

General Specifications

YTA310, YTA320 Temperature Transmitter



GS 01C50B02-00EN

[Style: S3]

The YTA310 and YTA320 are the highly accurate temperature transmitters that accept Thermocouple, RTD, ohms or DC millivolts inputs and converts it to a 4 to 20 mA DC signal for transmission. The YTA310 is a single sensor input model, and the YTA320 is a dual input model. Both models support either BRAIN or HART® communication protocol, and YTA320 also supports FOUNDATION fieldbus™.

The YTA310/320 in their standard configuration, with the exception of the Fieldbus type, are certified by TÜV as complying with SIL 2 for safety requirement.

For the specifications of Fieldbus communication type marked with "△", refer to GS 01C50T02-00EN.



■ FEATURES

Outstanding performance

Microprocessor-based sensing technology ensures high accuracy and reliability.

High reliability

Dual-compartment housing realizes high resistance capability to harsh environments and the YTA310/320 have 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.

Dual universal inputs (Model YTA320)

The YTA320 can accept two thermocouple, RTD, ohm or DC millivolt inputs. Differential or average temperature measurement is selectable. The sensor backup function for automatically switches-over from the primary to the backup upon sensor failure.

■ STANDARD SPECIFICATIONS

■ PERFORMANCE SPECIFICATIONS

Accuracy

BRAIN, HART communication type:

A/D accuracy/span + D/A accuracy
(See Table 1 on page 4.)

Fieldbus communication type:

A/D accuracy (See Table 1 on page 4.)

Cold Junction Compensation Accuracy

(For T/C only)
±0.5°C (±0.9°F)

Ambient Temperature Effect

BRAIN, HART communication type:

Sum of temperature coefficient of A/D conversion and D/A conversion. (See Table 2 on page 5.)

Fieldbus communication type:

Coefficient of A/D conversion.
(See Table 2 on page 5.)

Stability

RTD:

±0.1% of reading or ±0.1°C per 2 years, whichever is greater at 23±2°C.

T/C:

±0.1% of reading or ±0.1°C per year, whichever is greater at 23±2°C.

5 Year Stability

RTD:

±0.2% of reading or ±0.2°C, whichever is greater at 23±2°C.

T/C:

±0.4% of reading or ±0.4°C, whichever is greater at 23±2°C.

Vibration Effect

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

Power Supply Effect

±0.005% of calibrated span per volt

Position Effect

None

■ FUNCTIONAL SPECIFICATIONS**Input**

YTA310: single input, YTA320: dual input
Input type is selectable: Thermocouples, 2-, 3-, and 4-wire RTDs, ohms and DC millivolts. See Table 1. on page 4.

Span & Range Limits

See Table 1. on page 4.

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 “◇”

Two wire 4 to 20 mA DC.
Output range: 3.68 to 20.8 mA
BRAIN or HART® protocol is superimposed on the 4 to 20 mA signal.
Any single value among followings can be selected as the analog output signal.
Sensor 1, Terminal Temperature.
For YTA320, same as above plus;
Sensor 2, Average, and Differential 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

Manual Output Function

The output value can be set manually.

Sensor Burnout (Output signal code D & E)

High (21.6 mA DC) or low (3.6 mA DC), user-selectable.

Output in Transmitter Failure (Output signal code D & E)

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 (Output signal code D & E)

Approximately 0.5 seconds for a single sensor
(0.8 second for dual sensors)

Turn-on Time (Output signal code D & E)

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
EN61326-2-5 (for fieldbus)
CE Marking is not conformed.

SIL Certification

YTA310/320 temperature transmitters except Fieldbus communication type are 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-diagnostics

Loss of input error, ambient temperature error, EEPROM error, and CPU error.

Sensor Back-up Function (Model YTA320)

The YTA320 can be set to automatically switch to Sensor 2 when Sensor 1 fails, and not “bump” the output signal.

Sensor Matching Function

Callender-vanDusen coefficient of specific RTD can be programmed into a transmitter to improve total measurement accuracy.

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 (Output signal code D & E)

0 to 1335 Ω for operation
250 to 600 Ω for digital communication
See Figure 1. on page 3.

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.'

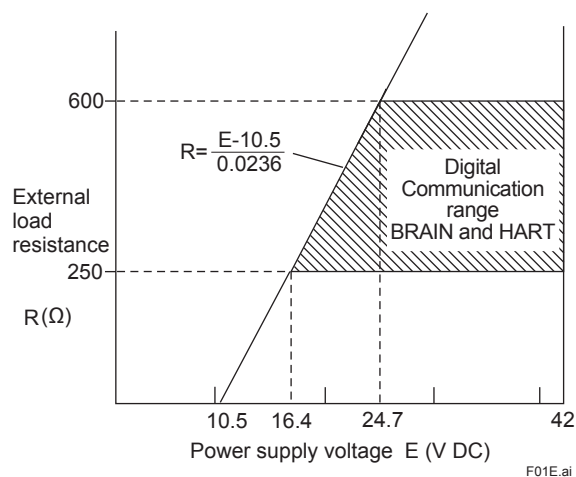


Figure 1. Relationship Between Power Supply Voltage and External Load Resistance

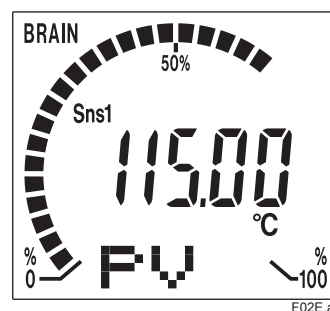


Figure 2. Integral Indicator Display Example

Table 1. Sensor type, range, and accuracy

Sensor Type		Reference Standard	Measurement Range		Minimum Span (Recommended)	Accuracy				
			°C	°F		Input range		A/D Accuracy		D/A Accuracy
					°C	°F	°C	°F	°C	
Y/C	B	IEC584	100 to 1820	212 to 3308	25°C (45°F)	100 to 300 300 to 400 400 to 1820	212 to 572 572 to 752 752 to 3308	±3.0 ±1.0 ±0.75	±5.4 ±1.8 ±1.35	±0.02% of span
	E		-200 to 1000	-328 to 1832		-200 to -50 -50 to 1000	-328 to -58 -58 to 1832	±0.35 ±0.16	±0.63 ±0.29	
	J		-200 to 1200	-328 to 2192		-200 to -50 -50 to 1200	-328 to -58 -58 to 2192	±0.40 ±0.20	±0.72 ±0.36	
	K		-200 to 1372	-328 to 2502		-200 to -50 -50 to 1372	-328 to -58 -58 to 2502	±0.50 ±0.25	±0.90 ±0.45	
	N		-200 to 1300	-328 to 2372		-200 to -50 -50 to 1300	-328 to -58 -58 to 2372	±0.80 ±0.35	±1.44 ±0.63	
	R		-50 to 1768	-58 to 3214		-50 to 0 0 to 100 100 to 600 600 to 1768	-58 to 32 32 to 212 212 to 1112 1112 to 3214	±1.0 ±0.80 ±0.60 ±0.40	±1.8 ±1.44 ±1.08 ±0.72	
	S		-50 to 1768	-58 to 3214		-50 to 0 0 to 100 100 to 600 600 to 1768	-58 to 32 32 to 212 212 to 1112 1112 to 3214	±1.0 ±0.80 ±0.60 ±0.40	±1.8 ±1.44 ±1.08 ±0.72	
	T		-200 to 400	-328 to 752		-200 to -50 -50 to 400	-328 to -58 -58 to 752	±0.25 ±0.14	±0.45 ±0.25	
	W3	ASTM E988	0 to 2300	32 to 4172		0 to 400 400 to 1400 1400 to 2000 2000 to 2300	32 to 752 752 to 2552 2552 to 3632 3632 to 4172	±0.80 ±0.50 ±0.60 ±0.90	±1.44 ±0.90 ±1.08 ±1.62	
	W5		0 to 2300	32 to 4172		0 to 400 400 to 1400 1400 to 2000 2000 to 2300	32 to 752 752 to 2552 2552 to 3632 3632 to 4172	±0.70 ±0.50 ±0.70 ±0.90	±1.26 ±0.90 ±1.26 ±1.62	
	L	DIN43710	-200 to 900	-328 to 1652		-200 to -50 -50 to 900	-328 to -58 -58 to 1652	±0.30 ±0.20	±0.54 ±0.36	
	U		-200 to 600	-328 to 1112		-200 to -50 -50 to 600	-328 to -58 -58 to 1112	±0.50 ±0.25	±0.90 ±0.45	
RTD	Pt100	IEC751	-200 to 850	-328 to 1562	10°C (18°F)	-200 to 850	-328 to 1562	±0.14 (±0.10)*	±0.25 (±0.18)*	
	Pt200		-200 to 850	-328 to 1562		-200 to 850	-328 to 1562	±0.30 (±0.22)*	±0.54 (±0.40)*	
	Pt500		-200 to 850	-328 to 1562		-200 to 850	-328 to 1562	±0.20 (±0.14)*	±0.36 (±0.25)*	
	JPt100	JIS C1604	-200 to 500	-328 to 932		-200 to 500	-328 to 932	±0.16 (±0.10)*	±0.29 (±0.18)*	
	Cu	SAMA RC21-4	-70 to 150	-94 to 302		-70 to -40 -40 to 150	-94 to -40 -40 to 302	±1.35 ±1.0	±2.43 ±1.8	
mV		—	-10 to 100 [mV]		3 [mV]	—		±12 [μV]		
ohm		—	0 to 2000 [Ω]		20 [Ω]	—		±0.35 [Ω]		

Note 1: A/D accuracy marked with () * in the above table is an accuracy for Fieldbus communication type.

Note 2: For BRAIN/HART communication type, Total Accuracy = (A/D Accuracy/Span + D/A Accuracy)

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.

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

Note 3: For differential or average measurement of YTA320, the digital accuracy is as follows;

<When the types of the sensors are similar (for example, T/C & T/C, RTD & RTD)>

A/D accuracy = A/D accuracy of either two input, whichever is worse × 1.5

<When the types of the sensors are dissimilar (for example, T/C & RTD)>

A/D accuracy = Sensor 1 A/D accuracy + Sensor 2 A/D accuracy

Table 2. Temperature Coefficient

Sensor Type		Input Range		A/D Coefficient	D/A Coefficient
		°C	°F		
T/C	B	100 to 300	212 to 572	$\pm(0.530\text{ }^{\circ}\text{C} - 0.080\text{ \% of reading})$	$\pm\{0.0088\text{ \% of span} + 0.007\text{ \% of (reading - LRV)}\}$
		300 to 1000	572 to 1832	$\pm(0.350\text{ }^{\circ}\text{C} - 0.021\text{ \% of reading})$	
		1000 to 1820	1832 to 3308	$\pm(0.140\text{ }^{\circ}\text{C})$	
	E	-200 to 1000	-328 to 1832	$\pm(0.035\text{ }^{\circ}\text{C} + 0.0042\text{ \% of abs.reading})$	
	J	-200 to 0	-328 to 32	$\pm(0.039\text{ }^{\circ}\text{C} + 0.020\text{ \% of abs.reading})$	
		0 to 1200	32 to 2192	$\pm(0.039\text{ }^{\circ}\text{C} + 0.0029\text{ \% of reading})$	
	K	-200 to 0	-328 to 32	$\pm(0.046\text{ }^{\circ}\text{C} + 0.020\text{ \% of abs.reading})$	
		0 to 1372	32 to 2502	$\pm(0.046\text{ }^{\circ}\text{C} + 0.0054\text{ \% of reading})$	
	N	-200 to 0	-328 to 32	$\pm(0.054\text{ }^{\circ}\text{C} + 0.010\text{ \% of abs.reading})$	
		0 to 1300	32 to 2372	$\pm(0.054\text{ }^{\circ}\text{C} + 0.0036\text{ \% of reading})$	
	R	-50 to 200	-58 to 392	$\pm(0.210\text{ }^{\circ}\text{C} - 0.032\text{ \% of abs.reading})$	
		200 to 1768	392 to 3214	$\pm(0.150\text{ }^{\circ}\text{C})$	
	S	-50 to 200	-58 to 392	$\pm(0.210\text{ }^{\circ}\text{C} - 0.032\text{ \% of abs.reading})$	
		200 to 1768	392 to 3214	$\pm(0.150\text{ }^{\circ}\text{C})$	
RTD	T	-200 to 0	-328 to 32	$\pm(0.046\text{ }^{\circ}\text{C} + 0.036\text{ \% of abs.reading})$	$\pm\{0.0088\text{ \% of span} + 0.007\text{ \% of (reading - LRV)}\}$
		0 to 400	32 to 752	$\pm(0.046\text{ }^{\circ}\text{C})$	
	W3	0 to 1400	32 to 2552	$\pm(0.100\text{ }^{\circ}\text{C} + 0.0040\text{ \% of reading})$	
		1400 to 2300	2552 to 4172	$\pm(-0.130\text{ }^{\circ}\text{C} + 0.020\text{ \% of reading})$	
	W5	0 to 1400	32 to 2552	$\pm(0.100\text{ }^{\circ}\text{C} + 0.0040\text{ \% of reading})$	
		1400 to 2300	2552 to 4172	$\pm(-0.120\text{ }^{\circ}\text{C} + 0.020\text{ \% of reading})$	
	L	-200 to 0	-328 to 32	$\pm(0.039\text{ }^{\circ}\text{C} + 0.020\text{ \% of abs.reading})$	
		0 to 900	32 to 1652	$\pm(0.039\text{ }^{\circ}\text{C} + 0.0029\text{ \% of reading})$	
	U	-200 to 0	-328 to 32	$\pm(0.046\text{ }^{\circ}\text{C} + 0.036\text{ \% of abs.reading})$	
		0 to 600	32 to 1112	$\pm(0.046\text{ }^{\circ}\text{C})$	
	Pt100	-200 to 850	-328 to 1562	$\pm(0.047\text{ }^{\circ}\text{C} + 0.009\text{ \% of reading})$ $[\pm(0.015\text{ }^{\circ}\text{C} + 0.005\text{ \% of reading})]^*$	
	Pt200	-200 to 850	-328 to 1562	$\pm(0.065\text{ }^{\circ}\text{C} + 0.012\text{ \% of reading})$ $[\pm(0.023\text{ }^{\circ}\text{C} + 0.005\text{ \% of reading})]^*$	
	Pt500	-200 to 850	-328 to 1562	$\pm(0.047\text{ }^{\circ}\text{C} + 0.009\text{ \% of reading})$ $[\pm(0.015\text{ }^{\circ}\text{C} + 0.005\text{ \% of reading})]^*$	
	JPt100	-200 to 500	-328 to 932	$\pm(0.047\text{ }^{\circ}\text{C} + 0.009\text{ \% of reading})$ $[\pm(0.015\text{ }^{\circ}\text{C} + 0.005\text{ \% of reading})]^*$	
	Cu	-70 to 150	-94 to 302	$\pm(0.320\text{ }^{\circ}\text{C} + 0.120\text{ \% of reading})$	
mV		—		$\pm(0.001\text{ mV} + 0.0043\text{ \% of abs.reading})$	$\pm\{0.0088\text{ \% of span} + 0.007\text{ \% of (reading - LRV)}\}$
ohm		—		$\pm(0.040\Omega + 0.0088\text{ \% of reading})$	

Note 1: A/D Coefficient marked with []* in the above table is an coefficient for Fieldbus communication type.

Note 2: For BRAIN/HART communication type;

Temperature Effect = A/D coefficient + D/A coefficient (The data in the table is the coefficient per 10 °C change.)

Example 1; Pt100Ω, 0 to 200 °C calibration range, 50 °C reading
 $(0.047\text{ }^{\circ}\text{C} + 50\text{ }^{\circ}\text{C} \times 0.009\text{ \%}) + [200\text{ }^{\circ}\text{C} \times 0.0088\text{ \%} + (50 - 0) \times 0.007\text{ \%}]$
 $= (0.047\text{ }^{\circ}\text{C} + 0.0045\text{ }^{\circ}\text{C}) + (0.0176\text{ }^{\circ}\text{C} + 0.0035\text{ }^{\circ}\text{C})$
 $= \pm 0.0726\text{ }^{\circ}\text{C}$ [per 10 °C change]

Example 2; T T/C, -100 to 100 °C calibration range, -50 °C reading
 $(0.046\text{ }^{\circ}\text{C} + |-50\text{ }^{\circ}\text{C}| \times 0.036\text{ \%}) + \{200\text{ }^{\circ}\text{C} \times 0.0088\text{ \%} + [-50 - (-100)] \times 0.007\text{ \%}\}$
 $= (0.046\text{ }^{\circ}\text{C} + 0.018\text{ }^{\circ}\text{C}) + (0.0176\text{ }^{\circ}\text{C} + 0.0035\text{ }^{\circ}\text{C})$
 $= \pm 0.0851\text{ }^{\circ}\text{C}$ [per 10 °C change]

■ MODEL AND SUFFIX CODES

Model	Suffix Codes	Descriptions
YTA310	Temperature Transmitter with Single Sensor Input
YTA320	Temperature Transmitter with Dual Sensor Input
Output Signal	-D..... -E..... -F.....	4 to 20 mA DC with digital communication (BRAIN protocol) 4 to 20 mA DC with digital communication (HART protocol, refer to GS 01C50T01-00EN) Digital communication (FOUNDATION Fieldbus protocol) ^{*1}
—	A.....	Always A
Electrical Connection	0..... 2..... 3..... 4.....	G1/2 female 1/2 NPT female Pg 13.5 female M20 female
Integral Indicator	D..... N.....	with digital indicator None
Mounting Bracket	B..... D..... J..... K..... N.....	SUS304 Stainless steel 2-inch horizontal pipe mounting ^{*2} SUS304 Stainless steel 2-inch vertical pipe mounting ^{*2} SUS316 Stainless steel 2-inch horizontal pipe mounting ^{*2} SUS316 Stainless steel 2-inch vertical pipe mounting ^{*2} None
Option codes	/□ Optional specifications	

*1: Applicable only for YTA320, refer to GS 01C50T02-00EN for Fieldbus communication.

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

■ OPTIONAL SPECIFICATION

Item	Description	Code
Lightning protector	Power supply voltage: 10.5 to 32 V DC (9 to 32 V DC for Fieldbus communication type.) Allowable current: Max. 6000 A(1×40μs), repeating 1000 A(1×40μs) 100 times	A
Painting	Coating change	X1
	Color change	P1
	Amplifier cover only	P2
	Munsell code: N1.5 Black	P7
	Munsell code: 7.5BG4/1.5, Jade green	PR
	Metallic silver	
	Amplifier and terminal Covers	
	Munsell code: 7.5 R4/14 Red	
SUS316 exterior parts	Exterior parts on the amplifier housing (name plates, tag plate, screws) will become SUS316 stainless steel ^{*4}	HC
Calibration Unit	Degree F/Degree R unit	D2
Output signal low-side in Transmitter failure ^{*1}	Output signal low-side: -5%, 3.2 mA DC or less. Sensor burnout is also set to 'LOW': -2.5%, 3.6 mA DC.	C1
NAMUR NE43 Compliant ^{*1}	Output signal limits: 3.8 mA to 20.5 mA	C2
	Failure alarm down-scale: output status at CPU failure and hardware error is -5%, 3.2 mA or less. Sensor burnout is also set to LOW: -2.5%, 3.6 mA DC.	C3
	Failure alarm up-scale: output status at CPU failure and hardware error is 110%, 21.6 mA or more. In this case Sensor burnout is High: 110%, 21.6 mA DC.	
Data Configuration	Description into "Descriptor" parameter of HART protocol (max. 16 characters)	CA
Sensor matching function ^{*2}	RTD Sensor matching function	CM1
Stainless steel housing ^{*3}	Housing Material: SCS14A stainless steel (equivalent to SUS316 cast stainless steel and ASTM CF-8M)	E1
Wired tag plate	SUS304 stainless steel tag plate wired onto transmitter ^{*5}	N4

*1: Not applicable for output signal code F.

*2: Not necessary to specify when ordering output signal code F, as this function is already included.

*3: Not applicable for optional code JF3, G12, P1, P2, P7, PR, and X1.

*4: This specification is not included in option code E1. Select HC for SUS316 exterior parts regardless of E1.

*5: When HC is selected, the material is SUS316 stainless steel.

■ OPTIONAL SPECIFICATION (For Explosion Protected type)

For FOUNDATION Fieldbus explosion protected type, see GS 01C50T02-00EN

Item	Description	Code
Canadian Standards Association (CSA)	<p>CSA Intrinsically safe, non-incendive and Explosionproof approval combination^{*3}</p> <p>[Intrinsically safe/non-incendive approval]</p> <p>Applicable standard: C22.2 No0, C22.2 No0.4, C22.2 No25, C22.2 No94, C22.2 No142, C22.2 No157, C22.2 No213</p> <p>Certificate: 172608-0001053837</p> <p>Intrinsically safe for Class I, Division 1, Groups A, B, C and D; Class II, Division 1, Groups E, F and G; Class III, Division 1:</p> <p>Non-incendive for Class I, Division 2, Groups A, B, C and D; Class II, Division 2, Groups E, F and G; Class III, Division 1:</p> <p>Enclosure Type 4X Temperature Class: T4, Ambient Temperature: -40 to 60°C</p> <p>Supply: Vmax=30 V, Imax=165 mA, Pmax=0.9W, Ci=18nF, Li=730μH</p> <p>Sensor input: Voc=9 V, Isc=40 mA, Po=0.09W, Ca=1μF, La=10 mH</p> <p>Electrical Connection: 1/2 NPT female^{*2}</p> <p>[Explosionproof approval]</p> <p>Applicable standard: C22.2 No0, C22.2 No0.4, C22.2 No25, C22.2 No30, C22.2 No94, C22.2 No142, C22.2 No157, C22.2 No213, C22.2 No1010.1</p> <p>Certificate: 1089576</p> <p>Explosionproof Class I, Div.1, Groups B, C and D, Class II, Groups E, F and G, Class III.</p> <p>For Class I, Div.2 Locations "FACTORY SEALED, CONDUIT SEAL NOT REQUIRED"</p> <p>Enclosure TYPE 4X Temperature Class: T6 Ambient Temperature: -40 to 60°C</p> <p>Electrical Connection: 1/2 NPT female^{*2}</p>	CU1
Factory Mutual (FM)	<p>FM Intrinsically safe, non-incendive and Explosionproof approval combination^{*3}</p> <p>[Intrinsically safe/non-incendive approval]</p> <p>Applicable standard: FM 3600, FM 3610, FM 3611, FM 3810</p> <p>Intrinsically safe for Class I, II, III Division 1 Groups A, B, C, D, E, F and G.</p> <p>Non-incendive for Class I, II, Division 2 Groups A, B, C, D, F and G Class III, Division 1.</p> <p>Enclosure Type: 4X Temperature Class: T4 Ambient Temperature: -40 to 60°C (-40 to 140°F)</p> <p>Supply: Vmax=30 V, Imax=165 mA, Pmax=0.9W, Ci=18nF, Li=730μH</p> <p>Sensor: Voc=9 V, Isc=40 mA, Po=0.09W, Ca=1μF, La=10 mH</p> <p>[Explosionproof approval]</p> <p>Applicable standard: FM 3600, FM 3615, FM 3810, ANSI/NEMA 250</p> <p>Class I, Division 1, Groups A, B, C and D.;</p> <p>Dust-ignitionproof for Class II/III, Division 1, Groups E, F and G.</p> <p>"FACTORY SEALED, CONDUIT SEAL NOT REQUIRED." Enclosure Ratings: TYPE 4X</p> <p>Temperature Class: T6 Ambient Temperature: -40 to 60°C (-40 to 140°F)</p> <p>Electrical Connection: 1/2NPT female^{*2}</p>	FU1
	<p>FM Explosionproof approval</p> <p>Applicable standard: FM 3600, FM 3615, FM 3810, ANSI/NEMA 250</p> <p>Explosionproof Class I, Division 1, Groups A, B, C and D;</p> <p>Dust-ignitionproof for Class II/III, Division 1, Groups E, F and G.</p> <p>"FACTORY SEALED, CONDUIT SEAL NOT REQUIRED." Enclosure Rating: TYPE 4X</p> <p>Temperature Class: T6 Ambient Temperature: -40 to 60°C (-40 to 140°F)</p> <p>Electrical Connection: 1/2 NPT female^{*2}</p>	FF1
IECEx	<p>IECEx Intrinsically safe, Flameproof and Dust ignition proof Approval</p> <p>[Intrinsically safe approval]</p> <p>Applicable standard: IEC60079-11:2011, IEC60079-0:2011, IEC60079-26:2006</p> <p>Certificate No.: IECEx KEM 09.0032X</p> <p>Ex ia IIC T4...T5 Ga, Ex ic IIC T4...T5 Gc</p> <p>Ambient Temperature: -40 to 70°C for T4, -40 to 50°C for T5</p> <p>Enclosure: IP66/IP67</p> <p>Supply circuit : Ui = 30 V, Ii = 165 mA, Pi = 900 mW, Ci = 20nF, Li = 730μH (Ex ia IIC T4...T5 Ga)</p> <p>: Ui = 30 V, Ci = 20nF, Li = 730μH (Ex ic IIC T4...T5 Gc)</p> <p>Sensor circuit: Uo = 9 V, Io = 40 mA, Po = 90 mW, Co = 0.7μF, Lo = 10 mH</p> <p>[Flameproof and Dust ignition proof]</p> <p>Applicable Standard: IEC 60079-0: 2011, IEC 60079-1: 2014-06, IEC 60079-31:2013</p> <p>Certificate: IECEx KEM 07.0044</p> <p>Ex db IIC T6/T5 Gb, Ex tb IIC T70°C/T90°C Db</p> <p>Ambient Temperature for Gas Atmospheres: -40 to 75°C (-40 to 167°F) for T6,</p> <p>-40 to 80°C (-40 to 176°F) for T5</p> <p>Ambient Temperature for Dust Atmospheres: -30 to 65°C (-22 to 149°F) for T70°C,</p> <p>-30 to 80°C (-22 to 176°F) for T90°C</p> <p>Enclosure: IP66/IP67</p> <p>Electrical Connection: 1/2 NPT female and M20 female^{*1}</p>	SU2

Item	Description		Code
TIIS Certification*4	TIIS Flameproof approval Ex ds IIC T6 X Amb. Temp.: -20 to 60°C		JF3
Attached flameproof packing adapter*5	Electrical connection: G1/2 female Applicable cable: O.D. 8.5 to 11 mm	2 pc.	G12

*1: Applicable for Electrical Connection Code 2 and 4.

*2: Applicable for Electrical Connection Code 2.

*3: Not applicable for Output Signal Code F.

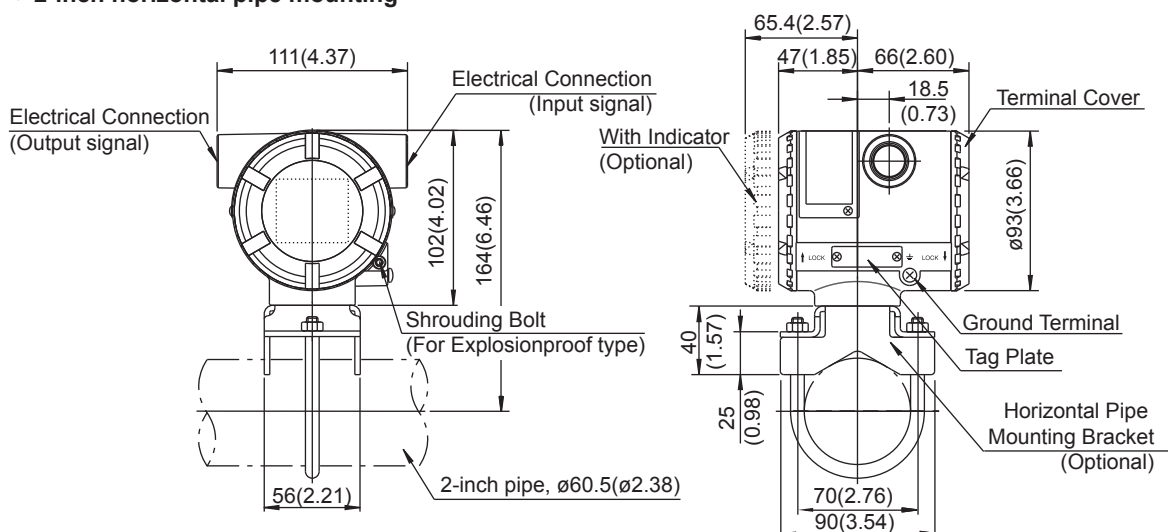
*4: Not applicable for /HC and /E1.

*5: If cable wiring is to be used to a TIIS flameproof type transmitter, do not fail to add the YOKOGAWA-assured flameproof packing adapter.

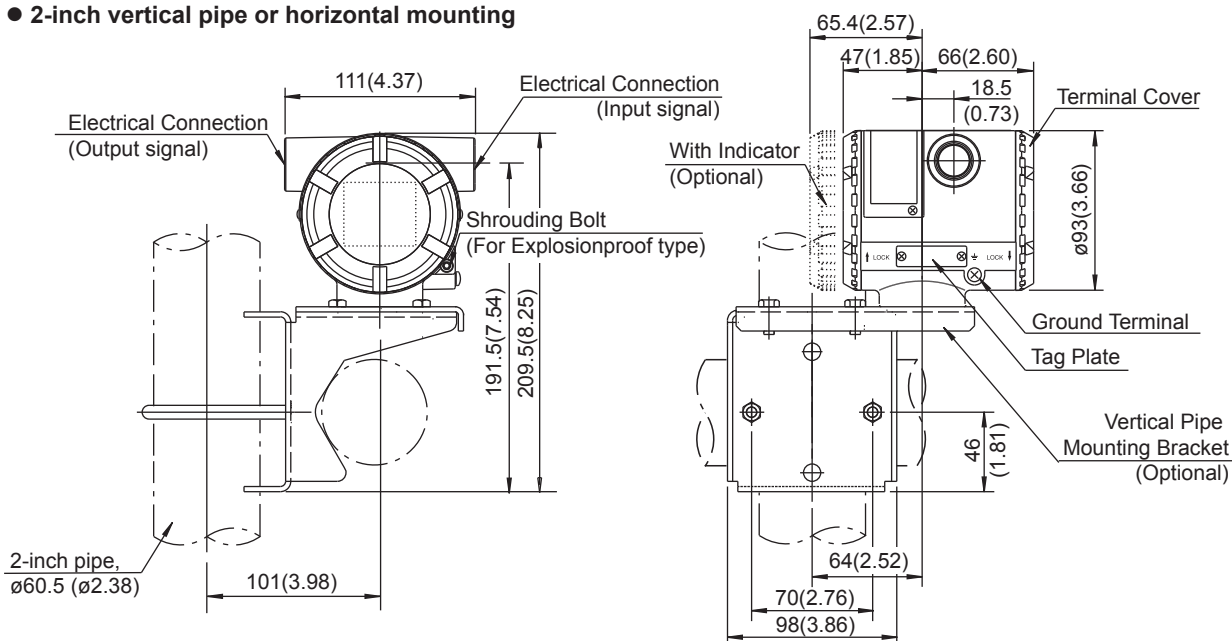
■ DIMENSIONS

Unit: mm (Approx. inch)

- **2-inch horizontal pipe mounting**

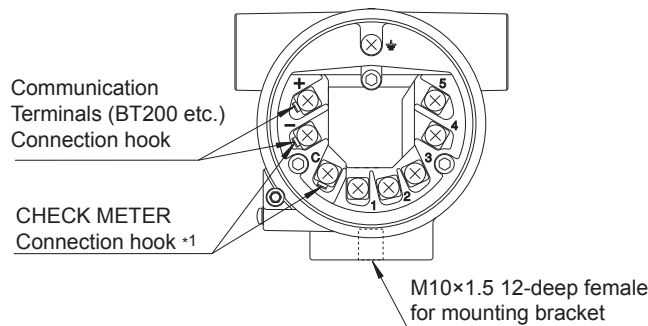


- 2-inch vertical pipe or horizontal mounting



F03E.ai

Terminals



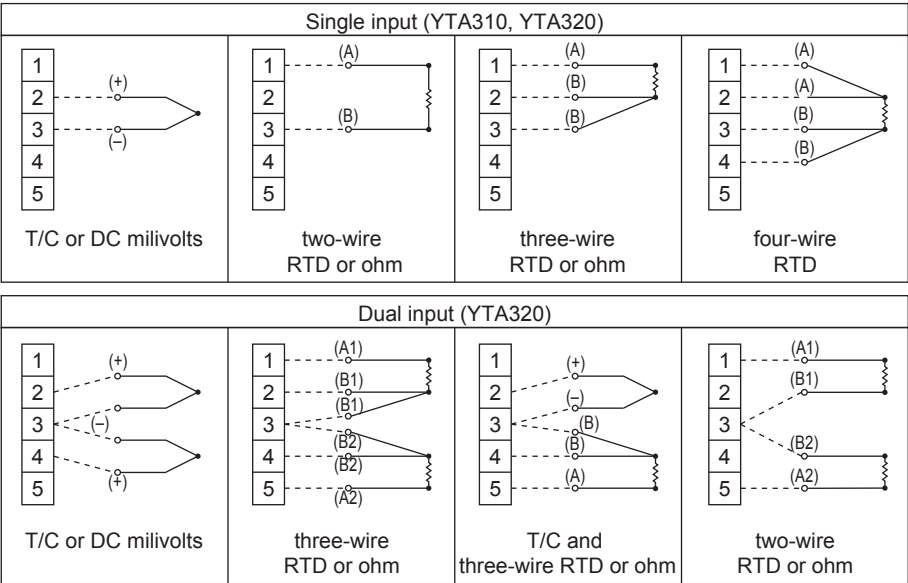
Terminal Configuration

+	Power Supply and output terminal
- C	External Indicator (ammeter) terminal *1
⏏	Ground terminal

*1: When using an external indicator or check meter, the internal resistance must be 10Ω or less. This hook is not available for Fieldbus communication type(output signal code F).

F04E.ai

Input Wiring



F05E.ai

< Ordering Information > "◇"

Specify the following when ordering.

For output signal code F, refer to GS 01C50T02-00EN.

Model, suffix codes, and optional codes

The instrument is shipped with the settings shown in Table A. Specify the followings when necessary.

1. Sensor type.

For RTD and resistance input, specify the number of wire as well. For YTA320, specify the type for two inputs.*1

(Example; Pt200 3-wire system)

2. Calibration range and unit

1) Calibration range can be specified within the measurement range shown in Table 1. on page 4.

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 input, for these units automatically will be mV or Ω.

3. Tag Number

4. Other Items related with options

/CA option allows specifying the setting Descriptor for HART protocol type at factory.

Specify upto 16 characters to be entered in the Descriptor parameter.

*1: For YTA320 when 4-wire RTD is specified as Sensor1, Sensor2 cannot be used.

Table A. Settings upon shipment

Input sensor type	Pt100 three-wire system, or as specified
Calibration range lower limit	"0" or as specified
Calibration range upper limit	"100" or as specified
Calibration unit	"°C" or as specified
Damping time constant	2 seconds
Sensor burnout *1	High (110%, 21.6 mA DC)
Output in Transmitter failure *1	High (110%, 21.6 mA DC or more)
Integral Indicator *2	PV
Output type	Sensor 1
Tag number	As specified in order

*1: Except when Optional code C1 or C2 is specified.

*2: When Integral indicator is specified.

< Related Instruments >

Power Distributor:

Refer to GS 01B04T01-02E or GS 01B04T02-00E

BRAIN TERMINAL: Refer to GS 01C00A11-00E

< Reference >

HART; Trademark of The HART Communiation Foundation. (USA)

FOUNDATION Fieldbus; Trademark of The Fieldbus Foundation. (USA)

Material Cross Reference Table

SUS304	AISI 304
SUS316	AISI 316