General Specifications

Model YTA310, YTA320
Temperature Transmitter

YTA SERIES

GS 1C50B2-E

The YTA310 and YTA320 are the highly accurate temperature transmitters that accept Thermocouple, RTD, ohms or DC milivolts 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® 275 communication protocol.

■ FEATURES

Outstanding performance, high reliability

Microprocesser-based sensing technology ensures high accuracy and reliability.

Variety of sensor inputs

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

Digital communication

BRAIN or HART® communication protocol is available. The insturment configuration can be changed by the user with using the BT200 or HART®275 communicator.

Self-diagnostics function

Continuous self-diagnostics capability ensures long-term 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 milivolt 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
A/D accuracy/span + D/A accuracy
See Table 1. on page 3.

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

Ambient Temperature Effect
Sum of temperature coefficient of A/D conversion and D/A conversion. See Table 2. on page 4.

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

RFI Effect
Tested per EN 50082-2, field intensity up to 10 V/m.

Power Supply Effect
± 0.005 % of calibration 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 milivolts. See table 1. on page 2.

Span & Range Limits
See Table 1. on page 3.

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.
Signal 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 singal.
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 500V AC

Manual Output Function
The output value can be set manually.

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

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Output in Transmitter Failure
High (21.6 mA DC or more) or Low (3.2 mA DC or less)

Response 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 CE , N200
For EMI (Emission): EN55011, AS/NZS 2064 1/2
For EMS (Immunity): EN550082-2

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.

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 operation
16.4 to 42 V DC for digital communications, BRAIN and HART® protocols

Load
0 to 1335 Ω for operation
250 to 600 Ω for digital communication

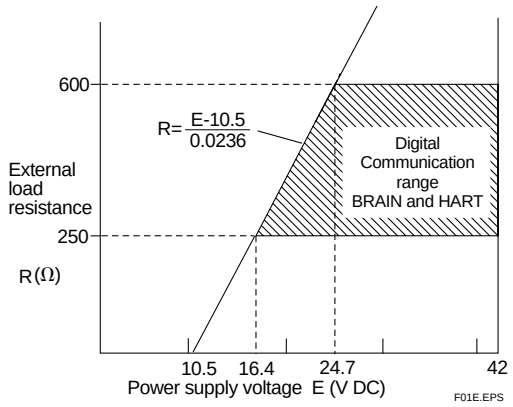

Figure 1. Relationship Between Power Supply Voltage and External Load Resistance.

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.

HART®

Communication Distance
Up to 1.5 km (1 mile) when using multiple twisted pair cables. Communication distance varies depending on type of cable used.

Use the following formula to determine cable length for specific applications:

$$L=\frac{65 \times 10^6}{(R \times C)} - \frac{(C_f + 10{,}000)}{C}$$

Where:
L = length in meters or feet
R = resistance in Ω (including barrier resistance)
C = cable capacitance in pF/m or pF/ft
C_f = maximum shunt capacitance of receiving devices in pF

PHYSICAL SPECIFICATIONS

Enclosure

Material
Low copper cast-aluminum alloy
Coating
Polyurethan resin baked finish
Color: Deep-sea moss green (Munsell 0.6GY3.1/2.0)

Enclosure Classification
JIS C0920 immersion proof
(equivalent to NEMA 4X and IEC IP67)

Data and tag plat
SUS304 Stainless steel
Mounting
Optional mounting bracket 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 dispaly with ˚C, ˚F, K, ˚R, % and mV, 0 to 100% bargraph and dot-matrix display.

Weight
1.2 kg(2.6lbs.) without integral indicator and mountingbracket. Integral indicator weights 0.2 kg(0.4lbs.).

Electrical Connections
Refer to '**MODEL AND SUFFIX CODES.**'

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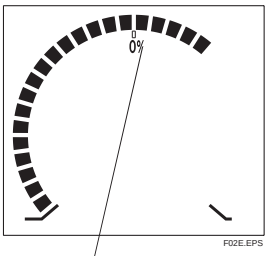

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< Ordering Information >

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. 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 3.
   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

*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 (°C)
Output type	Sensor 1
Tag number	As specified in order

*1: Except when Optional code C1 is specified. T07E.EPS
*2: When Integral indicator is specified.

< Related Instruments >

Power Distributor: Refer to GS 1B4T1-E, 1B4T2-E.
BRAIN TERMINAL: Refer to GS 1C0A11-E

< Reference >

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

Material Cross Reference Table

SUS304	AISI 304

T08E.EPS

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