# YTA610 and YTA710
## Temperature Transmitters (Hardware)

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Revision Information
1. Preface

The YTA temperature transmitter is fully factory-tested according to the specifications indicated on the order.
In order for the YTA temperature transmitter to be fully functional and to operate in an efficient manner, the manual must be carefully read to become familiar with the functions, operation, and handling of the YTA.
This manual gives instructions on handling, wiring, installation, maintenance, and general specifications.
To ensure correct use, please read this manual and following user’s manuals.

<table>
<thead>
<tr>
<th>Document No.</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>IM 01C50G01-01EN</td>
<td>Hardware (This manual)</td>
</tr>
<tr>
<td>IM 01C50G01-02EN*1</td>
<td>For NEPSI Certification (Option code: /NS2, /NS25 and /NF2)</td>
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<tr>
<td>IM 01C50G01-01P*2</td>
<td>For Transmissor de Temperaturas YTA610 e YTA710 (Hardware) (Option code: /UF1, /US1 and /US15)</td>
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<tr>
<td>IM 01C50G01-01K*3</td>
<td>YTA610 and YTA710 Temperature Transmitters (Hardware) (Option code: /PF2, /PS2 and /PS25)</td>
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<tr>
<td>IM 01C50T01-02EN</td>
<td>For HART protocol type</td>
</tr>
<tr>
<td>IM 01C50T02-02EN</td>
<td>For FOUNDATION Fieldbus communication type</td>
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<td>IM 01C50T03-02EN</td>
<td>For BRAIN protocol type</td>
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<td>GS 01C50G01-01EN</td>
<td>YTA710 Temperature Transmitter</td>
</tr>
<tr>
<td>GS 01C50H01-01EN</td>
<td>YTA610 Temperature Transmitter</td>
</tr>
</tbody>
</table>

**WARNING**

When using the transmitter in a Safety Instrumented System (SIS) application, refer to Appendix 1 in either IM 01C50T01-02EN for the HART protocol.
The instructions and procedures in this section must be strictly followed in order to maintain the transmitter for this safety level.

These manuals can be downloaded from the website of Yokogawa or purchased from the Yokogawa representatives.
Website address: http://www.yokogawa.com/fld/

*1: It is a manual when there is /NS2, /NS25 and /NF2 in the additional specifications.
*2: It is a manual when there is /UF1, /US1 and /US15 in the additional specifications. This IM 01C50G01-01P is only in Portuguese.
*3: It is a manual when there is /PF2, /PS2 and /PS25 in the additional specifications. This IM 01C50G01-01K is only in Korean.
Notes on the User’s Manual

- This manual should be delivered to the end user.
- This manual and the identification tag attached on packing box are essential parts of the product; keep them in a safe place for future reference.
- The information contained in this manual is subject to change without prior notice.
- The information contained in this manual, in whole or part, shall not be transcribed or copied without notice.
- In no case does this manual guarantee the merchant ability of the transmitter or its adaptability to a specific client need.
- Should any doubt or error be found in this manual, submit inquiries to your local dealer.
- No special specifications are contained in this manual. When products whose suffix code or optional codes contain code “Z” and an exclusive document is attached, please read it along with this manual.
- Changes to specifications, structure, and components used may not lead to the revision of this manual unless such changes affect the function and performance of the transmitter.

Notes on Safety and Modifications

- This product is designed to be used by a person with specialized knowledge.
- Before handling the YTA, it is absolutely imperative that users of this equipment read and observe the safety instructions mentioned in each section of the manual in order to ensure the protection and safety of operators, the YTA itself and the system containing the transmitter. We are not liable for any accidents arising out of handling that does not adhere to the guidelines established in the safety instructions.
- No maintenance should be performed on explosionproof type temperature transmitters while the equipment is energized. If maintenance is required with the cover open, always first use a gas detector to check that no explosive gases are present.
- If the user attempts to repair or modify an explosionproof type transmitter and is unable to restore it to its original condition, damage to the explosionproof features result, leading to dangerous conditions. Contact your authorized Yokogawa Electric Corporation representative for repairs or modifications of an explosionproof type transmitter.

For Safe Use of Product

Please give your attention to the followings.

(a) Installation
- The instrument must be installed by an expert engineer or a skilled personnel. The procedures described about INSTALLATION are not permitted for operators.
- In case of high process temperature, care should be taken not to burn yourself because the surface of the case reaches a high temperature.
- All installation shall comply with local installation requirement and local electrical code.

(b) Wiring
- The instrument must be installed by an expert engineer or a skilled personnel. The procedures described about WIRING are not permitted for operators.
- Please confirm that voltages between the power supply and the instrument before connecting the power cables and that the cables are not powered before connecting.

(c) Maintenance
- Please do not carry out except being written to a maintenance descriptions. When these procedures are needed, please contact nearest YOKOGAWA office.
- Care should be taken to prevent the build up of drift, dust or other material on the display glass and name plate. In case of its maintenance, soft and dry cloth is used.

(d) Modification
Yokogawa will not be liable for malfunctions or damage resulting from any modification made to this instrument by the customer.

(e) Product Disposal
The instrument should be disposed of in accordance with local and national legislation/regulations.

(f) Authorized Representative in EEA
In relation to the CE Marking, The authorized representative for this product in the EEA (European Economic Area) is:
Yokogawa Europe B.V.
Euroweg 2, 3825 HD Amersfoort, The Netherlands
(g) Morocco conformity mark

This conformity mark indicates that the product complies with Moroccan safety and EMC requirements.

● Symbols used in this manual

The YTA temperature transmitter and this manual use the following safety related symbols and signals.

![WARNING]

Contains precautions to protect against the chance of explosion or electric shock which, if not observed, could lead to death or serious injury.

![CAUTION]

Contains precautions to protect against danger, which, if not observed, could lead to personal injury or damage to the instrument.

![IMPORTANT]

Contains precautions to be observed to protect against adverse conditions that may lead to damage to the instrument or a system failure.

![NOTE]

Contains precautions to be observed with regard to understanding operation and functions.

Some of the diagrams in this manual are partially omitted, described in writing, or simplified for ease of explanation. The screen drawings contained in the instruction manual may have a display position or characters (upper/lower case) that differ slightly from the full-scale screen to an extent that does not hinder the understanding of functions or monitoring of operation.

■ Warranty

- The warranty period of the instrument is written on the estimate sheet that is included with your purchase. Any trouble arising during the warranty period shall be repaired free of charge.
- Inquiries with regard to problems with the instrument shall be accepted by the sales outlet or our local dealer representative.
- Should the instrument be found to be defective, inform us of the model name and the serial number of the instrument together with a detailed description of nonconformance and a progress report. Outline drawings or related data will also be helpful for repair.
- Whether or not the defective instrument is repaired free of charge depends on the result of our inspection.

● Conditions not eligible for charge-exempt repair.

- Problems caused by improper or insufficient maintenance on the part of the customer.
- Trouble or damage caused by mishandling, misusage, or storage that exceeds the design or specification requirements.
- Problems caused by improper installation location or by maintenance conducted in a non-conforming location.
- Trouble or damage was caused by modification or repair that was handled by a party or parties other than our consigned agent.
- Trouble or damage was caused by inappropriate relocation following delivery.
- Trouble or damage was caused by fire, earthquake, wind or flood damage, lightning strikes or other acts of God that are not directly a result of problems with this instrument.

■ Trademarks

- HART is a trademark of the FieldComm Group.
- Registered trademarks or trademarks appearing in this manual are not designated by a TM or ® symbol.
- Other company names and product names used in this manual are the registered trademarks or trademarks of their respective owners.
Control of Pollution Caused by the Product

This is an explanation for the product based on “Control of Pollution caused by Electronic Information Products” in the People’s Republic of China.

電子情報製品污染制御管理弁法（中国版RoHS）

产品中有害物质或元件的名称及含量

<table>
<thead>
<tr>
<th>型号</th>
<th>部件名称</th>
<th>有害物质</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>铅（Pb）</td>
</tr>
<tr>
<td>YTA610 and YTA710 温度变送器</td>
<td>壳体</td>
<td>×</td>
</tr>
<tr>
<td></td>
<td>基板组件</td>
<td>×</td>
</tr>
<tr>
<td></td>
<td>电源连接线</td>
<td>×</td>
</tr>
</tbody>
</table>

○：表示该部件的所有均质材料中的有害物质的含量均在 GB/T26572 标准中所规定的限值以下。
×：表示至少该部件的某些均质材料中的有害物质的含量均在 GB/T26572 标准中所规定的限值以上。

环保使用期限：
该标识适用于 SJ/T11364 中所述，在中华人民共和国销售的电子电气产品的环保使用期限。

注）该年数为“环保使用期限”，并非产品的质量保证期。
2. Notes on Handling

The YTA temperature transmitter is fully factory tested upon shipment. When the YTA is delivered, check the appearance for damage, and also check that the transmitter mounting parts shown in Figure 2.1 are included with your shipment. If “No Mounting Bracket” is indicated, no transmitter mounting bracket is included.

2.3 Storage

When an extended storage period is expected, observe the following precautions:

1. If at all possible, store the transmitter in factory shipped condition, that is, in the original shipping container.
2. Choose a storage location that satisfies the following requirements.
   - A location that is not exposed to rain or water.
   - A location subject to a minimum of vibration or impact.
   - The following temperature and humidity range is recommended. Ordinary temperature and humidity (25°C, 65%) are preferable.
     - Temperature: No Integral indicator –40 to 85°C
     - With Integral indicator –30 to 80°C
     - Humidity: 0 to 100% RH (at 40°C)
3. The performance of the transmitter may be impaired if stored in an area exposed to direct rain and water. To avoid damage to the transmitter, install it immediately after removal from shipping container. Follow wiring instructions in Chapter 5.

2.4 Choosing the Installation Location

Although the temperature transmitter is designed to operate in a vigorous environment, to maintain stability and accuracy, the following is recommended:

(1) Ambient Temperature

It is preferable to not to expose the instrument to extreme temperatures or temperature fluctuations. If the instrument is exposed to radiation heat a thermal protection system and appropriate ventilation is recommended.

(2) Environmental Requirements

Do not allow the instrument to be installed in a location that is exposed to corrosive atmospheric conditions. When using the instrument in a corrosive environment, ensure the location is well ventilated.

The unit and its wiring should be protected from exposure to rainwater.
(3) Impact and Vibration

It is recommended that the instrument be installed in a location that is subject to a minimum amount of impact and vibration.

2.5 Use of a Transceiver

**IMPORTANT**

Although the temperature transmitter is designed to resist influence from high frequency noise; use of a transceiver in the vicinity of installation may cause problems. Installing the transmitter in an area free from high frequency noise (RFI) is recommended.

2.6 Insulation Resistance Test and Withstand Voltage Test

**CAUTION**

(1) Overvoltage of the test voltage that is so small that it does not cause an dielectric breakdown may in fact deteriorate insulation and lower the safety performance; to prevent this it is recommended that the amount of testing be kept to a minimum.

(2) The voltage for the insulation resistance test must be 500 V DC or lower, and the voltage for the withstand voltage test must be 500 V AC or lower. Failure to heed these guidelines may cause faulty operation.

(3) For with a lighting protector (option code: /A), please remove the lightning protector from terminal at the test. In case of testing with the lightning protector, the voltage for the insulation resistance test must be 100V DC or lower, and the voltage for the withstand voltage test must be 100V AC or lower. Failure to heed these guidelines may cause faulty operation.

Follow the steps below to perform the test, the wiring of the transmission line must be removed before initiating testing.

## 2.6.1 Insulation resistance test procedure

**Testing between the output terminal and input terminal**

1. Lay transition wiring between the + terminal, the – terminal, and the check terminal of the terminal box.
2. Lay wiring across terminals 1, 2, 3, 4, and 5 of the terminal box.
3. Connect the insulation resistance meter (with the power turned OFF) between the transition wiring of Steps 1 and 2 above. The polarity of the input terminals must be positive and that of the output terminals must be negative.
4. Turn the power of the insulation resistance meter ON and measure the insulation resistance. The duration of the applied voltage must be the period during which 100MΩ or more is confirmed (or 20MΩ if the unit is equipped with a lightning protector).
5. Upon completion of the test, remove the insulation resistance meter, connect a 100KΩ resistor between the transition wiring, and allow the electricity to discharge. Do not touch the terminal with your bare hands while the electricity is discharging for more than 1 second.

**Testing between the output terminal and grounding terminal**

1. Lay transition wiring between the + terminal, the - terminal, and the check terminal of the terminal box, then connect an insulation resistance meter (with the power turned OFF) between the transition wiring and the grounding terminal. The polarity of the transition wiring must be positive and that of the grounding terminal must be negative.
2. Turn the power of the insulation resistance meter ON and measure the insulation resistance. The duration of the applied voltage must be the period during which 100MΩ or more is confirmed (or 20MΩ if the unit is equipped with a lightning protector).
3. Upon completion of the test, remove the insulation resistance meter, connect a 100KΩ resistor between the transition wiring and the grounding terminal, and allow the electricity to discharge. Do not touch the terminal with your bare hands while the electricity is discharging for more than 1 second.
### 2. Notes on Handling

- **Testing between the input terminal and grounding terminal**
  1. Lay transition wiring between terminals 1, 2, 3, 4, and 5 of the terminal box, and connect the insulation resistor (with the power turned OFF) between the transition wiring and the grounding terminal. The polarity of the transition wiring must be positive and that of the grounding terminal must be negative.
  2. Turn the power of the insulation resistance meter ON and measure the insulation resistance. The duration of the applied voltage must be the period during which 100MΩ or more is confirmed (or 20MΩ if the unit is equipped with a lightning protector).
  3. Upon completion of the test, remove the insulation resistance meter, connect a 100KΩ resistor between the transition wiring and the grounding terminal, and allow the electricity to discharge. Do not touch the terminal with your bare hands while the electricity is discharging for more than 1 second.

### 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 gradually 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 ATEX Certification

(1) Technical Data

a) ATEX intrinsically safe approval

Caution for ATEX intrinsically safe approval.

Note 1. Certification information

1 4 - 20mA type

- YTA610 and YTA710 with /KU2 temperature transmitter (4 - 20mA type) is applicable for use in hazardous locations.

[Intrinsically safe ia]

- Certificate No. FM16ATEX0019X
- Type of protection and marking code: II 1 G Ex ia IIC T5…T4 Ga
- Ambient Temperature: –40 to 70°C for T4, –40 to 50°C for T5
- Enclosure: IP66/IP67
- Electrical parameters:
  - Supply/Output circuit: Terminals: +, -
    - Ui=30V, Ii=200mA, Pi=1.0W, Ci=22nF, Li=0mH
  - Sensor circuit: Terminals: 1,2,3,4,5
    - Uo=6V, Io=90mA, Po=135mW, Co=10μF, Lo=3.9mH
- Dielectric strength: 500 V a.c.r.m.s., 1 min
  (See specific conditions of use)

[Intrinsically safe ic]

- Applicable Standard:
- Certificate Not Applicable as per Annex VIII to ATEX 2014/34/EU
- Type of protection and marking code:
  - II 3 G Ex ic IIC T5…T4 Gc
- Ambient Temperature:
  - –30 to 70°C for T4, –30 to 50°C for T5
- Enclosure: IP66/IP67
- Overvoltage category: I
- Electrical parameters:
  - Supply/Output circuit: Terminals: +, -
    - Ui=30V, Ci=22nF, Li=0mH
  - Sensor circuit: Terminals: 1,2,3,4,5
    - Uo=6V, Io=90mA, Po=135mW, Co=10μF, Lo=3.9mH
- Dielectric strength: 500 V a.c.r.m.s., 1 min
  (See specific conditions of use)

2 Fieldbus type

- YTA610 and YTA710 with /KU25 temperature transmitter (Fieldbus type) is applicable for use in hazardous locations.

[Intrinsically safe ia]

- Certificate No. FM16ATEX0019X
- Type of protection and marking code: II 1 G Ex ia IIC T4 Ga
- Ambient Temperature: –55 to 60°C
- Enclosure: IP66/IP67
- Electrical parameters:
  - Supply/Output circuit: Terminals: +, -
    - Ui=30V, Ci=22nF, Li=0mH
  - Sensor circuit: Terminals: 1,2,3,4,5
    - Uo=6V, Io=90mA, Po=135mW, Co=10μF, Lo=3.9mH
- Dielectric strength: 500 V a.c.r.m.s., 1 min
  (See specific conditions of use)

[Intrinsically safe ic]

- Applicable Standard:
- Certificate Not Applicable as per Annex VIII to ATEX 2014/34/EU
• Type of protection and marking code: II 3 G Ex ic IIC T4 Gc
• Ambient Temperature: –30 to 70°C
• Enclosure: IP66/IP67
• Overvoltage category: I
• Electrical parameters:
  Supply/Output circuit: Terminals: +, -
  FISCO field device or
  U_i=32V, C_i=2.2nF, L_i=0mH
  Sensor circuit: Terminals: 1,2,3,4,5
  U_o=6V, I_o=90mA, P_o=135mW, C_o=10μF,
  L_o=3.9mH
• Dielectric strength: 500 V a.c.r.m.s., 1 min
  (See specific conditions of use)

WARNING

Specification conditions of use
• Electrostatic charges on the non-metallic
  parts (excluding glass parts) or coated parts
  of the Temperature Transmitter shall be
  avoided.
• When the enclosure of the Temperature
  Transmitter is made of aluminum alloy, if
  it is mounted in an area where the use of
  Category 1G equipment is required, it must
  be installed such that, even in the event
  of rare incidents, an ignition source due to
  impact and/or friction sparks is excluded.
• The dielectric strength of 500V r.m.s
  between the intrinsically safe circuit and the
  enclosure of the Temperature Transmitter
  is limited, only by the removable surge
  absorber F9220AR.

Note 2. Note for multiple types of protection
(KU2 and KU25)
• 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. Cross out the unnecessary
  type of protection on the name plate in the
  following ways.

  e.g. In case of selecting “ia” and crossing out “db”
  and “tb” and “ic”

  e.g. In case of selecting “db” and “tb” and crossing
  out “ia” and “ic”

Note 3. Installation
  Installation should be in accordance with
  Control Drawing IIE029-A63.

b) ATEX Flameproof Type and Dust Ignition
  Proof Type

Caution for ATEX Flameproof Type and Dust
  Ignition Proof Type

Note 1. Certificate information
• YTA710 with /KF2, YTA610 and YTA710 with
  /KU2 and /KU25 temperature transmitters are
  applicable for use in hazardous locations.
• No. KEMA 07ATEX0130
• Applicable Standard:
  EN 60079-0:2012+A11:2013,
• Type of Protection and Marking Code:
  II 2 G Ex db IIC T6/T5 Gb,
  II 2 D Ex tb IIIIC T70°C / T90°C Db
• Ambient Temperature for Gas Atmospheres:
  –40 to 75°C (T6), –40 to 80°C (T5)
• Ambient Temperature for Dust Atmospheres:
  –30 to 65°C (T70°C), –30 to 80°C (T90°C)
• Degree of protection of enclosure: IP66/IP67
• Supply Voltage: 42 V dc max. (4 to 20 mA type)
  : 32 V dc max. (Fieldbus type)
• Output Signal: 4 to 20 mA
  : 24 mA dc max. (Fieldbus type)

Note 2. Installation
• Cable glands, adapters and/or blanking
  elements with a suitable IP rating shall be of Ex
  d IIC/Ex tb IIIIC certified by ATEX and shall be
  installed so as to maintain the specific degree of
  protection (IP Code) of the equipment.
• All wiring shall comply with local installation
  requirement.
Note 3. Operation

- Keep “WARNING” on the equipment as follows.
  
  **WARNING:** AFTER DE-ENERGIZING, DELAY 10 MINUTES BEFORE OPENING. WHEN THE AMBIENT TEMP. ≥70°C, USE THE HEAT-RESISTING CABLES & CABLE GLANDS ≥90°C. POTENTIAL ELECTROSTATIC CHARGING HAZARD - SEE USER’S MANUAL

- Take care not to generate mechanical spark when access to the instrument and peripheral devices in hazardous location.

Note 4. Special Conditions for Safe Use

**WARNING**

- Electrostatic charge may cause an explosion hazard. Avoid any actions that cause the generation of electrostatic charge, such as rubbing with a dry cloth on coating face of the product.
- If the YTA is mounted in an area where the use of Category 2D equipment is required, it shall be installed in such a way that the risk from electrostatic discharges and propagating brush discharges caused by rapid flow of dust is avoided.
- To satisfy IP66 or IP67, apply waterproof glands to the electrical connection port.
- If the equipment is affected by external sources of heating or cooling from plant facilities, make sure that the parts in contact with the equipment or in the near vicinity of the equipment do not exceed the ambient temperature range of the equipment.

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.

Note 6. Surge absorber

- The surge absorber can be removed from, or added to the equipment.

### (2) Electrical Connection

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

<table>
<thead>
<tr>
<th>Screw Size</th>
<th>Marking</th>
</tr>
</thead>
<tbody>
<tr>
<td>ISO M20×1.5 female</td>
<td>△ M</td>
</tr>
<tr>
<td>ANSI 1/2 NPT female</td>
<td>△ N</td>
</tr>
</tbody>
</table>

### (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

YTA710 /KF2 Flameproof and Dust ignition proof type

WARNING
AFTER DE-ENERGIZING, DELAY 10 MINUTES BEFORE OPENING.
WHEN THE AMBIENT TEMP.≥70°C,
USE THE HEAT-RESISTING CABLES & CABLE GLANDS≥90°C.
POTENTIAL ELECTROSTATIC CHARGING HAZARD -SEE USER’S MANUAL

Intrinsically safe approval and Flameproof and Dust ignition approval (4 - 20 mA type)

II 3 G
Ex ia IIC Gc
T4: -30 ≤ Ta ≤ 70°C
IP66/IP67
FISCO field device
Supply/Output:
Ui=32V, Ci=2.2nF, Li=0mH
Sensor:
Uo=6.0V, Io=90mA, Po=135mW
Co=10µF, Lo=3.9mH
WARNING
WHEN THE AMBIENT TEMP.≥68°C,
USE HEAT-RESISTING CABLES AND CABLE GLANDS≥75°C.
POTENTIAL ELECTROSTATIC CHARGING HAZARD -SEE USER’S MANUAL

II 2 GD
Ex ia IIC T4 Ga
T4: -55 ≤ Ta ≤ 60°C
IP66/IP67
FISCO field device
Supply/Output:
Ui=30V, Ci=2.2nF, Li=0mH
Sensor:
Uo=6.0V, Io=90mA, Po=135mW
Co=10µF, Lo=3.9mH
WARNING
WHEN THE AMBIENT TEMP.≥68°C,
USE HEAT-RESISTING CABLES AND CABLE GLANDS≥75°C.
POTENTIAL ELECTROSTATIC CHARGING HAZARD -SEE USER’S MANUAL

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.

<table>
<thead>
<tr>
<th>S</th>
<th>T</th>
<th>U</th>
<th>V</th>
<th>W</th>
<th>X</th>
<th>Y</th>
</tr>
</thead>
</table>

For example, the production year of the product engraved in "NO." column on the name plate as follows is 2016.

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

*3: The identification number of Notified Body.

2-9-32 Nakacho, Musashino-shi, Tokyo Japan
2.7.2 IECEx Certification

(1) Technical Data

a) IECEx intrinsically safe approval

Caution for IECEx intrinsically safe approval.

Note 1. Certification information

1. 4 - 20mA type
   • YTA610 and YTA710 with /SU2 temperature transmitter (4 - 20mA type) is applicable for use in hazardous locations.
   • Applicable Standard:
   • Certificate No. IECEx FMG 16.0014X
   • Type of protection and marking code:
     Ex ia IIC T5...T4 Gc
     Ex ic IIC T5...T4 Gc
   • Ambient Temperature:
     -40 to 70°C for T4, -40 to 50°C for T5 (Ex ia)
     -30 to 70°C for T4, -30 to 50°C for T5 (Ex ic)
   • Enclosure: IP66/IP67
   • Overvoltage category: I
   • Electrical parameters (Ex ia):
     Supply/Output circuit: Terminals: +, -
     \[ U_i=30V, I_i=200mA, P_i=1.0W, C_i=22nF, L_i=0mH \]
     Sensor circuit: Terminals: 1, 2, 3, 4, 5
     \[ U_o=6V, I_o=90mA, P_o=135mW, C_o=10\mu F, L_o=3.9mH \]
   • Electrical parameters (Ex ic):
     Supply/Output circuit: Terminals: +, -
     \[ U_i=30V, C_i=22nF, L_i=0mH \]
     Sensor circuit: Terminals: 1, 2, 3, 4, 5
     \[ U_o=6V, I_o=90mA, P_o=135mW, C_o=10\mu F, L_o=3.9mH \]
   • Dielectric strength: 500 V a.c.r.m.s., 1 min
     (See specific conditions of use)

2. Fieldbus type
   • YTA610 and YTA710 with /SU25 temperature transmitter (Fieldbus type) is applicable for use in hazardous locations.
   • Applicable Standard:
   • Certificate No. IECEx FMG 16.0014X
   • Type of protection and marking code:
     Ex ia IIC T4 Ga
     Ex ic IIC T4 Gc
   • Ambient Temperature(Ex ia): -55 to 60°C
   • Ambient Temperature(Ex ic): -30 to 60°C
   • Enclosure: IP66/IP67
   • Overvoltage category: I

- Electrical parameters (Ex ia):
  Supply/Output circuit: Terminals: +, -
  \[ FISCO field device or \]
  \[ U_i=30V, I_i=300mA, P_i=1.2W, C_i=2.2nF, L_i=0mH \]
  Sensor circuit: Terminals: 1, 2, 3, 4, 5
  \[ U_o=6V, I_o=90mA, P_o=135mW, C_o=10\mu F, L_o=3.9mH \]

- Electrical parameters (Ex ic):
  Supply/Output circuit: Terminals: +, -
  \[ FISCO field device or \]
  \[ U_i=30V, C_i=2.2nF, L_i=0mH \]
  Sensor circuit: Terminals: 1, 2, 3, 4, 5
  \[ U_o=6V, I_o=90mA, P_o=135mW, C_o=10\mu F, L_o=3.9mH \]

- Dielectric strength: 500 V a.c.r.m.s., 1 min
  (See specific conditions of use)

WARNING

Specific conditions of use
- Electrostatic charges on the non-metallic parts (excluding glass parts) or coated parts of the Temperature Transmitter shall be avoided.
- When the enclosure of the Temperature Transmitter is made of aluminum alloy, if it is mounted in an area where the use of EPL Ga equipment is required, it must be installed such that, even in the event of rare incidents, an ignition source due to impact and/or friction sparks is excluded.
- The dielectric strength of 500 V r.m.s. between the intrinsically safe circuit and the enclosure of the Temperature Transmitter is limited, only by the removable surge absorber F9220AR.

Note 2. Note for multiple types of protection (SU2 and SU25)

- 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. Cross out the unnecessary type of protection on the name plate in the same ways of ATEX.

Note 3. Installation
Installation should be in accordance with Control Drawing IIE029-A63.
b) IECEx Flameproof Type and Dust Ignition Proof Type

Caution for IECEx flameproof type and Dust Ignition Proof Type

Note 1. Certification information
- YTA710 with /SF2, YTA610 and YTA710 with /SU2 and /SU25 temperature transmitters are applicable for use in hazardous locations.
- No. IECEx KEM 07.0044
- Type of Protection and Marking Code: Ex db IIC T6/T5 Gb, Ex tb IIIC T70°C / T90°C Db
- Ambient Temperature for Gas Atmospheres: –40 to 75°C (T6), –40 to 80°C (T5)
- Ambient Temperature for Dust Atmospheres: –30 to 65°C (T70°C), –30 to 80°C (T90°C)
- Enclosure: IP66/IP67
- Supply Voltage: 42 V dc max. (4 to 20 mA type) : 32 V dc max. (Fieldbus type)
- Output Signal: 4 to 20 mA : 24 mA dc max. (Fieldbus type)

Note 2. Installation
- Cable glands, adapters and/or blanking elements with a suitable IP rating shall be of Ex d IIC/Ex tb IIIC certified by IECEx and shall be installed so as to maintain the specific degree of protection (IP Code) of the equipment.
- All wiring shall comply with local installation requirement.

Note 3. Operation
- Keep strictly the “WARNING” on the label on the transmitter.
  WARNING: AFTER DE-ENERGIZING, DELAY 10 MINUTES BEFORE OPENING. WHEN THE AMBIENT TEMP.≥70°C, USE THE HEAT-RESISTING CABLES & CABLE GLANDS ≥90°C. POTENTIAL ELECTROSTATIC CHARGING HAZARD -SEE USER’S MANUAL
- Take care not to generate mechanical spark when access to the instrument and peripheral devices in hazardous location.

Note 4. Special Conditions for Safe Use

![WARNING]
- Electrostatic charge may cause an explosion hazard. Avoid any actions that cause the generation of electrostatic charge, such as rubbing with a dry cloth on coating face of the product.
- If the YTA is mounted in an area where the use of EPL Db equipment is required, it shall be installed in such a way that the risk from electrostatic discharges and propagating brush discharges caused by rapid flow of dust is avoided.
- To satisfy IP66 or IP67, apply waterproof glands to the electrical connection port.
- If the equipment is affected by external sources of heating or cooling from plant facilities, make sure that the parts in contact with the equipment or in the near vicinity of the equipment do not exceed the ambient temperature range of the equipment.

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.

Note 6. Surge absorber
- The surge absorber can be removed from, or added to the equipment.

(2) Electrical Connection

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

<table>
<thead>
<tr>
<th>Screw Size</th>
<th>Marking</th>
<th>Location of the marking</th>
</tr>
</thead>
<tbody>
<tr>
<td>ISO M20×1.5 female</td>
<td>M</td>
<td></td>
</tr>
<tr>
<td>ANSI 1/2 NPT female</td>
<td>N</td>
<td></td>
</tr>
</tbody>
</table>
2.7.3 FM Certification

(1) Technical Data

a) FM (US) intrinsically safe approval/non-incendive approval

Caution for FM (US) intrinsically safe approval/non-incendive approval.

Note 1. Certification information

① 4 - 20mA type

- YTA610 and YTA710 with /FU1 temperature transmitter (4 - 20mA type) is applicable for use in hazardous locations.
- Applicable standard:
- Marking/Rating
  - Intrinsically safe for Class I, II, III Division 1, Groups A, B, C, D, E, F, G, T5…T4
  - Class I, Zone 0 AEx ia IIC T5…T4
  - Non-incendive for Class I, II, Division 2, Groups A, B, C, D, F, G, T5…T4
  - Class III, Division 1 T5…T4
  - Class I, Zone 2 Group IIC T5…T4
- Ambient Temperature:
  - –40 to 70°C for T4, –40 to 50°C for T5
- Enclosure Type 4X, IP66/IP67
- Electrical parameters:
  - Intrinsically safe for
    - Supply/Output circuit:
      - Terminals: +, -
      - $U_i=30V$, $I_i=200mA$, $P_i=1.0W$, $C_i=22nF$, $L_i=0mH$
      - Sensor circuit:
        - Terminals: 1, 2, 3, 4, 5
        - $U_o=6V$, $I_o=90mA$, $P_o=135mW$, $C_o=10μF$, $L_o=3.9mH$
    - Non-incendive for
      - Supply/Output circuit:
        - Terminals: +, -
        - $U_i=32V$, $C_i=22nF$, $L_i=0mH$
        - Sensor circuit:
          - Terminals: 1, 2, 3, 4, 5
          - $U_o=6V$, $I_o=90mA$, $P_o=135mW$, $C_o=10μF$, $L_o=3.9mH$
- Dielectric strength: 500 V a.c.r.m.s., 1 min
  (See specific conditions of use)

② Fieldbus type

- YTA610 and YTA710 with /FU15 temperature transmitter (Fieldbus type) is applicable for use in hazardous locations.
- Applicable standard:
- Marking/Rating
  - Intrinsically safe for
    - Class I, II, III Division 1 Groups A, B, C, D, E, F, G T4
    - Class I, Zone 0 AEx ia IIC T4
  - Non-incendive for
    - Class I, II, Division 2, Groups A, B, C, D, F, G T4
    - Class III Division 1 T4
    - Class I Zone 2 Group IIC T4
- Ambient Temperature: –55 to 60°C
- Enclosure Type 4X, IP66/IP67
- Electrical parameters:
  - Intrinsically safe for
    - Supply/Output circuit:
      - Terminals: +, -
      - FISCO field device or
      - $U_i=30V$, $I_i=300mA$, $P_i=1.2W$, $C_i=2.2nF$, $L_i=0mH$
      - Sensor circuit:
        - Terminals: 1, 2, 3, 4, 5
        - $U_o=6V$, $I_o=90mA$, $P_o=135mW$, $C_o=10μF$, $L_o=3.9mH$
  - Non-incendive for
    - Supply/Output circuit:
      - Terminals: +, -
      - $U_i=32V$, $C_i=2.2nF$, $L_i=0mH$
      - Sensor circuit:
        - Terminals: 1, 2, 3, 4, 5
        - $U_o=6V$, $I_o=90mA$, $P_o=135mW$, $C_o=10μF$, $L_o=3.9mH$
- Dielectric strength: 500 V a.c.r.m.s., 1 min
  (See specific conditions of use)
WARNING

Specific conditions of use
- Electrostatic charges on the non-metallic parts (excluding glass parts) or coated parts of the Temperature Transmitter shall be avoided.
- When the enclosure of the Temperature Transmitter is made of aluminum alloy, if it is mounted in Zone 0, it must be installed such that, even in the event of rare incidents, an ignition source due to impact and/or friction sparks is excluded.
- The dielectric strength of 500 V r.m.s. between the intrinsically safe circuit and the enclosure of the Temperature Transmitter is limited, only by the removable surge absorber F9220AR.

Note 2. Note for multiple types of protection (FU1 and FU15)
- 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. Cross out the unnecessary type of protection on the name plate in the same ways of ATEX.

Note 3. Installation
Installation should be in accordance with Control Drawing IIE029-A61.

b) FM Explosionproof Type
Caution for FM Explosionproof type

Note 1. Certification information
- YTA710 with /FF1, YTA610 and YTA710 with /FU1 and /FU15 temperature transmitter are applicable for use in hazardous locations.
- 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: TYPE 4X.
- Temperature Class: T6
- Ambient Temperature: -40 to 60°C
- Supply Voltage: 42 V dc max. (4 to 20 mA type) : 32 V dc max. (Fieldbus type)
- Output Signal: 4 to 20 mA : 24 mA dc max. (Fieldbus type)

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”. AFTER DE-ENERGIZING, DELAY 2 MINUTES BEFORE OPENING. INSTALL IN ACCORDANCE WITH THE INSTRUCTION MANUAL IM 1C50G01-01EN.
- 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 CSA Certification

(1) Technical Data
a) FM (Canada) intrinsically safe approval/non-incendive approval
Caution for FM (Canada) intrinsically safe approval/ non-incendive approval.

Note 1. Certification information
- 4 - 20mA type
- YTA610 and YTA710 with /CU1 temperature transmitter (4 - 20mA type) is applicable for use in hazardous locations.
- Applicable standard:
  - CAN/CSA-C22.2 No. 94.2-07, C22.2 No.213:1987,
  - CAN/CSA-C22.2 No. 60079-0:11,
  - CAN/CSA-C22.2 No. 60079-11:14,
  - CAN/CSA-C22.2 No. 60529:05,
  - CAN/CSA-C22.2 No. 61010-1-12,
  - CAN/CSA-C22.2 No. 61010-2-030-12
2. Notes on Handling

- Marking/Rating
  Intrinsically safe for
  - Class I, II, III Division 1, Groups A, B, C, D, E, F, G, T5…T4
  - Ex ia IIC T5…T4 Ga
  Non-incendive for
  - Class I, II, Division 2, Groups A, B, C, D, F, G, T5…T4
  - Class III, Division 1 T5…T4

- Ambient Temperature:
  - –40 to 70°C for T4, –40 to 50°C for T5

- Enclosure Type 4X, IP66/IP67

- Electrical parameters:
  Intrinsically safe for
  - Supply/Output circuit:
    Terminals: +, -
    Ui=30V, Ii=200mA, Pi=1.0W, Ci=22nF, Li=0mH
  - Sensor circuit:
    Terminals: 1, 2, 3, 4, 5
    Uo=6V, Io=90mA, Po=135mW, Co=10μF, Lo=3.9mH

  Non-incendive for
  - Supply/Output circuit:
    Terminals: +/-
    Ui=32V, Ci=22nF, Li=0mH
  - Sensor circuit:
    Terminals: 1, 2, 3, 4, 5
    Uo=6V, Io=90mA, Po=135mW, Co=10μF, Lo=3.9mH

- Dielectric strength: 500 V a.c.r.m.s., 1 min (See specific conditions of use)

 LGBTQ Community

WARNING

Specific conditions of use
- Electrostatic charges on the non-metallic parts (excluding glass parts) or coated parts of the Temperature Transmitter shall be avoided.
- When the enclosure of the Temperature Transmitter is made of aluminum alloy, if it is mounted in Zone 0, it must be installed such that, even in the event of rare incidents, an ignition source due to impact and/or friction sparks is excluded.
- The dielectric strength of 500 V r.m.s. between the intrinsically safe circuit and the enclosure of the Temperature Transmitter is limited, only by the removable surge absorber F9220AR.

Note 2. Note for multiple types of protection (CU1 and CU15)
- 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. Cross out the unnecessary type of protection on the name plate in the same ways of ATEX.
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. AFTER DE-ENERGIZING, DELAY 2 MINUTES BEFORE OPENING. OUVRIR LE CIRCUIT AVANT D’ENLEVER LE COUVERCLE. APRÈS POWER-OFF, ATTENDRE 2 MINUTES AVANT D’OUVRIR.
- 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.

Note 3. Installation
Installation should be in accordance with Control Drawing IIE029-A62.

b) CSA Explosionproof Type
Caution for CSA Explosionproof type
Note 1. Certification information
- YTA710 with /CF1, YTA610 and YTA710 with /CU1 and /CU15 temperature transmitters are applicable for use in hazardous locations.
- Certificate 1089576
- Applicable Standard:
  C22.2 No. 0-10, C22.2 No. 0.4-04, C22.2 No. 25-M1966, C22.2 No. 30-M1986, C22.2 No. 94-M1991, C22.2 No. 142-M1987, C22.2 No. 157-92, C22.2 No. 213-M1987, C22.2 No.61010-1-12, C22.2 No. 61010-2-030-12
- Class I, Groups B, C and D;
- Class II, Groups E, F and G;
- Class III.
- Enclosure: TYPE 4X
t- Temperature Class: T6
- Ambient Temperature: –40 to 60°C
- Supply Voltage: 42 V dc max. (4 to 20 mA type) : 32 V dc max. (Fieldbus type)
- Output Signal: 4 to 20 mA : 24 mA dc max. (Fieldbus type)

Note: Temperature sensor shall be certified in type of Hazardous Locations.
2.7.5 Control Drawing

Control Drawing for ATEX and IECEx Ex ia

<table>
<thead>
<tr>
<th>Yokogawa Electric Corporation</th>
<th>Model</th>
<th>YTxxx</th>
</tr>
</thead>
<tbody>
<tr>
<td>Title</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No.</td>
<td>HE029-A63</td>
<td>01</td>
</tr>
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<td>01</td>
<td>01</td>
</tr>
<tr>
<td>Revision</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Date</td>
<td>2017-08-18</td>
<td></td>
</tr>
</tbody>
</table>

Control Drawing (ATEX, IECEx)

Intrinsically Safe Installation for YTAxxx – J or – D (Ex ia)

Temperature Transmitter

Sensor Input: 
- $U_o = 6.0 \text{ V}$
- $I_o = 90 \text{ mA}$
- $P_o = 135 \text{ mW}$
- $C_o = 10 \mu \text{ F}$
- $L_o = 3.9 \text{ mH}$

Supply/Output: 
- $U_i = 30 \text{ V}$
- $I_i = 200 \text{ mA}$
- $P_i = 1.0 \text{ W}$
- $C_i = 22 \text{ nF}$
- $L_i = 0 \text{ mH}$

Linear source

Associated Apparatus

Intrinsically Safe Apparatus or Simple Apparatus
Intrinsically Safe Installation for YTxxx – F or – G (Ex ia)

Specific Condition of Use:
- Electrostatic charges on the non-metallic parts (excluding glass parts) or coated parts of the Temperature Transmitter shall be avoided.
- (ATEX) When the enclosure of the Temperature Transmitter is made of aluminium alloy, if it is mounted in a potentially explosive atmosphere requiring apparatus of equipment category 1 G is required, it must be installed such that, even in the event of rare incidents, an ignition source due to impact and/or friction sparks is excluded.
- (IECEx) When the enclosure of the Temperature Transmitters is made of aluminium alloy, if it is mounted in a potentially explosive atmosphere requiring apparatus of equipment EPL Ga is required, it must be installed such that, even in the event of rare incidents, an ignition source due to impact and/or friction sparks is excluded.
- The dielectric strength of 500 V r.m.s. between the intrinsically safe circuit and the enclosure of the Temperature Transmitter is limited, only by the removable surge absorber F9220AR.

WARNING—ELECTROSTATIC CHARGE MAY CAUSE AN EXPLOSION HAZARD. AVOID ANY ACTIONS THAT CAUSE THE GENERATION OF ELECTROSTATIC CHARGE, SUCH AS RUBBING WITH A DRY CLOTH ON COATING FACE OF THE PRODUCT.

Note: The surge absorber F9220AR can be removed from, or added to the equipment.
Intrinsically Safe Installation for YTAxxx – J or – D (Ex ic)
Control Drawing ATEX Ex ic

Yokogawa Electric Corporation

Model YTxxx

Title Control drawing

No. IKE061-A07

Page 02

Revision 0

Date 2017-12-27

Intrinsically Safe Installation for YTxxx – F or – G (Ex ic)

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Specific Condition of Use:

- Electrostatic charges on the non-metallic parts (excluding glass parts) or coated parts of the Temperature Transmitter shall be avoided.
- The dielectric strength of 500 V r.m.s. between the intrinsically safe circuit and the enclosure of the Temperature Transmitter is limited, only by the removable surge absorber F9220AR.

WARNING – WHEN THE AMBIENT TEMP. ≥68°C, USE HEAT-RESISTING CABLES AND CABLE GLANDS ≥75°C

WARNING – ELECTROSTATIC CHARGE MAY CAUSE AN EXPLOSION HAZARD. AVOID ANY ACTIONS THAT CAUSE THE GENERATION OF ELECTROSTATIC CHARGE, SUCH AS RUBBING WITH A DRY CLOTH ON COATING FACE OF THE PRODUCT.

Notes:

- The surge absorber F9220AR can be removed from, or added to the equipment.
- The equipment must be installed so that pollution degree 2 in accordance with EN 60664-1 is maintained inside the enclosure.
- Cable glands, adapters and/or blanking elements shall be of Ex “n”, Ex “e” or Ex “d” and shall be installed so as to maintain the specified degree of protection (IP Code) according to the environmental conditions. IP must be at least IP54.
Control Drawing IECEx Ex ic

Control Drawing (IECEx)

Intrinsically Safe Installation for YTxxx – J or – D (Ex ic)

<table>
<thead>
<tr>
<th>Hazardous Area</th>
<th>Hazardous Area</th>
<th>Non-Hazardous Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sensor Input</td>
<td>Supply/Output</td>
<td>Temperature Transmitter</td>
</tr>
<tr>
<td>1</td>
<td>+</td>
<td>Model YTxxx – J or – D</td>
</tr>
<tr>
<td>2</td>
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<td>6</td>
<td>5</td>
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</tr>
</tbody>
</table>

Intrinsically Safe Apparatus or Simple Apparatus

Supply/Output

Model YTxxx – J or – D

Sensor Input:
- \( U_o = 6.0 \text{ V} \)
- \( I_o = 90 \text{ mA} \)
- \( P_o = 135 \text{ mW} \)
- \( C_o = 10 \mu\text{F} \)
- \( L_o = 3.9 \text{ mH} \)

Supply/Output:
- \( U_i = 30 \text{ V} \)
- \( C_i = 22 \text{ nF} \)
- \( L_i = 6 \text{ mH} \)

Linear source

Associated Apparatus

\[ + \quad + \]

\[ - \quad - \]
Intrinsically Safe Installation for YTxxxx – F or – G (Ex ic)

Specific Condition of Use:
- Electrostatic charges on the non-metallic parts (excluding glass parts) or coated parts of the Temperature Transmitter shall be avoided.
- The dielectric strength of 500 V r.m.s. between the intrinsically safe circuit and the enclosure of the Temperature Transmitter is limited, only by the removable surge absorber F9220AR.

WARNING – WHEN THE AMBIENT TEMP. ≥68°C, USE HEAT-RESISTING CABLES AND CABLE GLANDS ≥75°C

WARNING – ELECTROSTATIC CHARGE MAY CAUSE AN EXPLOSION HAZARD. AVOID ANY ACTIONS THAT CAUSE THE GENERATION OF ELECTROSTATIC CHARGE, SUCH AS RUBBING WITH A DRY CLOTH ON COATING FACE OF THE PRODUCT.

Notes:
- The surge absorber F9220AR can be removed from, or added to the equipment.
- The equipment must be installed so that pollution degree 2 in accordance with IEC 60664-1 is maintained inside the enclosure.
- Cable glands, adapters and/or blanking elements shall be of Ex “n”, Ex “e” or Ex “d” and shall be installed so as to maintain the specified degree of protection (IP Code) according to the environmental conditions. IP must be at least IP54.
Control Drawing (US)

Intrinsically Safe Installation for YTAxxx – J or – D

Hazardous (Classified) Location

- Class I, Division 1, Groups A, B, C, D
- Class II, Division 1, Groups E, F, G
- Class III, Division 1
- Class I, Zone 0, Group IIC

Unclassified Location

- Temperature Class: T5...T4

Supply/Output

- Uᵢ = 30 V
- Iᵢ = 200 mA
- Pᵢ = 1.0 W
- Cᵢ = 22 nF
- Lᵢ = 0 mH

Sensor Input

- Uₒ = 6.0 V
- Iₒ = 90 mA
- Pₒ = 135 mW
- Cₒ = 10 μF
- Lₒ = 3.9 mH

Model YTAxxx – J or – D

See Note 4

Simple Apparatus

Intrinsically Safe Apparatus

Linear source
Division 2 Installation for YTxxx – J or – D

Hazardous (Classified) Location

- Class I, Division 2, Groups A, B, C, D
- Class II, Division 2, Groups F, G
- Class III, Division 1
- Class I, Zone 2, Group IIC

Temperature Transmitter

- Sensor Input
- Supply/Output

1 + 0
2 + 0
3 − 0
4 − 0
5 C 0

Unclassified Location

Associated Apparatus

- Model YTxxx – J or – D
- Sensor Input:
  - Uo = 6.0 V
  - Io = 90 mA
- Supply/Output:
  - Ui = 30 V
  - Ci = 22 nF
  - Po = 135 mW
  - Li = 5 mH
- Co = 10 μF
- Lo = 3.9 mH

See Note 4

See Note 7
Intrinsically Safe Installation for YTxxx – F or – G

Hazardous (Classified) Location
- Class I, Division 1, Groups A, B, C, D
- Class II, Division 1, Groups E, F, G
- Class III, Division 1
- Class I, Zone 0, Group IIC

Unclassified Location
- Class I, Division 1, Groups A, B, C, D
- Class II, Division 1, Groups E, F, G
- Class III, Division 1
- Class I, Zone 0, Group IIC

Temperature Class: T4

B Location

Hazardous (Classified) Location

Terminator

Terminator

Field Device

Field Device

Associated Apparatus

See Note 4

Linear source or FISCO power supply

Model YTxxx – F or – G

Sensor Input

Supply/Output

1

2

3

4

5

Model YTxxx – F or – G

Sensor Input

Supply/Output

Uo = 6.0 V

Io = 90 mA

Po = 135 mW

Ci = 10 μF

Li = 3.9 mH

FISCO field device
Division 2 Installation for YTxxx – F or – G

- Hazardous (Classified) Location
  - Class I, Division 2, Groups A, B, C, D
  - Class II, Division 2, Groups F, G
  - Class III, Division 1
  - Class I, Zone 2, Group IIC

- Unclassified Location
  - Field Device
  - Field Device

- Sensor Input: Supply/Output
  - Model YTxxx – F or – G
  - Sensor Input: Supply/Output
  - Uo = 6.0 V
  - Io = 90 mA
  - Po = 135 mW
  - Co = 10 μF
  - Lo = 3.9 mH

- Model YTxxx – F or – G
  - Sensor Input: Supply/Output
  - Uo = 32 V
  - Io = 2.2 mA
  - Po = 55 mW
  - Co = 2.2 μF
  - Lo = 0 mH

- Intrinsically Safe Apparatus
  - or
  - Simple Apparatus
  - See Note 4

- Temperature Transmitter

- See Note 7
Control Drawing for FM (US) intrinsically safe approval/non-incendive approval
(4 - 20 mA & Fieldbus type)

<table>
<thead>
<tr>
<th>Title</th>
<th>Model</th>
<th>YTxxxx</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control Drawing</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>No.</th>
<th>Page</th>
<th>Revision</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>IIE029-A61</td>
<td>05</td>
<td>1</td>
<td>2017-08-18</td>
</tr>
</tbody>
</table>

Specific Conditions of Use:

- Electrostatic charges on the non-metallic parts (excluding glass parts) or coated parts of the Temperature Transmitter shall be avoided.
- When the enclosure of the Temperature Transmitter is made of aluminum alloy, if it is mounted in Zone 0, it must be installed such that, even in the event of rare incidents, an ignition source due to impact and/or friction sparks is excluded.
- The dielectric strength of 500 V r.m.s. between the intrinsically safe circuit and the enclosure of the Temperature Transmitter is limited, only by the removable surge absorber F9220AR.

Notes:

1. No revision to this drawing without prior approval of FM.
2. Installation must be in accordance with the National Electric Code (NFPA70), ANSI/ISA-RP12.06.01, and relevant local codes.
3. The Associated Apparatus must be FM-approved.
4. The following conditions must be satisfied for each circuit.
   \[
   \begin{align*}
   \text{Voc (or Uo)} & \leq \text{Ui} \\
   \text{Isc (or Io)} & \leq \text{Ii} \\
   \text{Po} & \leq \text{Pi} \\
   \text{Ca (or Co)} & \geq \text{Ci} + \text{Ccable} \\
   \text{La (or Lo)} & \geq \text{Li} + \text{Lcable}
   \end{align*}
   \]
5. Control equipment connected to the Associated Apparatus must not use or generate a voltage more than Um of the Associated Apparatus.
6. The control drawing of the Associated Apparatus must be followed when installing the equipment.
7. In case Nonincendive Field Wiring Concept is used for the interconnection, FM-approved Associated Nonincendive Field Wiring Apparatus, which meets the following conditions, must be used as the Power Supply / Control Equipment.
   \[
   \begin{align*}
   \text{Voc (or Uo)} & \leq \text{Ui} \\
   \text{Ca (or Co)} & \geq \text{Ci} + \text{Ccable} \\
   \text{La (or Lo)} & \geq \text{Li} + \text{Lcable}
   \end{align*}
   \]
8. The surge absorber F9220AR can be removed from, or added to the equipment.
9. Dust-tight conduit seals must be used when installed in Class II or Class III environments.
10. FISCO/FNICO installation must be in accordance with ANSI/ISA-60079-25.
11. The terminator(s) must be FM approved.
12. WARNING – ELECTROSTATIC CHARGE MAY CAUSE AN EXPLOSION HAZARD. AVOID ANY ACTIONS THAT CAUSE THE GENERATION OF ELECTROSTATIC CHARGE, SUCH AS RUBBING WITH A DRY CLOTH ON COATING FACE OF THE PRODUCT.
13. WARNING – SUBSTITUTION OF COMPONENTS MAY IMPAIR INTRINSIC SAFETY AND SUITABILITY FOR HAZARDOUS LOCATIONS
Control Drawing (Canada)

Intrinsically Safe Installation for YTAxxx – J or – D

### Hazardous Location
- Class I, Division 1, Groups A, B, C, D
- Class II, Division 1, Groups E, F, G
- Class III, Division 1

### Non-Hazardous Location

<table>
<thead>
<tr>
<th>Hazardous Location</th>
<th>Non-Hazardous Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature Transmitter</td>
<td>Model YTAxxx – J or – D</td>
</tr>
<tr>
<td>Sensor Input</td>
<td>Supply/Output</td>
</tr>
<tr>
<td>1</td>
<td>+</td>
</tr>
<tr>
<td>2</td>
<td>−</td>
</tr>
<tr>
<td>3</td>
<td>−</td>
</tr>
<tr>
<td>4</td>
<td>C</td>
</tr>
<tr>
<td>5</td>
<td>−</td>
</tr>
</tbody>
</table>

Associated Apparatus
- See Note 3

Linear source
- Supply/Output:
  - \( U_i = 30 \text{ V} \)
  - \( I_i = 200 \text{ mA} \)
- See Note 3

### Notes on Handling

1. \( U_o = 6.0 \text{ V} \)
2. \( I_o = 90 \text{ mA} \)
3. \( P_o = 135 \text{ mW} \)
4. \( C_o = 10 \text{ μF} \)
5. \( L_o = 3.9 \text{ mH} \)
## Control Drawing for FM (Canada) Division 2 installation (4 - 20 mA type)

<table>
<thead>
<tr>
<th>Yokogawa Electric Corporation</th>
<th>Model</th>
<th>YTxxx</th>
</tr>
</thead>
<tbody>
<tr>
<td>Title</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No.  IIE029-A62</td>
<td>Page</td>
<td>Revision</td>
</tr>
<tr>
<td></td>
<td>02</td>
<td>1</td>
</tr>
</tbody>
</table>

### Division 2 Installation for YTxxx – J or – D

#### Hazardous Location
- Class I, Division 2, Groups A, B, C, D
- Class II, Division 2, Groups F, G
- Class III, Division 1

#### Temperature Transmitter

<table>
<thead>
<tr>
<th>Sensor Input</th>
<th>Supply/Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>+</td>
</tr>
<tr>
<td>2</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>−</td>
</tr>
<tr>
<td>4</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>C</td>
</tr>
</tbody>
</table>

#### Associated Apparatus

- Supply/Output: Model YTxxx – J or – D
- Supply/Output: Uo = 6.0 V
- Io = 90 mA
- Po = 135 mW
- Co = 10 μF
- Lo = 3.9 mH
- Uo = 30 V
- Io = 22 mA
- Po = 0 mW

### Notes

- See Note 3
- See Note 6
Control Drawing for FM (Canada) intrinsically safe approval (Fieldbus type)

<table>
<thead>
<tr>
<th>Title</th>
<th>Model</th>
<th>YTAxxx</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control Drawing</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

No. | Page | Revision | Date       |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>HE029-A62</td>
<td>03</td>
<td>1</td>
<td>2017-08-18</td>
</tr>
</tbody>
</table>

Intrinsically Safe Installation for YTAxxx – F or – G

Sensor Input

Supply/Output

1
2
3
4
5

Field Device

Temperature Transmitter

FISCO field device

Supply/Output

Sensor Input

Ui = 30 V
Ii = 300 mA
Pi = 1.2 W
Ci = 2.2 nF
Li = 0 mH

Ui = 6.0 V
Io = 90 mA
Po = 135 mW
Co = 10 μF
Lo = 3.9 mH

Hazardous Location

Class I, Division 1, Groups A, B, C, D
Class II, Division 1, Groups E, F, G
Class III, Division 1

Temperature Class: T4

Non-Hazardous Location

Linear source or FISCO power supply

See Note 3

Simple Apparatus

See Note 3
Control Drawing for FM (Canada) Division 2 installation (Fieldbus type)

Division 2 Installation for YTxxxx – F or – G

Hazardous Location
Class I, Division 2, Groups A, B, C, D
Class II, Division 2, Groups F, G
Class III, Division 1
Temperature Class: T4

Non-Hazardous Location

Class I, Division 2, Groups A, B, C, D
Class II, Division 2, Groups F, G
Class III, Division 1

Model YTxxxx - F or - G

Sensor Input: $Uo = 6.0\ V$
$Io = 30\ mA$
$Po = 135\ mW$
$Co = 10\ \mu F$
$Lo = 3.9\ mH$

Supply/Output: $Ui = 32\ V$
$Ci = 2.2\ nF$
$Li = 0\ mH$

Terminator

Model YTxxxx - F or - G

Terminator

Field Device

Intrinsically Safe Apparatus or Simple Apparatus
See Note 3

See Note 6
Control Drawings for FM (Canada) intrinsically safe approval/non-incendive approval (4 - 20 mA & Fieldbus type)

<table>
<thead>
<tr>
<th>Title</th>
<th>Model</th>
<th>YTAnnn</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control Drawing</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Specific Condition of Use:
- Electrostatic charges on the non-metallic parts (excluding glass parts) or coated parts of the Temperature Transmitter shall be avoided.
- When the enclosure of the Temperature Transmitter is made of aluminum alloy, if it is mounted in Zone 0, it must be installed such that, even in the event of rare incidents, an ignition source due to impact and/or friction sparks is excluded.
- The dielectric strength of 500 V r.m.s. between the intrinsically safe circuit and the enclosure of the Temperature Transmitter is limited, only by the removable surge absorber F9220AR.

Notes:
1. No revision to this drawing without prior approval of FM.
2. Installation must be in accordance with the Canadian Electrical Code Part I (C22.1), ANSI/ISA RP12.06.01, and relevant local codes.
3. The following conditions must be satisfied for each circuit.
   \[
   \begin{align*}
   V_{oc} & \leq U_i \\
   I_{sc} & \leq I_i \\
   P_o & \leq P_i \\
   C_a & \geq C_i + C_{cable} \\
   L_a & \geq L_i + L_{cable}
   \end{align*}
   \]
4. Control equipment connected to the Associated Apparatus must not use or generate a voltage more than \( U_m \) of the Associated Apparatus.
5. The control drawing of the Associated Apparatus must be followed when installing the equipment.
6. In case Nonincendive Field Wiring Concept is used for the interconnection, Nonincendive Field Wiring Apparatus, which meets the following conditions, must be used as the Power Supply / Control Equipment.
   \[
   \begin{align*}
   V_{oc} & \leq U_i \\
   C_a & \geq C_i + C_{cable} \\
   L_a & \geq L_i + L_{cable}
   \end{align*}
   \]
7. The surge absorber F9220AR can be removed from, or added to the equipment.
8. Dust-tight conduit seal must be used when installed in Class II and Class III environments.
9. FISCO/FNICO installation must be in accordance with CAN/CSA-C22.2 No. 60079-25.
10. **WARNING** – ELECTROSTATIC CHARGE MAY CAUSE AN EXPLOSION HAZARD. AVOID ANY ACTIONS THAT CAUSE THE GENERATION OF ELECTROSTATIC CHARGE, SUCH AS RUBBING WITH A DRY CLOTH ON COATING FACE OF THE PRODUCT.
11. **WARNING** – SUBSTITUTION OF COMPONENTS MAY IMPAIR INTRINSIC SAFETY AND SUITABILITY FOR HAZARDOUS LOCATIONS
2.8  EMC Conformity Standards

EN61326-1 Class A, Table 2
EN61326-2-3
EN61326-2-5 (for Fieldbus)

Immunity influence during the test:
Output shift is specified within ±1% of full span.

CAUTION

This instrument is a Class A product, and it is designed for use in the industrial environment. Please use this instrument in the industrial environment only.

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 Transmitter to the plant.

2.9  Safety Requirement Standards

EN61010-1, C22.2 No.61010-1

• Altitude of installation site: Max. 2,000 m above sea level
• Installation category: I
  (Anticipated transient overvoltage 330 V)
• Pollution degree: 2
• Indoor/Outdoor use

EN61010-2-030, C22.2 No.61010-2-030

• Measurement category: O(Other)
  (Measurement Input voltage: 150mVdc max)
3. Part Names and Functions

3.1 Part Names

3.2 Hardware Error Burnout and Hardware Write Protect Switch (HART/BRAIN)

There are two slide switches on the MAIN assembly board. One sets the hardware error burnout direction, and the other sets a hardware write protection function which disables parameter changes through the use of a handheld terminal or some other communication method.
The temperature transmitter is equipped with a hardware error burnout function used to set the output direction upon hardware error, and a sensor burnout function that sets the direction of the output in the event of burnout of the temperature sensor. When factory-shipped under standard specification or suffix code /C3, the output of both hardware error burnout and sensor burnout are set to HIGH, but if suffix code /C1 or /C2 is specified, the hardware error burnout is set to LOW (-5%) output, and sensor burnout is set to LOW (-2.5%) output, respectively. The setting of the direction of output from burnout can be changed.

To change the direction of output arising from burnout, set the switch on the MAIN assembly (see Figure 3.1 and Table 3.1). To change the direction of output arising out of sensor burnout, a dedicated hand-held terminal is required to rewrite the parameters within the transmitter.

For details, refer to the separate instruction manual, IM 01C50T01-02EN “HART Protocol” or IM 01C50T03-02EN “BRAIN Protocol”.

**NOTE**

1. Turn off the power supply before changing the switches
2. To change the switches, it is necessary to remove the integral indicator assembly. Refer to “ 6.3.1 Replacement of Integral Indicator” about the procedures.

### Table 3.1 Burnout Direction and Hardware Write Protect Switch

<table>
<thead>
<tr>
<th>Burnout direction (BOUT) and hardware write protect (WP) switch position</th>
<th>SW1 BOUT</th>
<th>SW1 WP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hardware error burnout direction</td>
<td>HIGH</td>
<td>LOW</td>
</tr>
<tr>
<td>Hardware error burnout output</td>
<td>110% or more (21.6 mA DC)</td>
<td>-5% or less (3.2 mA DC)</td>
</tr>
<tr>
<td>Remark</td>
<td>Set to HIGH when standard specification or suffix code /C3 is provided</td>
<td>Set to LOW when suffix code /C1 or /C2 is provided</td>
</tr>
<tr>
<td>Hardware write protect switch</td>
<td>OFF Write enabled</td>
<td>ON Write disabled</td>
</tr>
</tbody>
</table>

3.3 Integral Indicator Display Function

(1) Integral Indicator Display When Powering On

![All segments display](image1)

Model name

![Communication Protocol (HART or FF)](image2)

Communication Protocol (BRAIN)

Device revision (HART or FF)

Software revision

Process variable display

---

IM 01C50G01-01EN
(2) Process Variable Display

Process variables that can be displayed in YTA are shown in the Table 3.2. A cycle of up to four displays can be shown by assigning variables to the parameters. Indicates values of process variables with the indication limits –99999 to 99999.

Table 3.2 Process Variable Display

<table>
<thead>
<tr>
<th>Process variable</th>
<th>HART</th>
<th>BRAIN</th>
<th>FF</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sensor1</td>
<td>✓</td>
<td>—</td>
<td>✓</td>
</tr>
<tr>
<td>Sensor1 - Terminal</td>
<td>✓</td>
<td>—</td>
<td>✓</td>
</tr>
<tr>
<td>Terminal</td>
<td>✓</td>
<td>—</td>
<td>✓</td>
</tr>
<tr>
<td>Sensor2</td>
<td>✓</td>
<td>—</td>
<td>✓</td>
</tr>
<tr>
<td>Sensor2 - Terminal</td>
<td>✓</td>
<td>—</td>
<td>✓</td>
</tr>
<tr>
<td>Sensor1 - Sensor2</td>
<td>✓</td>
<td>—</td>
<td>✓</td>
</tr>
<tr>
<td>Sensor2 - Sensor1</td>
<td>✓</td>
<td>—</td>
<td>✓</td>
</tr>
<tr>
<td>Sensor Average</td>
<td>✓</td>
<td>—</td>
<td>✓</td>
</tr>
<tr>
<td>Sensor Backup</td>
<td>✓</td>
<td>—</td>
<td>✓</td>
</tr>
<tr>
<td>PV</td>
<td>✓</td>
<td>✓</td>
<td>—</td>
</tr>
<tr>
<td>SV</td>
<td>✓</td>
<td>✓</td>
<td>—</td>
</tr>
<tr>
<td>TV</td>
<td>✓</td>
<td>✓</td>
<td>—</td>
</tr>
<tr>
<td>QV</td>
<td>✓</td>
<td>✓</td>
<td>—</td>
</tr>
<tr>
<td>% of RANG</td>
<td>✓</td>
<td>✓</td>
<td>—</td>
</tr>
<tr>
<td>mA of RANGE</td>
<td>✓</td>
<td>✓</td>
<td>—</td>
</tr>
<tr>
<td>AI1</td>
<td>—</td>
<td>—</td>
<td>✓</td>
</tr>
<tr>
<td>AI2</td>
<td>—</td>
<td>—</td>
<td>✓</td>
</tr>
<tr>
<td>AI3</td>
<td>—</td>
<td>—</td>
<td>✓</td>
</tr>
<tr>
<td>AI4</td>
<td>—</td>
<td>—</td>
<td>✓</td>
</tr>
</tbody>
</table>

3.4 Local Parameter Setting

**WARNING**

The local push button on the integral indicator must not be used in a hazardous area. When it is necessary to use the push button, operate it in a non-hazardous location.

[3.4.1 Local Parameter Setting (LPS) Overview]

Parameter configuration by the 3 push button on the integral indicator offers easy and quick setup for parameters of Tag number, Unit, PV Damping, Display 1, and etc. There is no effect on measurement signal (analog output or communication signal) when Local Parameter Setting is carried out.

Table 3.3 Action

<table>
<thead>
<tr>
<th>Action</th>
<th>Operation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Activate</td>
<td>Push ▲ or ▼ button</td>
</tr>
<tr>
<td>Move</td>
<td>Push ▲ or ▼ button</td>
</tr>
<tr>
<td>Edit</td>
<td>Push SET button</td>
</tr>
<tr>
<td>Save</td>
<td>After parameter setting → Push SET button → “SAVE?” → Push SET button → “SAVED” If “FAILED” appear, retry or check the specifications.</td>
</tr>
<tr>
<td>Cancel</td>
<td>After parameter setting → Push SET button → “SAVE?” → Push ▲ or ▼ button → “CANCL?” → Push SET button → “CANCLD”</td>
</tr>
<tr>
<td>Abort</td>
<td>Hold down the SET button for over 2 seconds → “ABORT” and move to the process measurement display</td>
</tr>
<tr>
<td>Exit</td>
<td>Push ▲ button (When the first parameter is selected) or Push ▼ button (When the last parameter is selected)</td>
</tr>
<tr>
<td>Time out</td>
<td>no operation for 10 minutes</td>
</tr>
</tbody>
</table>

**IMPORTANT**

- Do not turn off the power to the temperature transmitter immediately after performing parameter setting. Powering off within 30 seconds of performing this procedure will return the parameter to its previous setting.
- LCD update will be slower at low ambient temperature, and it is recommended to use LPS function at temperatures above –10 degrees C.
- To implement local parameter settings, it is necessary to turn off the software Write protect and the hardware write protect switch on the MAIN assembly.
### Table 3.4 Parameters List (HART)

<table>
<thead>
<tr>
<th>Item</th>
<th>Indicator Display</th>
<th>Write Mode</th>
<th>Setting Type</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tag number</td>
<td>TAG</td>
<td>RW</td>
<td>Character</td>
<td>up to 8 characters</td>
</tr>
<tr>
<td>Long tag number</td>
<td>LNG.TAG</td>
<td>RW</td>
<td>Character</td>
<td>up to 32 characters</td>
</tr>
<tr>
<td>PV unit</td>
<td>PV.UNIT</td>
<td>RW</td>
<td>Selection</td>
<td>K, °C, °F, °R, mV, ohm, mA, %, NOUNIT</td>
</tr>
<tr>
<td>PV damping time constant</td>
<td>PV.DAMP</td>
<td>RW</td>
<td>Numeric</td>
<td>0.00 to 100.00 seconds</td>
</tr>
<tr>
<td>Sensor 1 type</td>
<td>S1.TYPE</td>
<td>RW</td>
<td>Selection</td>
<td>mv, ohm, Pt100, JPt100, Pt200, Pt500, Pt1000, Cu10, Ni120, TYPE.B, TYPE.E, TYPE.J, TYPE.K, TYPE.N, TYPE.R, TYPE.S, TYPE.T, TYPE.L, TYPE.U, TYPE.W3, TYPE.C, USR, TBL, NO.CNCT, S.MATCH</td>
</tr>
<tr>
<td>Sensor 1 wire</td>
<td>S1.WIRE</td>
<td>RW</td>
<td>Selection</td>
<td>2, 3, 4</td>
</tr>
<tr>
<td>Sensor 2 type</td>
<td>S2.TYPE</td>
<td>RW</td>
<td>Selection</td>
<td>same as sensor1 type</td>
</tr>
<tr>
<td>Sensor 2 wire</td>
<td>S2.WIRE</td>
<td>RW</td>
<td>Selection</td>
<td>same as sensor1 wire</td>
</tr>
<tr>
<td>PV lower range</td>
<td>PV.LRV</td>
<td>RW</td>
<td>Numeric</td>
<td></td>
</tr>
<tr>
<td>PV upper range</td>
<td>PV.URV</td>
<td>RW</td>
<td>Numeric</td>
<td></td>
</tr>
<tr>
<td>Sensor burnout direction</td>
<td>BUN.DIR</td>
<td>RW</td>
<td>Selection</td>
<td>HIGH, LOW, USER, OFF</td>
</tr>
<tr>
<td>Sensor burnout value (mA)</td>
<td>BUN mA</td>
<td>RW</td>
<td>Numeric</td>
<td>3.6 to 21.6 mA</td>
</tr>
<tr>
<td>Sensor burnout value (%)</td>
<td>BUN %</td>
<td>RW</td>
<td>Numeric</td>
<td>-2.5 to 110%</td>
</tr>
<tr>
<td>Display out 1</td>
<td>DISP.1</td>
<td>RW</td>
<td>Selection</td>
<td>SENS.1, S.1-TER., TERM, SENS.2, S.2 - TER., S.1 - S.2, S2 - S.1, AVG, BACKUP, PV, SV, TV, QV, OUT %, OUT.mA</td>
</tr>
<tr>
<td>Write protect</td>
<td>WRT.PRT</td>
<td>RW</td>
<td>Selection, Character</td>
<td>ON, OFF, Up to 8 Characters</td>
</tr>
<tr>
<td>Model</td>
<td>MODEL</td>
<td>R</td>
<td>—</td>
<td></td>
</tr>
<tr>
<td>HART revision</td>
<td>HART</td>
<td>R</td>
<td>—</td>
<td></td>
</tr>
<tr>
<td>Device revision</td>
<td>DEV.REV</td>
<td>R</td>
<td>—</td>
<td></td>
</tr>
<tr>
<td>Software revision</td>
<td>SW.REV</td>
<td>R</td>
<td>—</td>
<td></td>
</tr>
</tbody>
</table>

### Table 3.5 Parameters List (FF)

<table>
<thead>
<tr>
<th>Item</th>
<th>Indicator Display</th>
<th>Write Mode</th>
<th>Setting Type</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>PD TAG</td>
<td>PD.TAG</td>
<td>R</td>
<td>—</td>
<td></td>
</tr>
<tr>
<td>Disp Out 1</td>
<td>DISP.1</td>
<td>RW</td>
<td>Selection</td>
<td>SENS.1, S.1-TER., TERM, SENS.2, S.2 - TER., S.1 - S.2, S2 - S.1, AVG, BACKUP, AI1.OUT, AI2.OUT, AI3.OUT, AI4.OUT</td>
</tr>
<tr>
<td>Local Write Lock</td>
<td>HW.LOCK</td>
<td>RW</td>
<td>Selection, Character</td>
<td>ON, OFF, Up to 8 Characters</td>
</tr>
<tr>
<td>Simulation</td>
<td>HW.SIM</td>
<td>RW</td>
<td>Selection</td>
<td>ON, OFF</td>
</tr>
<tr>
<td>Model</td>
<td>MODEL</td>
<td>R</td>
<td>—</td>
<td></td>
</tr>
<tr>
<td>Dev Rev</td>
<td>DEV.REV</td>
<td>R</td>
<td>—</td>
<td></td>
</tr>
<tr>
<td>Software Rev</td>
<td>SW.REV</td>
<td>R</td>
<td>—</td>
<td></td>
</tr>
<tr>
<td>Item</td>
<td>Indicator Display</td>
<td>Write Mode</td>
<td>Setting Type</td>
<td>Remarks</td>
</tr>
<tr>
<td>------------------------------</td>
<td>-------------------</td>
<td>------------</td>
<td>--------------</td>
<td>----------------------------------------------</td>
</tr>
<tr>
<td>Tag number</td>
<td>TAG</td>
<td>RW</td>
<td>Character</td>
<td>up to 16 characters</td>
</tr>
<tr>
<td>PV unit</td>
<td>PV.UNIT</td>
<td>RW</td>
<td>Selection</td>
<td>K, °C, °F, °R, mV, ohms, mA, %, NOUNIT</td>
</tr>
<tr>
<td>PV damping time constant</td>
<td>PV.DAMP</td>
<td>RW</td>
<td>Selection</td>
<td>0,1,2,...,100 seconds</td>
</tr>
<tr>
<td>Sensor 1 type</td>
<td>S1.TYPE</td>
<td>RW</td>
<td>Selection</td>
<td>TYPE.B, TYPE.E, TYPE.J, TYPE.K, TYPE.N, TYPE.R, TYPE.S, TYPE.T, TYPE.C, TYPE.W3, TYPE.L, TYPE.U, Pt100, Pt200, Pt500, Pt1000, JPt100, Ni120, Cu10, S.MATCH, ohms, mV, NO.CNCT</td>
</tr>
<tr>
<td>Sensor 1 wire</td>
<td>S1.WIRE</td>
<td>RW</td>
<td>Selection</td>
<td>2, 3, 4</td>
</tr>
<tr>
<td>Sensor 2 type</td>
<td>S2.TYPE</td>
<td>RW</td>
<td>Selection</td>
<td>same as sensor1 type</td>
</tr>
<tr>
<td>Sensor 2 wire</td>
<td>S2.WIRE</td>
<td>RW</td>
<td>Selection</td>
<td>same as sensor1 wire</td>
</tr>
<tr>
<td>PV lower range</td>
<td>PV LRV</td>
<td>RW</td>
<td>Numeric</td>
<td></td>
</tr>
<tr>
<td>PV upper range</td>
<td>PV URV</td>
<td>RW</td>
<td>Numeric</td>
<td></td>
</tr>
<tr>
<td>Sensor burnout direction</td>
<td>BUN.DIR</td>
<td>RW</td>
<td>Selection</td>
<td>HIGH, LOW, USER, OFF</td>
</tr>
<tr>
<td>Sensor burnout value (mA)</td>
<td>BUN mA</td>
<td>RW</td>
<td>Numeric</td>
<td>3.6 to 21.6 mA</td>
</tr>
<tr>
<td>Sensor burnout value (%)</td>
<td>BUN %</td>
<td>RW</td>
<td>Numeric</td>
<td>-2.5 to 110%</td>
</tr>
<tr>
<td>Display out 1</td>
<td>DISP.1</td>
<td>RW</td>
<td>Selection</td>
<td>PV, SV, TV, QV</td>
</tr>
<tr>
<td>Write protect</td>
<td>WRT.PRT</td>
<td>RW</td>
<td>Selection, Character</td>
<td>ON, OFF, Up to 8 Characters</td>
</tr>
<tr>
<td>Model</td>
<td>MODEL</td>
<td>R</td>
<td>—</td>
<td></td>
</tr>
<tr>
<td>Software revision</td>
<td>SW.REV</td>
<td>R</td>
<td>—</td>
<td></td>
</tr>
</tbody>
</table>
3.4.2 Parameters Configuration

(1) Activating Local Parameter Setting

Push the ▲ or ▼ button on the integral indicator to activate the local parameter setting mode. The transmitter will exit automatically from the local parameter setting mode if no operation is carried out for 10 minutes.

(2) Parameter Setting Review

As you press the button, you will be shown in the order of the Parameter list in each communication table. Press ▲ to back to previous Parameter. Press ▲ on the first Parameter or ▼ on the last Parameter to back to the process value display screen.

(3) Character Configuration

Character parameter → Push SET button → Change the first character by pushing ▲/▼ button → Push SET button to go to the second character → Change the second character by pushing ▲/▼ button → Set all other characters in the same way → Hold down the SET button → “SAVE?” → Push SET button → “SAVED”

(4) Selection Configuration

Selection parameter → Push SET button → Use ▲/▼ button to select → Push SET button → “SAVE?” → Push SET button → “SAVED”

(5) Numeric Configuration

Numeric parameter → Push SET button → Change the first digit by pushing ▲/▼ button → Push SET button to go to the second digit → Change the second figure by pushing ▲/▼ button → Set all other digits in the same way → Hold down the SET button → “SAVE?” → Push SET button → “SAVED”

Available numbers

<table>
<thead>
<tr>
<th>Number of digits</th>
<th>Selection</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0, 1, 2, 3, 4, 5, 6, 7, 8, 9, -9, -8, -7, -6, -5, -4, -3, -2, -1, -0</td>
<td>Determine plus and minus in the first digit. Return cannot be selected. In case of integer a minus cannot be selected.</td>
</tr>
<tr>
<td>2 to 5</td>
<td>0, 1, 2, 3, 4, 5, 6, 7, 8, 9, Dot(.), r*</td>
<td>A dot uses a one digit. Two dots cannot use. In case of integer a dot cannot be selected.</td>
</tr>
<tr>
<td>6</td>
<td>0, 1, 2, 3, 4, 5, 6, 7, 8, 9, r*</td>
<td></td>
</tr>
</tbody>
</table>

*: Press the SET button at the time of r display, one digit will return.
4. Installation

**IMPORTANT**

- When performing on-site pipe fitting work that involves welding, use care to prevent outflow of the welding current into the transmitter.
- Do not use the transmitter as a foothold for installation.

**Horizontal Pipe Mounting**

- When using a horizontal pipe mounting bracket

**Vertical Pipe Mounting**

- When using a vertical pipe mounting bracket

**Wall Mounting**

- For details of choosing the installation location, refer to the guidelines outlined in Section 2.4, “Choosing the installation location”.
- The mounting bracket shown in Figure 4.1 is used for the transmitter and is installed on 50A (2B) pipe. It can be installed either on a horizontal pipe and a vertical pipe or on a wall.
- To install the mounting bracket on the transmitter, torque the transmitter lock screw to about 20 to 30N•m.

**Figure 4.1 Mounting the Transmitter**
5. **Wiring**

### 5.1 Notes on Wiring

**IMPORTANT**

- Apply a waterproofing sealant to the threads of the connection port. (It is recommended that you use non-hardening sealant made of silicon resin for waterproofing.)
- Lay wiring as far away as possible from electrical noise sources such as large transformers, motors and power supplies.
- Remove the wiring connection dust-caps before wiring.
- To prevent electrical noise, the signal cable and the power cable must not be housed in the same conduit.
- The terminal box cover is locked by an Allen head bolt (a shrouding bolt) on ATEX and IECEx flameproof type transmitters. When the shrouding bolt is driven clockwise by an Allen wrench, it is going in and cover lock is released, and then the cove can be opened by hands. See Subsection 6.3 “Disassembly and Assembly” for details.

### 5.2 Loop Construction

The YTA temperature transmitter is a two-wire temperature transmitter that uses the output power supply wiring and signal wiring alternately.

The transmission loop requires DC power. Connect the transmitter with the distributor as shown in Figure 5.1.

For the transmission loop, the load resistance of the distributor or other instrument to be installed in the loop and the lead wire must be within the range shown in Figure 5.2.

For details of communication requirements, refer to the additional reference materials, IM 01C50T01-02EN “YTA610 and YTA710 Temperature Transmitter (HART Protocol)” and IM 01C50T03-02EN “YTA710 Temperature Transmitter Functions (BRAIN Protocol)”.

**Figure 5.1 Loop Construction (for General-use Type and Flameproof Type)**

**Figure 5.2 Relation Between Power Supply Voltage and External Load Resistance**

Note: For intrinsic safe explosion-proof type units, the internal resistance of the safety barrier is also included in the load resistance.
5.3 Cable Selection

5.3.1 Input signal Cable Selection

A dedicated cable is used for connection between the temperature sensor and the temperature transmitter.
When a thermocouple is used as the temperature sensor, a compensation wire must be used that it is appropriate for the type of thermocouple (refer to compensating cables for JIS C 1610/IEC60584-3 thermocouples). When a RTD is used as the temperature sensor, 2-core/3-core/4-core cable must be used (refer to JIS C 1604/IEC60751). The terminal of the dedicated cable is a 4 mm screw.

5.3.2 Output Signal Cable Selection

- With regard to the type of wire to be used for wiring, use twisted wires or cables with performance equivalent of 600V vinyl insulated cable (JIS C3307).
- For wiring in areas susceptible to electrical noise, use shielded wires.
- For wiring in high or low temperature areas, use wires or cables suitable for such temperatures.
- For use in an atmosphere where harmful gases or liquids, oil, or solvents are present, use wires or cables made of materials resistant to those substances.
- It is recommended that a self-sealing terminal with insulation sleeve (4-mm screw) be used for lead wire ends.

5.4 Cable and Terminal Connections

5.4.1 Input Terminal Connections

⚠️ NOTE

Turn off the power when installing the sensor. Please make sure that the sensor will not affect the host system in case not turning off the power.

⚠️ NOTE

It is recommended that the terminals be connected in the order of STEP 1 and STEP 2.

⚠️ CAUTION

When wiring, pay attention not to damage the cable and cores. All the cores of the cable must have the sufficient insulation around them.

---

Figure 5.3 Terminal Connection Procedure

---

a. Cable connection to RTD 3-wire

b. Output signal cable connection

---

Figure 5.3 Terminal Connection Procedure
The temperature sensor is to be connected as shown in Figures 5.5.

5.4.2 Output Terminal Connection

(1) Connection of output signal/power supply cable
Connect the output signal cable (shared with the power supply cable) to the – terminal and the + terminal. For details, refer to Figure 5.1, “Loop construction”.

(2) Connection of wiring for field indicator
Connect the lead wire for the field indicator with the – terminal and the C terminal.
Note: Use a field indicator with an internal resistance of 10Ω or less.

(3) Connection of check meter
Connect the check meter with the – terminal and the C terminal.
The current signal of output signal 4 to 20 mA DC is output from the – terminal and the C terminal.
Note: Use a check meter with internal resistance of 10Ω or less.
5.5 Wiring Cautions

(1) General-use Type and Intrinsically Safe Type

Use metal conduit wiring or a waterproof gland (metal wiring conduit JIS F 8801) for cable wiring.

- Apply nonhardening sealant to the threads of the wiring tap and a flexible fitting for secure waterproofing. Figure 5.8 shows an example of wiring on the output side. This example also applies to the wiring on the input side.

![Figure 5.8 Example of Wiring Using a Wiring Conduit](image)

(2) Flameproof Type

Wire cables through a flameproof packing adapter, or using a flameproof metal conduit.

- A seal fitting must be installed near the terminal box connection port for a sealed construction.
- Apply a nonhardening sealant to the threads of the terminal box connection port, flexible metal conduit and seal fitting for waterproofing.

![Figure 5.9 Typical Wiring Using Flameproof Metal Conduit](image)

5.6 Grounding

Grounding is always required for the proper operation of transmitters. Follow the domestic electrical requirements as regulated in each country. For a transmitter with a lightning protector, grounding should satisfy ground resistance of 10Ω or less.

Ground terminals are located on the inside and outside of the terminal box. Either of these terminals may be used.

⚠️ CAUTION ⚠️

To use an external arrester, carry out the interlocked grounding as shown below, and perform grounding work (ground resistance: 10Ω or less) in the arrester side.

![Figure 5.10 Grounding Terminal](image)
6. Maintenance

6.1 General
Each component of this instrument is configured in units to make maintenance easier.

This chapter contains disassembly and assembly procedures associated with calibration, adjustment and part replacement required for maintenance of the affected instrument.

**IMPORTANT**

1. Maintenance of this instrument should be performed in a service shop where the necessary tools are provided.
2. Handling the MAIN and Indicator assembly
   Some of the parts contained in the MAIN and Indicator assembly are susceptible to static electricity damage. Before performing maintenance, use a ground wrist band or other antistatic measures, and avoid touching the electronic components and circuits with bare hands.

6.2 Calibration
This instrument is fully factory-tested and is guaranteed for the intended accuracy, eliminating the need for calibration. When calibration needs to be verified, the following equipment and calibration procedure is recommended.

6.2.1 Selection of Equipment for Calibration
Table 6.1 lists the equipment required for calibration. The calibration equipment traceable to a verifying agency standard should be used.

<table>
<thead>
<tr>
<th>Name</th>
<th>Recommended</th>
<th>Remark</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power supply</td>
<td>SDBT, SDBS distributor</td>
<td>4 to 20mA DC (Output voltage: 26.5±1.5V DC, drop by internal 250Ω resistance included)</td>
</tr>
<tr>
<td>Load resistance</td>
<td>2792 standard resistor (250Ω ±0.005%)</td>
<td>For 4 to 20mA DC</td>
</tr>
<tr>
<td>Voltmeter</td>
<td></td>
<td>For 4 to 20mA DC signal</td>
</tr>
<tr>
<td>Universal calibrator</td>
<td></td>
<td>For calibration of DC voltage and thermocouple</td>
</tr>
<tr>
<td>Variable resistor</td>
<td>279301 6-dial variable resistor (accuracy: ±(0.01% of rdg + 2mΩ))</td>
<td>For calibration of RTD input</td>
</tr>
</tbody>
</table>
6.2.2 Calibration Procedure

To conduct calibration required to evaluate the uncertainty while using the instrument, follow the steps below:

1. In accordance with the example wiring shown in Figure 6.1, connect each equipment, and warm up for 3 minutes or more. Lay wiring on the input side according to the sensor to be used.

   a. Wiring of power supply and output

   ![Diagram of power supply and output wiring](image)

   b. Example of wiring for thermocouple or DC voltage input (when 1 input type is used)

   ![Diagram of thermocouple or DC voltage input wiring](image)

   c. Example of wiring for RTD 4-core type (when 1 input type is used)

   ![Diagram of RTD 4-core type wiring](image)

Figure 6.1 Example of Wiring for Calibration Equipment

2. For DC voltage input
   With a voltage generator, deliver input signals corresponding to 0, 25, 75, or 100% of the input span to the temperature transmitter. Measure the resulting input signal with the voltmeter (digital multimeter) and check the output value relative to the input value.

3. For thermocouple input
   Since this instrument is equipped with a reference junction compensating function, use a reference junction compensating function in universal calibrator in order to compensate for this function upon calibration. According to the reference millivolt table for thermocouple, obtain millivolt corresponding to 0, 25, 50, 75, or 100% of the span, and use that power as the input value, then deliver it to the temperature transmitter by means of a variable resistor. Measure the resulting output signal with the voltmeter (digital multimeter) and check the output value relative to the input value.

4. RTD
   Using a RTD as input, calibration of the temperature transmitter is carried out via a 4-core wire connection.
   As defined the reference resistor value table of the RTD, obtain resistance values corresponding to 0, 25, 50, 75 or 100% of the span, and use the obtained resistance as the input value, then deliver it to the temperature transmitter by means of a variable resistor. Measure the resulting output signal with the voltmeter (digital multimeter) and check the output value relative to the input value.

5. In Steps 2 through 4, if the output signal deviates from the given range of accuracy when a given input signal is delivered, adjust the output using the handheld terminal. For details of how to adjust the output, refer to the additional reference, “HART Protocol” IM 01C50T01-02EN, or “BRAIN Protocol” IM 01C50T03-02EN and the instruction manual for each terminal.

6.3 Disassembly and Assembly

This section details the procedure for part replacement or disassembly and assembly of each component depending on the maintenance process.

Before starting disassembly and assembly work, turn off the power, and use a tool suited to the associated work.

Table 6.2 lists the tools required for disassembly and assembly of the instrument.

<table>
<thead>
<tr>
<th>Tool name</th>
<th>Quantity</th>
<th>Remark</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phillips screwdriver</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Standard screwdriver</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Hexagonal wrench</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Crescent wrench</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Torque wrench</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Box wrench</td>
<td>1</td>
<td>For M10 screw</td>
</tr>
<tr>
<td>Box screwdriver</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Forceps</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

Table 6.2 Tools for Disassembly and Assembly
CAUTION

Precautions for ATEX and IECEx Flameproof Type Transmitters

- For a withstand flameproof type transmitter, as a rule, move the transmitter to a non-hazardous location, then proceed with maintenance and restore the instrument to the original condition.
- For a withstand ATEX and IECEx flameproof type transmitter, turn the lock bolt (hexagon socket bolt) clockwise with a wrench for hexagon head, unlock and remove the cover. When installing the cover, it is the must to turn the lock bolt counterclockwise and lock the cover (locked to a torque of 0.7 Nm).
- For a withstand flameproof type transmitter, in no case should the user be allowed to modify the transmitter. Therefore, no user is allowed to add a integral indicator, or use the transmitter with the indicator removed. Contact us for any modification.

6.3.1 Replacement of Integral Indicator

- Removal of integral indicator
  1. Remove the cover.
  2. Remove two nuts while using your hand to support the integral indicator.
  3. Remove the indicator assembly from the MAIN assembly. At this time, straighten and pull the indicator assembly forward so that the connector connecting the MAIN assembly and the indicator assembly is not damaged.

- Mounting the Integral indicator
  Integral Indicator can be installed in the following three directions.

  1. Place the Indicator assembly in desired direction over the MAIN assembly.
  2. Align the mounting hole of the Indicator assembly with the stud bolt hole, and carefully insert the indicator into the connector in a straight manner so that the connector is not damaged.
  3. Tighten the two nuts that secure the indicator.
  4. Mount the cover.
6.4 Troubleshooting

When the measured value is found abnormal, follow the troubleshooting flowchart below. If the complex nature of the trouble means that the cause cannot be identified using the following flowchart, refer the matter to our service personnel.

6.4.1 Basic Troubleshooting Flow

When the process measurement is found to be abnormal, it is necessary to determine whether the input temperature is out of range, the sensor has failed or being damaged, or the unit has been improperly wired. If it is suspected that the measurement system is the source of the problem, use the flowchart to identify the affected area and determine how to proceed.

In these troubleshooting steps, the self diagnostic function provides helpful solutions to the problem, refer to the instructions in Section 6.5 for details.

Figure 6.4 Basic Flow and Self-diagnosis

6.4.2 Example of Troubleshooting Flow

The following phenomena indicate that this instrument may be out of operation.
[Example]
- No output signal is delivered.
- Process variable changes but the output signal remains unchanged.
- The assessed value of the process variable and the output are not coincident.

- If a integral indicator is attached, check the display of the error code.
- Connect a hand-held terminal and check self-diagnosis.

Refer to the error code list and check for recovery measures.

Was a faulty area found with self-diagnosis?
YES
NO

Is the polarity of the power supply correct?
YES
NO

Check the polarity between the power supply and terminal box and correct it.

Are the power supply voltage and load resistance correct?
YES
NO

Refer to Section 5.2 and set the specified voltage and load resistance.

Is the sensor correctly connected?
YES
NO

Check the sensor connection and correct it.

Is there a disconnection in the loop? Do the loop numbers correspond to the counterpart?
YES
NO

Check for disconnection or faulty wiring and take corrective measures.

Refer to our service personnel for details.

Figure 6.5 Example of Troubleshooting Flow
### Table 6.3 Problems and Causes

<table>
<thead>
<tr>
<th>Observed Problems</th>
<th>Possible Cause</th>
<th>Related Parameter (HART)</th>
<th>Related Parameter (FF)</th>
<th>Related Parameter (BRAIN)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Output fluctuates greatly.</td>
<td>Span is too narrow.</td>
<td>PV LRV</td>
<td>--</td>
<td>E10:PV LRV</td>
</tr>
<tr>
<td></td>
<td></td>
<td>PV URV</td>
<td></td>
<td>E11:PV URV</td>
</tr>
<tr>
<td></td>
<td>Input adjustment by user was not correctly done.</td>
<td></td>
<td></td>
<td>I16:S1 ADJ CLR</td>
</tr>
<tr>
<td></td>
<td>reset Sensor1(2) Trim</td>
<td>Sensor1 Trim</td>
<td></td>
<td>I26:S2 ADJ CLR</td>
</tr>
<tr>
<td></td>
<td>Output adjustment by user was not correctly done.</td>
<td>reset AO Trim</td>
<td>--</td>
<td>I33:OUT ADJ CLR</td>
</tr>
<tr>
<td>Transmitter outputs fixed</td>
<td>The transmitter is in manual (test output) mode.</td>
<td>exec Loop Test</td>
<td>SIM_ENABLE_MSG</td>
<td>F10:OUTPUT MODE</td>
</tr>
<tr>
<td>current.</td>
<td></td>
<td>enable Dev Var Sim</td>
<td></td>
<td>I30:OUTPUT</td>
</tr>
<tr>
<td></td>
<td>Output adjustment by user was not correctly done.</td>
<td>reset AO Trim</td>
<td>--</td>
<td>I33:OUT ADJ CLR</td>
</tr>
<tr>
<td>Output is reversed.</td>
<td>LRV is greater than URV.</td>
<td>PV LRV</td>
<td>--</td>
<td>E10:PV LRV</td>
</tr>
<tr>
<td>(See note 1)</td>
<td></td>
<td>PV URV</td>
<td></td>
<td>E11:PV URV</td>
</tr>
<tr>
<td>Parameters cannot be</td>
<td>The transmitter is in write protect status.</td>
<td>Write Protect</td>
<td>WRITE_LOCK</td>
<td>G40:WRT PROTECT</td>
</tr>
<tr>
<td>changed.</td>
<td></td>
<td></td>
<td></td>
<td>G41:WRT ENABLE</td>
</tr>
<tr>
<td>Sensor backup function</td>
<td>Configuration of Sensor1 and Sensor2 is not correct.</td>
<td>Sns1(2) Probe Type</td>
<td>SENSOR_TYPE_1(2)</td>
<td>D10:SSENSOR1 TYPE</td>
</tr>
<tr>
<td>doesn’t work correctly.</td>
<td></td>
<td>Sns1(2) Wire</td>
<td>SENSOR_CONNECTION_1(2)</td>
<td>D11:SSENSOR1 WIRE</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Status group2 Mask</td>
<td>SENSOR_STATUS_1(2)</td>
<td>D30:SSENSOR2 TYPE</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Status group3 Mask</td>
<td>SENSOR_STATUS_3</td>
<td>D31:SSENSOR2 WIRE</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>MASK_3</td>
<td>K10:S1 FAIL MASK</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>K11:S2 FAIL MASK</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>K12:S1 SHRT MASK</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>K13:S2 SHRT MASK</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>K23:8KUP S1 MASK</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>K24:8KUP S2 MASK</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Sensor backup mode is not enabled.</td>
<td>PV is</td>
<td>BACKUP_VALUE</td>
<td>B10:PV is</td>
</tr>
<tr>
<td>Output damping doesn’t</td>
<td>Damping time constant is set to “0 second.”</td>
<td>AO Damping</td>
<td>PV_FTIME</td>
<td>E20:AO DAMP</td>
</tr>
<tr>
<td>work.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Note 1:** If the reversed output is desired and necessary setting was done by user, it is not considered as a problem.

### Table 6.4 Problems and Countermeasures

<table>
<thead>
<tr>
<th>Observed Problems</th>
<th>Possible Cause</th>
<th>Countermeasure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Output fluctuates greatly.</td>
<td>Span is too narrow.</td>
<td>Check the range, and change the settings to make the span larger.</td>
</tr>
<tr>
<td></td>
<td>Input adjustment by user was not correctly done.</td>
<td>Clear the user adjustment (Sensor trim) value or set it to off.</td>
</tr>
<tr>
<td></td>
<td>Output adjustment by user was not correctly done.</td>
<td>Clear the user adjustment (output trim) value or set it to off.</td>
</tr>
<tr>
<td>Transmitter outputs fixed</td>
<td>The transmitter is in manual (test output) mode.</td>
<td>Release manual mode. (Make the transmitter return to Automatic Mode)</td>
</tr>
<tr>
<td>current.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Output is reversed.</td>
<td>LRV is greater than URV.</td>
<td>Set the correct value to URV and LRV.</td>
</tr>
<tr>
<td>(See note 1)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Parameters cannot be</td>
<td>The transmitter is in write protect status.</td>
<td>Release write protect.</td>
</tr>
<tr>
<td>changed.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sensor backup function</td>
<td>Configuration of Sensor1 and Sensor2 is not correct.</td>
<td>• Check the type and wire settings for Sensor1 and Sensor2.</td>
</tr>
<tr>
<td>doesn’t work correctly.</td>
<td></td>
<td>• Check the connection of Sensor1 and Sensor2.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Sensor backup mode is not enabled.</td>
<td>Change PV mapping “Sensor Backup.”</td>
</tr>
<tr>
<td>Output damping doesn’t</td>
<td>Damping time constant is set to “0 second.”</td>
<td>Set correct value.</td>
</tr>
<tr>
<td>work.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Note 1:** If the reversed output is desired and necessary setting was done by user, it is not considered as a problem.
6.5 Integral Indicator and Error Display

For temperature transmitters equipped with an integral indicator, errors in the temperature sensor or the transmitter cause an integral indicator to call up the applicable error code. Table 6.5 lists the error codes for HART and BRAIN. Table 6.7 lists the error codes for Foundation fieldbus.

### Table 6.5 List of Error Codes (HART and BRAIN)

<table>
<thead>
<tr>
<th>Alarm Number</th>
<th>Indicator Message</th>
<th>Cause</th>
<th>Output operation during error</th>
</tr>
</thead>
<tbody>
<tr>
<td>AL.00</td>
<td>CPU.ERR</td>
<td>MAIN CPU failed</td>
<td>According to the transmitter failure output (burnout) Communication disabled</td>
</tr>
<tr>
<td>AL.01</td>
<td>SENSOR</td>
<td>Sensor non-volatile memory verifies alarm</td>
<td>According to the transmitter failure output (burnout) Communication enabled</td>
</tr>
<tr>
<td>AL.02</td>
<td>TMP.MEM</td>
<td>Non-volatile memory of the TEMP ASSY verify alarm</td>
<td></td>
</tr>
<tr>
<td>AL.03</td>
<td>AD.CONV</td>
<td>Input circuit hardware failed</td>
<td></td>
</tr>
<tr>
<td>AL.04*3</td>
<td>CAL.ERR</td>
<td>MAIN ASSY memory failed</td>
<td></td>
</tr>
<tr>
<td>AL.05</td>
<td>CAL.ERR</td>
<td>TEMP ASSY memory failed</td>
<td></td>
</tr>
<tr>
<td>AL.06</td>
<td>TMP.ERR</td>
<td>TEMP ASSY voltage failed</td>
<td></td>
</tr>
<tr>
<td>AL.07</td>
<td>COM.EEP</td>
<td>Communication non-volatile memory verifies alarm</td>
<td>Continue to operate and output</td>
</tr>
<tr>
<td>AL.08</td>
<td>TMP.MEM</td>
<td>Non-volatile memory of the TEMP ASSY verifies alarm</td>
<td></td>
</tr>
<tr>
<td>AL.09</td>
<td>COM.ERR</td>
<td>Internal communication failed</td>
<td>According to the transmitter failure output (burnout) Communication enabled</td>
</tr>
<tr>
<td>AL.10</td>
<td>S.1.FAIL</td>
<td>Sensor 1 failed or disconnected from terminal block</td>
<td>Refer to table 6.6</td>
</tr>
<tr>
<td>AL.11</td>
<td>S.2.FAIL</td>
<td>Sensor 2 failed or disconnected from terminal block</td>
<td>Refer to table 6.6</td>
</tr>
<tr>
<td>AL.12*1</td>
<td>S.1.SHRT</td>
<td>Sensor 1 short-circuited</td>
<td>Refer to table 6.6</td>
</tr>
<tr>
<td>AL.13*1</td>
<td>S.2.SHRT</td>
<td>Sensor 2 short-circuited</td>
<td>Refer to table 6.6</td>
</tr>
<tr>
<td>AL.14*1</td>
<td>S.1.CORR</td>
<td>Sensor 1 corroded</td>
<td>Continue to operate and output</td>
</tr>
<tr>
<td>AL.15*1</td>
<td>S.2.CORR</td>
<td>Sensor 2 corroded</td>
<td>Continue to operate and output</td>
</tr>
<tr>
<td>AL.20</td>
<td>S.1.SGNL</td>
<td>Sensor 1 input is out of measurable range.</td>
<td>Continue to operate and output</td>
</tr>
<tr>
<td>AL.21</td>
<td>S.2.SGNL</td>
<td>Sensor 2 input is out of measurable range.</td>
<td>Continue to operate and output</td>
</tr>
<tr>
<td>AL.22*4</td>
<td>TERMINL</td>
<td>Terminal block temperature is abnormal. Or terminal block temperature sensor failed</td>
<td>Refer to table 6.6</td>
</tr>
<tr>
<td>AL.23</td>
<td>S.1.FAIL</td>
<td>During sensor backup operation, Sensor1 fails, it has output Sensor2</td>
<td>Operating to the backup side. When the backup side also fails, output is according to burnout setting.</td>
</tr>
<tr>
<td>AL.24</td>
<td>S.2.FAIL</td>
<td>During sensor backup operation, Sensor2 fails</td>
<td>Continue to operate and output</td>
</tr>
<tr>
<td>AL.25</td>
<td>DRIFT</td>
<td>Sensor drift</td>
<td>Continue to operate and output</td>
</tr>
<tr>
<td>AL.26*1</td>
<td>S.1.CYCL</td>
<td>Temperature cycling times of Sensor1 exceeds the threshold</td>
<td>Continue to operate and output</td>
</tr>
<tr>
<td>AL.27*1</td>
<td>S.2.CYCL</td>
<td>Temperature cycling times of Sensor2 exceeds the threshold</td>
<td>Continue to operate and output</td>
</tr>
<tr>
<td>AL.30</td>
<td>PV LO</td>
<td>PV value is below the range limit setting</td>
<td>Lower limit 3.68mA (-2%)</td>
</tr>
<tr>
<td>AL.31</td>
<td>PV HI</td>
<td>PV value is above the range limit setting</td>
<td>Upper limit 20.8mA (105%)</td>
</tr>
<tr>
<td>AL.40</td>
<td>S.1 LO</td>
<td>Measured temperature of sensor 1 is too low</td>
<td>Continue to operate and output</td>
</tr>
<tr>
<td>AL.41</td>
<td>S.1 HI</td>
<td>Measured temperature of sensor 1 is too high</td>
<td>Continue to operate and output</td>
</tr>
<tr>
<td>AL.42</td>
<td>S.2 LO</td>
<td>Measured temperature of sensor 2 is too low</td>
<td>Continue to operate and output</td>
</tr>
<tr>
<td>AL.43</td>
<td>S.2 HI</td>
<td>Measured temperature of sensor 2 is too high</td>
<td>Continue to operate and output</td>
</tr>
<tr>
<td>AL.44</td>
<td>AMBNT.L</td>
<td>Ambient temperature is below-40 degree C</td>
<td>Continue to operate and output</td>
</tr>
<tr>
<td>AL.45</td>
<td>AMBNT.H</td>
<td>Ambient temperature is above 85 degree C</td>
<td>Continue to operate and output</td>
</tr>
<tr>
<td>AL.50</td>
<td>LRV LO</td>
<td>LRV setting is below the sensor operating temperature range</td>
<td>Continue to operate and output</td>
</tr>
</tbody>
</table>
### Table 6.6 Output operation (HART and BRAIN)

<table>
<thead>
<tr>
<th>Current output mapping</th>
<th>S.1.FAIL</th>
<th>S.2.FAIL</th>
<th>S.1.SHRT&lt;sup&gt;3&lt;/sup&gt;</th>
<th>S.2.SHRT&lt;sup&gt;3&lt;/sup&gt;</th>
<th>TERMNL</th>
</tr>
</thead>
<tbody>
<tr>
<td>SENS.1</td>
<td>Sensor Burnout</td>
<td>*&lt;sup&gt;1&lt;/sup&gt;</td>
<td>Sensor Burnout</td>
<td>*&lt;sup&gt;1&lt;/sup&gt;</td>
<td>Sensor Burnout&lt;sup&gt;4&lt;/sup&gt;</td>
</tr>
<tr>
<td>S.1-TER</td>
<td>Sensor Burnout</td>
<td>*&lt;sup&gt;1&lt;/sup&gt;</td>
<td>Sensor Burnout</td>
<td>*&lt;sup&gt;1&lt;/sup&gt;</td>
<td>Sensor Burnout&lt;sup&gt;4&lt;/sup&gt;</td>
</tr>
<tr>
<td>TERM</td>
<td>*&lt;sup&gt;1&lt;/sup&gt;</td>
<td>*&lt;sup&gt;1&lt;/sup&gt;</td>
<td>*&lt;sup&gt;1&lt;/sup&gt;</td>
<td>*&lt;sup&gt;1&lt;/sup&gt;</td>
<td>Sensor Burnout&lt;sup&gt;4&lt;/sup&gt;</td>
</tr>
<tr>
<td>SENS.2</td>
<td>*&lt;sup&gt;1&lt;/sup&gt;</td>
<td>Sensor Burnout</td>
<td>*&lt;sup&gt;1&lt;/sup&gt;</td>
<td>Sensor Burnout</td>
<td>Sensor Burnout&lt;sup&gt;4&lt;/sup&gt;</td>
</tr>
<tr>
<td>S.2-TER</td>
<td>*&lt;sup&gt;1&lt;/sup&gt;</td>
<td>Sensor Burnout</td>
<td>*&lt;sup&gt;1&lt;/sup&gt;</td>
<td>Sensor Burnout</td>
<td>Sensor Burnout&lt;sup&gt;4&lt;/sup&gt;</td>
</tr>
<tr>
<td>S.1-S.2</td>
<td>Sensor Burnout</td>
<td>Sensor Burnout</td>
<td>Sensor Burnout</td>
<td>Sensor Burnout</td>
<td>Sensor Burnout&lt;sup&gt;4&lt;/sup&gt;</td>
</tr>
<tr>
<td>S.2-S.1</td>
<td>Sensor Burnout</td>
<td>Sensor Burnout</td>
<td>Sensor Burnout</td>
<td>Sensor Burnout</td>
<td>Sensor Burnout&lt;sup&gt;4&lt;/sup&gt;</td>
</tr>
<tr>
<td>AVG</td>
<td>Sensor Burnout</td>
<td>Sensor Burnout</td>
<td>Sensor Burnout</td>
<td>Sensor Burnout</td>
<td>Sensor Burnout&lt;sup&gt;4&lt;/sup&gt;</td>
</tr>
<tr>
<td>BACKUP</td>
<td>*&lt;sup&gt;2&lt;/sup&gt;</td>
<td>*&lt;sup&gt;2&lt;/sup&gt;</td>
<td>*&lt;sup&gt;2&lt;/sup&gt;</td>
<td>*&lt;sup&gt;2&lt;/sup&gt;</td>
<td>*&lt;sup&gt;2&lt;/sup&gt;</td>
</tr>
</tbody>
</table>

*<sup>1</sup>: Continue to operate and output.
*<sup>2</sup>: When both sensor1 and sensor2 occur error, output is burnout.
*<sup>3</sup>: Applicable only for YTA710.
*<sup>4</sup>: In software revision HART R1.03.01 or earlier or BRAIN R1.01.01, fixed output value just before the alarm occurred.

---

*<sup>1</sup>: Applicable only for YTA710.
*<sup>2</sup>: Applicable only for HART.
*<sup>3</sup>: In software revision HART R1.03.01 or earlier or BRAIN R1.01.01, AL04 may be generated even when abnormality or disconnection of the terminal block temperature sensor occurs.
*<sup>4</sup>: In software revision HART R1.03.01 or earlier or BRAIN R1.01.01, even if abnormality or disconnection of the terminal block temperature sensor occurs, AL22 may not be output and AL04 may be generated.
### Table 6.7 List of Error Codes (FF)

<table>
<thead>
<tr>
<th>Alarm Number</th>
<th>Indicator Message</th>
<th>Cause</th>
</tr>
</thead>
<tbody>
<tr>
<td>AL.00</td>
<td>CPU.ERR</td>
<td>MAIN CPU failed</td>
</tr>
<tr>
<td>AL.01</td>
<td>SENSOR</td>
<td>Sensor non-volatile memory verifies alarm</td>
</tr>
<tr>
<td>AL.02</td>
<td>TMP.MEM</td>
<td>Non-volatile memory of the TEMP ASSY verifies alarm</td>
</tr>
<tr>
<td>AL.03</td>
<td>AD.CONV</td>
<td>Input circuit hardware failed</td>
</tr>
<tr>
<td>AL.04</td>
<td>CAL.ERR</td>
<td>MAIN ASSY memory failed</td>
</tr>
<tr>
<td>AL.05</td>
<td>CAL.ERR</td>
<td>TEMP ASSY memory failed</td>
</tr>
<tr>
<td>AL.06</td>
<td>TMP.ERR</td>
<td>TEMP ASSY voltage failed</td>
</tr>
<tr>
<td>AL.07</td>
<td>COM.EEP</td>
<td>Communication non-volatile memory verifies alarm</td>
</tr>
<tr>
<td>AL.08</td>
<td>TMP.MEM</td>
<td>Non-volatile memory of the TEMP ASSY verifies alarm</td>
</tr>
<tr>
<td>AL.09</td>
<td>COM.ERR</td>
<td>Internal communication failed</td>
</tr>
<tr>
<td>AL.10</td>
<td>S.1.FAIL</td>
<td>Sensor 1 failed or disconnected from terminal block</td>
</tr>
<tr>
<td>AL.11</td>
<td>S.2.FAIL</td>
<td>Sensor 2 failed or disconnected from terminal block</td>
</tr>
<tr>
<td>AL.12*1</td>
<td>S.1.SHRT</td>
<td>Sensor 1 short-circuited</td>
</tr>
<tr>
<td>AL.13*1</td>
<td>S.2.SHRT</td>
<td>Sensor 2 short-circuited</td>
</tr>
<tr>
<td>AL.14*1</td>
<td>S.1.CORR</td>
<td>Sensor 1 corroded</td>
</tr>
<tr>
<td>AL.15*1</td>
<td>S.2.CORR</td>
<td>Sensor 2 corroded</td>
</tr>
<tr>
<td>AL.20</td>
<td>S.1.SGNL</td>
<td>Sensor 1 input is out of measurable range.</td>
</tr>
<tr>
<td>AL.21</td>
<td>S.2.SGNL</td>
<td>Sensor 2 input is out of measurable range.</td>
</tr>
<tr>
<td>AL.22</td>
<td>TERMNL</td>
<td>Terminal block temperature is abnormal. Such as abnormal or disconnection of the terminal block temperature sensor</td>
</tr>
<tr>
<td>AL.23</td>
<td>S.1.FAIL</td>
<td>During sensor backup operation, Sensor1 fails, it has output Sensor2</td>
</tr>
<tr>
<td>AL.24</td>
<td>S.2.FAIL</td>
<td>During sensor backup operation, Sensor2 fails</td>
</tr>
<tr>
<td>AL.25</td>
<td>DRIFT</td>
<td>Sensor drift</td>
</tr>
<tr>
<td>AL.26*1</td>
<td>S.1.CYCL</td>
<td>Temperature cycling times of Sensor1 exceeds the threshold</td>
</tr>
<tr>
<td>AL.27*1</td>
<td>S.2.CYCL</td>
<td>Temperature cycling times of Sensor2 exceeds the threshold</td>
</tr>
<tr>
<td>AL.40</td>
<td>S.1 LO</td>
<td>Measured temperature of sensor 1 is to low</td>
</tr>
<tr>
<td>AL.41</td>
<td>S.1 HI</td>
<td>Measured temperature of sensor 1 is to high</td>
</tr>
<tr>
<td>AL.42</td>
<td>S.2 LO</td>
<td>Measured temperature of sensor 2 is to low</td>
</tr>
<tr>
<td>AL.43</td>
<td>S.2 HI</td>
<td>Measured temperature of sensor 2 is to high</td>
</tr>
<tr>
<td>AL.44</td>
<td>AMBNT.L</td>
<td>Ambient temperature is below -40 degree C</td>
</tr>
<tr>
<td>AL.45</td>
<td>AMBNT.H</td>
<td>Ambient temperature is above 85 degree C</td>
</tr>
<tr>
<td>AL.61</td>
<td>S.1 CFG</td>
<td>There is a false set to sensor1</td>
</tr>
<tr>
<td>AL.62</td>
<td>S.2 CFG</td>
<td>There is a false set to sensor2</td>
</tr>
<tr>
<td>AL.100</td>
<td>NOT.RDY</td>
<td>Any function block is not scheduled</td>
</tr>
<tr>
<td>AL.101</td>
<td>AI1 HH</td>
<td>HI HI alarm occurs in AI1 block</td>
</tr>
<tr>
<td>AL.101</td>
<td>AI1 LL</td>
<td>LO LO alarm occurs in AI1 block</td>
</tr>
<tr>
<td>AL.102</td>
<td>AI2 HH</td>
<td>HI HI alarm occurs in AI2 block</td>
</tr>
<tr>
<td>AL.102</td>
<td>AI2 LL</td>
<td>LO LO alarm occurs in AI2 block</td>
</tr>
<tr>
<td>AL.103</td>
<td>AI3 HH</td>
<td>HI HI alarm occurs in AI3 block</td>
</tr>
<tr>
<td>AL.103</td>
<td>AI3 LL</td>
<td>LO LO alarm occurs in AI3 block</td>
</tr>
<tr>
<td>AL.104</td>
<td>AI4 HH</td>
<td>HI HI alarm occurs in AI4 block</td>
</tr>
<tr>
<td>AL.104</td>
<td>AI4 LL</td>
<td>LO LO alarm occurs in AI4 block</td>
</tr>
<tr>
<td>AL.105</td>
<td>PID1.HH</td>
<td>HI HI alarm occurs in PID1 block</td>
</tr>
<tr>
<td>AL.105</td>
<td>PID1.LL</td>
<td>LO LO alarm occurs in PID1 block</td>
</tr>
<tr>
<td>AL.106</td>
<td>PID2.HH</td>
<td>HI HI alarm occurs in PID2 block</td>
</tr>
<tr>
<td>AL.106</td>
<td>PID2.LL</td>
<td>LO LO alarm occurs in PID2 block</td>
</tr>
<tr>
<td>AL.110</td>
<td>RS O/S</td>
<td>The actual mode of the RS block is O/S.</td>
</tr>
<tr>
<td>AL.111</td>
<td>STB O/S</td>
<td>The actual mode of the STB block is O/S.</td>
</tr>
<tr>
<td>AL.112</td>
<td>LTB O/S</td>
<td>The actual mode of the LTB block is O/S.</td>
</tr>
<tr>
<td>AL.113</td>
<td>MTB O/S</td>
<td>The actual mode of the MTB block is O/S.</td>
</tr>
<tr>
<td>AL.114</td>
<td>AI1 O/S</td>
<td>The actual mode of the AI1 block is O/S.</td>
</tr>
<tr>
<td>AL.115</td>
<td>AI2 O/S</td>
<td>The actual mode of the AI2 block is O/S.</td>
</tr>
<tr>
<td>AL.116</td>
<td>AI3 O/S</td>
<td>The actual mode of the AI3 block is O/S.</td>
</tr>
<tr>
<td>Alarm Number</td>
<td>Indicator Message</td>
<td>Cause</td>
</tr>
<tr>
<td>--------------</td>
<td>-------------------</td>
<td>-------</td>
</tr>
<tr>
<td>AL.117</td>
<td>AI4 O/S</td>
<td>The actual mode of the AI4 block is O/S.</td>
</tr>
<tr>
<td>AL.118</td>
<td>SCHEDL</td>
<td>Execution of AI1 is not scheduled.</td>
</tr>
<tr>
<td>AL.119</td>
<td>SCHEDL</td>
<td>Execution of AI2 is not scheduled.</td>
</tr>
<tr>
<td>AL.120</td>
<td>SCHEDL</td>
<td>Execution of AI3 is not scheduled.</td>
</tr>
<tr>
<td>AL.121</td>
<td>SCHEDL</td>
<td>Execution of AI4 is not scheduled.</td>
</tr>
<tr>
<td>AL.122</td>
<td>STB.MAN</td>
<td>The actual mode of the STB block is Man.</td>
</tr>
<tr>
<td>AL.130</td>
<td>DI1 O/S</td>
<td>The actual mode of the DI1 block is O/S.</td>
</tr>
<tr>
<td>AL.130</td>
<td>DI1.MAN</td>
<td>The actual mode of the DI1 block is Man.</td>
</tr>
<tr>
<td>AL.130</td>
<td>SCHEDL</td>
<td>Execution of DI1 is not scheduled.</td>
</tr>
<tr>
<td>AL.130</td>
<td>DI1.SIM</td>
<td>Simulate of the DI1 block is active.</td>
</tr>
<tr>
<td>AL.131</td>
<td>DI2 O/S</td>
<td>The actual mode of the DI2 block is O/S.</td>
</tr>
<tr>
<td>AL.131</td>
<td>DI2.MAN</td>
<td>The actual mode of the DI2 block is Man.</td>
</tr>
<tr>
<td>AL.131</td>
<td>SCHEDL</td>
<td>Execution of DI2 is not scheduled.</td>
</tr>
<tr>
<td>AL.131</td>
<td>DI2.SIM</td>
<td>Simulate of the DI2 block is active.</td>
</tr>
<tr>
<td>AL.132</td>
<td>DI3 O/S</td>
<td>The actual mode of the DI3 block is O/S.</td>
</tr>
<tr>
<td>AL.132</td>
<td>DI3.MAN</td>
<td>The actual mode of the DI3 block is Man.</td>
</tr>
<tr>
<td>AL.132</td>
<td>SCHEDL</td>
<td>Execution of DI3 is not scheduled.</td>
</tr>
<tr>
<td>AL.132</td>
<td>DI3.SIM</td>
<td>Simulate of the DI3 block is active.</td>
</tr>
<tr>
<td>AL.133</td>
<td>DI4 O/S</td>
<td>The actual mode of the DI4 block is O/S.</td>
</tr>
<tr>
<td>AL.133</td>
<td>DI4.MAN</td>
<td>The actual mode of the DI4 block is Man.</td>
</tr>
<tr>
<td>AL.133</td>
<td>SCHEDL</td>
<td>Execution of DI4 is not scheduled.</td>
</tr>
<tr>
<td>AL.133</td>
<td>DI4.SIM</td>
<td>Simulate of the DI4 block is active.</td>
</tr>
<tr>
<td>AL.134</td>
<td>PID1.O/S</td>
<td>The actual mode of the PID1 block is O/S.</td>
</tr>
<tr>
<td>AL.134</td>
<td>PID.MAN</td>
<td>The actual mode of the PID1 block is Man.</td>
</tr>
<tr>
<td>AL.134</td>
<td>SCHEDL</td>
<td>Execution of PID1 is not scheduled.</td>
</tr>
<tr>
<td>AL.134</td>
<td>PID.BYP</td>
<td>The bypass action for PID1 is active.</td>
</tr>
<tr>
<td>AL.135</td>
<td>PID2.O/S</td>
<td>The actual mode of the PID2 block is O/S.</td>
</tr>
<tr>
<td>AL.135</td>
<td>PID.MAN</td>
<td>The actual mode of the PID2 block is Man.</td>
</tr>
<tr>
<td>AL.135</td>
<td>SCHEDL</td>
<td>Execution of PID2 is not scheduled.</td>
</tr>
<tr>
<td>AL.135</td>
<td>PID.BYP</td>
<td>The bypass action for PID2 is active.</td>
</tr>
<tr>
<td>AL.136</td>
<td>SC O/S</td>
<td>The actual mode of the SC block is O/S.</td>
</tr>
<tr>
<td>AL.136</td>
<td>SC.MAN</td>
<td>The actual mode of the SC block is Man.</td>
</tr>
<tr>
<td>AL.136</td>
<td>SCHEDL</td>
<td>Execution of SC is not scheduled.</td>
</tr>
<tr>
<td>AL.137</td>
<td>IS O/S</td>
<td>The actual mode of the IS block is O/S.</td>
</tr>
<tr>
<td>AL.137</td>
<td>IS.MAN</td>
<td>The actual mode of the IS block is Man.</td>
</tr>
<tr>
<td>AL.137</td>
<td>SCHEDL</td>
<td>Execution of IS is not scheduled.</td>
</tr>
<tr>
<td>AL.138</td>
<td>AR O/S</td>
<td>The actual mode of the AR block is O/S.</td>
</tr>
<tr>
<td>AL.138</td>
<td>AR.MAN</td>
<td>The actual mode of the AR block is Man.</td>
</tr>
<tr>
<td>AL.138</td>
<td>SCHEDL</td>
<td>Execution of AR is not scheduled.</td>
</tr>
<tr>
<td>AL.150</td>
<td>A11.SIM</td>
<td>Simulate of the A1 block is active.</td>
</tr>
<tr>
<td>AL.151</td>
<td>A12.SIM</td>
<td>Simulate of the A12 block is active.</td>
</tr>
<tr>
<td>AL.152</td>
<td>A13.SIM</td>
<td>Simulate of the A13 block is active.</td>
</tr>
<tr>
<td>AL.153</td>
<td>A14.SIM</td>
<td>Simulate of the A14 block is active.</td>
</tr>
<tr>
<td>AL.154</td>
<td>A11.MAN</td>
<td>The actual mode of the A1 block is Man.</td>
</tr>
<tr>
<td>AL.155</td>
<td>A12.MAN</td>
<td>The actual mode of the A12 block is Man.</td>
</tr>
<tr>
<td>AL.156</td>
<td>A13.MAN</td>
<td>The actual mode of the A13 block is Man.</td>
</tr>
<tr>
<td>AL.157</td>
<td>A14.MAN</td>
<td>The actual mode of the A14 block is Man.</td>
</tr>
</tbody>
</table>

*1: Applicable only for YTA710.
7. General Specifications

7.1 Standard Specifications

7.1.1 YTA710

■ Performance Specifications

Accuracy
HART and BRAIN communication type:
A/D accuracy/span + D/A accuracy
(See Table 7.1.)
Fieldbus communication type:
A/D accuracy (See Table 7.1.)

Cold Junction Compensation Accuracy (T/C)
±(0.32°C + 0.003 × |Tterm – 23°C|)
Tterm means the terminal temperature
(–40°C ≤ Tterm ≤ 85°C).

Ambient Temperature Effect (per 10°C change)
See Table 7.2. for Standard type
See Table 7.5. for /R1 option type

Stability (at 23±2°C)
RTD: ±0.1% of reading or ±0.1°C per 2 years,
whichever is greater.
T/C: ±0.1% of reading or ±0.1°C per year,
whichever is greater.

5 Year Stability (at 23±2°C)
RTD: ±0.2% of reading or ±0.2°C, whichever is
greater.
T/C: ±0.4% of reading or ±0.4°C, whichever is
greater.

Vibration Effect
The YTA710 is tested to the following
specifications with no effect on performance per
IEC 60770-1
10 to 60 Hz : 0.21 mm peak displacement
60 to 2000 Hz : 3g

Power Supply Effect (HART and BRAIN Type)
±0.005% of calibrated span per volt

■ Functional Specifications

Input signals
Input number: single and dual input
Input type is selectable: Thermocouples, 2-, 3-,
and 4-wire RTDs, ohms and DC millivolts.
See Table 7.1.

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

Span & Range Limits
See Table 7.1.

Output signals
Two wire 4 to 20 mA DC Type
Output range: 3.68 to 20.8 mA DC
HART® or BRAIN protocol is superimposed
on the 4 to 20 mA signal.

Fieldbus communication Type
Output signal based on FOUNDATION
fieldbus™ communication protocol.

Isolation
Input/Output/GND isolated to 500V DC
Except lightning protector option.

Manual Test Output Function
The output value can be set manually.

Sensor Burnout (HART and BRAIN Type)
High (21.6 mA DC) or Low (3.6 mA DC), user
selectable.

Output in Transmitter Failure (HART and BRAIN
Type)
Down-scale: –5%, 3.2 mA DC or less (Optional
code C1 or C2)
Up-scale: 110%, 21.6 mA DC or more
(Standard or Optional code C3)
**Update Time (HART and BRAIN Type)**
Approximately 0.5 seconds for a single sensor
(0.8 second for dual sensors)

**Turn-on Time (HART and BRAIN Type)**
Approximately 6 seconds for a single sensor
(7 seconds for dual sensors)

**Damping Time Constant**
Selectable from 0 to 100 seconds

**Self-Diagnostics**
Self-diagnostic function based on the NAMUR NE107 standard detects failures.

**Hardware-Diagnostics**
Hardware failure: Detect failures in CPU, ADC, Memory, etc.

**Sensor-Diagnostics**
Sensor failure: Detect the disconnection of sensor.
Sensor short: Detect the short circuit of the sensor.
Sensor Corrosion: Measure the loop resistance.
Sensor line information: Measure the line resistance.
Sensor drift: Detect the difference between sensor1 and sensor2.
Temperature Cycle Diagnostics: Count the number of temperature fluctuations.

**Fieldbus functions (Fieldbus Type)**
Functional specifications for Fieldbus communication conform to the standard specifications (H1) of FOUNDATION Fieldbus.

**Function Block (Fieldbus Type)**
- **Resource block**
  The resource block contains physical transmitter information.
- **Transducer block**
  The transducer block contains the actual measurement data and information about sensor type and configuration and diagnostics.
- **LCD display block**
  The LCD display block is used to configure the local display, if an LCD display is being used.

**Analog input (AI)**
Four independent AI blocks can be selected.

**Digital input (DI)**
Four DI function blocks can be used as a limit switch for those temperature.

**Other Function block**
As other Function blocks, Arithmetic (AR), Signal Characterizer (SC), Input Selector (IS), and two PID function blocks are available.

<table>
<thead>
<tr>
<th>Function block</th>
<th>Execution time (ms)</th>
</tr>
</thead>
<tbody>
<tr>
<td>AI</td>
<td>30</td>
</tr>
<tr>
<td>DI</td>
<td>30</td>
</tr>
<tr>
<td>SC</td>
<td>30</td>
</tr>
<tr>
<td>IS</td>
<td>30</td>
</tr>
<tr>
<td>AR</td>
<td>30</td>
</tr>
<tr>
<td>PID</td>
<td>45</td>
</tr>
</tbody>
</table>

**Link master function**
This function enables backup of network manager and local control only by field devices.

**Alarm function**
Fieldbus models securely support various alarm functions, such as High/Low alarm, notice of block error, etc. based on FOUNDATION fieldbus specifications.

**Software download function**
This function permits to update YTA software via a FOUNDATION fieldbus. Based on Fundation fieldbus specifications (FF883)
Download class: Class 1

**EMC Conformity Standards**
- EN61326-1 Class A, Table2
- EN61326-2-3
- EN61326-2-5 (for fieldbus type)

Immunity influence during the test: Output shift is specified within ±1% of full span.

**Functional Safety (HART Type)**
HART type is certified in compliance with IEC 61508: 2010.
Functional Safety of Electrical/electronic/programmable electronic related systems;
SIL 2 capability for single transmitter use
SIL 3 capability for dual transmitter use
Safety Requirement Standards
EN61010-1, C22.2 No.61010-1
• Altitude of installation site:
  Max. 2,000 m above sea level
• Installation category: I
  (Anticipated transient overvoltage 330 V)
• Pollution degree: 2
• Indoor/Outdoor use
EN61010-2-030, C22.2 No.61010-2-030
• Measurement category: O (Other)
  (Measurement Input voltage: 150mVdc max)

EU RoHS Directive
Applicable standard: EN 50581
Applicable production sites is shown below.
The production sites of the RoHS compliant product are confirmed by the serial number shown in the frame of “NO.” in the name plate of the product.
Serial numbers (9 letters): NNYMnnnnn
  NN: Identification code of production site.
  Use “C2, U1, BH, Y3 or S5”
  Y: Year of production
    2015: Use “R”  2016: Use “S”
    2019: Use “V”
  M: Month of production
    January to September: Use “1” to “9”
    (January: 1, September: 9).
    October: Use “A”. November: Use “B”.
    December: Use “C”.
nnnnn: 5-digit number assigned sequentially in each production date by the production site.

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) (with indicator model)

Ambient Humidity Limits
0 to 100% RH at 40°C (104°F)

Supply Voltage Requirements
HART and BRAIN Type
  10.5 to 42 V DC for general use and flameproof type
  10.5 to 32 V DC for lightning protector (option code /A)
  10.5 to 30 V DC for intrinsically safe and non-incendive
Minimum voltage limited at 16.6 V DC for digital communications HART and BRAIN
With 24 V DC supply, up to a 550Ω load can be used. See graph below.

![Figure 7.1 Relationship Between Power Supply Voltage and External Load Resistance](F0701.ai)
Fieldbus Type
9 to 32V DC for general use, flameproof type, and non-incendive type
9 to 30 V DC for intrinsically safe type
9 to 17.5 V DC for FISCO field device
Communication Requirements
Supply Voltage: 9 to 32 V DC
Current Draw:
Steady state: 15 mA (max)
Software download state: 24 mA (max)
Communication Requirements (BRAIN Type)
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
10kΩ or more at 2.4 kHz
Load Requirements (HART and BRAIN Type)
0 to 1290Ω for operation
250 to 600Ω for digital communication

Physical Specifications
Enclosure
Material & Coating
• Low copper cast aluminum alloy
  [for aluminum housing]
  Polyester powder coating
  Mint-green paint (Munsell 5.6BG 3.3/2.9 or its equivalent)
  [for option code /P0 or /X2]
  Epoxy and polyurethane resin solvent coating
• ASTM CF-8M Stainless steel
Degrees of Protection
IP66/IP67, TYPE 4X
Name plate and tag
316 SST
Mounting
Optional mounting brackets can be used either for two-inch pipe or flat panel mounting.
Terminal Screws
M4 screws
Integral Indicator (with indicator model)
5-digit numerical display, 6-digit unit display and bar graph.
Local Parameter Setting (with indicator model)
Parameter configuration by the push button offers easy and quick setup for parameters. Accessible parameters are different with each output signal cord.
Weight
Aluminum housing:
1.3 kg (2.9 lb) without integral indicator and mounting
Integral indicator: 0.2 kg (0.4 lb)
Bracket for horizontal pipe: 0.3 kg (0.7 lb)
Bracket for vertical pipe: 1.0 kg (2.2 lb)
Stainless housing:
3.1 kg (6.8 lb) without integral indicator and mounting
Integral indicator: 0.3 kg (0.7 lb)
Connections
Refer to “Model and Suffix Codes.”
### General Specifications

#### Table 7.1  Sensor type, measurement range, and accuracy.

<table>
<thead>
<tr>
<th>Sensor Type</th>
<th>Standard</th>
<th>Measurement Range</th>
<th>Minimum Span</th>
<th>A/D Accuracy</th>
<th>D/A Accuracy</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>°C</td>
<td>°F</td>
<td>°C</td>
<td>°F</td>
</tr>
<tr>
<td>B</td>
<td></td>
<td>100 to 300</td>
<td>212 to 572</td>
<td>±3.0</td>
<td>±5.4</td>
</tr>
<tr>
<td>E</td>
<td></td>
<td>300 to 1820</td>
<td>572 to 3308</td>
<td>±0.35</td>
<td>±0.63</td>
</tr>
<tr>
<td>J</td>
<td></td>
<td>-200 to -50</td>
<td>-328 to -58</td>
<td>±0.25</td>
<td>±0.45</td>
</tr>
<tr>
<td>K</td>
<td></td>
<td>-50 to 1000</td>
<td>-58 to 1832</td>
<td>±0.25</td>
<td>±0.45</td>
</tr>
<tr>
<td>N</td>
<td></td>
<td>-200 to -50</td>
<td>-328 to -58</td>
<td>±0.4</td>
<td>±0.72</td>
</tr>
<tr>
<td>R</td>
<td>IEC60584</td>
<td>-50 to 0</td>
<td>-58 to 32</td>
<td>±1.0</td>
<td>±1.8</td>
</tr>
<tr>
<td>T/C</td>
<td></td>
<td>0 to 600</td>
<td>32 to 1112</td>
<td>±0.4</td>
<td>±0.72</td>
</tr>
<tr>
<td>S</td>
<td></td>
<td>600 to 1768</td>
<td>1112 to 3214</td>
<td>±25°C</td>
<td>±1.0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>25°C (45°F)</td>
<td></td>
<td>±0.4</td>
<td>±0.72</td>
</tr>
<tr>
<td>T</td>
<td></td>
<td>-200 to -50</td>
<td>-328 to -58</td>
<td>±0.25</td>
<td>±0.45</td>
</tr>
<tr>
<td>C</td>
<td></td>
<td>0 to 400</td>
<td>32 to 752</td>
<td>±0.7</td>
<td>±1.26</td>
</tr>
<tr>
<td></td>
<td></td>
<td>400 to 1400</td>
<td>752 to 2552</td>
<td>±1.0</td>
<td>±1.44</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1400 to 2000</td>
<td>2552 to 3632</td>
<td>±0.5</td>
<td>±0.9</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2000 to 2300</td>
<td>3632 to 4172</td>
<td>±0.7</td>
<td>±1.26</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2000 to 2300</td>
<td>3632 to 4172</td>
<td>±0.9</td>
<td>±1.62</td>
</tr>
<tr>
<td>W3</td>
<td>ASTM E988</td>
<td>0 to 400</td>
<td>32 to 752</td>
<td>±0.8</td>
<td>±1.44</td>
</tr>
<tr>
<td></td>
<td></td>
<td>400 to 1400</td>
<td>752 to 2552</td>
<td>±0.5</td>
<td>±0.9</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1400 to 2000</td>
<td>2552 to 3632</td>
<td>±0.6</td>
<td>±1.08</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2000 to 2300</td>
<td>3632 to 4172</td>
<td>±1.0</td>
<td>±1.26</td>
</tr>
<tr>
<td>L</td>
<td>DIN43710</td>
<td>-200 to -50</td>
<td>-328 to -58</td>
<td>±0.3</td>
<td>±0.54</td>
</tr>
<tr>
<td>U</td>
<td></td>
<td>-50 to 1000</td>
<td>-58 to 1652</td>
<td>±0.2</td>
<td>±0.36</td>
</tr>
<tr>
<td>R</td>
<td>IEC60751</td>
<td>-200 to 850</td>
<td>-328 to 1562</td>
<td>±0.1</td>
<td>±0.18</td>
</tr>
<tr>
<td>Pt100</td>
<td></td>
<td>-200 to 850</td>
<td>-328 to 1562</td>
<td>±0.1</td>
<td>±0.18</td>
</tr>
<tr>
<td>Pt200</td>
<td></td>
<td>-200 to 850</td>
<td>-328 to 1562</td>
<td>±0.22</td>
<td>±0.396</td>
</tr>
<tr>
<td>Pt500</td>
<td></td>
<td>-200 to 850</td>
<td>-328 to 1562</td>
<td>±0.1</td>
<td>±0.18</td>
</tr>
<tr>
<td>Pt1000</td>
<td></td>
<td>-200 to 850</td>
<td>-328 to 1562</td>
<td>±0.1</td>
<td>±0.18</td>
</tr>
<tr>
<td>JPt1000</td>
<td></td>
<td>-200 to 850</td>
<td>-328 to 1562</td>
<td>±0.1</td>
<td>±0.18</td>
</tr>
<tr>
<td>Cu10</td>
<td>SAMA RC21-4</td>
<td>-70 to 150</td>
<td>-94 to 302</td>
<td>±1.0</td>
<td>±1.8</td>
</tr>
<tr>
<td>Ni120</td>
<td></td>
<td>-70 to 320</td>
<td>-94 to 608</td>
<td>±0.08</td>
<td>±0.15</td>
</tr>
</tbody>
</table>

Note 1: Total Accuracy = (A/D Accuracy / Span + D/A Accuracy).
For Fieldbus type, accuracy = A/D Accuracy.
For T/C input, add Cold Junction Compensation Error to the total accuracy.
Example: when selecting Pt100 with measurement range of 0 to 200 °C
0.1°C / 200°C = 100% of span +0.02% of span = 0.07% of span

Note 2: T/C C type is same as W5 (ASTM E988).
### Table 7.2  Temperature coefficient

<table>
<thead>
<tr>
<th>Sensor Type</th>
<th>Temperature Coefficient</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thermocouples E, J, K, N, T, L, U</td>
<td>0.08°C + 0.02% of abs.reading</td>
</tr>
<tr>
<td>Thermocouples R, S, W3, C</td>
<td>0.25°C + 0.02% of abs.reading</td>
</tr>
</tbody>
</table>
| Thermocouple B 
  100°C ≤ Reading < 300°C        | 1°C + 0.02% of abs.reading                    |
| 300°C ≤ Reading                   | 0.5°C + 0.02% of abs.reading                  |
| RTD                               | 0.08°C + 0.02% of abs.reading                 |
| mV                                | 0.002 mV + 0.02% of abs.reading               |
| ohm                               | 0.1Ω + 0.02% of reading                       |

Note 1: The "abs.reading" for thermocouples and RTD means the absolute value of the reading in °C. When the temperature value is 250 Kelvin, "abs.reading" is 23.15.

Example of "abs.reading"

<table>
<thead>
<tr>
<th>Input Sensor: Pt100</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calibration Range: -100 to 100°C</td>
</tr>
<tr>
<td>Reading value: -50°C</td>
</tr>
</tbody>
</table>

| Ambient Temperature Effect per 10°C change is ±0.1% or ±(temperature coefficient/span), whichever is greater. |
| 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 |

Note 2: Ambient Temperature Effect per 10 °C change is ±0.1% or ±(temperature coefficient/span), whichever is greater.

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 |

Note 3: See Table 7.5 for R1 option type.
### 7.1.2 YTA610

#### Performance Specifications

##### Accuracy

- **HART communication type:**
  - A/D accuracy/span + D/A accuracy
  - (See Table 7.3.)
- **Fieldbus communication type:**
  - A/D accuracy (See Table 7.3.)

##### Cold Junction Compensation Accuracy

± 0.5°C (± 0.9 °F) for T/C only

##### Ambient Temperature Effect (per 10°C change)

- See Table 7.4.

##### Stability (at 23±2°C)

- **RTD:** ±0.1% of reading or ±0.1°C per 2 years, whichever is greater.
- **T/C:** ±0.1% of reading or ±0.1°C per year, whichever is greater.

##### 5 Year Stability (at 23±2°C)

- **RTD:** ±0.25% of reading or ±0.25°C, whichever is greater.
- **T/C:** ±0.5% of reading or ±0.5°C, whichever is greater.

##### Vibration Effect

The YTA610 is tested to the following specifications with no effect on performance per IEC 60770-1:

- 10 to 60 Hz: 0.21 mm peak displacement
- 60 to 2000 Hz: 3g

##### Power Supply Effect (HART Type)

±0.005% of calibrated span per volt

#### Functional Specifications

##### Input signals

- **Input number:** single and dual input
- **Input type is selectable:** Thermocouples, 2-, 3-, and 4-wire RTDs, ohms and DC millivolts.
  - See Table 7.3.

##### 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

##### Span & Range Limits

- See Table 7.3.

##### Output signals

- **Two wire 4 to 20 mA DC Type**
  - Output range: 3.68 to 20.8 mA DC
  - HART® protocol is superimposed on the 4 to 20 mA signal.

- **Fieldbus communication Type**
  - Output signal based on FOUNDATION fieldbus™ communication protocol.

##### Isolation

- Input/Output/GND isolated to 500V DC
- Except lightning protector option.

##### Manual Test Output Function

- The output value can be set manually.

##### Sensor Burnout (HART Type)

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

##### Output in Transmitter Failure (HART Type)

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

##### Update Time (HART Type)

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

##### Turn-on Time (HART Type)

- Approximately 6 seconds for a single sensor (7 seconds for dual sensors)

##### Damping Time Constant

- Selectable from 0 to 100 seconds

##### Self-Diagnostics

- Self-diagnostic function based on the NAMUR NE107 standard detects failures.

##### Hardware-Diagnostics

- Hardware failure: Detect in CPU, ADC, Memory, etc.

##### Sensor-Diagnostics

- Sensor failure: Detect the disconnection of sensor.
- Sensor line information: Measure the line resistance.
- Sensor drift: Detect the difference between sensor1 and sensor2.
Fieldbus functions (Fieldbus Type)
Functional specifications for Fieldbus communication conform to the standard specifications (H1) of FOUNDATION Fieldbus.

Function Block (Fieldbus Type)

Resource block
The resource block contains physical transmitter information.

Transducer block
The transducer block contains the actual measurement data and information about sensor type and configuration and diagnostics.

LCD display block
The LCD display block is used to configure the local display, if an LCD display is being used.

Analog input (AI)
Four independent AI blocks can be selected.

Digital input (DI)
Four DI function blocks can be used as a limit switch for those temperature.

Other Function block
As other Function blocks, Arithmetic (AR), Signal Characterizer (SC), Input Selector (IS), and two PID function blocks are available.

<table>
<thead>
<tr>
<th>Function block</th>
<th>Execution time (ms)</th>
</tr>
</thead>
<tbody>
<tr>
<td>AI</td>
<td>30</td>
</tr>
<tr>
<td>DI</td>
<td>30</td>
</tr>
<tr>
<td>SC</td>
<td>30</td>
</tr>
<tr>
<td>IS</td>
<td>30</td>
</tr>
<tr>
<td>AR</td>
<td>30</td>
</tr>
<tr>
<td>PID</td>
<td>45</td>
</tr>
</tbody>
</table>

Link master function
This function enables backup of network manager and local control only by field devices.

Alarm function
Fieldbus models securely support various alarm functions, such as High/Low alarm, notice of block error, etc. based on FOUNDATION fieldbus specifications.

Software download function
This function permits to update YTA software via a FOUNDATION fieldbus.
Based on Fundation fieldbus specifications (FF883)
Download class: Class 1

EMC Conformity Standards
EN61326-1 Class A, Table2
EN61326-2-3
EN61326-2-5 (for fieldbus)
Immunity influence during the test:
Output shift is specified within ±1% of full span.

Functional Safety
Hart communication type is certified in compliance with IEC 61508: 2010.
Functional Safety of Electrical/electronic/programmable electronic related systems;
SIL 2 capability for single transmitter use
SIL 3 capability for dual transmitter use

Safety Requirement Standards
EN61010-1, C22.2 No.61010-1
• Altitude of installation site:
  Max. 2,000 m above sea level
• Installation category: I
  (Anticipated transient overvoltage 330 V)
• Pollution degree: 2
• Indoor/Outdoor use
EN61010-2-030, C22.2 No.61010-2-030
• Measurement category: O (Other)
  (Measurement Input voltage: 150mVdc max)

EU RoHS Directive
Applicable standard: EN 50581
Applicable production sites is shown below.
The production sites of the RoHS compliant product are confirmed by the serial number shown in the frame of “NO.” in the name plate of the product.
Serial numbers (9 letters): NNYMnnnnn
NN: Identification code of production site.
Use “C2, U1, BH, Y3 or S5”
Y: Year of production
2015: Use “R” 2016: Use “S”
2019: Use “V”
M: Month of production
January to September: Use “1” to “9”
(October: Use “A”. November: Use “B”.
December: Use “C”.
nnnnn: 5-digit number assigned sequentially in each production date by the production site.
**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) (with indicator model)

**Ambient Humidity Limits**
0 to 100% RH at 40°C (104°F)

**Supply Voltage Requirements**

**HART Type**
- 10.5 to 42 V DC for general use and flameproof type
- 10.5 to 32 V DC for lightning protector (option code [A])
- 10.5 to 30 V DC for intrinsically safe and non-incendive

Minimum voltage limited at 16.6 V DC for digital communications HART
With 24 V DC supply, up to a 550Ω load can be used. See graph below.

**Fieldbus Type**
- 9 to 32 V DC for general use, flameproof type, and non-incendive type
- 9 to 30 V DC for intrinsically safe type
- 9 to 17.5 V DC for FISCO field device

Communication Requirements
- Supply Voltage: 9 to 32 V DC
- Current Draw:
  - Steady state: 15 mA (max)
  - Software download state: 24 mA (max)

**Load Requirements (HART Type)**
- 0 to 1290Ω for operation
- 250 to 600Ω for digital communication

**Physical Specifications**

**Enclosure**

**Material & Coating**
- Low copper cast aluminum alloy [for aluminum housing]
- Polyester powder coating
- Mint-green paint (Munsell 5.6BG 3.3/2.9 or its equivalent) [for option code /P or /X2]
- Epoxy and polyurethane resin solvent coating
- ASTM CF-8M Stainless steel

**Degrees of Protection**
- IP66/IP67, TYPE 4X

**Name plate and tag**
- 316 SST

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

**Terminal Screws**
- M4 screws

**Integral Indicator (with indicator model)**
- 5-digit numerical display, 6-digit unit display and bar graph.

**Local Parameter Setting (with indicator model)**
- Parameter configuration by the push button offers easy and quick setup for parameters.
  - Accessible parameters are different with each output signal cord.

**Weight**
- Alminum housing: 1.3 kg (2.9 lb) without integral indicator and mounting
  - Integral indicator: 0.2 kg (0.4 lb)
  - Bracket for horizontal pipe: 0.3 kg (0.7 lb)
  - Bracket for vertical pipe: 1.0 kg (2.2 lb)
- Stainless housing: 3.1 kg (6.8 lb) without integral indicator and mounting
  - Integral indicator: 0.3 kg (0.7 lb)

**Connections**
- Refer to “Model and Suffix Codes.”
### Table 7.3 Sensor type, measurement range, and accuracy

<table>
<thead>
<tr>
<th>Sensor Type</th>
<th>Standard</th>
<th>Measurement Range</th>
<th>Minimum Span</th>
<th>A/D Accuracy</th>
<th>D/A Accuracy</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>°C</td>
<td>°F</td>
<td>°C</td>
<td>°F</td>
</tr>
<tr>
<td>B</td>
<td></td>
<td>100 to 300</td>
<td>212 to 572</td>
<td>±3.0</td>
<td>±5.4</td>
</tr>
<tr>
<td></td>
<td></td>
<td>300 to 1820</td>
<td>572 to 3308</td>
<td>±0.77</td>
<td>±1.39</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-200 to -50</td>
<td>-328 to -58</td>
<td>±0.4</td>
<td>±0.72</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-50 to 1000</td>
<td>-58 to 1832</td>
<td>±0.2</td>
<td>±0.36</td>
</tr>
<tr>
<td>J</td>
<td></td>
<td>-200 to -50</td>
<td>-328 to -58</td>
<td>±0.35</td>
<td>±0.63</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-50 to 1200</td>
<td>-58 to 2192</td>
<td>±0.25</td>
<td>±0.45</td>
</tr>
<tr>
<td>K</td>
<td>IEC60584</td>
<td>-200 to -50</td>
<td>-328 to -58</td>
<td>±0.5</td>
<td>±0.9</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-50 to 1372</td>
<td>-58 to 2501</td>
<td>±0.3</td>
<td>±0.72</td>
</tr>
<tr>
<td>T/C</td>
<td></td>
<td>-50 to 0</td>
<td>-58 to 32</td>
<td>±1.0</td>
<td>±1.8</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0 to 600</td>
<td>32 to 1112</td>
<td>±0.7</td>
<td>±1.26</td>
</tr>
<tr>
<td></td>
<td></td>
<td>600 to 1768</td>
<td>1112 to 3214</td>
<td>±0.5</td>
<td>±0.9</td>
</tr>
<tr>
<td>S</td>
<td></td>
<td>-50 to 0</td>
<td>-58 to 32</td>
<td>±1.0</td>
<td>±1.8</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0 to 1768</td>
<td>32 to 3214</td>
<td>±0.6</td>
<td>±1.08</td>
</tr>
<tr>
<td>R</td>
<td></td>
<td>-200 to -50</td>
<td>-328 to -58</td>
<td>±0.35</td>
<td>±0.63</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-50 to 400</td>
<td>-58 to 752</td>
<td>±0.2</td>
<td>±0.36</td>
</tr>
<tr>
<td>C</td>
<td></td>
<td>0 to 2000</td>
<td>32 to 3632</td>
<td>±0.7</td>
<td>±1.26</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2000 to 2300</td>
<td>3632 to 4172</td>
<td>±1.0</td>
<td>±1.8</td>
</tr>
<tr>
<td>W3</td>
<td>ASTM E988</td>
<td>0 to 400</td>
<td>32 to 752</td>
<td>±0.9</td>
<td>±1.62</td>
</tr>
<tr>
<td></td>
<td></td>
<td>400 to 1400</td>
<td>752 to 2552</td>
<td>±0.6</td>
<td>±1.08</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1400 to 2000</td>
<td>2552 to 3632</td>
<td>±0.7</td>
<td>±1.26</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2000 to 2300</td>
<td>3632 to 4172</td>
<td>±1.0</td>
<td>±1.8</td>
</tr>
<tr>
<td>L</td>
<td>DIN43710</td>
<td>-200 to -50</td>
<td>-328 to -58</td>
<td>±0.35</td>
<td>±0.63</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-50 to 900</td>
<td>-58 to 1652</td>
<td>±0.3</td>
<td>±0.54</td>
</tr>
<tr>
<td>U</td>
<td></td>
<td>-200 to 600</td>
<td>-328 to 1112</td>
<td>±0.35</td>
<td>±0.63</td>
</tr>
<tr>
<td>RTD</td>
<td></td>
<td>-200 to 850</td>
<td>-328 to 1562</td>
<td>±0.14</td>
<td>±0.25</td>
</tr>
<tr>
<td>Pt100</td>
<td>IEC606751</td>
<td>-200 to 850</td>
<td>-328 to 1562</td>
<td>±0.25</td>
<td>±0.45</td>
</tr>
<tr>
<td>Pt200</td>
<td></td>
<td>-200 to 850</td>
<td>-328 to 1562</td>
<td>±0.18</td>
<td>±0.324</td>
</tr>
<tr>
<td>Pt500</td>
<td></td>
<td>-200 to 850</td>
<td>-328 to 1562</td>
<td>±0.18</td>
<td>±0.324</td>
</tr>
<tr>
<td>Pt1000</td>
<td></td>
<td>-200 to 850</td>
<td>-328 to 1562</td>
<td>±0.18</td>
<td>±0.324</td>
</tr>
<tr>
<td>JPt100</td>
<td></td>
<td>-200 to 500</td>
<td>-328 to 932</td>
<td>±0.16</td>
<td>±0.29</td>
</tr>
<tr>
<td>Cu10</td>
<td>SAMA RC21-4</td>
<td>-70 to 150</td>
<td>-94 to 302</td>
<td>±1.3</td>
<td>±2.23</td>
</tr>
<tr>
<td>Ni120</td>
<td></td>
<td>-70 to 320</td>
<td>-94 to 608</td>
<td>±0.14</td>
<td>±2.25</td>
</tr>
<tr>
<td>mV</td>
<td></td>
<td>-10 to 120 [mV]</td>
<td>3 mV</td>
<td>±0.015 [mV]</td>
<td>±0.05 [mV]</td>
</tr>
<tr>
<td>ohm</td>
<td></td>
<td>0 to 2000 [Ω]</td>
<td>20 Ω</td>
<td>±0.45 [Ω]</td>
<td>±0.45 [Ω]</td>
</tr>
</tbody>
</table>

**Note 1:** Total Accuracy = (A/D Accuracy / Span + D/A Accuracy) or (± 0.1% of calibrated span), whichever is greater. Accuracy of Fieldbus type: A/D Accuracy.

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

Example: when selecting Pt100 with measurement range of 0 to 400 °C 0.14°C / 400°C×100% of span +0.03% of span = 0.065% of span

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

**Note 2:** T/C C type is same as W5 (ASTM E988).
### Table 7.4 Temperature coefficient

<table>
<thead>
<tr>
<th>Sensor Type</th>
<th>Temperature Coefficient</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thermocouples E, J, K, N, T, L, U</td>
<td>0.08°C + 0.02% of abs.reading</td>
</tr>
<tr>
<td>Thermocouples R, S, W3, C</td>
<td>0.25°C + 0.02% of abs.reading</td>
</tr>
<tr>
<td>Thermocouple B</td>
<td>1°C + 0.02% of abs.reading</td>
</tr>
<tr>
<td></td>
<td>0.5°C + 0.02% of abs.reading</td>
</tr>
<tr>
<td>RTD</td>
<td>0.08°C + 0.02% of abs.reading</td>
</tr>
<tr>
<td>mV</td>
<td>0.002 mV + 0.02% of abs.reading</td>
</tr>
<tr>
<td>ohm</td>
<td>0.1Ω + 0.02% of reading</td>
</tr>
</tbody>
</table>

**Note 1:** The "abs.reading" for thermocouples and RTD 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.
|250−273.15| = 23.15

**Note 2:** Ambient Temperature Effect per 10 °C change is ±0.1% or ±(temperature coefficient/span), whichever is greater.
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
## 7.2 Model and Suffix Codes

<table>
<thead>
<tr>
<th>Model</th>
<th>Codes</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>YTA610</td>
<td></td>
<td>Temperature Transmitter</td>
</tr>
<tr>
<td>YTA710</td>
<td></td>
<td>4 to 20 mA DC with digital communication BRAIN protocol</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4 to 20 mA DC with digital communication HART protocol</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Digital communication (FOUNDATION Fieldbus protocol)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Output Signal</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-D</td>
<td>Digital communication</td>
</tr>
<tr>
<td>-J</td>
<td>Digital communication</td>
</tr>
<tr>
<td>-F</td>
<td>Digital communication</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Sensor input</th>
<th>Codes</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td>Single</td>
</tr>
<tr>
<td>2</td>
<td></td>
<td>Double</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Housing code</th>
<th>Codes</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td></td>
<td>Aluminum</td>
</tr>
<tr>
<td>C</td>
<td></td>
<td>Stainless</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Electrical Connection</th>
<th>Codes</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td></td>
<td>G 1/2 female</td>
</tr>
<tr>
<td>2</td>
<td></td>
<td>1/2 NPT female</td>
</tr>
<tr>
<td>4</td>
<td></td>
<td>M20 female</td>
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<tr>
<th>Integral Indicator</th>
<th>Codes</th>
<th>Description</th>
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<tr>
<td>D</td>
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<td>Digital indicator with Local Operating Switch</td>
</tr>
<tr>
<td>N</td>
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<td>None</td>
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<table>
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<tr>
<th>Mounting Bracket</th>
<th>Codes</th>
<th>Description</th>
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<tbody>
<tr>
<td>B</td>
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<td>SUS304 stainless steel 2-inch horizontal pipe mounting bracket</td>
</tr>
<tr>
<td>D</td>
<td></td>
<td>SUS304 stainless steel 2-inch vertical pipe mounting bracket</td>
</tr>
<tr>
<td>J</td>
<td></td>
<td>SUS316 stainless steel 2-inch horizontal pipe mounting bracket</td>
</tr>
<tr>
<td>K</td>
<td></td>
<td>SUS316 stainless steel 2-inch vertical pipe mounting bracket</td>
</tr>
<tr>
<td>N</td>
<td></td>
<td>None</td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>Option codes</th>
<th>Codes</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>/</td>
<td></td>
<td>Optional specification</td>
</tr>
</tbody>
</table>

*1: For flat-panel mounting, please prepare bolts and nuts.
*2: Applicable only for YTA710.
### 7.3 Optional Specifications (YTA610 and YTA710)

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lightning protector</td>
<td>Allowable current: Max. 6000A (8×20μs), repeating 1000A (8×20μs), 100 times</td>
<td>A</td>
</tr>
<tr>
<td>Painting <em>1</em>6*13</td>
<td>Color and coating change&lt;br&gt;Amplifier cover only *3&lt;br&gt;Color: Munsell code N1.5 Black&lt;br&gt;Coating: High anti-corrosion coating</td>
<td>P1</td>
</tr>
<tr>
<td></td>
<td>Allowable current: Max. 6000A (8×20μs), repeating 1000A (8×20μs), 100 times</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Coating: High anti-corrosion coating</td>
<td>P2</td>
</tr>
<tr>
<td></td>
<td>Color: Metallic silver&lt;br&gt;Coating: High anti-corrosion coating</td>
<td>P7</td>
</tr>
<tr>
<td>Color and coating change&lt;br&gt;Amplifier and terminal covers *3</td>
<td>Color: Munsell code 7.5 R4/14, Red&lt;br&gt;Coating: High anti-corrosion coating</td>
<td>PR</td>
</tr>
<tr>
<td>Coating change</td>
<td>High anti-corrosion coating</td>
<td>X2</td>
</tr>
<tr>
<td>Output signal Low-side in Transmitter failure *10</td>
<td>Output signal Low-side: –5%, 3.2 mA DC or less.&lt;br&gt;Sensor burnout is also set to ‘Low’: –2.5%, 3.6 mA DC.</td>
<td>C1</td>
</tr>
<tr>
<td>NAMUR NE43 Compliant *10</td>
<td>Output signal limits: 3.8 mA to 20.5 mA</td>
<td>C2</td>
</tr>
<tr>
<td>Data Configuration *2</td>
<td>Description into “Descriptor” parameter of HART protocol (max. 16 characters)</td>
<td>CA</td>
</tr>
<tr>
<td>Wired tag plate</td>
<td>SUS316 stainless steel tag plate wired onto transmitter</td>
<td>N4</td>
</tr>
<tr>
<td>Sensor matching</td>
<td>RTD sensor matching function</td>
<td>CM1</td>
</tr>
<tr>
<td>Attached flameproof packing adapter <em>5</em>7</td>
<td>Electrical connection G1/2 female&lt;br&gt;Applicable cable: O.D.8.0 to 12 mm 2pc.</td>
<td>V52</td>
</tr>
<tr>
<td>EAC approval and Russian pattern approval marking <em>9</em>11*13</td>
<td>EAC approval and Russian pattern approval marking</td>
<td>VR</td>
</tr>
<tr>
<td>EAC approval marking without Russian pattern approval marking <em>9</em>11*13</td>
<td>EAC approval marking without Russian pattern approval marking</td>
<td>VE</td>
</tr>
<tr>
<td>High ambient-temp characteristic type <em>8</em>13</td>
<td>Refer to Table 7.5 Temperature coefficient</td>
<td>R1</td>
</tr>
<tr>
<td>Manufacturing <em>12</em>14</td>
<td>Optional code to specify the manufacturing factory</td>
<td>SG</td>
</tr>
</tbody>
</table>

Note: The indication of the nameplate shows an initial shipment state.

*1: Not applicable for Stainless housing.

*2: Applicable for only HART type.

*3: Except for Amplifier and terminal cover, color and coating are general specification.

*4: Lighting protector (surge absorber) can be removed from, or added to the equipment.

*5: Combination with other Explosion protected other than T1IS flameproof is not possible.

*6: The combination of X2 and P can not be used.

*7: Applicable for Electrical Connection code 4. (The thread of connection between YTA and CABLE GLAND is M20, and the thread of connection between CABLE GLAND and CABLE is G1/2.)

*8: Applicable for only YTA710.

*9: Not applicable for BRAIN type.

*10: Not applicable for Fieldbus type.

*11: Combination with other Explosion protected other than EAC Explosion-proof type is not applicable.

*12: If SG is not attached, it is made in China. (It includes English name plate and English IM.)

*13: Selection of SG is required.

*14: In principle when this code is specified, the product made in Singapore will be delivered.
### Table 7.5 Temperature coefficient (R1)

<table>
<thead>
<tr>
<th>Sensor Type</th>
<th>Input Range °C</th>
<th>A/D Coefficient</th>
<th>D/A Coefficient</th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
<td>100 to 300</td>
<td>±(0.586°C - 0.1433% of reading)</td>
<td>±(0.038°C + 0.0046% of reading)</td>
</tr>
<tr>
<td></td>
<td>300 to 1000</td>
<td>±(0.187°C - 0.0103% of reading)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1000 to 1820</td>
<td>±(0.038°C + 0.0046% of reading)</td>
<td></td>
</tr>
<tr>
<td>E</td>
<td>-200 to 0</td>
<td>±(0.007°C + 0.158% of abs.reading)</td>
<td>±(0.007°C + 0.0065% of reading)</td>
</tr>
<tr>
<td></td>
<td>0 to 1000</td>
<td>±(0.187°C + 0.0103% of reading)</td>
<td></td>
</tr>
<tr>
<td>J</td>
<td>-200 to 0</td>
<td>±(0.011°C + 0.0195% of abs.reading)</td>
<td>±(0.011°C + 0.0078% of reading)</td>
</tr>
<tr>
<td></td>
<td>0 to 1200</td>
<td>±(0.0218% of abs.reading)</td>
<td></td>
</tr>
<tr>
<td>K</td>
<td>-200 to 0</td>
<td>±(0.011°C + 0.0172% of abs.reading)</td>
<td>±(0.011°C + 0.0078% of reading)</td>
</tr>
<tr>
<td></td>
<td>0 to 1372</td>
<td>±(0.011°C + 0.0218% of abs.reading)</td>
<td>±(0.011°C + 0.0078% of reading)</td>
</tr>
<tr>
<td>N</td>
<td>-200 to 0</td>
<td>±(0.017°C + 0.0265% of abs.reading)</td>
<td>±(0.017°C + 0.0063% of reading)</td>
</tr>
<tr>
<td></td>
<td>0 to 1300</td>
<td>±(0.017°C + 0.0265% of abs.reading)</td>
<td>±(0.017°C + 0.0063% of reading)</td>
</tr>
<tr>
<td>T/C</td>
<td>-50 to 0</td>
<td>±(0.088°C + 0.1273% of abs.reading)</td>
<td>±(0.088°C + 0.0058% of reading)</td>
</tr>
<tr>
<td></td>
<td>0 to 200</td>
<td>±(0.088°C - 0.0142% of reading)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>200 to 1768</td>
<td>±(0.048°C + 0.0058% of reading)</td>
<td></td>
</tr>
<tr>
<td>S</td>
<td>-50 to 0</td>
<td>±(0.088°C + 0.0517% of abs.reading)</td>
<td>±(0.088°C - 0.0106% of reading)</td>
</tr>
<tr>
<td></td>
<td>0 to 200</td>
<td>±(0.088°C - 0.0106% of reading)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>200 to 1768</td>
<td>±(0.054°C + 0.0063% of reading)</td>
<td></td>
</tr>
<tr>
<td>T</td>
<td>-200 to 0</td>
<td>±(0.011°C + 0.0195% of abs.reading)</td>
<td>±(0.011°C + 0.0044% of reading)</td>
</tr>
<tr>
<td></td>
<td>0 to 400</td>
<td>±(0.011°C + 0.0195% of abs.reading)</td>
<td>±(0.011°C + 0.0044% of reading)</td>
</tr>
<tr>
<td>C</td>
<td>0 to 1400</td>
<td>±(0.034°C + 0.0069% of reading)</td>
<td>±(-0.157°C + 0.0205% of reading)</td>
</tr>
<tr>
<td></td>
<td>1400 to 2300</td>
<td>±(0.034°C + 0.0069% of reading)</td>
<td>±(-0.157°C + 0.0205% of reading)</td>
</tr>
<tr>
<td>W3</td>
<td>0 to 1400</td>
<td>±(0.044°C + 0.0053% of reading)</td>
<td>±(-0.214°C + 0.0237% of reading)</td>
</tr>
<tr>
<td></td>
<td>1400 to 2300</td>
<td>±(0.044°C + 0.0053% of reading)</td>
<td>±(-0.214°C + 0.0237% of reading)</td>
</tr>
<tr>
<td>L</td>
<td>-200 to 0</td>
<td>±(0.009°C + 0.0117% of abs.reading)</td>
<td>±(0.009°C + 0.0052% of reading)</td>
</tr>
<tr>
<td></td>
<td>0 to 900</td>
<td>±(0.009°C + 0.0117% of abs.reading)</td>
<td>±(0.009°C + 0.0052% of reading)</td>
</tr>
<tr>
<td>U</td>
<td>-200 to 0</td>
<td>±(0.011°C + 0.0148% of abs.reading)</td>
<td>±(0.011°C + 0.0046% of reading)</td>
</tr>
<tr>
<td></td>
<td>0 to 800</td>
<td>±(0.011°C + 0.0148% of abs.reading)</td>
<td>±(0.011°C + 0.0046% of reading)</td>
</tr>
<tr>
<td>Pt100</td>
<td>-200 to 850</td>
<td>±(0.015°C + 0.0055% of reading)</td>
<td>±(0.015°C + 0.0055% of reading)</td>
</tr>
<tr>
<td>Pt200</td>
<td>-200 to 850</td>
<td>±(0.0123°C + 0.012% of reading)</td>
<td>±(0.0123°C + 0.012% of reading)</td>
</tr>
<tr>
<td>Pt500</td>
<td>-200 to 850</td>
<td>±(0.015°C + 0.0055% of reading)</td>
<td>±(0.015°C + 0.0055% of reading)</td>
</tr>
<tr>
<td>Pt1000</td>
<td>-200 to 300</td>
<td>±(0.015°C + 0.0055% of reading)</td>
<td>±(0.015°C + 0.0055% of reading)</td>
</tr>
<tr>
<td>JPt100</td>
<td>-200 to 300</td>
<td>±(0.015°C + 0.0055% of reading)</td>
<td>±(0.015°C + 0.0055% of reading)</td>
</tr>
<tr>
<td>Cu10</td>
<td>-70 to 150</td>
<td>±(0.032°C + 0.120% of reading)</td>
<td>±(0.032°C + 0.120% of reading)</td>
</tr>
<tr>
<td>Ni120</td>
<td>-70 to 320</td>
<td>±(0.010°C + 0.005% of reading)</td>
<td>±(0.010°C + 0.005% of reading)</td>
</tr>
<tr>
<td>mV</td>
<td>-10 to 120 [mV]</td>
<td>±(0.441uV + 0.0065% of abs.reading)</td>
<td>±(0.040Ω + 0.0088% of reading)</td>
</tr>
<tr>
<td>ohm</td>
<td>0 to 2000 [Ω]</td>
<td>±(0.040Ω + 0.0088% of reading)</td>
<td>±(0.040Ω + 0.0088% of reading)</td>
</tr>
</tbody>
</table>

Note: HART and BRAIN Temperature Effect = A/D coefficient + D/A coefficient
Fieldbus Temperature Effect = A/D 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

\[
\text{Temperature Effect} = (0.015°C + 0.0055% 
+ (0.0088% 
+ (50 - 0) \times 0.007%)
+ (0.015°C + 0.0025°C) 
+ (0.0176°C + 0.0035°C)}
= 0.0386°C [ per 10°C change ]
\]

Example 2: T T/C, -100 to 100°C calibration range, -50°C reading

\[
\text{Temperature Effect} = (0.011°C + 0.0195% 
+ (200°C \times 0.0088% + [-50 - (-100)] \times 0.007%)
+ (0.011°C + 0.0075°C) 
+ (0.0176°C + 0.0035°C)}
= ± 0.04185°C [ per 10°C change ]
\]
## General Specifications

### For Explosion Protected Type

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>ATEX</td>
<td>[4-20mA &amp; Fieldbus: Flameproof and dust ignition proof approval]</td>
<td>KF2&lt;sup&gt;5&lt;/sup&gt;</td>
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<tr>
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<td>Certificate: KEMA 07ATEX0130</td>
<td></td>
</tr>
<tr>
<td></td>
<td>II 2 G Ex db IIC T6/T5 Gb, II 2 D Ex tb IIC T70°C, T90°C Db</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Ambient Temperature for Gas Atmospheres: –40 to 75°C for T6, –40 to 80°C for T5</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Ambient Temperature for Dust Atmospheres: –30 to 65°C for T70°C, –30 to 80°C for T90°C</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Enclosure: IP66/IP67</td>
<td></td>
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<tr>
<td></td>
<td>Electrical Connection: 1/2 NPT female and M20 female&lt;sup&gt;1&lt;/sup&gt;</td>
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<td>4-20mA:</td>
<td>[Intrinsically safe ia approval]</td>
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<tr>
<td></td>
<td>II 3 G Ex ia IIC T5...T4 Ga</td>
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</tr>
<tr>
<td></td>
<td>Ambient Temperature: –40 to 70°C for T4, –40 to 50°C for T5</td>
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</tr>
<tr>
<td></td>
<td>Enclosure: IP66/IP67</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Overvoltage category: I</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Electrical parameters:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Supply/Output circuit: Terminals: +, -</td>
<td></td>
</tr>
<tr>
<td></td>
<td>U&lt;sub&gt;i&lt;/sub&gt;=30V, I&lt;sub&gt;i&lt;/sub&gt;=200mA, P&lt;sub&gt;i&lt;/sub&gt;=1.0W, C&lt;sub&gt;i&lt;/sub&gt;=22nF, L&lt;sub&gt;i&lt;/sub&gt;=0mH</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Sensor circuit: Terminals: 1, 2, 3, 4, 5</td>
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</tr>
<tr>
<td></td>
<td>U&lt;sub&gt;o&lt;/sub&gt;=6V, I&lt;sub&gt;o&lt;/sub&gt;=90mA, P&lt;sub&gt;o&lt;/sub&gt;=135mW, C&lt;sub&gt;o&lt;/sub&gt;=10μF, L&lt;sub&gt;o&lt;/sub&gt;=3.9mH</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Dielectric strength: 500 V a.c.r.m.s., 1 min (Without /A)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>[Intrinsically safe ic]</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Certificate Not Applicable as per Annex VIII to ATEX 2014/34/EU</td>
<td></td>
</tr>
<tr>
<td></td>
<td>II 3 G Ex ic IIC T5...T4 Ga</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Ambient Temperature: –30 to 70°C for T4, –30 to 50°C for T5</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Enclosure: IP66/IP67</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Overvoltage category: I</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Electrical parameters:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Supply/Output circuit: Terminals: +, -</td>
<td></td>
</tr>
<tr>
<td></td>
<td>U&lt;sub&gt;i&lt;/sub&gt;=32V, C&lt;sub&gt;i&lt;/sub&gt;=2.2nF, L&lt;sub&gt;i&lt;/sub&gt;=0mH</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Sensor circuit: Terminals: 1, 2, 3, 4, 5</td>
<td></td>
</tr>
<tr>
<td></td>
<td>U&lt;sub&gt;o&lt;/sub&gt;=6V, I&lt;sub&gt;o&lt;/sub&gt;=90mA, P&lt;sub&gt;o&lt;/sub&gt;=135mW, C&lt;sub&gt;o&lt;/sub&gt;=10μF, L&lt;sub&gt;o&lt;/sub&gt;=3.9mH</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Dielectric strength: 500 V a.c.r.m.s., 1 min (Without /A)</td>
<td></td>
</tr>
<tr>
<td>Fieldbus:</td>
<td>[Flameproof and Dust Ignition Proof Approval]</td>
<td>KU25</td>
</tr>
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<td></td>
<td>Certificate No. FM16ATEX0019X</td>
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</tr>
<tr>
<td></td>
<td>II 3 G Ex ia IIC T4 Ga</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Ambient Temperature: –55 to 60°C</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Enclosure: IP66/IP67</td>
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</tr>
<tr>
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<td>Overvoltage category: I</td>
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</tr>
<tr>
<td></td>
<td>Electrical parameters:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Supply/Output circuit: Terminals: +, -</td>
<td></td>
</tr>
<tr>
<td></td>
<td>FISCO field device or</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Ui=30V, Ii=300mA, Pi=1.2W, Ci=2.2nF, Li=0mH</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Sensor circuit: Terminals: 1, 2, 3, 4, 5</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Uo=6V, Io=90mA, Po=135mW, Co=10μF, Lo=3.9mH</td>
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</tr>
<tr>
<td></td>
<td>Dielectric strength: 500 V a.c.r.m.s., 1 min (Without /A)</td>
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</tr>
<tr>
<td></td>
<td>[Intrinsically safe ic]</td>
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<td>Certificate Not Applicable as per Annex VIII to ATEX 2014/34/EU</td>
<td></td>
</tr>
<tr>
<td></td>
<td>II 3 G Ex ic IIC T4 Ga</td>
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</tr>
<tr>
<td></td>
<td>Ambient Temperature: –30 to 70°C</td>
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<tr>
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<td>Enclosure: IP66/IP67</td>
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</tr>
<tr>
<td></td>
<td>Overvoltage category: I</td>
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</tr>
<tr>
<td></td>
<td>Electrical parameters:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Supply/Output circuit: Terminals: +, -</td>
<td></td>
</tr>
<tr>
<td></td>
<td>FISCO field device or</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Ui=32V, C&lt;sub&gt;i&lt;/sub&gt;=2.2nF, L&lt;sub&gt;i&lt;/sub&gt;=0mH</td>
<td></td>
</tr>
</tbody>
</table>
### General Specifications

#### Item Description

<table>
<thead>
<tr>
<th>Code</th>
<th>IECEx*8</th>
<th>4-20mA &amp; Fieldbus: Flameproof and Dust Ignition Proof Approval</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<td>Certificate: IECEx KEM 07.0044</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Ex db IIC T6/T5 Gb, Ex tb IIC T70°C / T90°C Db</td>
</tr>
<tr>
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<td>Ambient Temperature for Gas Atmospheres: –40 to 75°C (–40 to 167°F) for T6, –40 to 80°C (–40 to 176°F) for T5</td>
</tr>
<tr>
<td></td>
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<td>Ambient Temperature for Dust Atmospheres: –30 to 65°C (–22 to 149°F) for T70°C, –30 to 80°C (–22 to 176°F) for T90°C</td>
</tr>
<tr>
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<td>Enclosure: IP66/IP67</td>
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<tr>
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<td>Electrical Connection: 1/2 NPT female and M20 female</td>
</tr>
<tr>
<td></td>
<td>SF2</td>
<td>同样的</td>
</tr>
</tbody>
</table>
### General Specifications

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
<th>Code</th>
</tr>
</thead>
</table>
| **FM (US)** | [4-20mA & Fieldbus: Explosionproof approval]  
Class I, Division 1, Groups A, B, C and D.;  
Class II/III, Division 1, Groups E, F and G.  
"FACTORY SEALD, CONDUIT SEAL NOT REQUIRED."  
Enclosure Ratings: TYPE 4X  
Temperature Class: T6  
Ambient Temperature: –40 to 60°C (–40 to 140°F)  
Electrical Connection: 1/2NPT female | FF1 |

4-20mA:  
[Intrinsically safe approval/non-incendive approval]  
Intrinsically safe for  
Class I, II, Division 1, Groups A, B, C, D, E, F, G, T5…T4  
Class I Zone 0 AEx ia IIC T5…T4  
Non-incendive for  
Class I, II, Division 2, Groups A, B, C, D, F, G, T5…T4  
Class III, Division 1 T5…T4  
Class I Zone 2 Group IIC T5…T4  
Ambient Temperature: –40 to 70°C for T4, –40 to 50°C for T5  
Enclosure Type 4X, IP66/IP67  
Electrical parameters:  
Intrinsically safe for  
Supply/Output circuit: Terminals: +, -  
Ui=30V, Ii=200mA, Pi=1.0W, Ci=22nF, Li=0mH  
Sensor circuit: Terminals: 1, 2, 3, 4, 5  
Uo=6V, Io=90mA, Po=135mW, Co=10μF, Lo=3.9mH  
Non-incendive for  
Supply/Output circuit: Terminals: +, -  
Ui=30V, Ci=22nF, Li=0mH  
Sensor circuit: Terminals: 1, 2, 3, 4, 5  
Uo=6V, Io=90mA, Po=135mW, Co=10μF, Lo=3.9mH  
Dielectric strength: 500 V a.c.r.m.s.,1 min (Without /A)  
[Explosionproof approval]  
Same as FF1 |

Fieldbus:  
[Intrinsically safe approval/non-incendive approval]  
Intrinsically safe for  
Class I, II, III Division 1, Groups A, B, C, D, E, F, G T4  
Class I Zone 0 AEx ia IIC T4  
Non-incendive for  
Class I, II, Division 2, Groups A, B, C, D, F, G T4  
Class III, Division 1 T4  
Class I Zone 2 Group IIC T4  
Ambient Temperature: –55 to 60°C  
Enclosure Type 4X, IP66/IP67  
Electrical parameters:  
Intrinsically safe for  
Supply/Output circuit: Terminals: +, -  
FISCO field device or  
Ui=30V, Ii=300mA, Pi=1.2W, Ci=2.2nF, Li=0mH  
Sensor circuit: Terminals: 1, 2, 3, 4, 5  
Uo=6V, Io=90mA, Po=135mW, Co=10μF, Lo=3.9mH  
Non-incendive for  
Supply/Output circuit: Terminals: +, -  
Ui=32V, Ci=2.2nF, Li=0mH  
Sensor circuit: Terminals: 1, 2, 3, 4, 5  
Uo=6V, Io=90mA, Po=135mW, Co=10μF, Lo=3.9mH  
Dielectric strength: 500 V a.c.r.m.s.,1 min (Without /A)  
[Explosionproof approval]  
Same as FF1 |
### General Specifications

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>FM (Canada)[^4][^7]</td>
<td>Applicable standard: C22.2 No. 0-10, C22.2 No. 0.4-04, C22.2 No. 25-M1966, C22.2 No. 30-M1986, C22.2 No. 94-M1991, C22.2 No. 142-M1987, C22.2 No. 157-92, C22.2 No. 213-M1987, C22.2 No. 61010-1-12, C22.2 No. 61010-2-030-12</td>
<td></td>
</tr>
<tr>
<td>4-20mA:</td>
<td>[Intrinsically safe approval/non-incendive approval] Applicable standard: CAN/CSA-C22.2 No. 94.2-07, C22.2 No.213:1987, CAN /CSA-C22.2 No. 60079-0:11, CAN/CSA-C22.2 No. 60079-11:14, CAN/CSCA-C22.2 No. 60529:05, CAN/CSA-C22.2 No. 61010-1-12, CAN/CSCA-C22.2 No. 61010-2-030-12 Intrinsically safe for Class I, II, III, Division 1, Groups A, B, C, D, E, F, G, T5…T4 Ex ia IIC T5…T4 Ga Non-incendive for Class I, II, Division 2, Groups A, B, C, D, F, G T5…T4 Class III Division 1 T5…T4 Ambient Temperature: –40 to 70°C for T4, –40 to 50°C for T5 Enclosure Type: 4X, IP66/IP67 Electrical parameters: Instrinsically safe for Supply/Output circuit: Terminals: +, -, Ui=30V, Ii=200mA, Pi=1.0W, Ci=22nF, Li=0mH Sensor circuit: Terminals: 1, 2, 3, 4, 5, Uo=6V, Io=90mA, Po=135mW, Co=10μF, Lo=3.9mH Non-incendive for Supply/Output circuit: Terminals: +, -, Ui=30V, Ci=22nF, Li=0mH Sensor circuit: Terminals: 1, 2, 3, 4, 5 Uo=6V, Io=90mA, Po=135mW, Co=10μF, Lo=3.9mH Dielectric strength: 500 V a.c.r.m.s., 1 min (Without /A) [Explosionproof approval] Same as CF1</td>
<td>CU[^1]</td>
</tr>
</tbody>
</table>

[^7]: Applicable standard: C22.2 No. 0-10, C22.2 No. 0.4-04, C22.2 No. 25-M1966, C22.2 No. 30-M1986, C22.2 No. 94-M1991, C22.2 No. 142-M1987, C22.2 No. 157-92, C22.2 No. 213-M1987, C22.2 No. 61010-1-12, C22.2 No. 61010-2-030-12
[^5]: Intrinsically safe for Class I, II, III, Division 1, Groups A, B, C, D, E, F, G, T5…T4 Ex ia IIC T5…T4 Ga Non-incendive for Class I, II, Division 2, Groups A, B, C, D, F, G T5…T4 Class III Division 1 T5…T4 Ambient Temperature: –40 to 70°C for T4, –40 to 50°C for T5 Enclosure Type: 4X, IP66/IP67 Electrical parameters: Instrinsically safe for Supply/Output circuit: Terminals: +, -, Ui=30V, Ii=200mA, Pi=1.0W, Ci=22nF, Li=0mH Sensor circuit: Terminals: 1, 2, 3, 4, 5, Uo=6V, Io=90mA, Po=135mW, Co=10μF, Lo=3.9mH Non-incendive for Supply/Output circuit: Terminals: +, -, Ui=30V, Ci=22nF, Li=0mH Sensor circuit: Terminals: 1, 2, 3, 4, 5 Uo=6V, Io=90mA, Po=135mW, Co=10μF, Lo=3.9mH Dielectric strength: 500 V a.c.r.m.s., 1 min (Without /A) [Explosionproof approval] Same as CF1
### General Specifications

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
<th>Code</th>
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</thead>
<tbody>
<tr>
<td>CSA</td>
<td>Fieldbus: [Intrinsically safe approval/non-incendive approval] Applicable standard: CAN/CSA-C22.2 No. 94.2-07, C22.2 No. 213:1987, CAN/CSA-C22.2 No. 60079-0:11, CAN/CSA-C22.2 No. 60079-11:14, CAN/CSA-C22.2 No. 60529:05, CAN/CSA-C22.2 No. 61010-1-12, CAN/CSA-C22.2 No. 61010-2-030-12 Intrinsically safe for Class I, II, III, Division 1, Groups A, B, C, D, E, F, G T4 Ex ia IIC T4 Ga Non-incendive for Class I, II, Division 2, Groups A, B, C, D, F, G T4 Class III Division 1 T4 Ambient Temperature: –55 to 60°C Enclosure Type: 4X, IP66/IP67 Electrical parameters: Intrinsically safe for Supply/Output circuit: Terminals: +, - FISCO field device or $U_i=30V, I_i=300mA, P_i=1.2W, C_i=2.2nF, L_i=0mH$ Sensor circuit: Terminals: 1, 2, 3, 4, 5 $U_o=6V, I_o=90mA, P_o=135mW, C_o=10μF, L_o=3.9mH$ Non-incendive for Supply/Output circuit: Terminals: +, - $U_i=32V, C_i=2.2nF, L_i=0mH$ Sensor circuit: Terminals: 1, 2, 3, 4, 5 $U_o=6V, I_o=90mA, P_o=135mW, C_o=10μF, L_o=3.9mH$ Dielectric strength: 500 V a.c.r.m.s., 1 min (Without /A) [Explosionproof approval] Same as CF1</td>
<td>CU15</td>
</tr>
</tbody>
</table>
### 7. General Specifications

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
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</thead>
</table>
| NEPSI*8 | **4-20mA and Fieldbus:**  
*Flameproof and Dust Ignition Proof Approval*  
Applicable Standard: GB3836.1-2010, GB3836.2-2010, GB12476.1-2013, GB12476.5-2013  
Certificate No. GYJ16.1396X  
Ex d IIC T6/T5 Gb, Ex tD A21 IP66/IP67 T70°C/T90°C  
Ambient Temperature for Gas Atmospheres: –40 to 75°C for T6, –40 to 80°C for T5  
Ambient Temperature for Dust Atmospheres: –30 to 65°C for T70°C, –30 to 80°C for T90°C  
Enclosure: IP66/IP67  
Electrical Connection: 1/2 NPT female and M20 female*1 |
|        | **NF2**                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|        | **4-20mA:**  
*Intrinsically safe approval*  
Applicable Standard: GB 3836.1-2010, GB 3836.4-2010 GB 3836.20-2010  
Certificate No. GYJ16.1423X  
Ex ia IIC T4/T5 Ga  
Ambient Temperature: –40 to 70°C for T4, –40 to 50°C for T5  
Enclosure: IP66/IP67 in accordance with only IEC 60529  
Entity Parameters:  
Supply/Output circuit: U0=30V, I0=200mA, P0=1.0W, C0=22nF, L0=0mH  
Sensor circuit: U0=6V, I0=90mA, P0=135mW, C0=10μF, L0=3.9mH  
Dielectric strength: 500 V a.c.r.m.s., 1 min  
[+, -, C, 1, 2, 3, 4, 5] to Earth terminal  
[+, -] to [1, 2, 3, 4, 5] |
|        | **NF2**                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|        | **Fieldbus:**  
*Intrinsically safe approval*  
Applicable Standard: GB 3836.1-2010, GB 3836.4-2010, GB3836.20-2010  
Certificate No. GYJ16.1423X  
Ex ia IIC T4 Ga  
Ambient Temperature: –55 to 60°C for T4  
Enclosure: IP66/IP67 in accordance with only IEC 60529  
FISCO field device  
Entity Parameters:  
Supply/Output circuit: U0=30V, I0=300mA, P0=1.2W, C0=2.2nF, L0=0mH  
Sensor circuit: U0=6V, I0=90mA, P0=135mW, C0=10μF, L0=3.9mH  
Dielectric strength: 500 V a.c.r.m.s., 1 min  
[+, -, 1, 2, 3, 4, 5] to Earth terminal  
[+, -] to [1, 2, 3, 4, 5] |
<p>|        | <strong>NS2</strong>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|        | <strong>NS2</strong>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|        | <strong>NS25</strong>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|        | <strong>NS25</strong>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |</p>
<table>
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<tr>
<th>Item</th>
<th>Description</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>4-20mA:</strong></td>
<td>[Intrinsically safe approval] Applicable Standard: ABNT NBR IEC 60079-0:2013 Versão Corrigida 2:2016, ABNT NBR IEC 60079-11:2013 Certificate: ABNT 17.0001X Ex ia IIC T5...T4 Ga Ambient Temperature: –40 to 70 °C for T4, –40 to 50 °C for T5 Enclosure: IP66/IP67 Supply/Output circuit: [U_i=30V, I_i=200mA, P_i=1.0W, C_i=22nF, L_i=0mH] Sensor circuit: [U_o=6V, I_o=90mA, P_o=135mW, C_o=10μF, L_o=3.9mH] Dielectric strength: 500 V a.c.r.m.s.,1 min (Without /A)</td>
<td><strong>US1</strong></td>
</tr>
<tr>
<td><strong>Fieldbus:</strong></td>
<td>[Intrinsically safe approval “ia”] Applicable Standard: ABNT NBR IEC 60079-0:2013 Versão Corrigida 2:2016, ABNT NBR IEC 60079-11:2013 Certificate: ABNT 17.0001X Ex ia IIC T4 Ga Ambient Temperature: –55 to 60 °C Enclosure: IP66/IP67 Supply/Output circuit: FISCO field device and [U_i=30V, I_i=300mA, P_i=1.2W, C_i=2.2nF, L_i=0mH] Sensor circuit: [U_o=6V, I_o=90mA, P_o=135mW, C_o=10μF, L_o=3.9mH] Dielectric strength: 500 V a.c.r.m.s.,1 min (Without /A)</td>
<td><strong>US15</strong></td>
</tr>
</tbody>
</table>
## 7. General Specifications

### Item | Description | Code
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| Item | Description | Code
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| Item | Description | Code
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### General Specifications

**Item** | **Description** | **Code**
--- | --- | ---
EAC*7*8 | [4-20mA & Fieldbus: Flameproof and dust ignition proof approval] | **GF1**
| Applicable Standard: ГОСТ 31610.0-2014 | |
| ГОСТ IEC 60079-1-2013 | |
| ГОСТ IEC 60079-31-2013 | |
| Certificate: TC RU C-JP:ПБ98.Б.00040 | |
| 1Ex db IIC T6…T5 Gb, Ex tb IIIIC T70°C…T90°C Db | |
| Ambient Temperature for Gas Atmospheres: −40 to 75°C for T6, −40 to 80°C for T5 | |
| Ambient Temperature for Dust Atmospheres: −30 to 65°C for T70°C, −30 to 80°C for T90°C | |
| Enclosure: IP66/IP67 | |
| Electrical Connection: 1/2 NPT female and M20 female | |

### 4-20mA:

- **Intrinsically safe approval**

  **Applicable Standard:** ГОСТ 31610.0-2014
  ГОСТ 31610.11-2014

  **Certificate:** TC RU C-JP:ПБ98.Б.00040

  0Ex ia IIC T4…T5 Ga X

  **Ambient Temperature:** −40 to 70 °C for T4, −40 to 50 °C for T5

  **Enclosure:** IP66/IP67

- **Supply/Output circuit:**
  - Terminals: +, –
  - \( U_i=30V, I_i=200mA, P_i=1.0W, C_i=22nF, L_i=0mH \)

- **Sensor circuit:**
  - Terminals: 1, 2, 3, 4, 5
  - \( U_o=6V, I_o=90mA, P_o=135mW, C_o=10μF, L_o=3.9mH \)

- **Dielectric strength:** 500 V a.c.r.m.s., 1 min (Without /A)

- **Electrical Connection:** 1/2 NPT female and M20 female

**Code:** **GS1**

### Fieldbus:

- **Intrinsically safe approval**

  **Applicable Standard:** ГОСТ 31610.0-2014
  ГОСТ 31610.11-2014

  **Certificate:** TC RU C-JP:ПБ98.Б.00040

  0Ex ia IIC T4 Ga X

  **Ambient Temperature:** −55 to 60°C

  **Enclosure:** IP66/IP67

- **Supply/Output circuit:**
  - Terminals: +, –
  - FISCO field device and
  - \( U_i=30V, I_i=300mA, P_i=1.2W, C_i=2.2nF, L_i=0mH \)

- **Sensor circuit:**
  - Terminals: 1, 2, 3, 4, 5
  - \( U_o=6V, I_o=90mA, P_o=135mW, C_o=10μF, L_o=3.9mH \)

- **Dielectric strength:** 500 V a.c.r.m.s., 1 min (Without /A)

- **Electrical Connection:** 1/2 NPT female and M20 female

**Code:** **GS15**

---

*1: Applicable for Electrical Connection Code 2 and 4.
*2: Applicable for Electrical Connection Code 2.
*3: For Explosionproof approval.
*4: For Intrinsically safe approval/non-incendive approval.
*5: Not applicable for YTA610.
*6: GF1, /GS1 and /GS15 shall be combined with either /VE or /VR.
*7: Not applicable for BRAIN type.
*8: Selection of SG is required.
7.4 Dimensions (YTA610 and YTA710)

- 2-inch horizontal pipe mounting

- 2-inch vertical pipe mounting

Terminals

<table>
<thead>
<tr>
<th>Terminal Configuration</th>
</tr>
</thead>
<tbody>
<tr>
<td>±</td>
</tr>
<tr>
<td>C</td>
</tr>
<tr>
<td>G</td>
</tr>
</tbody>
</table>

*1: When using an external indicator or a check meter, the internal resistance must be 10Ω or less. The hook is not available for Fieldbus communication type.

Unit: mm (Approx. inch)
# Revision Information

- **Title**: YTA610 and YTA710 Temperature Transmitters (Hardware)
- **Manual No.**: IM 01C50G01-01EN

<table>
<thead>
<tr>
<th>Edition</th>
<th>Date</th>
<th>Page</th>
<th>Revised Item</th>
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<td>1st</td>
<td>June 2016</td>
<td>—</td>
<td>New publication.</td>
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<td>Add document No. of GS 01C50H01-01EN.</td>
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<td>1-5</td>
<td>Add YTA610 to the table.</td>
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<td>2-4</td>
<td>Add ATEX Intrinsically safe approval.</td>
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<td>2-5</td>
<td>Revise the name plate.</td>
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<td>2-6 &amp; 2-7</td>
<td>Add name plate (intrinsically safe approval and Flameproof and Dust ignition approval).</td>
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<tr>
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<td>2-7</td>
<td>Add IECEx intrinsically safe approval.</td>
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<td>2-9</td>
<td>Add FM (US) intrinsically safe approval/non-incendive approval.</td>
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<td>2-10</td>
<td>Add FM (Canada) intrinsically safe approval/non-incendive approval.</td>
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<tr>
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<td>2-13 to 2-24</td>
<td>Add “2.7.5 Control Drawing”.</td>
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<tr>
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<td>3-4</td>
<td>Add note for Ni120.</td>
</tr>
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<td>6-1</td>
<td>Revise the description of IMPORTANT.</td>
</tr>
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<td>6-3</td>
<td>Delete “6.3.2 Replacement of MAIN and TEMP Assembly”.</td>
</tr>
<tr>
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<td>6-6 &amp; 6-7</td>
<td>Add *1 to the Table 6.4.</td>
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<td>6-7</td>
<td>Add *3 to the Table 6.5.</td>
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<td>6-8 &amp; 6-9</td>
<td>Add *1 to the Table 6.6.</td>
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<td>7-1</td>
<td>Revise 5 year stability.</td>
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<td>7-2</td>
<td>Revise Sensor-Diagnostics.</td>
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<td>Add software download class.</td>
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<td>Add SIL certification.</td>
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<td>7-3</td>
<td>Revise supply voltage requirements.</td>
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<td>7-4</td>
<td>Revise accuracy of type N. Delete Ni120.</td>
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<tr>
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<td>7-5 to 7-9</td>
<td>Add YTA610 specifications.</td>
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<td>7-10</td>
<td>Add YTA610.</td>
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<tr>
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<td>7-11 to 7-15</td>
<td>Add intrinsically safe and non-incendive type (KU2, KU25, SU2, SU25, FU1, FU15, CU1, and CU15).</td>
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<td>7-16</td>
<td>Add YTA610.</td>
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<td>3rd</td>
<td>Dec. 2017</td>
<td>1-1</td>
<td>Add document No. of IM 01C50G01-02EN, IM 01C50G01-01P and IM 01C50G01-01K.</td>
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<td>2-4</td>
<td>Add Fieldbus Type.</td>
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<td>2-5 &amp; 2-8</td>
<td>Change applicable standards and Type of Protection and Marking Code,</td>
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<td>Add Supply Voltage and Output Signal specifications.</td>
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<td>2-6 &amp; 2-7</td>
<td>Change Name Plate.</td>
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<td>2-7</td>
<td>IECEx intrinsically safe approval Items to be changed.</td>
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<td>2-15 &amp; 2-16</td>
<td>Add Control Drawing.</td>
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<td>2-27</td>
<td>Add Immunity influence during the test.</td>
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<td>3-4</td>
<td>Delete *1 Applicable only for YTA610.</td>
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<td>7-2</td>
<td>Add Immunity influence during the test, Add EU RoHS Directive.</td>
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<td>7-4</td>
<td>Add Ni120.</td>
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<td>7-7</td>
<td>Add Immunity influence during the test, Add EU RoHS Directive and add SIL Certification.</td>
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<td>7-9</td>
<td>Change Note1.</td>
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<td>7-12</td>
<td>Revise ATEX Intrinsically safe.</td>
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<td>7-13</td>
<td>Revise IECEx.</td>
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<td>7-16</td>
<td>Add NEPSI (NF2, NS2, NS25).</td>
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<td>7-17</td>
<td>Add INMETRO (UF1, US1, US15).</td>
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<td>7-18</td>
<td>Add KOSHA (PF2, PS2, PS25).</td>
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<td>Revised Item</td>
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| 4th    | Mar. 2018  | 2-5    | Revise ATEX intrinsically safe approval  
Add “Ex ic” of ATEX intrinsically safe approval 4-20mA type  
2-8 Add “Ex ic” of IECEx intrinsically safe approval  
2-10 Revise IECEx intrinsically safe approval  
2-11 Revise FM (Canada) intrinsically safe approval/nonincendive approval  
2-14 to 2-29 Revise Control Drawing  
6-5 Add Table 6.4  
7-1 to 7-4 Add BRAIN Type  
7-13 Add R1 Option and VE, VR Option  
7-14 Add Table 7.5  
7-15 Revise ATEX  
7-16 Revise IECEx  
7-17 Revise FM (US)  
7-18 Revise CSA, FM (Canada)  
7-23 Add EAC (GF1, GS1, GS15) |
| 5th    | June 2019  | 1-1    | Add reference for functional safety  
3-1 Add Nut to 3.PART  
3-2 Delete (HART/BRAIN) Add FF  
3-4, 3-5 Add Character and Selection.  
3-6 Change Parameters Configuration  
5-2 Add Note  
6-5 Delete (HART/FF)  
6-6,6-7 Correction of errors  
7-1 to 7-13 Change Standard specification contents |