User's Manual

YTA Series
Temperature Transmitters
[Style: S3]

Manual Change No. 12-012

Please use the attached sheets for the pages listed below in the following manuals.

IM 01C50B01-01E (13th)

Page and Item	Contents of Correction/Change
P. 2-5 to 2-6 2.7.2 ATEX Certification	Change the applicable standards for EN60000 series standard. Change the electrical data for supply and sensor circuit.
P. 2-7 (6) Name Plate	Change the image of applicable name plate for ATEX Certification.
P. 2-11 2.7.5 IECEx Certification	Change the applicable standards for EN60000 series standard. Change the electrical data for supply and sensor circuit.
P.7-2 7.1 Standard Specifications	Add the notation of IP66. Remove JIS C0920 immersion proof.
P.7-5 7.2 Model and Suffix Codes 7.3 Optional Specifications	Add Mounting bracket code J and K. Add option code /HC and /N4.
P. 7-6 7.3 Optional Specifications	Change the notation of the table.
P. 7-7 7.4 Dimensions	Change the dimensions for cover.

YOKOGAWA ◆
Yokogawa Electric Corporation

June 11, 2012

2.6.2 Withstand voltage test procedure

■ Testing between the output terminal and the input terminal

1. Lay transition wiring between the + terminal, the – terminal, and the check terminal of the terminal box.
2. Lay transition wiring between terminals 1, 2, 3, 4 and 5 of the terminal box.
3. Connect the withstand voltage tester (with the power turned OFF) between the transition wiring shown in Steps 1 and 2 above.
4. After setting the current limit value of the withstand voltage tester to 10mA, turn the power ON, and carefully increase the impressed voltage from 0V to the specified value.
5. The voltage at the specified value must remain for a duration of one minute.
6. Upon completion of the test, carefully reduce the voltage so that no voltage surge occurs.

■ Testing between the output terminal and the grounding terminal

1. Lay the transition wiring between the + terminal, the - terminal and the check terminal of the terminal box, and connect the withstand voltage tester (with the power turned OFF) between the transition wiring and the grounding terminal. Connect the grounding side of the withstand voltage tester to the grounding terminal.
2. After setting the current limit value of the withstand voltage tester to 10mA, turn the power ON, and gradually increase the impressed voltage from 0V to the specified value.
3. The voltage at the specified value must remain for a duration of one minute.
4. Upon completion of the test, carefully reduce the voltage so that no voltage surge occurs.

■ Testing between the input terminal and the grounding terminal

1. Lay the transition wiring across terminals 1, 2, 3, 4, and 5 of the terminal box and connect the withstand voltage tester (with the power turned OFF) between the transition wiring and the grounding terminal. Connect the grounding side of the withstand voltage tester to the grounding terminal.
2. After setting the current limit value of the withstand voltage tester to 10mA, turn the power ON, and gradually increase the impressed voltage from 0V to the specified value.
3. The voltage at the specified value must remain for a duration of one minute.
4. Upon completion of the test, carefully reduce the voltage so that no voltage surge occurs.

2.7 Installation of Explosion Protected Type Transmitters

In this section, further requirements and differences and for explosionproof type instrument are described. For explosionproof type instrument, the description in this chapter is prior to other description in this users manual.

⚠ CAUTION

To preserve the safety of explosionproof equipment requires great care during mounting, wiring, and piping. Safety requirements also place restrictions on maintenance and repair activities. Please read the following sections very carefully.

2.7.1 CSA Certification

Model YTA110/CU1, YTA310/CU1 and YTA320/CU1 temperature transmitters can be selected the type of protection (CSA Intrinsically Safe, Non-incendive, or Explosionproof) for use in hazardous locations.

Note 1. For the installation of this transmitter, once a particular type of protection is selected, any other type of protection cannot be used. The installation must be in accordance with the description about the type of protection in this instruction manual.

Note 2. In order to avoid confusion, unnecessary marking is crossed out on the label other than the selected type of protection when the transmitter is installed.

a) CSA Intrinsically Safe Type/Non-incendive Type

Caution for CSA Intrinsically safe type. (Following contents refers “DOC No. ICS008-A13 P.1-1 and P.1-2”)

Note 1. Model YTA110/CU1, YTA310/CU1 and YTA320/CU1 temperature transmitters are applicable for use in hazardous locations:

Certificate 172608-0001053837

[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.142, C22.2 No.157, C22.2 No.213
- Intrinsically Safe for Class I, II, III, Division 1, Groups A, B, C, D, E, F & G.
- Non-incendive for Class I, II, Division 2, Groups A, B, C, D, F & G, Class III, Division 1.

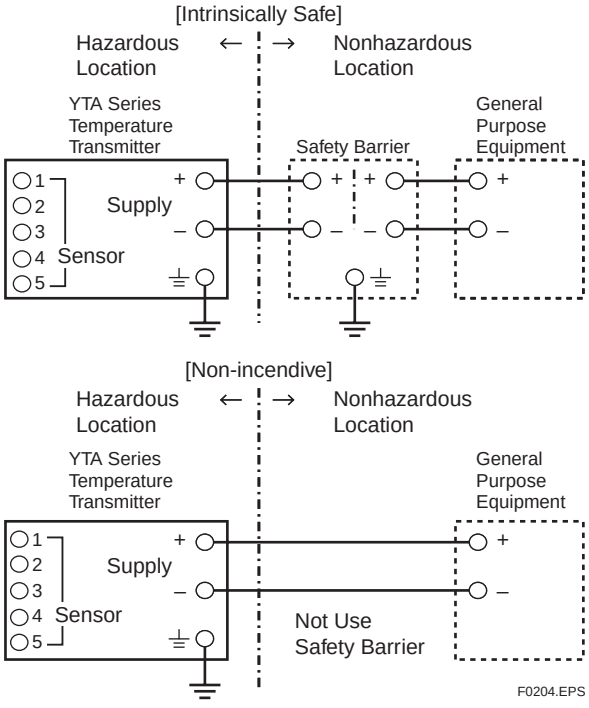
- Encl. “Type 4X”
- Temperature Class: T4
- Ambient temperature: –40 to 60°C

Note 2. Entity Parameters (Electrical/Non-incendive field wiring parameters)

- [Supply Circuit]
  Vmax = 30 V, Imax = 165 mA, Pmax = 0.9 W
  Ci = 18 nF, Li = 730 μH
- [Associated apparatus]
  Voc ≤ 30 V, Isc ≤ 165 mA, Pmax ≤ 0.9 W
- [Sensor Circuit]
  Voc = 9 V, Isc = 40 mA, Po = 90 mW,
  Ca = 1 μF, La = 10 mH

Note 3. Installation

- All wiring shall comply with Canadian Electrical Code Part I and Local Electrical Codes.
- For the sensor circuitry, the above parameters for sensor circuit must be taken into account.
- Dust-tight conduit seal must be used when installed in class II and III environments.
- In any used safety barrier, output current must be limited by a resistor 'R' such that Isc=Voc/R.
- The safety barrier must be CSA certified, and the input voltage of the barrier must be less than 250Vrms/Vdc.
- For non-incendive type, general purpose equipment must be CSA certified and the equipment which have non-incendive field wiring parameters.
- The instrument modification or parts replacement by other than authorized representative of Yokogawa Electric Corporation is prohibited and will void Canadian Standards Intrinsically safe and nonincendive Certification.



b) CSA Explosionproof Type

Caution for CSA Explosionproof type

Note 1. Model YTA110/CU1, YTA310/CU1 and YTA320/CU1 temperature transmitters are applicable for use in hazardous locations:

Certificate 1089576

[For CSA C22.2]

- Applicable Standard: C22.2 No.0, C22.2 No.0.4, C22.2 No.25, C22.2 No.30, C22.2 No.94, C22.2 No.142, C22.2 No.157, C22.2 No.213, C22.2 No.1010.1
- Explosionproof for Class I, Division 1, Groups B, C and D.
- Dust-ignitionproof for Class II, Groups E, F and G, Class III.
- Encl “Type 4X”
- Temperature Class: T6
- Ambient Temperature: –40 to 60°C
- Supply Voltage: 42 V dc max.
- Output Signal: 4 to 20 mA

Note 2. Wiring

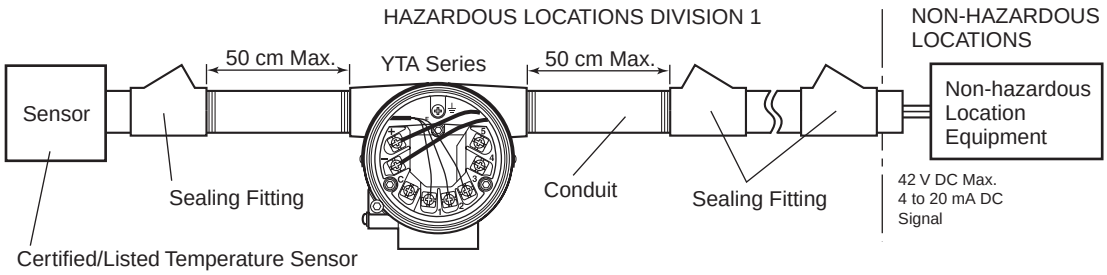
- All wiring shall comply with Canadian Electrical Code Part I and Local Electrical Codes.
- In hazardous location, wiring shall be in conduit as shown in the figure.
  WARNING: A SEAL SHALL BE INSTALLED WITHIN 50 cm OF THE ENCLOSURE. UN SCELLEMENT DOIT ÊTRE INSTALLÉ À MOINS DE 50 cm DU BOÎTIER.
- When installed in Division 2, “FACTORY SEALED, CONDUIT SEAL NOT REQUIRED”.

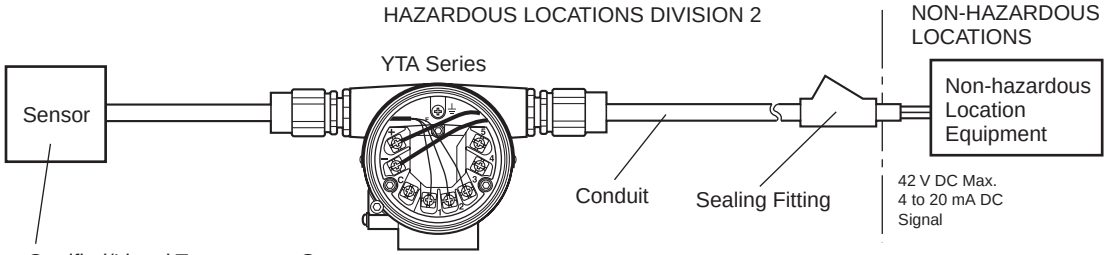
Note 3. Operation

- Keep strictly the “WARNING” on the label attached on the transmitter.
  WARNING: OPEN CIRCUIT BEFORE REMOVING COVER. OUVRIR LE CIRCUIT AVANT D´ENLEVER LE COUVERCLE.
- Take care not to generate mechanical spark when access to the instrument and peripheral devices in hazardous location.

Note 4. Maintenance and Repair

- The instrument modification or parts replacement by other than authorized representative of Yokogawa Electric Corporation is prohibited and will void Canadian Standards Explosionproof Certification.





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2.7.2 ATEX Certification

Model YTA110/KU2, YTA310/KU2 and YTA320/KU2 temperature transmitters can be selected the type of protection (ATEX Intrinsically Safe or ATEX Flameproof or ATEX Type of Protection "n") for use in hazardous locations.

Note 1. For the installation of this transmitter, once a particular type of protection is selected, any other type of protection cannot be used. The installation must be in accordance with the description about the type of protection in this instruction manual.

Note 2. In order to avoid confusion, unnecessary marking is crossed out on the label other than the selected type of protection when the transmitter is installed.

(1) Technical Data

a) ATEX Intrinsically Safe Type

Caution for ATEX Intrinsically safe type

Note 1. Model YTA110/KU2, YTA310/KU2 and YTA320/KU2 temperature transmitters for potentially explosive atmospheres:

- No. KEMA 02ATEX1026X
- Applicable Standard: EN 60079-0:2009, EN 60079-11:2007, EN 60079-26:2007, EN 60529:1991
- Type of Protection and Marking code: II 1G Ex ia IIC T4...T5
- Temperature Class: T5, T4
- Ambient Temperature: –40 to 70°C for T4, –40 to 50°C for T5
- Enclosure: IP67

Note 2. Electrical Data

- In type of explosion protection intrinsic safety II 1G Ex ia IIC only for connection to a certified intrinsically safe circuit with following maximum values:
- [Supply circuit]

  Ui = 30 V Ii = 165 mA
  Pi = 900 mW
  Effective internal capacitance, Ci = 20 nF
  Effective internal inductance, Li = 730 μH
- [Sensor circuit]

  Uo = 9 V Io = 40 mA
  Po = 90 mW
  Max. allowed external capacitance, Co = 0.7μF
  Max. allowed external inductance, Lo = 10 mH

Note 3. Installation

- All wiring shall comply with local installation requirements. (Refer to the installation diagram)

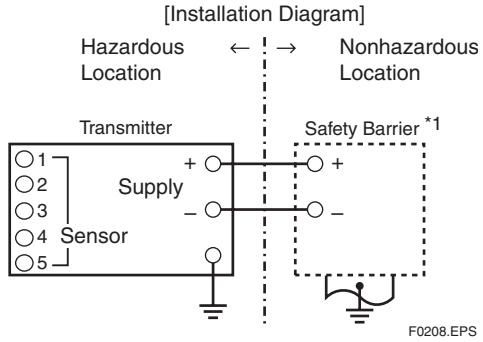
Note 4. Operation

- Keep strictly the "WARNING" on the label on the transmitter.

  WARNING: POTENTIAL ELECTROSTATIC CHARGING HAZARD. SEE USER'S MANUAL BEFORE USE.

Note 5. Maintenance and Repair
- The instrument modification or parts replacement by other than authorized representative of Yokogawa Electric Corporation is prohibited and will void ATEX Intrinsically safe Certification.

Note 6. Special condition for safe use
- Because the enclosure of the Temperature Transmitter is made of aluminium, if it is mounted in an area where the use of category 1G apparatus is required, it must be installed such, that, even in the event of rare incidents, ignition source due to impact and friction sparks are excluded.
- Avoid any actions that cause the generation of electrostatic charge on the non-metallic parts, such as rubbing with a dry cloth on coating face of product.



*1: In any safety barriers used the output current must be limited by a resistor "R" such that Imaxout-Uz/R.

b) ATEX Flameproof Type and Dust Ignition Proof Type

Caution for ATEX Flameproof Type and Dust Ignition Proof Type

Note 1. Model YTA110/KU2, YTA310/KU2 and YTA320/KU2 temperature transmitters are applicable for use in hazardous locations:
- No. KEMA 07ATEX0130
- Applicable Standard: EN 60079-0:2006, IEC 60079-1:2007, EN 61241-0:2006, EN 61241-1:2004
- Type of Protection and Marking Code: II 2G Ex d IIC T6/T5, II 2D Ex tD A21 IP67 T70°C, T90°C
- Ambient Temperature for Gas Atmospheres: –40 to 75°C (T6), –40 to 80°C (T5)
- Ambient Temperature for Dust Atmospheres: –40 to 65°C (T70°C), –40 to 80°C (T90°C)
- Enclosure: IP67

Note 2. Electrical Data
- Supply voltage: 42 V dc max.
- Output signal: 4 to 20 mA

Note 3. Installation
- All wiring shall comply with local installation requirement.
- The cable entry devices shall be of a certified flameproof type, suitable for the conditions of use.

Note 4. Operation
- Keep strictly the "WARNING" on the label on the transmitter.

  WARNING: AFTER DE-ENERGIZING, DELAY 5 MINUTES BEFORE OPENING. WHEN THE AMBIENT TEMP. ≧ 70°C, USE THE HEATRESISTING CABLES OF HIGHER THAN 90°C.
- Take care not to generate mechanical spark when access to the instrument and peripheral devices in hazardous location.

Note 5. Maintenance and Repair
- The instrument modification or parts replacement by other than authorized representative of Yokogawa Electric Corporation is prohibited and will void ATEX Flameproof Certification.

c) ATEX Type of Protection "n"

⚠ WARNING

When using a power supply not having a non-incendive circuit, please pay attention not to ignite in the surrounding flammable atmosphere. In such a case, we recommend using wiring metal conduit in order to prevent the ignition.

Caution for ATEX Type of Protection "n"

Note 1. Model YTA110/KU2, YTA310/KU2 and YTA320/KU2 temperature transmitters for potentially explosive atmospheres:
- Applicable standard: EN60079-15:2005, EN60079-0:2009
- Type of Protection and Marking Code: II 3G Ex nL IIC T4...T5 Gc
- Temperature Class: T5, T4
- Ambient Temperature: –30 to 50°C for T5, –30 to 70°C for T4
- Enclosure: IP67

Note 2. Electrical Data

[Supply circuit]

Ui = 30 V
Effective internal capacitance, Ci = 20 nF
Effective internal inductance, Li = 730 μH

[Sensor circuit]

Uo = 9 V Io = 40 mA Po = 90 mW
Max. allowed external capacitance, Co = 0.7μF
Max. allowed external inductance, Lo = 10 mH

Note 3. Installation

- All wiring shall comply with local installation requirements. (refer to the installation diagram)

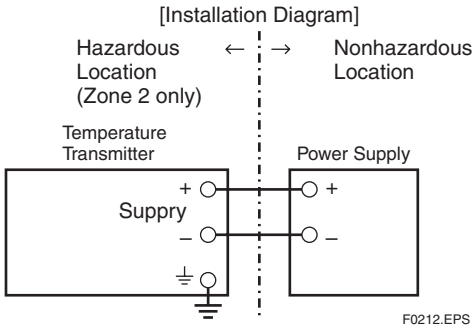
Note 4. Operation

- Keep strictly the “WARNING” on the label on the transmitter.

  WARNING: POTENTIAL ELECTROSTATIC CHARGING HAZARD. SEE USER’S MANUAL BEFORE USE.

Note 5. Maintenance and Repair

- The instrument modification or parts replacement by other than authorized representative of Yokogawa Electric Corporation is prohibited and will void Type of Protection “n” Certification.



Ratings of the Power Supply are as follows:
Maximum Voltage: 30 V

Note 6. Special condition for safe use

- Avoid any actions that cause the generation of electrostatic charge on the non-metallic parts, such as rubbing with a dry cloth on coating face of product.

(2) Electrical Connection

The type of electrical connection is stamped near the electrical connection port according to the following marking.

Screw Size	Marking
ISO M20×1.5 female	⚠ M
ANSI 1/2 NPT female	⚠ A

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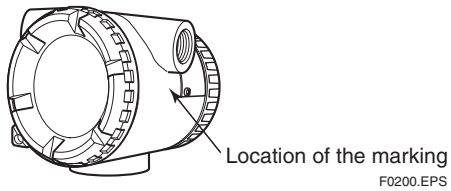


(3) Installation

⚠ WARNING

All wiring shall comply with local installation requirement and local electrical code.

(4) Operation

⚠ WARNING

- OPEN CIRCUIT BEFORE REMOVING COVER. INSTALL IN ACCORDANCE WITH THIS USER’S MANUAL
- Take care not to generate mechanical sparking when access to the instrument and peripheral devices in hazardous locations.

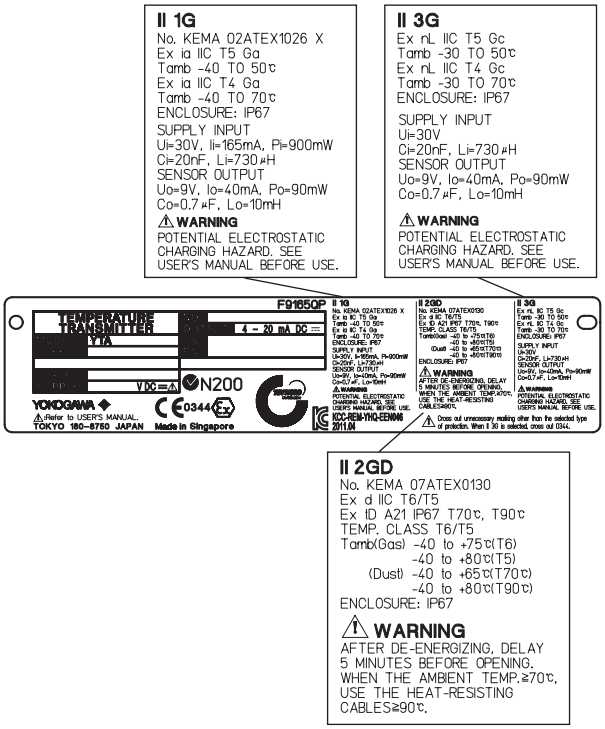
(5) Maintenance and Repair

⚠ WARNING

The instrument modification or parts replacement by other than authorized Representative of Yokogawa Electric Corporation is prohibited and will void the certification.

(6) Name Plate

● **Name plate for KU2**



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MODEL: Specified model code.
SUFFIX: Specified suffix code.
STYLE: Style code.
SUPPLY: Supply voltage.
NO.: Serial number and year of production*1.
OUTPUT: Output signal.
FACTORY CAL: Specified calibration range.
YOKOGAWA ◆ TOKYO 180-8750 JAPAN: The manufacturer name and the address*2.

*1: The third figure from the left shows the production year. The relationship between the production year and the third figure is shown below.

The third figure	F	G	H	J	K	L	M
The year of Production	2006	2007	2008	2009	2010	2011	2012

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For example, the production year of the product engraved in "NO." column on the name plate as follows is 2006.

C2F616294
↑
The year 2006

*2: "180-8750" is a postal code which represents the following address.

2-9-32 Nakacho, Musashino-shi, Tokyo Japan

2.7.3 FM Certification

a) FM Intrinsically Safe Type

Caution for FM Intrinsically safe type.

Note 1. Model YTA /FU1 temperature transmitter is applicable for use in hazardous locations

- Applicable Standard: FM 3600, FM 3610, FM 3611, FM 3810, 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 Hazardous Locations.
- Outdoor hazardous locations, NEMA 4X.
- Temperature Class: T4
- Ambient temperature: –40 to 60°C

Note 2. Entity Parameters of the temperature transmitter:

- Supply Circuit (+ and –) • Sensor Circuit (1 to 5)

Vmax : 30 V	Voc/Vt : 9 V
Imax : 165 mA	Isc/It : 40 mA
Pmax : 0.9 W	Po : 0.09 W
Ci : 18 nF	Ca : 1 μF
Li : 730 μH	La : 10 mH

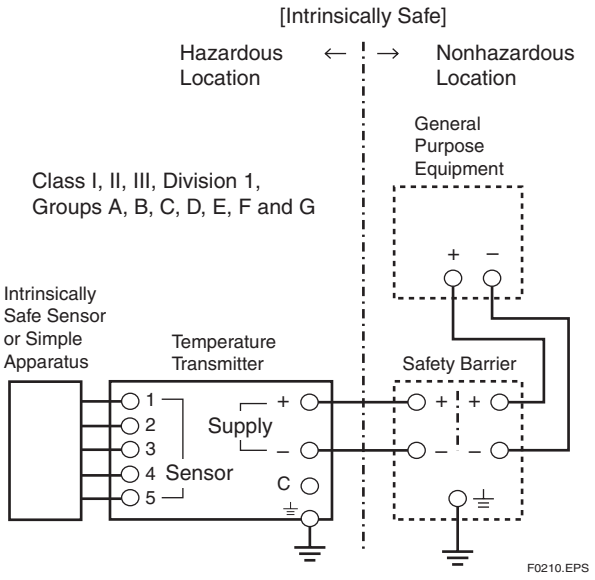
- For the sensor input circuitry, these entity parameters must be taken into account when installed.
- Installation Requirements between temperature transmitter and safety barrier:
  Voc ≤ Vmax, Isc ≤ Imax, Ca ≥ Ci + Ccable, La ≥ Li + Lcable
  Voc, Isc, Ca and La are parameters of the safety barrier.

Note 3. Installation

- The safety barrier must be FM approved.
- Input voltage of the safety barrier must be less than 250 Vrms/Vdc.
- Installation should be in accordance with ANSI/ISA RP12.6 "Installation of Intrinsically Safe Systems for Hazardous (Classified) Locations" and the National Electric Code (ANSI/NFPA 70).
- Intrinsically safe sensor must be FMRC Approved or be simple apparatus (a device which will neither generate nor store more than 1.2 V, 0.1 A, 25 mW or 20 μJ, ex. switches, thermocouples, LED's or RTD's).
- Dust-tight conduit seal must be used when installed in a Class II and III environments.

Note 4. Maintenance and Repair

- The instrument modification or parts replacement by other than authorized representative of Yokogawa Electric Corporation is prohibited and will void Factory Mutual Intrinsically safe and Nonincendive Approval.



b) FM Non-incendive Type

Caution for FM Non-incendive type.

Note 1. Model YTA /FU1 temperature transmitter is applicable for use in hazardous locations

- Applicable Standard: FM 3600, FM 3610, FM 3611, FM 3810, NEMA-250
- Non-incendive for Class I, Division 2, Groups A, B, C & D.
  Class II, Division 2, Groups F & G and Class III, Division 1 Hazardous Locations.
- Outdoor hazardous locations, NEMA 4X.
- Temperature Class: T4
- Ambient temperature: –40 to 60°C

Note 2. Non-incendive field wiring Parameters of the temperature transmitter:

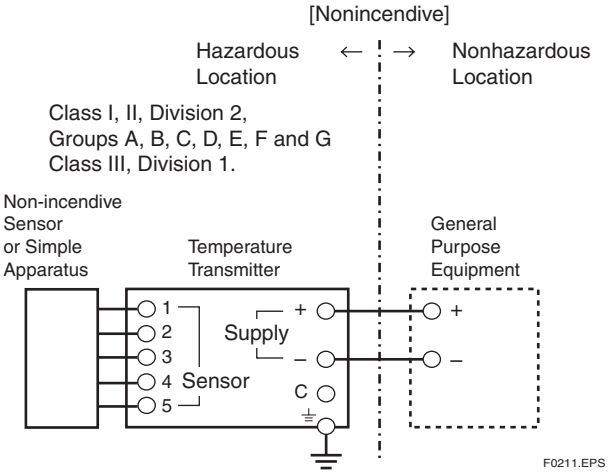
- Supply Circuit (+ and -)
  Vmax : 30 V
  Imax : 165 mA
  Pmax : 0.9 W
  Ci : 18 nF
  Li : 730 μH
- Sensor Circuit (1 to 5)
  Voc/Vt : 9 V
  Isc/It : 40 mA
  Po : 0.09 W
  Ca : 1 μF
  La : 10 mH
- For the sensor input circuitry, these non-incendive parameters must be taken into account when installed.
- Installation Requirements between temperature transmitter and general purpose equipment:
  Voc ≤ Vmax, Isc ≤ Imax, Ca ≥ Ci + Ccable, La ≥ Li + Lcable
  Voc , Isc, Ca and La are non-incendive field wiring parameters of general purpose equipment.

Note 3. Installation

- The general purpose equipment must be FM approved which have non-incendive field wiring parameters.
- Installation should be in accordance with ANSI/ISA RP12.6 “Installation of Intrinsically Safe Systems for Hazardous (Classified) Locations” and the National Electric Code (ANSI/NFPA 70).
- non-incendive sensor must be FMRC Approved or be simple apparatus (a device which will neither generate nor store more than 1.2 V, 0.1 A, 25 mW or 20 μJ, ex. switches, thermocouples, LED’s or RTD’s).
- Dust-tight conduit seal must be used when installed in a Class II and III environments.

Note 4. Maintenance and Repair

- The instrument modification or parts replacement by other than authorized representative of Yokogawa Electric Corporation is prohibited and will void Factory Mutual Intrinsically safe and Nonincendive Approval.



c) FM Explosionproof Type

Caution for FM Explosionproof type

Note 1. Model YTA /FU1 and YTA /FF1 temperature transmitters are applicable for use in hazardous locations:

- Applicable Standard: FM 3600, FM 3615, FM 3810, NEMA 250
- Explosionproof for Class I, Division 1, Groups A, B, C, and D.
- Dust-ignitionproof for Class II/III, Division 1, Groups E, F and G.
- Enclosure rating: NEMA 4X.
- Temperature Class: T6
- Ambient Temperature: –40 to 60°C
- Supply Voltage: 42 V dc max.
- Output signal: 4 to 20 mA

Note 2. Wiring

- All wiring shall comply with National Electrical Code ANSI/NEPA70 and Local Electrical Codes.
- “FACTORY SEALED, CONDUIT SEAL NOT REQUIRED”.

Note 3. Operation

- Keep strictly the "WARNING" on the nameplate attached on the transmitter.

  WARNING: OPEN CIRCUIT BEFORE REMOVING COVER. "FACTORY SEALED, CONDUIT SEAL NOT REQUIRED". INSTALL IN ACCORDANCE WITH THE INSTRUCTION MANUAL IM 1C50B1.
- Take care not to generate mechanical spark when access to the instrument and peripheral devices in hazardous location.

Note 4. Maintenance and Repair

- The instrument modification or parts replacement by other than authorized representative of Yokogawa Electric Corporation is prohibited and will void Factory Mutual Explosionproof Approval.

2.7.4 TIIS Certification

a) TIIS Flameproof Type

The model YTA /JF3 temperature transmitter, which has obtained certification according to technical criteria for explosion-protected construction of electric machinery and equipment (Standards Notification No.556 from the Japanese Ministry of Labor) conforming to IEC standards, is designed for hazardous areas where explosive gases and/or inflammable vapors may be present. (This allows installation in Division 1 and 2 areas)

To preserve the safety of flameproof equipment requires great care during mounting, wiring, and piping. Safety requirements also place restrictions on maintenance and repair activities. Users absolutely must read "Installation and Operating Precautions for TIIS Flameproof Equipment" at the end of this manual.

⚠ WARNING

The terminal cover should not be opened at least for three minutes after the power is turned off.

The terminal section of the flameproof YTA series is made of resin-filled, explosion-protected construction. The technical standards for this flameproof construction require that the possibility of explosion resulting from a prospective short-circuit current*1 of up to 4000 A be prevented even for cases when external power supply circuits are short-circuited accidentally.

Install a fuse or a circuit breaker having a breaking capacity of at least 4000 A in the higher-order power line connected to the YTA series. The breaking capacity refers to the upper limit of current that can be cut off. Normally, a fuse or a circuit breaker having a breaking capacity of greater than 5000 A is used in power supply circuits. Confirm that this is true with your factory. No extra measures need be taken after the confirmation.

Note that the rated current of the YTA series in terms of explosion protection is 4 to 20 mA; keep the input current of the YTA series within the appropriate range.

*1: Refers to a current that flows when a fuse in a circuit is substituted with a connecting metal piece having virtually no impedance and the circuit is then shorted. For AC circuits, this current is represented by a root-mean-square value (JIS C6575).

2.7.5 IECEx Certification

a) IECEx Intrinsic safety "ia"

Caution for IECEx Intrinsic safety "ia".

Note 1. Model YTA110/SU2, YTA310/SU2, and YTA320/SU2 temperature transmitters are applicable for use in hazardous locations:

- No. Certificate: IECEx KEM 09.0032X
- Applicable standard: IEC60079-11:2011, IEC60079-0:2011, IEC60079-26:2006
- Type of Protection and Marking Code: Ex ia IIC T4...T5 Ga
- Ambient Temperature: -40 to 70°C for T4, -40 to 50°C for T5
- Enclosure: IP67

Note 2. Electrical Data

- [Supply circuit (Terminals: + and –)]
  Ui = 30 V Ii = 165 mA Pi = 900 mW
  Effective internal capacitance, Ci = 20 nF
  Effective internal inductance, Li = 730 μH
- [Sensor circuit (Terminals: 1 to 5)]
  Uo = 9 V Io = 40 mA Po = 90 mW
  Max. allowed external capacitance, Co = 0.7 μF
  Max. allowed external inductance, Lo = 10 mH

Note 3. Installation

- All wiring shall comply with local installation requirements. (Refer to the installation diagram)

Note 4. Operation

- Keep strictly the "WARNING" on the label on the transmitter.

  WARNING: POTENTIAL ELECTROSTATIC CHARGING HAZARD. SEE USER'S MANUAL BEFORE USE.

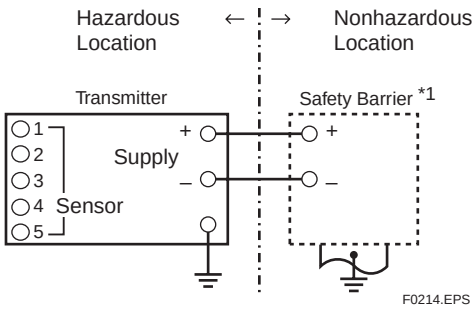
Note 5. Maintenance and Repair

- The instrument modification or parts replacement by other than authorized representative of Yokogawa Electric Corporation is prohibited and will void IECEx Certification.

Note 6. Conditions of Certification

- Because the enclosure of the Temperature Transmitter is made of aluminium, if it is mounted in zone 0, it must be installed such, that, even in the event of rare incidents, ignition sources due to impact and friction sparks are excluded.
- Avoid any actions that cause the generation of electrostatic charge on the non-metallic parts, such as rubbing with a dry cloth on coating face of product.

[Installation Diagram]



*1: In any safety barriers used the output current must be limited by a resistor "R" such that Imaxout-Uz/R.

b) IECEx Intrinsic safety "ic"

Caution for IECEx Intrinsic safety "ic".

Note 1. Model YTA110/SU2, YTA310/SU2, and YTA320/SU2 temperature transmitters are applicable for use in hazardous locations:

- No. Certificate: IECEx KEM 09.0032X
- Applicable standard: IEC60079-11:2011, IEC60079-0:2011, IEC60079-26:2006
- Type of Protection and Marking Code: Ex ic IIC T4...T5 Gc
- Ambient Temperature: -40 to 70°C for T4, -40 to 50°C for T5
- Enclosure: IP67

Note 2. Electrical Data

- [Supply circuit (Terminals: + and –)] Ui = 30 V, Ci = 20 nF, Li = 730 μH
- [Sensor circuit (Terminals: 1 to 5)] Uo = 9 V, Io = 40 mA, Po = 90 mW, Co = 0.7 μF, Lo = 10 mH

Note 3. Installation

- All wiring shall comply with local installation requirements. (Refer to the installation diagram)

Note 4. Operation

- Keep strictly the "WARNING" on the label on the transmitter.

  WARNING: POTENTIAL ELECTROSTATIC CHARGING HAZARD. SEE USER'S MANUAL BEFORE USE.

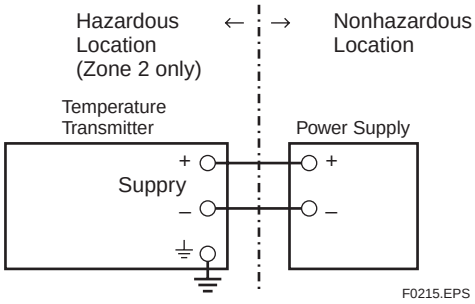
Note 5. Maintenance and Repair

- The instrument modification or parts replacement by other than authorized representative of Yokogawa Electric Corporation is prohibited and will void IECEx Certification.

Note 6. Special condition for safe use

- Avoid any actions that cause the generation of electrostatic charge on the non-metallic parts, such as rubbing with a dry cloth on coating face of product.

[Installation Diagram]



Ratings of the Power Supply are as follows:
Maximum Voltage: 30 V

c) IECEx Flameproof Type and Dust Ignition Proof Type

Caution for IECEx flameproof type and Dust Ignition Proof Type

Note 1. Model YTA110/SF2, YTA310/SF2, and YTA320/SF2, YTA110/SU2, YTA310/SU2, and YTA320/SU2 temperature transmitters are applicable for use in hazardous locations:

- No. IECEx KEM 07.0044
- Applicable Standard: IEC 60079-0, IEC 60079-1, IEC 61241-0, IEC 61241-1
- Type of Protection and Marking Code: Ex d IIC T6/T5, Ex tD A21 IP67 T70°C, T90°C
- Ambient Temperature for Gas Atmospheres: –40 to 75°C (T6), –40 to 80°C (T5)
- Ambient Temperature for Dust Atmospheres: –40 to 65°C (T70°C), –40 to 80°C (T90°C)
- Enclosure: IP67

Note 2. Electrical Data

- Supply voltage: 42 V dc max.
- Output signal: 4 to 20 mA

Note 3. Installation

- All wiring shall comply with local installation requirement.
- The cable entry devices shall be of a certified flameproof type, suitable for the conditions of use.

Note 4. Operation

- Keep strictly the “WARNING” on the label on the transmitter.

  WARNING: AFTER DE-ENERGIZING, DELAY 5 MINUTES BEFORE OPENING. WHEN THE AMBIENT TEMP. ≧ 70°C, USE THE HEATRESISTING CABLES OF HIGHER THAN 90°C.
- Take care not to generate mechanical spark when access to the instrument and peripheral devices in hazardous location.

Note 5. Maintenance and Repair

- The instrument modification or parts replacement by other than authorized representative of Yokogawa Electric Corporation is prohibited and will void IECEx Flameproof Certification.

2.8 EMC Conformity Standards

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

NOTE

YOKOGAWA recommends customer to apply the Metal Conduit Wiring or to use the twisted pair Shield Cable for signal wiring to conform the requirement of EMC Regulation, when customer installs the YTA Series Transmitters to the plant.

2.9 Low Voltage Directive

Applicable standard: EN61010-1

(1) Pollution Degree 2

“Pollution degree” describes the degree to which a soild, liquid, or gas which deteriorates dielectric strength or surface resistivity is adhering. “ 2 ” applies to normal indoor atmosphere. Normally, only non-conductive pollution occurs. Occasionally, however, temporary conductivity caused by condenstaion must be expected.

(2) Installation Category I

“Overvoltage category(Installation category)” describes a number which defines a transient overvoltage condition. It implies the regulattion for impulse withstand voltage. “ I ” applies to electrical equipment which is supplied from the circuit when appropriate transient overvoltage control means (interfaces) are provided.

Ambient humidity:
5 to 100%RH at 40°C (104°F)

Effect of supply voltage fluctuation:
±0.005%/V

Insulation:
Input/output insulated at 500 V DC

Mounting:
Mounted on 2B pipes and wall

Degrees of Protection:
IP66/IP67, NEMA 4X

Electrical connection:
Refer to “Model and Specification Codes”.

Case and cover:
Aluminum alloy casting

Painting:
Polyurethane resin baked finish
Deep sea moss green (equivalent of Munsell 0.6GY3.1/2.0)

Integral indicator (option):
LCD digital indicator (5-digit display)
Output bar graph; 0 to 100% display

Damping constant:
0 to 99 seconds (integer range that can be set)

Sensor burnout (Output Signal Code D&E) :
High (110%, 21.6 mA DC) or Low (–2.5%, 3.6 mA DC)

Weight:
1.2 kg; without built-in indicator (without mounting bracket)
1.4 kg; with Integral indicator (without mounting bracket)

EMC compliant standard: CE , N200
EN61326, AS/NZS CISPR11

Material Cross Reference Table

SUS304	AISI 304
SUS316	AISI 316

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Table 7.1 Input Type, Measurement Range and Accuracy

Sensor Type		Reference Standard	Measurement Range		Minimum Span (Recommended)	Accuracy				
						Input range		A/D Accuracy		D/A Accuracy
			℃	℉		℃	℉	℃	℉	
T/C	B	IEC584	100 to 1820	212 to 3308	25 ℃ (45 ℉)	100 to 300	212 to 572	± 3.0	± 5.4	± 0.02% of span
						300 to 400	572 to 752	± 1.0	± 1.8	
						400 to 1820	752 to 3308	± 0.75	± 1.35	
	E		-200 to 1000	-328 to 1832		-200 to -50	-328 to -58	± 0.35	± 0.63	
						-50 to 1000	-58 to 1832	± 0.16	± 0.29	
	J		-200 to 1200	-328 to 2192		-200 to -50	-328 to -58	± 0.40	± 0.72	
						-50 to 1200	-58 to 2192	± 0.20	± 0.36	
	K		-200 to 1372	-328 to 2502		-200 to -50	-328 to -58	± 0.50	± 0.90	
						-50 to 1372	-58 to 2502	± 0.25	± 0.45	
	N		-200 to 1300	-328 to 2372		-200 to -50	-328 to -58	± 0.80	± 1.44	
						-50 to 1300	-58 to 2372	± 0.35	± 0.63	
	R		-50 to 1768	-58 to 3214		-50 to 0	-58 to 32	± 1.0	± 1.8	
						0 to 100	32 to 212	± 0.80	± 1.44	
						100 to 600	212 to 1112	± 0.60	± 1.08	
						600 to 1768	1112 to 3214	± 0.40	± 0.72	
	S		-50 to 1768	-58 to 3214		-50 to 0	-58 to 32	± 1.0	± 1.8	
						0 to 100	32 to 212	± 0.80	± 1.44	
						100 to 600	212 to 1112	± 0.60	± 1.08	
						600 to 1768	1112 to 3214	± 0.40	± 0.72	
	T		-200 to 400	-328 to 752		-200 to -50	-328 to -58	± 0.25	± 0.45	
						-50 to 400	-58 to 752	± 0.14	± 0.25	
	W3	ASTM E988	0 to 2300	32 to 4172		0 to 400	32 to 752	± 0.80	± 1.44	
						400 to 1400	752 to 2552	± 0.50	± 0.90	
						1400 to 2000	2552 to 3632	± 0.60	± 1.08	
						2000 to 2300	3632 to 4172	± 0.90	± 1.62	
	W5		0 to 2300	32 to 4172		0 to 400	32 to 752	± 0.70	± 1.26	
						400 to 1400	752 to 2552	± 0.50	± 0.90	
						1400 to 2000	2552 to 3632	± 0.70	± 1.26	
						2000 to 2300	3632 to 4172	± 0.90	± 1.62	
	L	DIN43710	-200 to 900	-328 to 1652		-200 to -50	-328 to -58	± 0.30	± 0.54	
						-50 to 900	-58 to 1652	± 0.20	± 0.36	
	U		-200 to 600	-328 to 1112		-200 to -50	-328 to -58	± 0.50	± 0.90	
						-50 to 600	-58 to 1112	± 0.25	± 0.45	
RTD	Pt100	IEC751	-200 to 850	-328 to 1562	10 ℃ (18 ℉)	-200 to 850	-328 to 1562	± 0.14	± 0.25	
	Pt200		-200 to 850	-328 to 1562		-200 to 850	-328 to 1562	± 0.30	± 0.54	
	Pt500		-200 to 850	-328 to 1562		-200 to 850	-328 to 1562	± 0.20	± 0.36	
	JPt100	JIS C1604	-200 to 500	-328 to 932		-200 to 500	-328 to 932	± 0.16	± 0.29	
	Cu	SAMA RC21-4	-70 to 150	-94 to 302		-70 to -40	-94 to -40	± 1.35	± 2.43	
						-40 to 150	-40 to 302	± 1.0	± 1.8	
	Ni120	—	-70 to 320	-94 to 608		-70 to 320	-94 to 608	± 0.11	± 0.19	
mV		—	-10 to 100 [mV]		3 [mV]	—		±12 [μV]		
ohm			0 to 2000 [Ω]		20 [Ω]			± 0.35 [Ω]		

T0701.EPS

Table 7.2 YTA110 Effect of Ambient Temperature

Sensor Type		Temperature Coefficient
Thermocouples E, J, K, N, T, L, U		0.08℃ + 0.02% of abs.reading
Thermocouples R, S, W3, W5		0.25℃ + 0.02% of abs.reading
T/C B	100℃ ≦ Reading < 300℃	1℃ + 0.02% of abs.reading
	300℃ ≦ Reading	0.5℃ + 0.02% of abs.reading
RTD		0.08℃ + 0.02% of abs.reading
mV		0.002 mV + 0.02% of abs.reading
ohm		0.1 Ω + 0.02% of abs.reading

T07021.EPS

Note1: Ambient Temperature Effect per 10°C change is ±0.1% or ±(temperature coefficient/span), whichever is greater.
Note2: The “abs.reading” on Table7.2 means the absolute value of the reading in °C.
Example of abs reading;
When the temperature value is 250 Kelvin, abs reading is 23.15, absolute (250−273.15).
Example of Ambient Temperature Effect;
Conditions;
1) Input Sensor:Pt100 2) Calibration Range:−100 to 100°C
3) Reading value: −50°C
Ambient Temperature Effect per 10°C;
Temperature Coefficient/Span
=(0.08°C+0.02/100×|−50°C|)/{100°C−(−100°C)}= 0.00045
→ 0.045%
Therefore, Ambient Temperature Effect is ±0.1%/10°C

Table 7.3 YTA310, YTA320 Effect of Ambient Temperature

Sensor Type		Input Range °C	Input Range °F	A/D Coefficient	D/A Coeffieicient
T/C	B	100 to 300	212 to 572	± (0.530 °C−0.080 % of reading)	± {0.0088% of span+0.007% of (reading−LRV)}
		300 to 1000	572 to 1832	± (0.350 °C−0.021 % of reading)	
		1000 to 1820	1832 to 3308	± (0.140 °C)	
	E	-200 to 1000	-328 to 1832	± (0.035 °C+0.042 % of abs.reading)	
	J	-200 to 0	-328 to 32	± (0.039 °C+0.020 % of abs.reading)	
		0 to 1200	32 to 2192	± (0.039 °C+0.0029 % of reading)	
	K	-200 to 0	-328 to 32	± (0.046 °C+0.020 % of abs.reading)	
		0 to 1372	32 to 2502	± (0.046 °C+0.0054 % of reading)	
	N	-200 to 0	-328 to 32	± (0.054 °C+0.010 % of abs.reading)	
		0 to 1300	32 to 2372	± (0.054 °C+0.0036 % of reading)	
	R	-50 to 200	-58 to 392	± (0.210 °C−0.032 % of abs.reading)	
		200 to 1768	392 to 3214	± (0.150 °C)	
	S	-50 to 200	-58 to 392	± (0.210 °C−0.032 % of abs.reading)	
		200 to 1768	392 to 3214	± (0.150 °C)	
	T	-200 to 0	-328 to 32	± (0.046 °C−0.036 % of abs.reading)	
		0 to 400	32 to 752	± (0.046 °C)	
	W3	0 to 1400	32 to 2552	± (0.100 °C+0.0040 % of reading)	
		1400 to 2300	2552 to 4172	± (-0.130°C+0.020 % of reading)	
	W5	0 to 1400	32 to 2552	± (0.100 °C+0.0040 % of reading)	
		1400 to 2300	2552 to 4172	± (-0.120°C+0.020 % of reading)	
	L	-200 to 0	-328 to 32	± (0.039 °C+0.020 % of abs.reading)	
		0 to 900	32 to 1652	± (0.039 °C+0.0029 % of reading)	
	U	-200 to 0	-328 to 32	± (0.046 °C+0.036 % of abs.reading)	
		0 to 600	32 to 1112	± (0.046 °C)	
RTD	Pt100	-200 to 850	-328 to 1562	± (0.047 °C+0.009 % of reading)	
	Pt200	-200 to 850	-328 to 1562	± (0.065 °C+0.012 % of reading)	
	Pt500	-200 to 850	-328 to 1562	± (0.047 °C+0.009 % of reading)	
	JPt100	-200 to 500	-328 to 932	± (0.047 °C+0.009 % of reading)	
	Cu	-70 to 150	-94 to 302	± (0.320 °C+0.120 % of reading)	
	Ni120	-70 to 320	-94 to 608	± (0.016 °C+0.007 % of reading)	
mV		——		± (0.001mV+0.0043 % of abs.reading)	
ohm		——		± (0.040 Ω+0.0088 % of reading)	

T07022.EPS

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

Example 1; Pt100Ω, 0 to 200°C calibration range, 50°C reading

(0.047°C + 50°C × 0.009%) + [200°C × 0.0088% + (50 − 0) × 0.007%]

= (0.047°C + 0.0045°C) + (0.0176°C + 0.0035°C)

= ± 0.0726°C [per 10°C change]

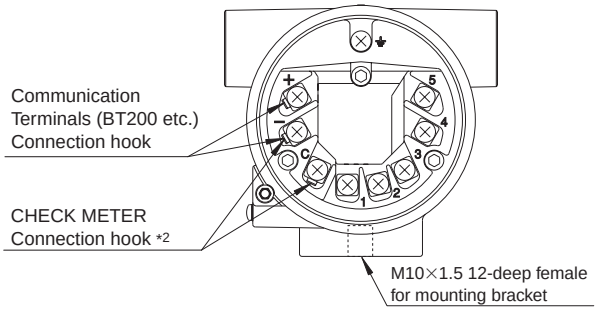
Example 2; T T/C, −100 to 100°C calibration range, 250°C reading

(0.046°C + | 250°C | × 0.036%) + {200°C × 0.0088% + [250 − (−100)] × 0.007%}

= (0.046°C + 0.018°C) + (0.0176°C + 0.0035°C)

= ± 0.0851°C [per 10°C change]

Terminals



Terminal Configuration

+ −	Power Supply and output terminal
− C	External Indicator (ammeter) terminal *2
⏚	Ground terminal

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

F0702.EPS

Factory setting (◇)

Tag No.	Left blank if not specified in order	**Unit of calibration range**	"°C" if not specified in order
Input sensor type	"Pt100, 3-wire" if not specified in order	**Damping constant**	2 seconds
Lower calibration range	"0" if not specified in order	**Sensor burnout**	High side (110%, 21.6 mA DC) *1
Upper calibration range	"100" if not specified in order	**Output when transmitter fails**	High side (110%, 21.6 mA DC) *2

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*1: When option code C1 is specified, Low takes effect (–2.5%, 3.6mADC).
*2: When option code C1 is specified, Low takes effect (–5%, 3.2mADC or less).

7.2 Model and Suffix Codes

Model	Basic Specification Codes	Description
YTA110 **YTA310** **YTA320**	. . . .	Temperature transmitter (1 input type) High precision temperature transmitter (1 input type) High precision temperature transmitter (2 input type)
Output signal	**–D** . . . . . . **–E** . . . . . . **–F**	4 to 20mA DC output, BRAIN communication type 4 to 20mA DC output, HART communication type FOUNDATION Fieldbus communication type (YTA320 only)
—	**A**	Always A
Electrical connection	**0** . . . . . . **2** . . . . . . **3** **4**	G1/2 female 1/2 NPT female Pg13.5 female M20 female
Built-in indicator	**D** . . . . . . **N**	Digital indicator None
Mounting bracket	**B** . . . . . . **D** . . . . . . **J** . . . . . . **K** . . . . . . **N**	SUS304 Stainless steel 2-inch horizontal pipe mounting *1 SUS304 Stainless steel 2-inch vertical pipe mounting *1 SUS316 Stainless steel 2-inch horizontal pipe mounting *1 SUS316 Stainless steel 2-inch vertical pipe mounting *1 None
Additional specifications	/ □	Additional specifications

T0703.EPS

*1: Use bolts for wall mounting.

7.3 Optional Specifications

Item		Descriptions		Code	YTA110	YTA310 YTA320
Lightning protector		Power supply voltage: 10.5 to 32 V DC Allowable current: Max. 6000A(1×40μs), repeating 1000A(1×40μs) 100 times		**A**	○	○
Painting	Coating change	Epoxy resin coating		**X1**	○	○
	Color change	Amplifier cover only	Munsell renotation code: NI1.5 Black	**P1**	○	○
			Munsell renotation code: 7.5BG4/1.5, Jade green	**P2**	○	○
			Metallic silver	**P7**	○	○
		Amplifier and Terminal covers	Munsell renotation code: 7.5R4/14 Red	**PR**	○	○
SUS316 exterior parts		Exterior parts on the amplifier housing (name plates, tag plate, screws) will become SUS316 stainless steel *3		**HC**	○	○
Stainless Steel Housing*1		Housing Material: SCS14A Stainless steel		**E1**	○	○
Wired tag plate		SUS304 stainless steel tag plate wired onto transmitter *4		**N4**	○	○
Calibration Unit		Addition of Degree F and Degree R unit		**D2**	○	○
Output signal low-side in Transmitter failure*2		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*2		Output signal limits: 3.8 mA to 20.5 mA	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	**C2**	○	○
			Failure alarm up-scale: output status at CPU failure and hardware error is 110%, 21.6 mA or more. Sensor burnout is also set to 'High': 110%, 21.6 mA	**C3**	○	○
Data Configuration*2		Description into "Descriptor" parameter of HART protocol. (max. 16 characters)		**CA**	○	○
Sensor matching function*2		RTD Sensor matching function		**CM1**	×	○

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*1 : Not applicable with other option codes, except for A, C1, D2 and CM1.
*2 : Not applicable for output signal code F.
*3 : This specification is not included in option code E1. Select HC for SUS316 exterior parts regardless of E1.
*4 : When HC is selected, the material is SUS316 stainless steel.

[For Explosion Protected Types]

For FOUNDATION Fieldbus explosion protected type, see IM 01C50T02-01E.

Item	Descriptions		Code
ATEX	ATEX Intrinsically safe, Flameproof approval and Type n combination Electrical Connection: 1/2 NPT female and M20 female*1		**KU2**
Canadian Standards Association (CSA)	CSA Intrinsically safe, non-incendive and Explosionproof approval combination*3 Electrical Connection: 1/2 NPT female*1		**CU1**
Factory Mutual (FM)	FM Explosionproof approval Electrical Connection: 1/2 NPT female*2		**FF1**
	FM Intrinsically safe, non-incendive and Explosionproof approval combination*3 Electrical Connection: 1/2NPT female*2		**FU1**
Japanese Industrial Standards (TIIS)	TIIS Flameproof approval		**JF3**
Attached flameproof packing adapter*4	Electrical connection: G1/2 female Applicable cable: O.D. 8.5 to 11 mm	2 pc.	**G12**
IECEx	IECEx Intrinsically safe, Flameproof and Dust ignition proof Approval Enclosure: IP67 Electrical Connection: 1/2 NPT female and M20 female*5		**SU2**

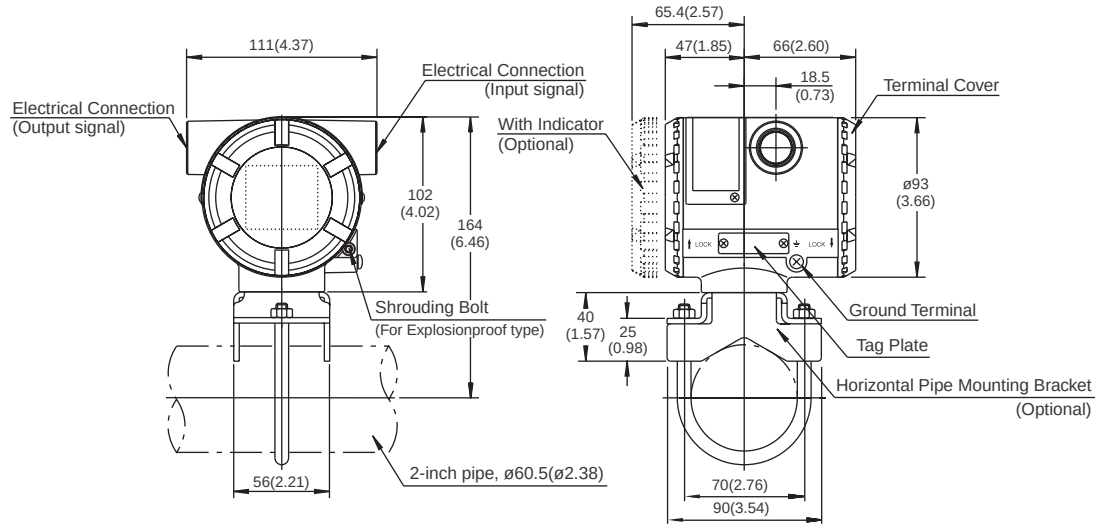
*1 : Applicable for Electrical Connection Code 2 and 4.
*2 : Applicable for Electrical Connection Code 2.
*3 : Not applicable for Output Signal Code F.
*4 : If cable wiring is to be used to a TIIS flameproof type transmitter, do not fail to add the YOKOGAWA-assured flameproof packing adapter.
*5 : Applicable for Electrical connection code 2 and 4.

T0706.EPS

7.4 Dimensions

Unit: mm (Approx. inch)

● 2-inch horizontal pipe mounting



● 2-inch vertical pipe mounting