIONAL SPECIFICATIONS

Input

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

Span & Range Limits

See Table 1. on page 3.

Input signal source resistance (for T/C, mV)

1 k Ω or lower

Input lead wire resistance (for RTD, ohm)

10 Ω per wire or lower

Output

Two wire 4 to 20 mA DC. Output range: 3.68 mA to 20.8 mA
 BRAIN or HART® protocol is superimposed on the 4 to 20 mA signal.
 Any single value from the followings can be selected as the analog output signal.
 Sensor 1, Terminal Temperature.
 Also, up to three of the above values can be displayed on LCD display or read via communication.

Isolation

Input/Output/GND isolated to 500 V DC

Sensor Burnout

High (21.6 mA DC) or Low (3.6 mA DC), userselectable.

Output in Transmitter Failure

Up-scale: 110%, 21.6 mA DC or more (Standard or Optional code /C3)
 Down-scale: -5%, 3.2 mA DC or less (Optional code /C1 or /C2)

Update Time

Approximately 0.5 seconds

Turn-on Time

Approximately 5 seconds

Damping Time Constant

Selectable from 0 to 99 seconds

Ambient Temperature Limits

Option code may affect limits.
 -40 to 85°C (-40 to 185°F)
 -30 to 80°C (-22 to 176°F) with Integral Indicator

Ambient Humidity Limits

5 to 100% RH at 40°C (104°F)

EMC Conformity Standards

EN61326-1 Class A, Table2
 EN61326-2-3
 CE Marking is not conformed.

SIL Certification

YTA110 temperature transmitter is certified by TÜV NORD CERT GmbH in compliance with the following standards;
 IEC 61508: 2000; Part1 to Part 7 Functional Safety of Electrical/electronic/programmable electronic related systems;
 SIL 2 capability for single transmitter use, SIL 3 capability for dual transmitter use.

Self-calibration

The analog-to-digital measurement circuitry automatically self-calibrates for temperature update by comparing the dynamic measurement to extremely stable and accurate internal reference elements.

Self-diagnostics

Loss of input error, ambient temperature error, EEPROM error, and CPU error. Up to four error history can be stored in the memory.

Manual Output Function

The output value can be set manually.

Supply & Load Requirements**Supply Voltage**

10.5 to 42 V DC for general use and flameproof type
 10.5 to 32 V DC for lightning protector (Optional code /A)
 10.5 to 30 V DC for intrinsically safe, Type n, nonincendive, or non-sparking type
 Minimum voltage limited at 16.4 V DC for digital communications, BRAIN and HART® protocols

Load

0 to 1335 Ω for operation
 250 to 600 Ω for digital communication
 See Figure 1. on page 4.

Communication Requirements**BRAIN:****Communication Distance**

Up to 2 km (1.25 miles) when using CEV polyethylene-insulated PVC-sheathed cables. Communication distance varies depending on type of cable used.

Load Capacitance

0.22 μF or less

Load Inductance

3.3 mH or less

Input Impedance of communicating device

10 kΩ or more at 2.4 kHz.

■ PHYSICAL SPECIFICATIONS**Enclosure****Material**

Low copper cast-aluminum alloy or SCS14A stainless steel (option, equivalent to SUS316 cast stainless steel and ASTM CF-8M)

Coating

Polyurethan resin baked finish
 Color: Deep-sea moss green (Munsell 0.6GY3.1/2.0)

Degrees of Protection

IP66/IP67, NEMA4X

Data and tag plate

SUS304 stainless steel or SUS316 stainless steel (option)

Mounting

Optional mounting brackets can be used either for two-inch pipe or flat panel mounting.

Terminal Screws

M4 screws

Integral Indicator

Optional LCD digital indicator includes 5-digit numerical display with °C, K, °F, °R, % and mV, 0 to 100 % bargraph and dot-matrix display.

Weight

1.2 kg(2.6 lb) without Integral indicator and Mounting bracket. Integral indicator weights 0.2 kg(0.4 lb).
 Bracket for horizontal pipe: 0.3 kg
 Bracket for vertical pipe: 1.0 kg

Electrical Connections

Refer to 'MODEL AND SUFFIX CODES' on page 5.

Table 1. Sensor type, measurement range, and accuracy

Sensor Type		Reference Standard	Measurement Range		Minimum Span (Recommended)	Accuracy				D/A Accuracy
						Input range		A/D Accuracy		
			°C	°F		°C	°F	°C	°F	
Y/C	B	IEC584	100 to 1820	212 to 3308	25°C (45°F)	100 to 300	212 to 572	±3.0	±5.4	±0.02% of span
	E		-200 to 1000	-328 to 1832		300 to 400	572 to 752	±1.0	±1.8	
	J		-200 to 1200	-328 to 2192		400 to 1820	752 to 3308	±0.75	±1.35	
	K		-200 to 1372	-328 to 2502		-200 to -50	-328 to -58	±0.35	±0.63	
	N		-200 to 1300	-328 to 2372		-50 to 1000	-58 to 1832	±0.16	±0.29	
	R		-50 to 1768	-58 to 3214		-200 to -50	-328 to -58	±0.40	±0.72	
	S		-50 to 1768	-58 to 3214		-50 to 1200	-58 to 2192	±0.20	±0.36	
	T		-200 to 400	-328 to 752		-200 to -50	-328 to -58	±0.50	±0.90	
	W3	ASTM E988	0 to 2300	32 to 4172		-50 to 1372	-58 to 2502	±0.25	±0.45	
	W5		0 to 2300	32 to 4172		-50 to 600	-58 to 1832	±0.80	±1.44	
	L	DIN43710	-200 to 900	-328 to 1652		-50 to 1300	-58 to 2372	±0.35	±0.63	
	U		-200 to 600	-328 to 1112		-50 to 0	-58 to 32	±1.0	±1.8	
RTD	Pt100	IEC751	-200 to 850	-328 to 1562	0 to 100	32 to 212	±0.80	±1.44		
	Pt200		-200 to 850	-328 to 1562	100 to 600	212 to 1112	±0.60	±1.08		
	Pt500		-200 to 850	-328 to 1562	600 to 1768	1112 to 3214	±0.40	±0.72		
	JPt100	JIS C1604	-200 to 500	-328 to 932	-200 to -50	-328 to -58	±0.25	±0.45		
	Cu	SAMA RC21-4	-70 to 150	-94 to 302	-50 to 400	-58 to 752	±0.14	±0.25		
mV	—	-10 to 100 [mV]		3 [mV]	—		±12 [µV]			
ohm	—	0 to 2000 [Ω]		20 [Ω]	—		±0.35 [Ω]			

Total Accuracy = (A/D Accuracy / Span + D/A Accuracy) or (± 0.1% of calibrated span), whichever is greater.

For T/C input, add Cold Junction Compensation Accuracy (± 0.5 °C) to the total accuracy.

Example; when selecting Pt100 with measurement range of 0 to 200 °C.

$$\frac{0.14^{\circ}\text{C}}{200^{\circ}\text{C}} \times 100\% \text{ of span} + 0.02\% \text{ of span} = 0.09\% \text{ of span}$$

Since the value is smaller than ± 0.1% of span, the total accuracy is ± 0.1%.