

**YTMX580  
Multi-Input Temperature Transmitter**

IM 04R01B01-01EN

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# YTMX580

## Multi-Input Temperature Transmitter

IM 04R01B01-01EN 7th Edition

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# 1. Introduction

Thank you for purchasing the YTMX580 Multi-Input Temperature Transmitter.

Your Transmitter was precisely calibrated at the factory before shipment. To ensure both safety and efficiency, please read this manual carefully before you operate the transmitter.

This manual describes the installation, wiring, and parameter setting of the YTMX580 Multi-Input Temperature Transmitter.

## Paper Manual

Title	Manual No.
YTMX580 Multi-Input Temperature Transmitter	IM 04R01B01-01EN

## Electronic Manual

You can download these manuals from the following web page.

<https://y-link.yokogawa.com/>

Title	Manual No.
YTMX580 Multi-Input Temperature Transmitter	IM 04R01B01-01EN

## General Specifications

Title	General specifications No.
YTMX580 Multi-Input Temperature Transmitter	GS 04R01B01-01EN

\* The last two characters of the manual number and general specification number indicate the language in which the manual is written.

This manual is an essential part of the product; keep it in a safe place for future reference. This manual is intended for the following personnel;

- Engineers responsible for installation, wiring, and maintenance of the equipment.
- Personnel responsible for normal daily operation of the equipment.

## Authorised Representative in the EEA

The Authorised Representative for this product in the EEA is:

Yokogawa Europe B.V. Euroweg 2, 3825 HD Amersfoort, The Netherlands



## CAUTION

This manual describes how to use the integrated antenna model (antenna suffix code: A), remote antenna model (antenna suffix code: B), battery model (power supply suffix code: -A) and external power supply model (power supply suffix code: -B).

Unless otherwise stated, integrated antenna and battery models are used in the transmitter illustrations

Note that the illustrations may be different from the actual remote antenna model and external power supply model.

## ■ Regarding This Manual

- This manual should be provided to the end user.
- The contents of this manual are subject to change without prior notice.
- All rights reserved. No part of this manual may be reproduced in any form without Yokogawa's written permission.
- Yokogawa makes no warranty of any kind with regard to this manual, including, but not limited to, implied warranty of merchantability and fitness for a particular purpose.
- If any question arises or errors are found, or if any information is missing from this manual, please inform the nearest Yokogawa sales office.
- The specifications covered by this manual are limited to those for the standard type under the specified model number break-down and do not cover custom-made transmitter.
- Please note that changes in the specifications, construction, or component parts of the transmitter may not immediately be reflected in this manual at the time of change, provided that postponement of revisions will not cause difficulty to the user from a functional or performance standpoint.
- Yokogawa assumes no responsibilities for this product except as stated in the warranty.

- If the customer or any third party is harmed by the use of this product, Yokogawa assumes no responsibility for any such harm owing to any defects in the product which were not predictable, or for any indirect damages.
- The following safety symbols are used in this manual:

 **WARNING**

Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

 **CAUTION**

Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury or physical damage. It may also be used to alert against unsafe practices.

 **IMPORTANT**

Indicates that operating the hardware or software in this manner may damage it or lead to system failure.

 **NOTE**

Draws attention to information essential for understanding the operation and features.

**Notice**

NO RIGHTS OR LICENSES, EXPRESS OR IMPLIED, ARE GRANTED TO USE THIRD-PARTY DEVICES IN COMBINATION WITH THESE PRODUCTS IN A WIRELESS MESH NETWORK, OR TO USE THIRD-PARTY SERVICES TO ACCESS, MONITOR OR CONTROL THESE PRODUCTS IN A WIRELESS MESH NETWORK VIA THE INTERNET OR ANOTHER EXTERNAL WIDE AREA NETWORK.

**Patent Marking**

Covered by one or more claims of patents: <http://sipcollc.com/patent-list/> and <http://intusiq.com/patent-list/>.

## Protection of Environment

### 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.

产品中有毒有害物质或元素的名称及含量

部件名称		有毒有害物质或元素					
		铅 (Pb)	汞 (Hg)	镉 (Cd)	六价铬 (Cr6+)	多溴联苯 (PBB)	多溴二苯醚 (PBDB)
印刷电路		N/A	N/A	N/A	✓	✓	✓
内部接线材料		N/A	N/A	N/A	✓	✓	✓
外壳		N/A	N/A	N/A	✓	✓	✓
天线		N/A	N/A	N/A	✓	✓	✓
电池		N/A	N/A	N/A	✓	✓	✓
电池盒		N/A	N/A	N/A	✓	✓	✓
标准附件/可选附件	安装支架	N/A	N/A	N/A	✓	✓	✓
	天线电缆	N/A	N/A	N/A	✓	✓	✓
	衬垫	N/A	N/A	N/A	✓	✓	✓
	分流电阻	N/A	N/A	N/A	✓	✓	✓
	盲塞	N/A	N/A	N/A	✓	✓	✓

✓ : 表示该部件的所有均质材料中的有毒有害物质或元素的含量均低于 GB/T26572 标准所规定的限量要求。

N/A : 表示该部件中至少有一种均质材料中的有毒有害物质或元素的含量超过 GB/T26572 标准所规定的限量要求。

本产品的部分部件包含RoHS指令中的限用物质，但是其使用方法不受该指令限制。

Some parts of this product include the restricted substances of RoHS Directive, but their applications are under the exemption of the directive.



该标志为环境保护使用期限，根据SJ/T11364，适用于在中国（台湾、香港、澳门除外）销售的电子电气产品。只要遵守该产品的安全及使用注意事项，从产品生产之日起至该标志所示年限内，不会因为产品中的有害物质外泄或突变而导致环境污染或对人身财产产生重大影响。

注释) 该标志所示年限为“环境保护使用期限”，并非产品的保质期。另外，关于更换部件的推荐更换周期，请参阅使用说明书。

### Product Disposal

The instrument should be disposed of in accordance with local and national legislation/regulations.

### 1.1 Safe Use of This Product

The following safety symbols are used on the product and in this manual.



“Handle with care.” To avoid injury and damage to the instrument, the operator must refer to the explanation in the manual.



Functional ground terminal (do not use this terminal as a protective ground terminal.)



Direct current

For the safety of the operator and to protect the transmitter and the system, please be sure to follow this manual’s safety instructions when handling this transmitter. If these instructions are not heeded, the protection provided by this transmitter may be impaired. In this case, Yokogawa cannot guarantee that the transmitter can be safely operated. Please pay special attention to the following points:

#### (a) Installation

- This transmitter may only be installed by an engineer or technician who has an expert knowledge of this device. Operators are not allowed to carry out installation unless they meet this condition.
- With high process temperatures, care must be taken not to burn yourself by touching the transmitter or its casing.
- All installation shall comply with local installation requirements and the local electrical code.

#### (b) Wiring

- The transmitter must be installed by an engineer or technician who has an expert knowledge of this transmitter. Operators are not permitted to carry out wiring unless they meet this condition.

#### (c) Maintenance

- Please carry out only the maintenance procedures described in this manual. If you require further assistance, please contact the nearest Yokogawa office.
- Care should be taken to prevent the build up of dust or other materials on the display glass and the name plate. To clean these surfaces, use a soft, dry cloth.

#### (d) Explosion Protected Type Instrument

- Users of explosion proof instruments should refer first to section 2.6 (Installation of an Explosion Protected Instrument) of this manual.
- The use of this instrument is restricted to those who have received appropriate training in the device.
- Take care not to create sparks when accessing the instrument or peripheral devices in a hazardous location.
- Repair or modification to this instrument by customer will cause malfunction of explosion protect function and hazardous situation. If you need to repair or modification, please contact the nearest Yokogawa office.

#### (e) Modification

- Yokogawa will not be liable for malfunctions or damage resulting from any modification made to this transmitter by the customer.



### CAUTION

This instrument is a Class A product. Operation of this instrument in a residential area may cause radio interference, in which case the user is required to take appropriate measures to correct the interference.

이 기기는 업무용 (A급) 전자파적합기기로서 판매자 또는 사용자는 이 점을 주의하시기 바라며, 가정외의 지역에서 사용하는 것을 목적으로 합니다.

## 1.2 Radio Wave



### IMPORTANT

- This transmitter is equipped with a wireless module which is designated as a Japanese Radio Law as a wireless facility for 2.4 GHz band low-power data communication system of the Radio Act.  
Refer to 2.9 “Regulatory Compliance for Radio and Telecommunication” for detail.
- Due to the designated Japanese Radio Law , users may be subject to legal punishment in case of:
  - Disassembling or modifying the wireless module or antenna in this transmitter
  - Peeling off the certification label attached to the wireless module in this transmitter
- Preventing interference with other wireless stations  
The operating frequency bandwidth of this transmitter may overlap the same range as industrial devices, scientific devices, medical devices, microwave ovens, licensed premises radio stations and non-licensed specified low-power radio stations for mobile object identification systems used in factory production lines.  
Before using this transmitter, ensure that neither a premises radio station nor specified low power radio station for mobile object identification systems is in use nearby.  
If this transmitter causes radio wave interference to a wireless station for mobile object identification systems, promptly change the frequency being used or turn off the source of radio wave emissions.  
Then, contact a Yokogawa office regarding countermeasures to prevent interference, such as setting up partitions.

## 1.3 Warranty

- The warranty shall cover the period noted on the quotation presented to the purchaser at the time of purchase. Problems occurring during the warranty period shall basically be repaired free of charge.
  - If any problems are experienced with this transmitter, the customer should contact the Yokogawa representative from which this transmitter was purchased or the nearest Yokogawa office.
  - If a problem arises with this transmitter, please inform us of the nature of the problem and the circumstances under which it developed, including the model specification and serial number. Any diagrams, data and other information you can include in your communication will also be helpful.
  - The party responsible for the cost of fixing the problem shall be determined by Yokogawa following an investigation conducted by Yokogawa.
- **The purchaser shall bear the responsibility for repair costs, even during the warranty period, if the malfunction is due to:**
- Improper and/or inadequate maintenance by the purchaser.
  - Malfunction or damage due to a failure to handle, use, or store the transmitter in accordance with the design specifications.
  - Use of the product in question in a location not conforming to the standards specified by Yokogawa, or due to improper maintenance of the installation location.
  - Failure or damage due to modification or repair by any party except Yokogawa or an approved representative of Yokogawa.
  - Malfunction or damage from improper relocation of the product in question after delivery.
  - Reason of force majeure such as fires, earthquakes, storms/floods, thunder/lightening, or other natural disasters, or disturbances, riots, warfare, or radioactive contamination.

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**■ Trademarks**

- YTMX are registered trademarks of Yokogawa Electric Corporation.
- All the brand names or product names of Yokogawa Electric used in this document are either trademarks or registered trademarks of Yokogawa Electric Corporation.
- Company and product names used in this manual are trademarks or registered trademarks of their respective holders.
- The company and product names used in this manual are not accompanied by the trademark or registered trademark symbols (“™” and “®”).

# 2. Notes on Handling

This transmitter is fully factory-tested upon shipment. When the transmitter 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. When specify the remote antenna, check the remote antenna. And when order the antenna cable as optional accessory, check the remote antenna mounting parts shown in Figure 2.2 are included with your shipment. This section describes precautions that must be observed when using the transmitter. Please first read this section carefully. As for precautions that are not described in this section, refer to the relevant sections.

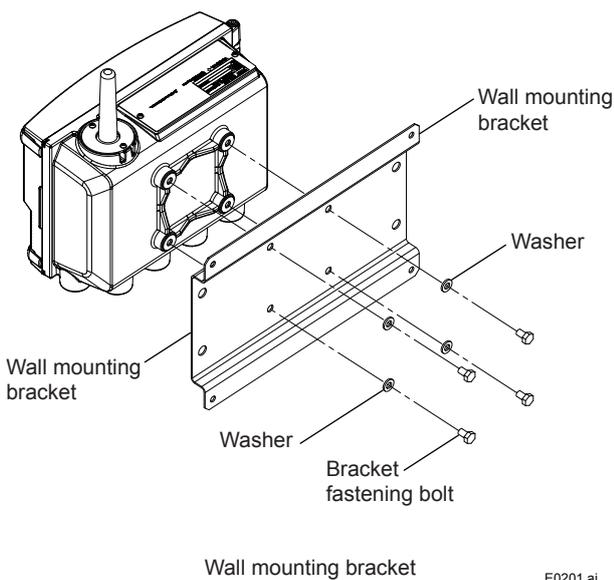
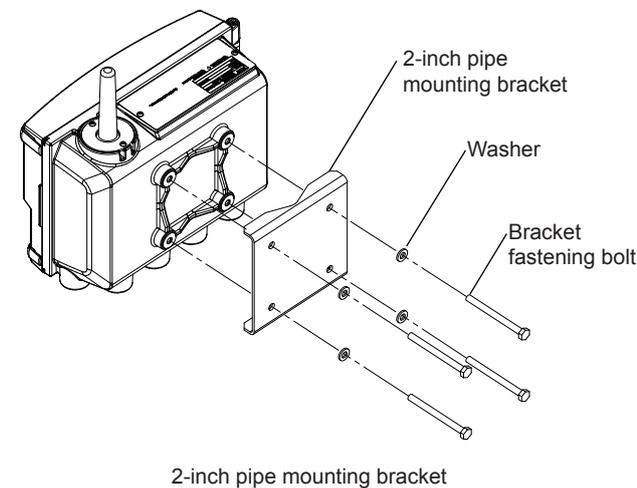


Figure 2.1 Transmitter Mounting Hardware

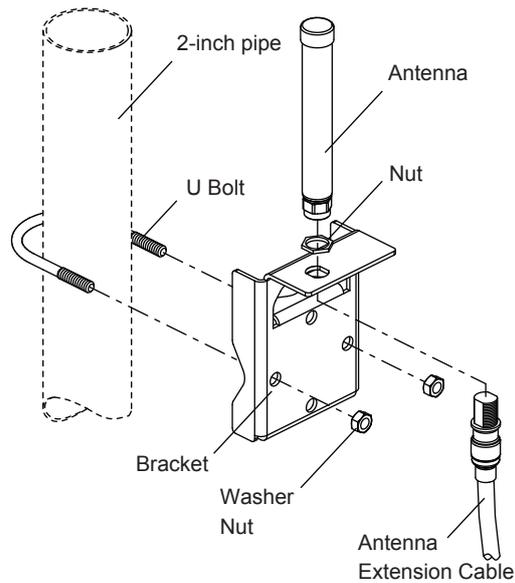


Figure 2.2 Remote antenna and Mounting Hardware

## 2.1 Check the Model Name and configuration

The model name and configuration are indicated on the nameplate. Verify that the configuration indicated in the “Model and Suffix Codes” in section 10.2 is in compliance with the specifications written on the order sheet.



Figure 2.3 Example of Name Plate

## 2.2 Transport

To prevent damage while in transit, leave the transmitter in the original shipping container until it reaches the installation site.

### 2.3 Storage

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

1. 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: -40 to 85°C  
 Humidity: 0 to 100% RH
2. If at all possible, store the transmitter in factory-shipped condition, that is, in the original shipping container.
3. Preferably remove the batteries for storage. For maximum battery life, the storage temperature should not exceed 30°C



#### NOTE

When storing the transmitter with a battery pack, it is recommended to put the transmitter in Deep Sleep mode to conserve the batteries. For details on how to switch to Deep Sleep mode, refer to subsection 7.3.11 “Switching to the Deep Sleep Mode”.

### 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.

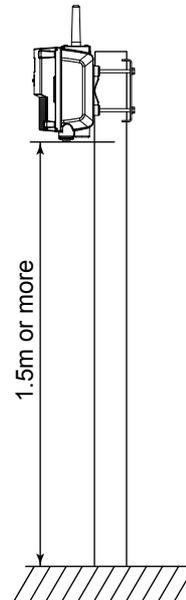
#### ■ Wireless Communication



#### NOTE

The installation location of this transmitter and remote antenna must meet the following conditions:

- Install the transmitter and remote antenna so that the antenna becomes vertical to the ground.
- Install the transmitter and remote antenna at least 1.5 m above the ground or floor.



E0204.ai

- Make sure there are no obstacles such as walls and pipes around the antenna to ensure visibility.
- Confirm that each field wireless equipment compliant with ISA100 Wireless can see the antenna of other devices which locate within its own communication range. In the star topology network, the visibility to the antenna of gateway is a mandatory clause.

### ■ Ambient Temperature

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

### ■ Environmental Requirements

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

The unit and its wiring should be protected from exposure to rainwater.

### ■ Impact and Vibration

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

### ■ Installation of Explosion-protected Transmitters

An explosion-protected transmitters is certified for installation in a hazardous area containing specific gas types. See subsection 2.6 “ Installation of an Explosion-Protected Instrument ”.

## 2.5 Use of a Transceiver



### IMPORTANT

Although the transmitter has been designed to resist high frequency electrical noise, if a radio transceiver is used near the transmitter or its external wiring, the transmitter may be affected by high frequency noise pickup. To test this, start out from a distance of several meters and slowly approach the transmitter with the transceiver while observing the measurement loop for noise effects. Thereafter use the transceiver outside the range where the noise effects were first observed.

## 2.6 Installation of an Explosion-Protected Instrument

If a customer makes a repair or modification to an intrinsically safe instrument and the instrument is not restored to its original condition, its intrinsically safe construction may be compromised and the instrument may be hazardous to operate. Please contact Yokogawa before making any repair or modification to an instrument.



### WARNING

- In the case where the enclosure of the Multi-Input Temperature Transmitter is made of aluminium, if it is mounted in a Zone 0 area or an area where the use of EPL Ga equipment is required, it must be installed such, that, even in the event of rare incidents, ignition sources due to impact and friction sparks are excluded.
- 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.
- To satisfy IP66 or IP67, apply waterproof glands to the electrical connection port.
- The instrument modification or parts replacement by other than an authorized Representative of Yokogawa Electric Corporation is prohibited and will void the certification.
- When replacing the Battery Pack or Antenna, be sure to minimize the risk of explosion from electrostatic discharge. Avoid any actions that cause the generation of electrostatic charge, such as rubbing with a dry cloth on face of the Battery Pack, Antenna, and product.

**CAUTION**

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- This instrument has been tested and certified as being intrinsically safe. Please note that severe restrictions apply to this instrument's construction, installation, external wiring, Maintenance and repair. A failure to abide by these restrictions could make the instrument a hazard to operate.
  - Be careful to make sure that an intrinsically safe apparatus, intrinsically safe devices, and wiring to connect them are arranged so that current and voltage are not induced by electromagnetic or electrostatic induction in the intrinsically safe circuit in order to prevent impairment of the intrinsically safe and explosion-proof performance of the intrinsically safe circuit.
- 

**2.6.1 FM Approval**

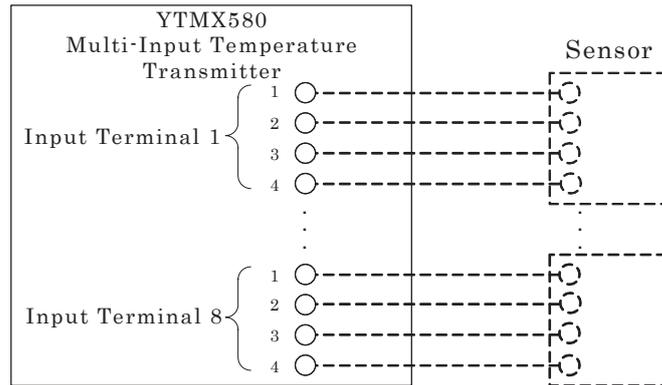
Caution for FM intrinsically safe type.(Following contents refer to "DOC. No. IFM041-A20")

Control Drawing

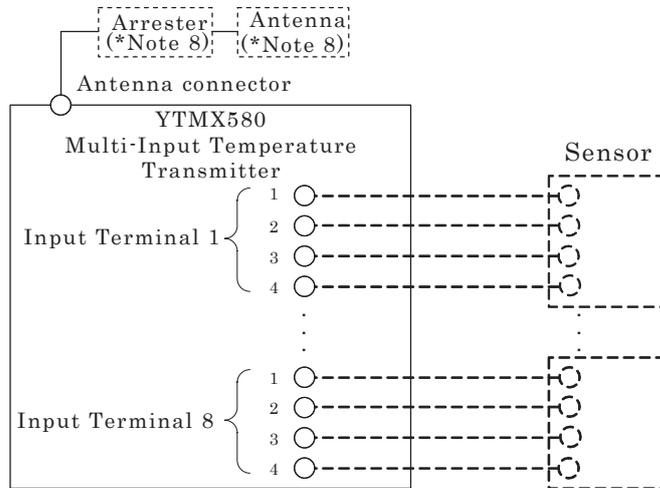
Hazardous (Classified) Location

Class I, Division 1, 2, Groups A, B, C, D  
 Class II, Division 1, Groups E, F, G or Class II, Division 2, Groups F, G  
 Class III, Division 1  
 Class I, Zone 0, 1, 2 Group IIC  
 Temperature Class: T4

Battery Model – Integral Antenna type



Battery Model – Remote Antenna type



Input Terminal 1-1 to 8-4

Uo: 5.88 V  
 Io: 130.1 mA  
 Po: 191.2 mW  
 Co: 1 µF  
 Lo: 1 mH

Model: YTMX580

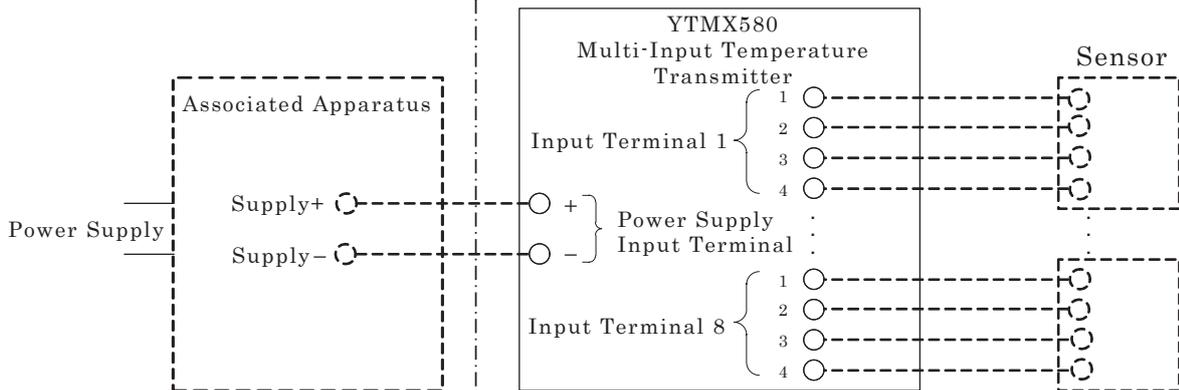
Date: October 14, 2011

Unclassified Location

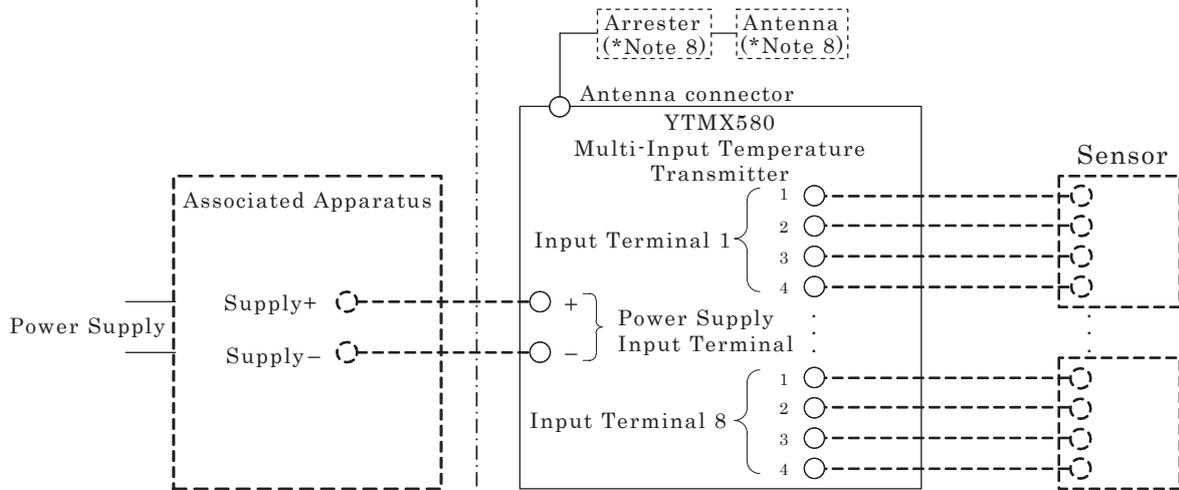
Hazardous (Classified) Location

Class I, Division 1, 2, Groups A, B, C, D  
 Class II, Division 1, Groups E, F, G or  
 Class II, Division 2, Groups F, G  
 Class III, Division 1  
 Class I, Zone 0, 1, 2 Group IIC  
 Temperature Class: T4

24VDC Model – Integral Antenna type



24VDC Model – Remote Antenna type



Power Supply Input Terminal(+,-)

Ui: 28V (26.4V for NI)  
 Ii: 135mA  
 Pi: 850mW  
 Ci: 0.013µF  
 Li: 0.24mH

Input Terminal 1-1 to 8-4

Uo: 5.88V  
 Io: 130.1mA  
 Po: 191.2mW  
 Co: 1µF  
 Lo: 1mH

Model: YTMX580

Date: October 15, 2015

Specific conditions of use:

- Precaution shall be taken to minimize the risk from electrostatic discharge of non-metallic parts and painted parts of the enclosure.
- If the equipment is mounted in Zone 0, it must be installed such that, even in the event of rare incidents, ignition sources due to impact and friction sparks are excluded.
- The dielectric strength of 500 V a.c. r.m.s. between the intrinsically safe circuit and the enclosure of the equipment is limited only by the overvoltage protection device.

Notes:

1. No revision to this drawing without prior approval of FM.
2. Installation must be in accordance with National Electrical Code (NFPA 70), ANSI/ISA-RP12.06.01, and relevant local codes.
3. Power supply or control equipment connected to Associated Apparatus must not use or generate more than  $U_m$  of Associated Apparatus.
4. In case of Zone 0 / Division 1 installation, Associated Apparatus must be an FM-approved linear source which meets the following conditions.

$$U_o (Voc) \leq U_i$$

$$I_o (Isc) \leq I_i$$

$$P_o \leq P_i$$

$$C_o (Ca) \leq C_i + C_c (Ccable)$$

$$L_o (La) \leq L_i + L_c (Lcable)$$

In case both  $C_i$  and  $L_i$  are equal to or more than  $C_o/100$  and  $L_o/100$  respectively,  $C_o$  and  $L_o$  must be reduced to 50 % and  $(C_i + C_c)$  must not exceed 1  $\mu F$  for Groups C, D and 600 nF for Groups A, B.

5. The control drawing of Associated Apparatus must be followed when installing the equipment.
6. In case Non-incendive Field Wiring Concept is used for Zone 2 / Division 2 installation, associated non-incendive field wiring apparatus which meets the following condition must be used.

$$U_o (Voc) \leq U_i$$

$$C_o (Ca) \leq C_i + C_c (Ccable)$$

$$L_o (La) \leq L_i + L_c (Lcable)$$

7. Sensors may be simple apparatus, or intrinsically safe apparatus which meets the following conditions.

$$U_i (Vmax) \geq U_o$$

$$I_i (Imax) \geq I_o$$

$$P_i \geq P_o$$

$$C_i \geq C_o - C_c (Ccable)$$

$$L_i \geq L_o - L_c (Lcable)$$

In case both  $C_i$  and  $L_i$  are equal to or more than  $C_o/100$  and  $L_o/100$  respectively,  $C_o$  and  $L_o$  must be reduced to 50 % and  $(C_i + C_c)$  must not exceed 1  $\mu F$  for Groups C, D and 600 nF for Groups A, B.

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Yokogawa Electric Corporation

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Model: YTMX580

Date: October 15, 2015

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8. Antenna and Arrester are simple apparatus.
- 8.1 The following conditions must be met.
- $(\text{total } L_i \text{ of simple apparatus}) + (\text{total } L_c \text{ (Lcable)}) \leq 15 \mu\text{H}$
- $(\text{total } C_i \text{ of simple apparatus}) + (\text{total } C_c \text{ (Ccable)}) \leq 30 \text{ nF}$
- 8.2 The temperature class of Antenna and Arrester must be determined from  $P_o = 206.9$  mW at Antenna Connector.
- 8.3 Arrester is not necessarily connected.
- 9 Dust-tight conduit seal must be used when installed in Class II/III environments.
- 10 WARNING: POTENTIAL ELECTROSTATIC CHARGING HAZARD – SECURE DISTANCE OF 100MM FROM ANTENNA FOR INTEGRAL ANTENNA MODEL
- 11 WARNING: THE BATTERY PACK MAY BE REPLACED IN A HAZARDOUS AREA. THE BATTERY PACK HAS SURFACE RESISTIVITY GREATER THAN 1GOHM AND MUST BE PROPERLY INSTALLED IN THE ENCLOSURE OF THE TEMPERATURE TRANSMITTER. CARE MUST BE TAKEN DURING TRANSPORTATION TO AND FROM THE POINT OF INSTALLATION TO PREVENT ELECTROSTATIC CHARGE BUILD-UP.
- 12 WARNING: USE ONLY BATTERY PACK YOKOGAWA F9915MA OR F9915NS
- 13 WARNING: DO NOT OPEN WHEN CL II, III, DIV 1, 2 ATMOSPHERE IS PRESENT
- 14 SUBSTITUTION OF COMPONENTS MAY IMPAIR INTRINSIC SAFETY AND SUITABILITY FOR HARZARDOUS LOCATIONS

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**WARNING**

THE POWER MODULE MAY BE REPLACED IN A HAZARDOUS AREA.

THE POWER MODULE HAS SURFACE RESISTIVITY GREATER THAN 1G OHM AND MUST BE PROPERLY INSTALLED IN THE ENCLOSURE OF THE TEMPERATURE TRANSMITTER. CARE MUST BE TAKEN DURING TRANSPORTATION TO AND FROM THE POINT OF INSTALLATION TO PREVENT ELECTROSTATIC DISCHARGE BUILD-UP.

**WARNING**

- Be sure to use the specified battery pack and batteries. For details, refer to section 8.4.3 "Handling Batteries."
- With an intrinsically safe transmitter, the battery pack is replaceable in a hazardous area. During the replacement work, make sure that dust and water droplets do not enter inside the transmitter. For details on how to replace the battery pack, refer to section 8.4.1 "Replacing the Battery Pack."

### 2.6.2 CSA Certification

Caution for CSA intrinsically safe type.

Note 1. Model YTMX580 Multi-Input temperature transmitters with optional code /CS17 are applicable for use in hazardous locations.

Certificate: 2495456

- Applicable Standard:  
 CAN/CSA-C22.2 No. 0-10 (R2015)  
 CAN/CSA-C22.2 No. 94-M91 (R2011)  
 C22.2 No. 213-M1987 (R2013)  
 CAN/CSA-C22.2 No. 60079-0:11  
 CAN/CSA-C22.2 No. 60079-11:14  
 CAN/CSA-C22.2 No. 60529-05 (R2015)  
 CAN/CSA-C22.2 No. 61010-1-12
- Intrinsically Safe for Class I, Division 1, Groups A, B, C & D, Class II, Division 1, Groups E, F & G, Class III, Division 1
- Non-incendive for Class I, Division 2, Groups A, B, C & D, Class II, Division 2, Groups F & G, Class III, Division 1
- Enclosure: Type 4X, IP66/IP67
- Temperature Code: T4
- Ambient. Temperature: -50 to 70°C
- Ex ia IIC T4

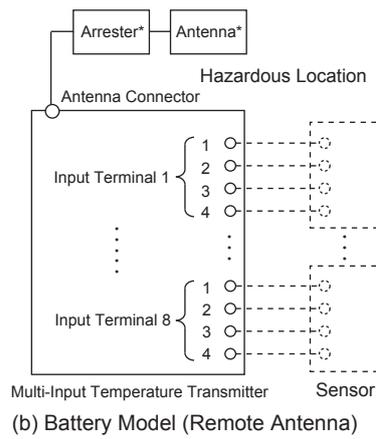
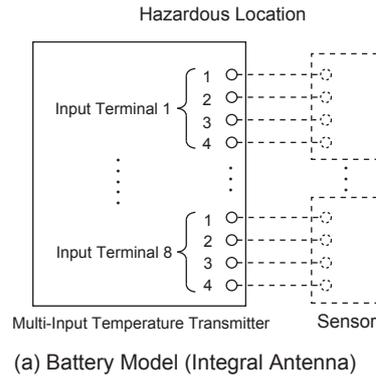
Note 2. Entity Parameters

- Intrinsically Safe Apparatus Parameters  
 [Groups A, B, C, D, E, F and G]  
 $U_o = 5.88 \text{ V}$ ,  $I_o = 130.1 \text{ mA}$ ,  
 $P_o = 191.2 \text{ mW}$ ,  $C_o = 1 \mu\text{F}$ ,  
 $L_o = 1 \text{ mH}$

Note 3. Installation

- Installation should be in accordance with Canadian Electrical Code Part I and Local Electrical Code.
- Do not alter drawing without authorization from CSA.
- The instrument modification or parts replacement by other than authorized representative of Yokogawa Electric Corporation of America is prohibited and will void Canadian Standards Intrinsically safe and nonincendive Certification.

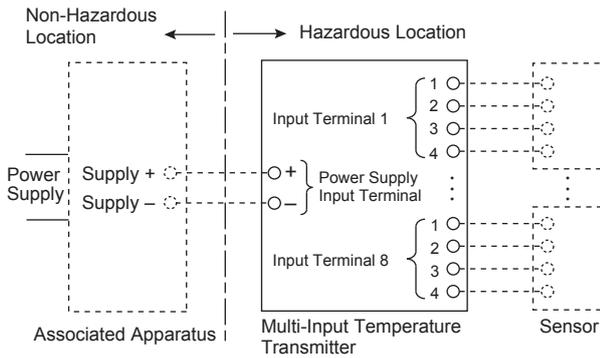
### Battery Model



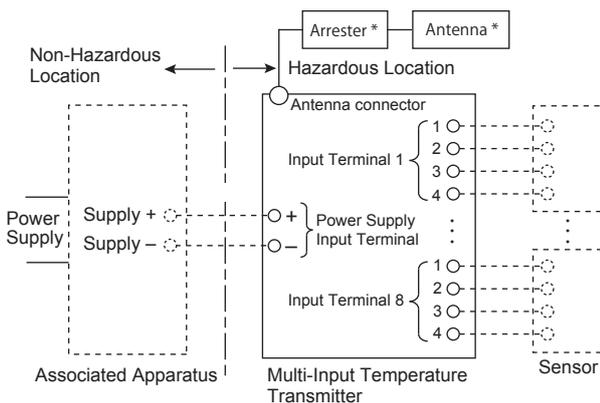
\* Simple Apparatus

E0206-1.ai

**External Power Supply Model**



(c) External Power Supply Model (Integral Antenna)



(d) External Power Supply Model (Remote Antenna)

\* Simple Apparatus  
E0206-2.ai

**2.6.3 ATEX Certification**

**(1) Technical Data**

Caution for ATEX Intrinsically safe type.

Note 1. Model YTMX580 Multi-Input temperature transmitters with optional code /KS27 for potentially explosive atmospheres:

- No. DEKRA 12ATEX0068 X
- Applicable Standard: EN60079-0:2009, EN60079-0:2012+A11:2013, EN60079-11:2007, EN60079-11:2012, EN60079-26:2007
- Type of Protection and Marking code: Ex ia IIC T4 Ga
- Group: II
- Category: 1 G
- Ambient Temperature: -50°C to 70°C
- Enclosure: IP66/IP67

Note 2. Output Parameters

- Sensor input circuit (Input Terminal 1-1 to Input Terminal 8-4)  
 $U_o = 5.88 \text{ V}$   
 $I_o = 130.1 \text{ mA}$   
 $P_o = 191.2 \text{ mW}$   
 $C_o = 1 \mu\text{F}$   
 $L_o = 1 \text{ mH}$

**Note 4. Battery Pack**

Use only YOKOGAWA battery pack F9915MA, F9915NS.



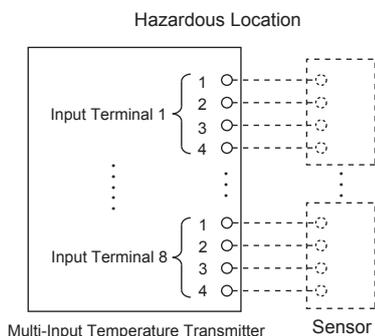
**WARNING**

- Be sure to use the specified battery pack and batteries. For details, refer to section 8.4.3 “Handling Batteries.”
- With an intrinsically safe transmitter, the battery pack is replaceable in a hazardous area. During the replacement work, make sure that dust and water droplets do not enter inside the transmitter. For details on how to replace the battery pack, refer to section 8.4.1 “Replacing the Battery Pack.”

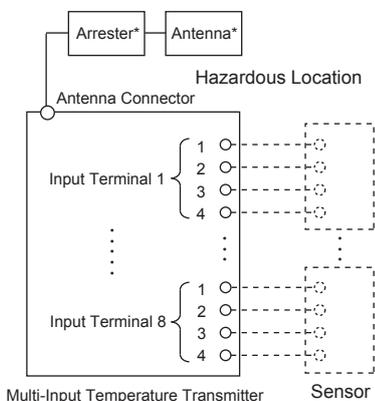
Note 3. Installation

- Installation should be in accordance with local installation requirements. (Refer to the control drawing.)

**Battery Model**



(a) Battery Model (Integral Antenna)

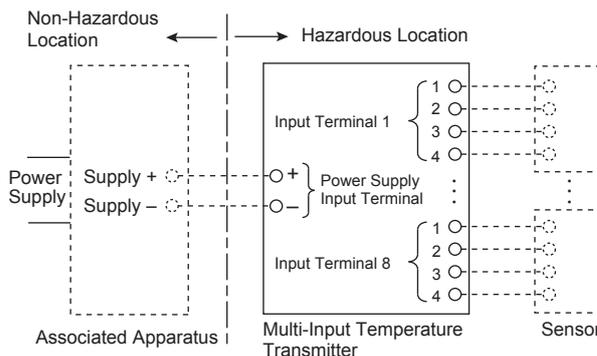


(b) Battery Model (Remote Antenna)

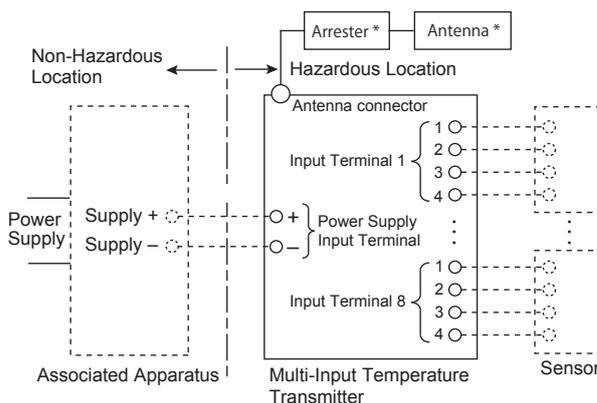
\* Simple Apparatus

E0207-1.ai

**External Power Supply Model**



(c) External Power Supply Model (Integral Antenna)



(d) External Power Supply Model (Remote Antenna)

\* Simple Apparatus

E0207-2.ai

Note 4. Battery Pack

- Use only YOKOGAWA battery pack F9915MA, F9915NS.



**WARNING**

- Be sure to use the specified battery pack and batteries. For details, refer to section 8.4.3 “Handling Batteries.”
- With an intrinsically safe transmitter, the battery pack is replaceable in a hazardous area. During the replacement work, make sure that dust and water droplets do not enter inside the transmitter. For details on how to replace the battery pack, refer to section 8.4.1 “Replacing the Battery Pack.”

Note 5. Special conditions for Safe Use

- In the case where the enclosure of the Multi-Input Temperature Transmitter is made of aluminium, if it is mounted in an area where the use of category 1 G apparatus is required, it must be installed such, that, even in the event of rare incidents, ignition sources due to impact and friction sparks are excluded.
- 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.



**WARNING**

Potential electrostatic charging hazard - secure distance of 100mm from antenna.

(2) Operation



**WARNING**

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

(3) Maintenance and repair



**WARNING**

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

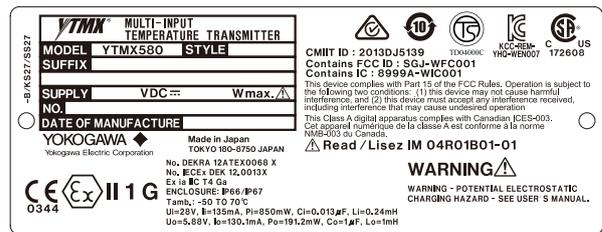
(4) Name Plate

- Name Plate for intrinsically safe type



E0208.ai

Figure 2.4 Name plate for ATEX intrinsically safe explosion-proof transmitter (Battery Mode)



E0209.ai

Figure 2.5 Name plate for ATEX intrinsically safe explosion-proof transmitter (External Power Supply Model)

MODEL: Specified model code.

SUFFIX: Specified suffix code.

STYLE: Style code.

SUPPLY: Supply voltage.

NO.: Serial number.

DATE OF MANUFACTURE: Date of manufacture.

TOKYO 180-8750 JAPAN: The manufacturer name and the address \*1.

\*1: "180-8750" is a zip code which represents the following address.

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

### 2.6.4 IECEx Certification

Caution for IECEx Intrinsically safe type.

Note 1. Model YTMX580 Multi-Input temperature transmitters with optional code /SS27 for potentially explosive atmospheres:

- No. IECEx DEK 12.0013X
- Applicable Standard: IEC 60079-0: 2011, IEC 60079-11: 2011, IEC 60079-26: 2006
- Type of Protection and Marking code: Ex ia IIC T4 Ga
- Ambient Temperature: -50°C to 70°C
- Enclosure: IP66/IP67

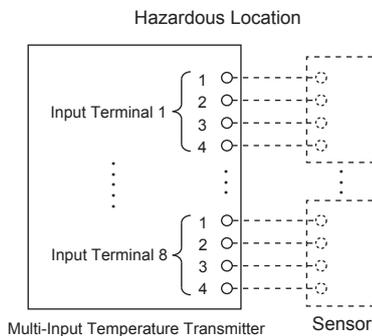
Note 2. Output Parameters

- Sensor input circuit (Input Terminal 1-1 to Input Terminal 8-4)  
 $U_o = 5.88\text{ V}$   
 $I_o = 130.1\text{ mA}$   
 $P_o = 191.2\text{ mW}$   
 $C_o = 1\text{ }\mu\text{F}$   
 $L_o = 1\text{ mH}$

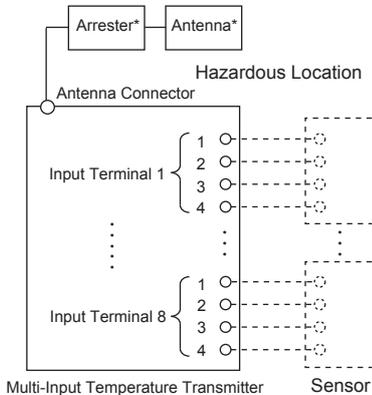
Note 3. Installation

- Installation should be in accordance with local installation requirements. (Refer to the control drawing.)

### Battery Model



(a) Battery Model (Integral Antenna)

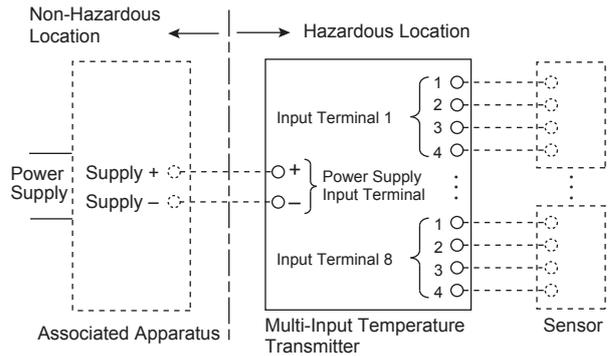


(b) Battery Model (Remote Antenna)

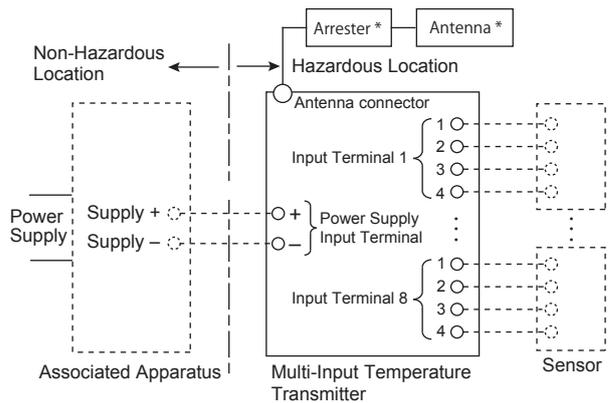
\* Simple Apparatus

E0210-1.ai

### External Power Supply Model



(c) External Power Supply Model (Integral Antenna)



(d) External Power Supply Model (Remote Antenna)

\* Simple Apparatus

E0210-2.ai

Note 4. Maintenance and Repair



The instrument modification or parts replacement by other than an authorized Representative of Yokogawa Electric Corporation is prohibited and will void IECEx Intrinsically safe Certification.

Note 5. Battery Pack

- Use only YOKOGAWA battery pack F9915MA, F9915NS.



**WARNING**

- Be sure to use the specified battery pack and batteries. For details, refer to section 8.4.3 “Handling Batteries.”
- With an intrinsically safe transmitter, the battery pack is replaceable in a hazardous area. During the replacement work, make sure that dust and water droplets do not enter inside the transmitter. For details on how to replace the battery pack, refer to section 8.4.1 “Replacing the Battery Pack.”

Note 6. Special conditions for Safe Use

- Because the enclosure of the Multi-Input Temperature Transmitter is made of aluminium, if it is mounted in an area where the use of apparatus of equipment protection level Ga is required, it must be installed such that, even in the event of rare incidents, ignition sources due to impact and friction sparks are excluded.
- 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.



**WARNING**

- Potential electrostatic charging hazard - secure distance of 100mm from antenna.
- Take care not to generate mechanical sparking when access to the instrument and peripheral devices in a hazardous location.

Name Plate for intrinsically safe type



Figure 2.6 Name plate for IECx intrinsically safe explosion-proof transmitter (Battery Mode)



Figure 2.7 Name plate for IECx intrinsically safe explosion-proof transmitter (External Power Supply Model)

- MODEL: Specified model code.
- SUFFIX: Specified suffix code.
- STYLE: Style code.
- SUPPLY: Supply voltage.
- NO.: Serial number.
- DATE OF MANUFACTURE: Date of manufacture.
- TOKYO 180-8750 JAPAN: The manufacturer name and the address \*1.

\*1: “180-8750” is a zip code which represents the following address.  
2-9-32 Nakacho, Musashino-shi, Tokyo Japan

2.6.5 TIIS intrinsically safe approval

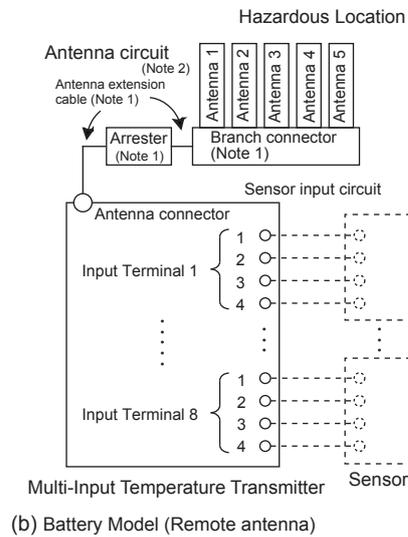
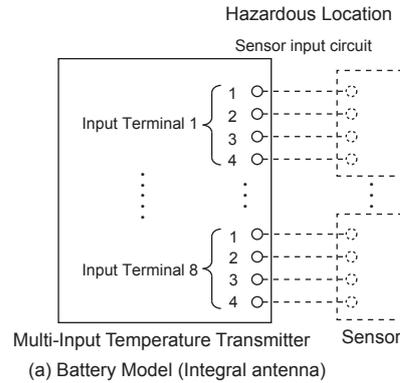


TIIS intrinsically safe explosion-proof transmitters are those that have passed the type examination based on the recommended practices for explosion-protected electrical installations in general industries (technical guidelines that conform to international standards; 2008) and are designed to be used in explosive gas or dangerous atmosphere in which steam is generated. (They can be installed in Zone 0, Zone 1, and Zone 2.) Intrinsically safe explosion-protected apparatuses require special care in their installation, wiring, piping, and the like to secure safety. Moreover, restrictions are placed on maintenance and repairing for safety reasons.

Note: Hazardous areas are classified in zones based upon the frequency of the appearance and the duration of an explosive gas atmosphere as follows:  
 Zone 0: An area in which an explosive gas atmosphere is present continuously or is present for long periods.  
 Zone 1: An area in which an explosive gas atmosphere is likely to occur in normal operation.  
 Zone 2: An area in which an explosive gas atmosphere is not likely to occur in normal operation and if it does occur it will exist for a short period only.

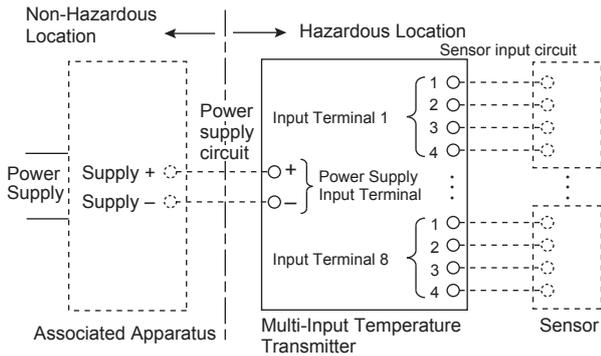
Intrinsically safe explosion-proof transmitters can be installed and used in a hazardous area in the following manner.

Battery Model

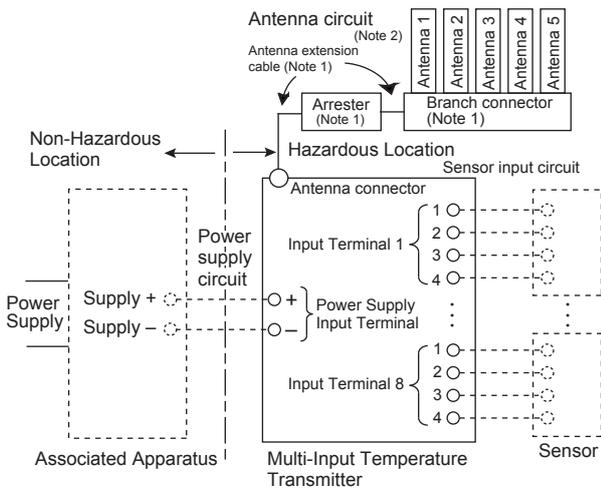


Note 1: Arrester, antenna extension cable, and branch connector are not connected in some cases. In such a case, the corresponding section is connected directly to the antenna input terminal.  
 Note 2: In some cases, antenna 1 to antenna 5 are not connected .

External Power Supply Model



(c) External Power Supply Model (Integral Antenna)



(d) External Power Supply Model (Remote Antenna)

\* Simple Apparatus

Note 1: Arrester, antenna extension cable, and branch connector are not connected in some cases. In such a case, the corresponding section is connected directly to the antenna input terminal.

Note 2: In some cases, antenna 1 to antenna 5 are not connected.

E0213-2.ai

Figure 2.8 Use example for TIIS intrinsically safe explosion-proof transmitter

**CAUTION**

The remote antenna model is set up in its maximum configuration for examining several antennas in a bundle. During actual use, use the configurations shown in chapter 4, "Installation," and chapter 5, "Wiring." In addition, the branch connector is used only to construct the maximum configuration; it is not sold.

**CAUTION**

Make sure that current and voltage that can undermine the circuit's intrinsically safe features are not induced in intrinsically safe apparatuses, associated apparatuses, and the wires that connect these apparatuses as a result of electromagnetic induction or electrostatic induction.

- Sensor connection  
The sensors that are connected to the multi-input temperature transmitters must meet the following conditions.
  - (1) Intrinsically safe rating  
 Allowable voltage in intrinsically safe circuit : 5.88V or more  
 Allowable current in intrinsically safe circuit : 130.1mA or more  
 Allowable power in intrinsically safe circuit : 191.3mW or more
  - (2) Protection level and group  
 Protection level : ia, ib  
 Group : IIA, IIB, IIC
  - (3) Internal inductance and internal capacitance vs. inductance (Lc) and capacitance (Cc) of wiring external to the intrinsically safe circuit  
 Internal inductance : less than (1mH - Lc) or less  
 Internal capacitance : less than (1μF - Cc) or less
- Be sure to use the specified battery pack (with Rev.1 indication) and batteries. For details, refer to section 8.4.3, "Handling Batteries."
- The battery pack in an intrinsically safe explosion-proof transmitter can be replaced in a hazardous area. While replacing the battery pack, make sure that dust and water droplets do not enter inside the transmitter. For details on how to replace the battery pack, refer to section 8.4.1 "Replacing the Battery Pack."
- Enclosure  
 In the examination, IP20 enclosure, which is the lowest intrinsically safe explosion-proof requirement, has been verified, but both the integrated antenna model and remote antenna model can be used in an environment that requires IP66/IP67.

- Antenna circuit connection  
The antennas that are connected to the multi-input temperature transmitters must meet the following conditions.
  - (1) Intrinsically safe rating  
Intrinsically safe circuit's allowable voltage 5.88V  
Intrinsically safe circuit's allowable current 177.4mA  
Intrinsically safe circuit's allowable power 349.5mW
  - (2) Capacitance and inductance of the antenna extension cable  
Capacitance less than 30nF  
Inductance less than 15μHmA
- External power supply connection  
When using the transmitter with external power supply specifications, be sure to use a barrier that meets the following conditions.

- (1) Intrinsically safe rating  
Intrinsically safe circuit's maximum voltage 28 V  
Intrinsically safe circuit's maximum current 135 mA  
Intrinsically safe circuit's maximum power 850 mW
  - (2) Protection level and group  
Protection level ia  
Group IIC
  - (3) Intrinsically safe circuit's allowable inductance (Lo) and intrinsically safe circuit's allowable capacitance (Co) vs. inductance (Lc) and capacitance (Cc) of wiring external to the intrinsically safe circuit  
 $Lo \geq (Lc + 0.24 \text{ mH}) \times 2$   
 $Co \geq (Cc + 0.013 \mu\text{F}) \times 2$
- For the intrinsically safe explosion proof specifications, refer to section 10.1, "General Specification".



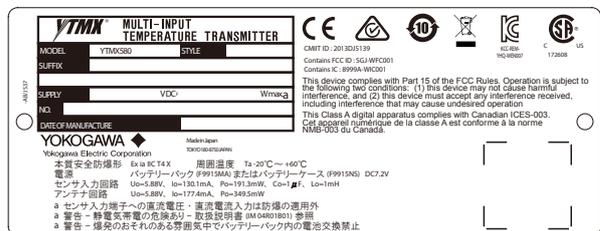
**WARNING**

When replacing the Battery Pack, be sure to minimize the risk of explosion from electrostatic discharge. To prevent electrostatic discharge caused by static charge built up on the operator, ground the operator through conductive shoes and floors and by wearing anti-static work clothes to prevent charge build-up. Avoid any actions that cause the generation of electrostatic charge, such as rubbing with a dry cloth on face of the Battery Pack and product. If static electricity cannot be suppressed, check that the surrounding atmosphere does not contain explosive gas or steam before replacing the Battery Pack.



E0214.ai

**Figure 2.9 Name plate for TIIS intrinsically safe explosion-proof transmitter (For Battery Model (Integral antenna))**



E0215.ai

**Figure 2.10 Name plate for TIIS intrinsically safe explosion-proof transmitter (For Battery Model (Remote antenna))**



E0216.ai

**Figure 2.11 Name plate for TIIS intrinsically safe explosion-proof transmitter (For External Power Supply Model (Integral antenna))**



Figure 2.12 Name plate for TIIS intrinsically safe explosion-proof transmitter (For External Power Supply Model (Remote antenna))

## 2.7 EMC Conformity Standards

EN 61326-1 Class A, Table 2 (For use in industrial locations), EN 61326-2-3

\* During the test, the transmitter continues to operate under the electromagnetic effects of within ±1% of the span.

EN 301 489-1, EN 301 489-17



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

## 2.8 Safety Standard

Standard:

EN 61010-1, EN 61010-2-030

CSA C22.2 No.61010-1,

CSA C22.2 No.61010-2-030-12,

UL 61010-1, UL 61010-2-030 ( CSA NRTL/C )

Indoor/Outdoor use

### (1) Pollution Degree 2

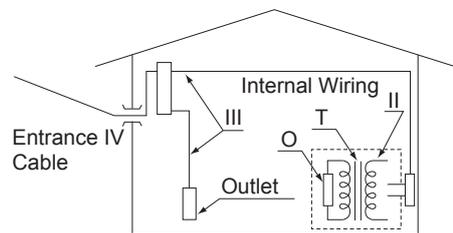
"Pollution degree" describes the degree to which a solid, liquid, or gas which deteriorates dielectric strength or surface resistivity is adhering. " 2 " applies to normal indoor atmosphere. Normally, only non-conductive pollution occurs. Occasionally, however, temporary conductivity caused by condensation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

### (2) Installation Category I

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



This instrument is designed to measure circuits that are not directly connected to the mains. Do not use it for measurements that fall under Measurement Category II, III, or IV.



Measurement category	Description	Remarks
O	Other circuits that are not directly connected to MAINS.	
CAT.II	For measurements performed on circuits directly connected to the low-voltage installation.	Appliances, portable equipments, etc.
CAT.III	For measurements performed in the building installation.	Distribution board, circuit breaker, etc.
CAT.IV	For measurements performed at the source of the low-voltage installation.	Overhead wire, cable systems, etc.

## 2.9 Regulatory Compliance for Radio and Telecommunication



### WARNING

Be sure to use the remote antennas and cables specified by local radio and telecommunication law.

Please confirm that an installation region fulfills a standards, require additional regulatory information and approvals, contact to Yokogawa Electric Corporation.

## 2.10 Radio Equipment Directive (RE)

We, Yokogawa Electric Corporation hereby declare that this equipment, model YTMX580 Multi-Input temperature transmitters is in compliance with the essential requirements and other relevant provisions of Directive 1999/5/EC.

The CE declaration of conformity for RE for this product can be found at  
< <http://www.field-wireless.com/> >

## 2.11 FCC compliance

YTMX580 contains transmitter module FCC ID: SGJ-WFC001.

### Co-located:

This transmitter must not be co-located or operated in conjunction with any other antenna or transmitter.

### FCC CAUTION

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

## 2.12 Industry Canada (IC) compliance

YTMX580 contains transmitter modeule IC : 8999A-WIC001.

This Class A digital apparatus complies with Canadian ICES-003.

This device complies with Industry Canada licence-exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

Under Industry Canada regulations, this radio transmitter may only operate using an antenna of a type and maximum (or lesser) gain approved for the transmitter by Industry Canada. To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (e.i.r.p.) is not more than that necessary for successful communication.

This radio transmitter IC Number 8999A-WIC001 has been approved by Industry Canada to operate with the antenna types listed below with the maximum permissible gain and required antenna impedance for each antenna type indicated. Antenna types not included in this list, having a gain greater than the maximum gain indicated for that type, are strictly prohibited for use with this device.

Antenna type:	Gain:
COLLINEAR	9dBi, 50Ω
Sleeve	2.14dBi, 50Ω

French: Cet appareil numérique de la classe A est conforme à la norme NMB-003 du Canada.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes : (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

Conformément à la réglementation d'Industrie Canada, le présent émetteur radio peut fonctionner avec une antenne d'un type et d'un gain maximal (ou inférieur) approuvé pour l'émetteur par Industrie Canada. Dans le but de réduire les risques de brouillage radioélectrique à l'intention des autres utilisateurs, il faut choisir le type d'antenne et son gain de sorte que la puissance isotrope rayonnée équivalente (p.i.r.e.) ne dépasse pas l'intensité nécessaire à l'établissement d'une communication satisfaisante.

Le présent émetteur radio IC Number 8999A-WIC001 a été approuvé par Industrie Canada pour fonctionner avec les types d'antenne énumérés ci-dessous et ayant un gain admissible maximal et l'impédance requise pour chaque type d'antenne. Les types d'antenne non inclus dans cette liste, ou dont le gain est supérieur au gain maximal indiqué, sont strictement interdits pour l'exploitation de l'émetteur.

Antenne type:	Gain:
COLLINEAR	9dBi, 50Ω
Sleeve	2.14dBi, 50Ω

## 2.13 EMC and Radiocommunications regulatory arrangement in Australia and New Zealand (RCM)

AS/NZS 4268  
AS/NZS 2772.2  
EN 61326-1 Class A, Table2 (For use in industrial location)



### CAUTION

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

## 2.14 Regarding the Specifications at the Time of Order

### Sensor type



### CAUTION

The available types of sensors of this product that comply with explosion-proof standards are thermocouple, RTD, and resistor. Thus, if you select the explosion proof suffix code, you cannot select DC voltage (mV, V) for the sensor type.

If you need to change it to DC voltage in your environment, make sure your environment does not require explosion protection.

## 2.15 Configuration Tools for Transmitter

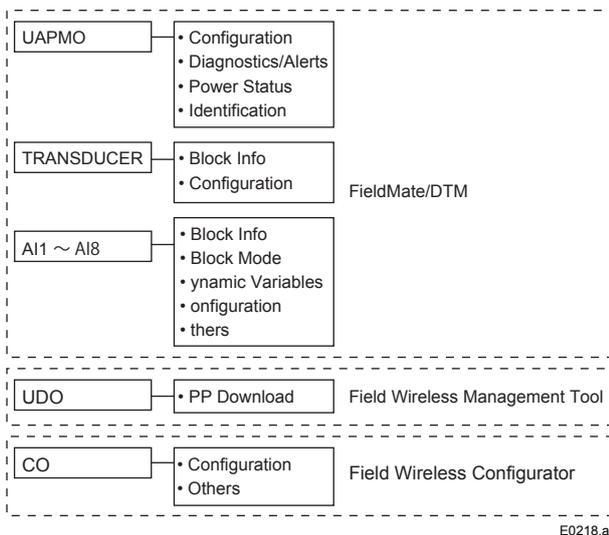
Table 8.1 shows Yokogawa's recommended devices and configuration tools required for configuring the settings of the transmitter. Configure the settings for the transmitter using the these tools via infrared or wireless communication. The following describes the overview of the main configuration tools. For relation between each function block and setting tool, refer to table 2.1. For details on each of the tools, including the operating procedures, refer to the respective instruction manual.

### Wireless Field Device Configuration Tool (Wireless and Infrared Communication)

- Device adjustment and configuration software  
FieldMate:  
For configuring the input settings for the transmitter and the device settings and performing a self-diagnosis and other checks

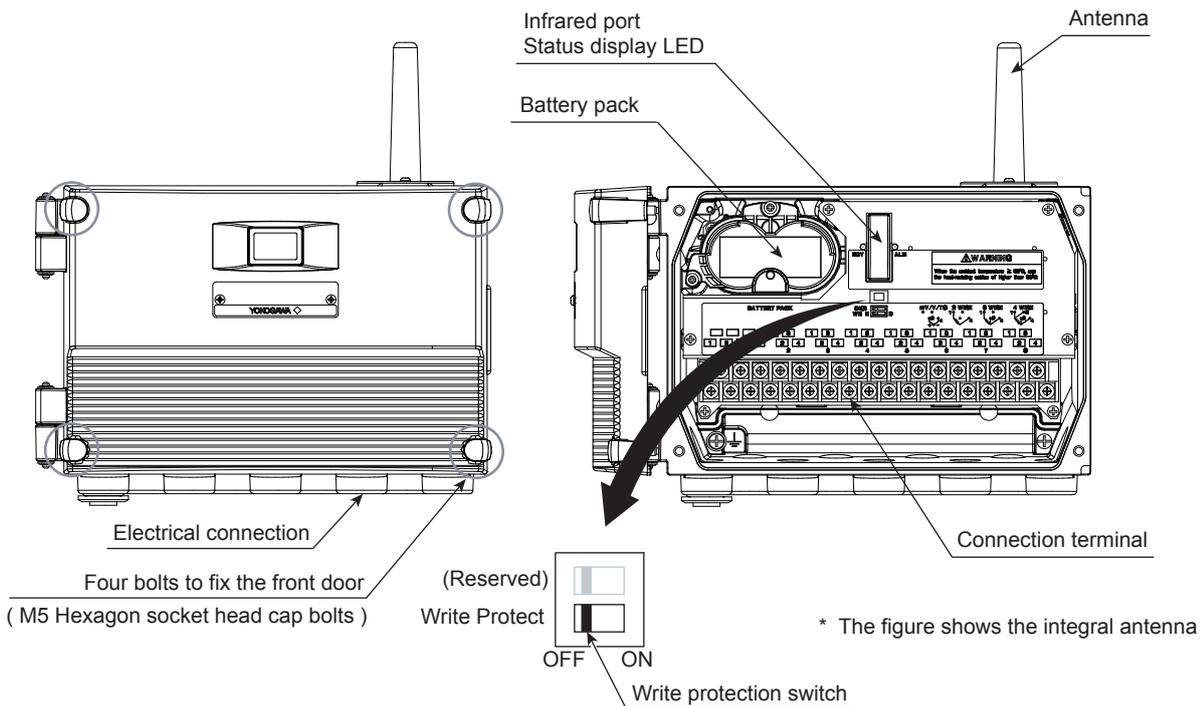
### Field Wireless System Configuration Tools (Wireless Communication)

- Field Wireless Configurator:  
For configuring the network (communication) settings and registering the transmitter with the gateway
- Field Wireless Management Tool:  
For maintenance, including the transmitter management and program downloading



**Table 2.1 Relation between functional block and setting tool**

# 3. Part Names and Functions



Hardware write protection switch (Write Protect)		
Write Protection Switch Position (Note1)	(Reserved) Write Protect OFF ON	(Reserved) Write Protect OFF ON
Write Protection	No (Write enabled)	Yes (Note2) (Write disenabled)

E0301.ai

- Note 1: Set the switch ( Write Protct ) as shown in the figure above to set the write protection . The hardware write protection switch is set to OFF side (writable). For details of write protection settings, refer to subsection 7.3.9 “ Write Protect ”.
- Note 2: When the switch is ON side (write protection setting), provisioning is acceptable. For details of provisioning, refer to section 6.4 “ Connecting to the Field Wireless Network “

Figure 3.1 Component Names

Table 3.1 Display Description of Status Display LED

Display		Status
RDY (green)	On	At Startup, Squawk
	Blinking	During operation ( measurement period ), waiting to join the network ( at 1Hz ),
	Off	Power Off, in Deep Sleep mode, LED Mode set to Off
ALM (red)	On	Alarm generated, Squawk
	Off	Power Off, in Deep Sleep mode, LED Mode set to Off.

Squawk:

The RDY and ALM LED's of the transmitter (YTMX580) that responds to the Squawk command (TRANSDUCER block Special cmd) light for ten seconds. This can be used for such things as identifying the transmitter.

---

# 4. Installation

## 4.1 Precautions

- Before installing the transmitter and remote antenna, read the cautionary notes in section 2.4, “Choosing the Installation Location.”
- For additional information on the ambient conditions allowed at the installation location, refer to chapter 10 “General Specifications.”



### NOTE

---

To connect this transmitter to the Field Wireless Network, information for connecting to the field wireless devices needs to be set beforehand. Refer to section 6.4 “Connecting to the Field Wireless Network.”

---



### IMPORTANT

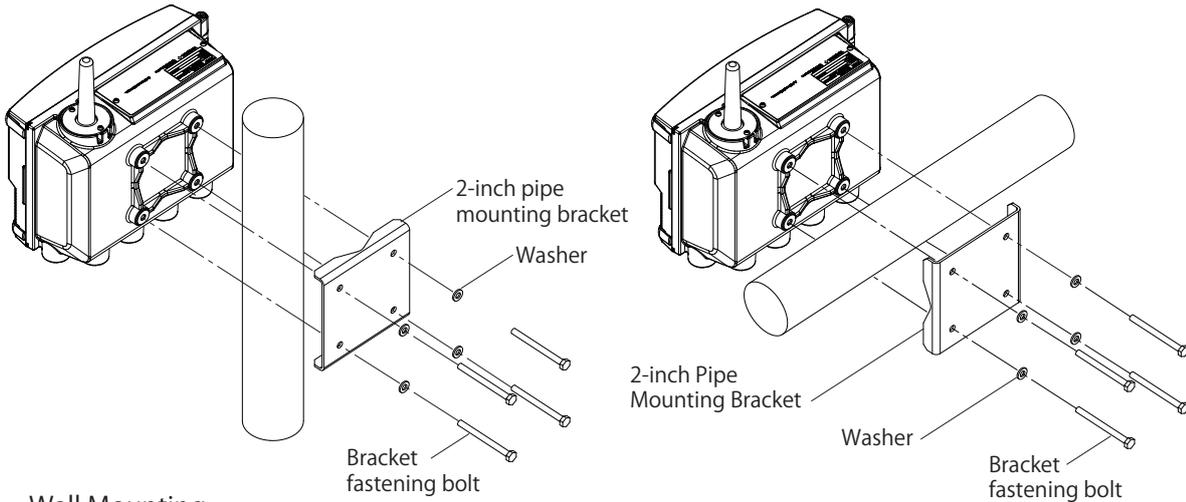
- 
- When performing on-site pipe fitting work that involves welding, use care to prevent outflow of the welding current into the transmitter.
  - Do not use the transmitter as a foothold for installation.
- 

## 4.2 Procedure for Mounting Transmitter

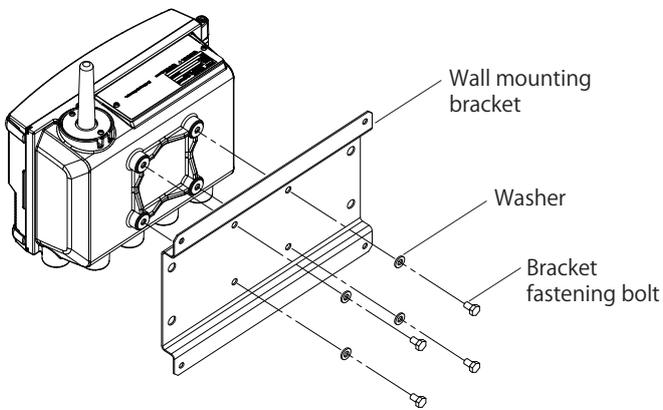
- Use the mounting bracket shown in Figure 4.1 to install the transmitter on a 50A (2-inch) pipe or wall. The pipe mounting bracket can be used for both a horizontal pipe and a vertical pipe.
- To install the mounting bracket on the transmitter, torque the transmitter fastening each bolts about 5 to 6 N·m.

Vertical Pipe Mounting

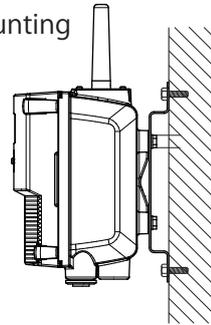
Horizontal Pipe Mounting



Wall Mounting



Wall Mounting



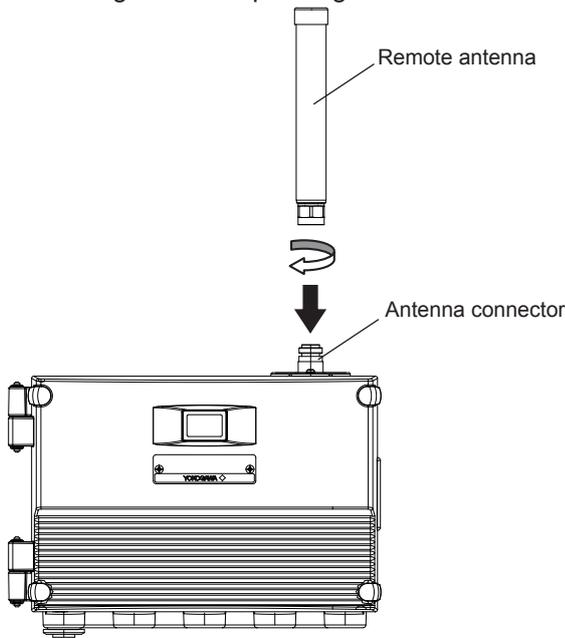
Note: You need to provide bolts for fastening the wall mounting bracket on the wall. Recommended 5mm bolt. (When inch bolt, #10 or #12.) E0401.ai

Figure 4.1 Transmitter Mounting

### 4.3 Mounting Procedure of Remote Antenna

#### ■ Mounting Remote Antenna to Main Body

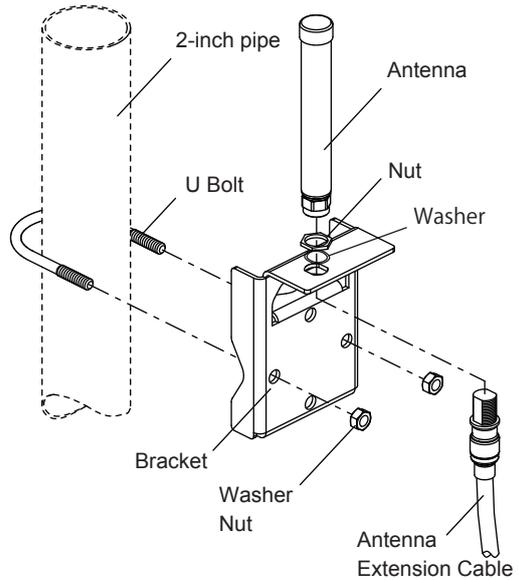
- Screw the remote antenna into the connector on the top of the body. Tighten the antenna connector with a torque of 2 to 3 N·m.
- Confirm and waterproof the connection. For details of waterproofing, see section 5.5 “Wiring and Waterproofing of Remote Antenna”



E0402.ai

#### ■ Fixing of Remote Antenna

- Fix the antenna extension cable to the bracket with the provided nut as shown in the figure 4.2.
- Fix to the 2-inch (2B) pipe by using the U bolts and bracket.
- Screw the antenna into the antenna connector of the antenna extension cable on the bracket. Tighten the antenna connector with a torque of 2 to 3 N·m.
- Waterproof the connection. For details of waterproofing, see section 5.5 “Wiring and Waterproofing of Remote Antenna”



E0403.ai

Figure 4.2 Example of fixing of remote antenna

# 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.)
- Cover unused connection ports with YTMXBP (blind plug for wire connection port).
- Lay wiring as far away as possible from electrical noise sources such as large transformers, motors and power supplies.
- Before wiring, remove the blind plugs and insert the cables into the main body and connect them to the appropriate terminals.
- When you open the door, pay great attention to the environmental conditions in order to prevent dust and water droplets entering inside the transmitter.
- To run wiring to the sensor, pay sufficient attention to the wiring parameters described in section 2.6 “Installation of an Explosion-Protected Instrument.”
- To prevent electrical noise, the signal cable and the power cable must not be housed in the same conduit.
- The front door can be opened by turning the four front door bolts seven times counterclockwise. Please note that the bolts are held by the friction force of the rubber but may fall out if turned more than necessary.
- This instrument is designed to measure circuits that are not directly connected to the mains.  
Do not use it for measurements that fall under Measurement Category II, III, or IV.

## 5.2 Cable Selection

When wiring in an area where the ambient temperature is high or low, use wires or cables that are appropriate for such an area.

### ■ Input Wiring

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 that is appropriate for the type of thermocouple (refer to compensating cables for IEC 584-3 thermocouples) must be used. When a resistance temperature sensor (RTD) is used as the temperature sensor, 2-core/3-core/4-core cable must be used (refer to resistance thermometer sensor IEC 60751). In a place where the cable will be susceptible to the effect of noise, a shielded cable must be used.

The terminal of the dedicated cable is a 4 mm screw.

### ■ External Power Wiring

Required cables (industrial equipment insulation cables)

Examples:

- 600 V polyvinyl chloride insulated wires (IV): JIS C3307  
Operational temperature high limit: 60 °C
- Polyvinyl chloride insulated wires for electrical apparatus (KIV): JIS C3316  
Operational temperature high limit: 60 °C
- 600 V grade heat-resistant polyvinyl chloride insulated wires (HIV): JIS C3317  
Operational temperature high limit: 60 °C
- Heatproof vinyl insulated wires VW-1 (UL 1015/UL 1007)  
Operational temperature high limit: 105 °C

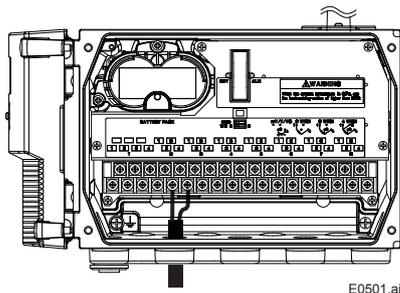
Wire Size

- Core: AWG14 to 13 (2 to 2.6 mm<sup>2</sup>)

Terminal Treatment

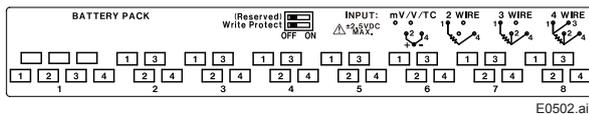
- Ring terminal for 4 mm: With insulation covers

### 5.3 Cable and Terminal Connections



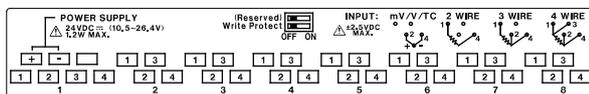
E0501.ai

Figure 5.1 Input Terminal Connection



E0502.ai

Figure 5.2 Input Terminal Connection Label (For Battery Model)



E0503.ai

Figure 5.3 Input Terminal Connection Label (For External Power Supply Model)

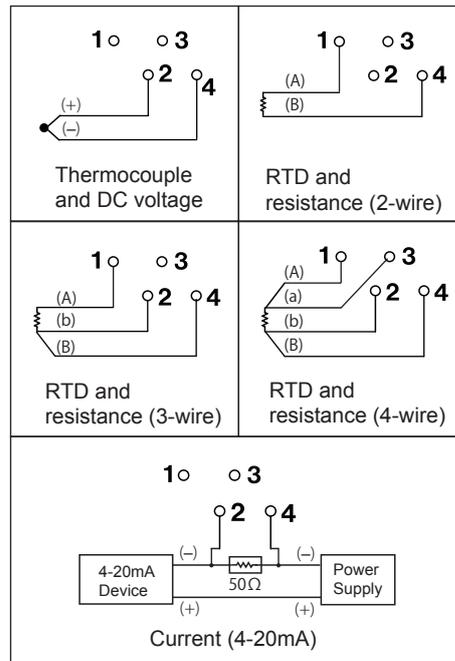
#### Input Wiring

Connect the temperature sensor and other input cables as shown in Figure 5.4. The sensor input terminal layout differs between input 1 and inputs 2 to 8 as shown in Figure 5.5. Be careful to avoid a wiring error.



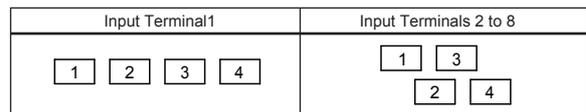
#### CAUTION

Explosion proofing not applicable during DC voltages, DC milliamperes input.



E0504.ai

Figure 5.4 Input Terminal Wire Connection Diagram

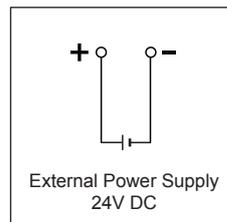


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Figure 5.5 Input Terminal Layout

#### External Power Supply Wiring

Connect the external power cables as shown in Figure 5.6.



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Figure 5.6 External Power Supply Terminal Wire Connection Diagram

**WARNING**

- External power supply transmitter models do not have a power switch. Provide a power switch on the power supply line to separate the transmitter from the main power supply. Use labels to indicate that this switch is for cutting off the power supply to the transmitter and to indicate ON and OFF.

Switch specifications

Steady-state current rating: 100 mA or more

Inrush current rating: 500 mA or more

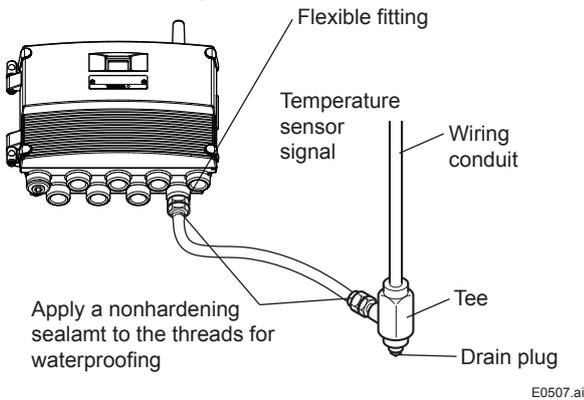
IEC 60947-1,3 compliant

- Connect a fuse (between 630 mA and 1 A) to the power supply line.

**5.4 Wiring Cautions**

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

- Apply non-hardening sealant to the threads of the wiring tap and a flexible fitting for secure waterproofing.

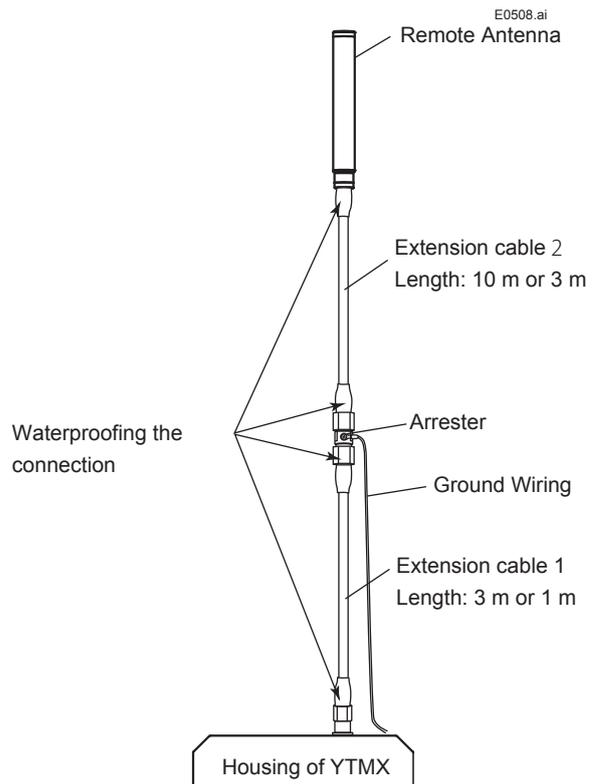
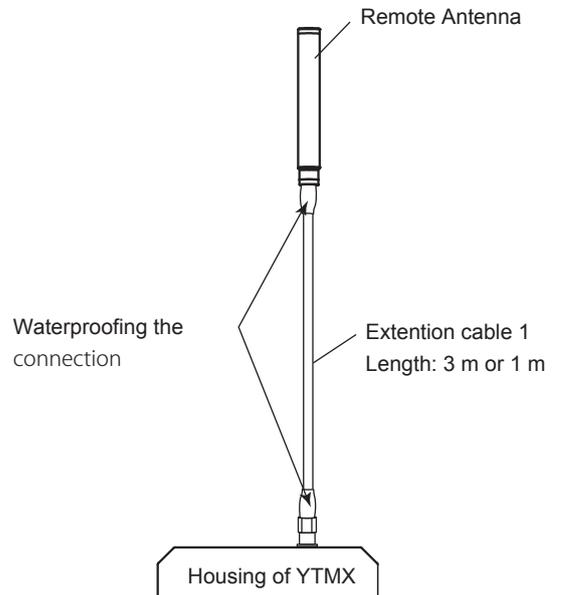


**Figure 5.7 Example of Wiring Using a Wiring Conduit**

**5.5 Wiring and Waterproofing of Remote Antenna**

- Use the provided extension antenna cable to connect the antenna connector with the remote antenna. Tighten the connector of the antenna extension cable with a torque of 2 to 3 N-m. For the allowable bending radius when wiring the antenna and for the fixed antenna, refer to Chapter 10 “General Specifications”.

- When using two extension cables, the provided arrester should be inserted between these cables.
- Before the wiring work, confirm the polarities (male/female) of the connectors of antenna, extension antenna cable, and arrester.



**Figure 5.8 Example of Wiring Using a Wiring Conduit for Remote antenna**

■ **Mounting of Arrester and Wiring**

- Mount an arrester between the extension cables and connect the grounding cable to the grounding
- Connect the grounding cable to the grounding terminal on the main body.  
Make sure to earth ground the protective ground terminal through minimum resistance. Do not share the ground with other devices.

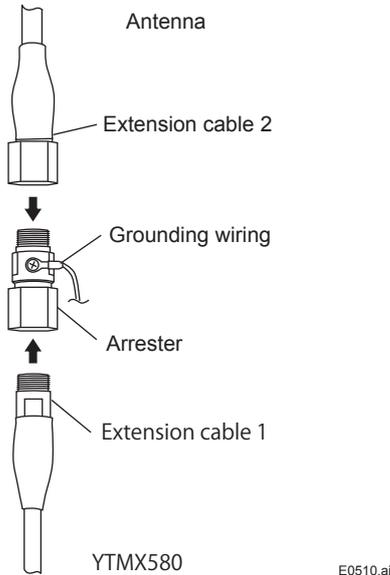


Figure 5.9 Connection of the arrester and antenna extension cables

■ **Waterproofing of Remote Antenna connector**

Confirm the connection of the remote antenna, extension antenna cable, arrester, and the grounding cable from arrester, and then waterproof the connection.

- 1) Clean the connection to be waterproofed.
- 2) Wind the butyl rubber self-bonding tape around the connection. See the manual of the tape about the winding.
- 3) To protect the butyl rubber self-bonding tape from the environment such as ultraviolet rays and so on, wind vinyl tape (or a vinyl type self-bonding tape) on it.

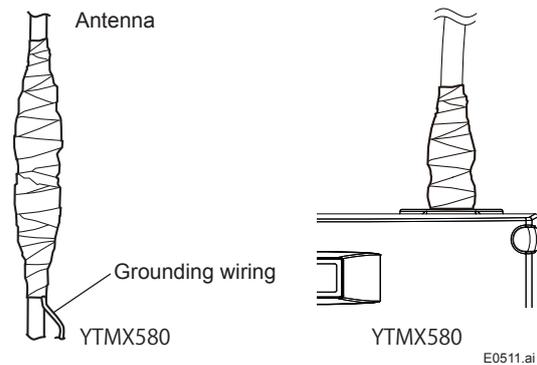


Figure 5.10 Waterproofing of remote antenna connector

**5.6 Grounding**

Always ground the transmitter case in accordance with national and local electrical codes. The most effective transmitter case grounding method is a direct connection to earth ground with minimal impedance.

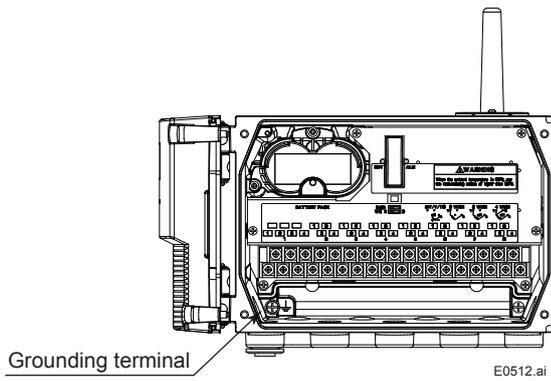
Grounding terminals are located inside and outside of the terminal block respectively. Any of them may be used.



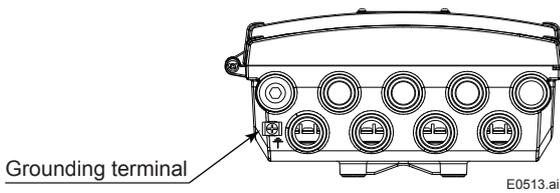
**IMPORTANT**

Proper grounding is necessary to maintain the function and performance of this product. When the grounding is inadequate, the equipment may be damaged. Refer to **TI 01W01A58-01EN** for details of grounding method and precautions.

- Use a grounding cable of AWG 14 (2 mm<sup>2</sup>) or more between the grounding electrode and the grounding terminal of this product, and connect with the shortest route.
- Use a grounding cable of AWG 11 (4 mm<sup>2</sup>) or more and ring tongue terminal for M4 terminal between the grounding terminal of the arrester and grounding electrode, and connect with the shortest route via external grounding terminal of this product.
- Select the grounding cable that has a structure of adequately protects against mechanical damage, chemical or electrical degradation, electrodynamic force and thermodynamic force for connection of the grounding electrode and the ground terminal of this product or arrester.



**Figure 5.11** Grounding Terminal inside the Terminal Cover



**Figure 5.12** Grounding Terminal on the Bottom of the Case

■ **Applicable Cable (Insulated wire for industrial equipment)**

When wiring in an area where the ambient temperature is high or low, use wires or cables that are appropriate for such an area.

Examples:

- 600 V polyvinyl chloride insulated wires (IV): JIS C3307  
Operational temperature high limit: 60 °C
- Polyvinyl chloride insulated wires for electrical apparatus (KIV): JIS C3316  
Operational temperature high limit: 60 °C
- 600 V grade heat-resistant polyvinyl chloride insulated wires (HIV): JIS C3317  
Operational temperature high limit: 60 °C
- Heatproof vinyl insulated wires VW-1 (UL 1015/UL 1007)  
Operational temperature high limit: 105 °C

Wire Size

- Core: AWG14 to 13 (2 to 2.6 mm<sup>2</sup>)

Terminal Treatment

- Ring terminal for 4mm: With insulation covers



**CAUTION**

Grounding is recommended for safe operation.

# 6. Operation

## 6.1 Preparation for Starting Operation



### NOTE

It is required to set security and network information to enable the transmitter to be connected to the Field Wireless Network. For more details, refer to section 6.4 “Connecting to the Field Wireless Network”.

- 1) **Checking Installation and Wiring**  
Ensure that the transmitter is installed correctly and the temperature sensor and other input cables are connected correctly according to the procedures described in Chapter 4 “Installation” and Chapter 5 “Wiring”.  
When connecting the thermocouple, particular attention needs to be paid because the transmitter cannot detect a wrong polarity connection.
- 2) **Turning on the power**  
In the case of the battery model, place batteries in the battery case,\* and insert it in the transmitter.  
To insert batteries into the battery case, be careful to polarity of batteries and battery case. For details of Installation of battery, refer to section 8.4 “Battery”.  
In the case of the external power supply model, turn on the power supply.  
\* Battery case is installed in the main body when shipped from the factory. however, batteries not included because sold separately.
- 3) **Connecting to the field wireless system configuration tool or field wireless device configuration tool**  
Connect the field wireless devices to the field wireless network.  
For Yokogawa’s recommended field wireless system configuration tool or field wireless device configuration tool, refer to section 8.2 “Calibration Instruments Selection.”
- 4) **Using the device configuration tool confirm that transmitter is operation properly. Check parameter values or change the setpoints as necessary.**

For details on how to confirm this, refer to section 7.4 “Self-Diagnostics.”

ISA100 Wireless devices display self-diagnostic information in an easy-to-understand manner using four categories ( Failure status, Function check status, Out of specification status, Maintenance required status ) according to NAMUR NE107\*

The status display LED can also be used to ensure that the transmitter operates normally.

\* NAMUR NE107 “Self-Monitoring and Diagnosis of Field Devices”

### ■ Checking Using the Status Display LED:

When the transmitter operates normally, the display of the status display LED is as follows.

RDY (green): Turns on for approx. 1 second in the publish period.

ALM (red): Off

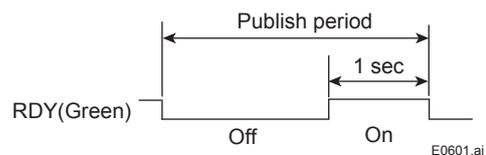


Figure 6.1 LED Display Example



### NOTE

If an error occurs with the transmitter, ALM of the status display LED turns on.

If ALM turns on, check the self-diagnostic result in the wireless field device configuration tool. (Refer to section 7.4 “Self-Diagnostics”)

### ■ Verify and Change Transmitter Parameter Setting and Values

The parameters related to the following items are set at factory as specified in order.

- Input sensor type
- Connection of RTD
- Measurement range (measurement lower/ upper limit, unit)

## 6.2 Zero-gain Adjustment



### IMPORTANT

After performing zero-gain adjustment, do not power off the transmitter immediately. Turning off the power within 30 seconds resets the zero-gain adjustment value to the value before the adjustment.

Furthermore, setting the sensor type automatically resets the zero-gain adjustment value to the factory setting

When the preparation for starting operation is completed, perform a zero-gain adjustment as necessary.

This transmitter is fully calibrated at the factory and basically re-calibration is not necessary; however, users can make the zero-gain adjustment.

The zero-gain adjustment of this transmitter can be performed by the following steps.

- 1) Apply the lower limit of process temperature to the sensor. Set the lower limit temperature using the device configuration tool.
- 2) Apply the upper limit of process temperature to the sensor. Set the upper limit temperature using the device configuration tool.

The zero-gain adjustment should be performed when the input to the temperature sensor is stabilized.

For details on the zero-gain adjustment, refer to subsection 7.3.10 "Input calibration".

## 6.3 Starting Operation

Ensure that the installation, the wiring, the network connection, and the action of the transmitter are correct before starting operation.



### IMPORTANT

Close the front door and tighten the fastening bolts on the front door firmly.

## 6.4 Connecting to the Field Wireless Network

### ■ Preparation work prior to connecting to a field wireless network

This transmitter does not need to be connected with a physical wire. Instead of physical wiring, it is necessary to set the field wireless devices to communicate with before installing the transmitter. This procedure is called a provisioning.

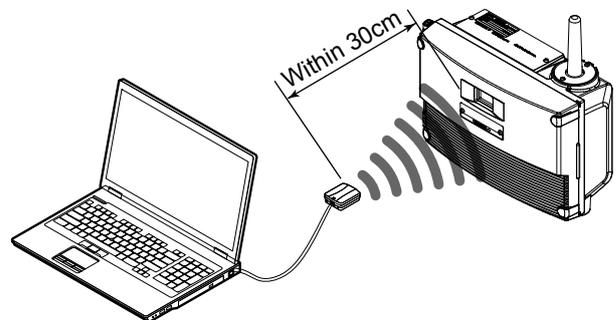
This transmitter supports provisioning via infrared communication using a provisioning device and can be securely connected to a network. If the provisioning information is not set, the transmitter cannot be connected to the field wireless network.

#### Provisioning:

Provisioning is work to set the security and network information to enable the transmitter to be connected to the field wireless network.

This transmitter supports a provisioning method using infrared communication.

For details on provisioning using a provisioning device, connecting to a field wireless network and the setting procedure, refer to YFGW710 Field Wireless Integrated Gateway (IM 01W01F01-01EN) or YFGW410 Field Wireless Management Station (IM 01W02D01-01EN).



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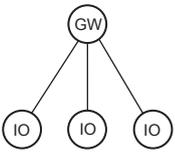
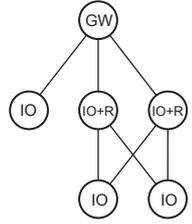
Figure 6.2 Provisioning Example

■ **Device Role**

The transmitter supports two functions: an IO function and a routing function to route wireless traffic. The device roles below can be set in accordance with the network topology (star or mesh).

Configure the settings using the Field Wireless Configurator. For details on the Field Wireless Configurator, refer to section 8.2 “Calibration Instruments Selection.”

- IO Function only (IO)
- IO and Routing Function (IO + Router)

Device role	IO	IO+Router
Network form	Star	Mesh
Example network connections and devices	 <p>GW: Gateway device IO: YTMX580</p>	 <p>GW: Gateway device IO + R: YTMX580 IO: YTMX580</p>
	E0603.ai	

- Setting device tag  
The device tag is used for the user to recognize the field wireless device.
- Setting Network ID  
This is the Network ID for the field wireless network to which the field wireless device is connected. Set a value from 2 to 65535.

The field wireless device is connected to the field wireless network corresponding to the Network ID set by provisioning work.

2) Creating a provisioning information file

The following provisioned information is stored in the provisioning information file.

- Network ID
- Device tag
- EUI64
- Join key
- Provisioner (name of the user who performed provisioning work by FieldMate)
- Date (Time and date when provisioning was performed by FieldMate)

This provisioning information file is required to load from the field wireless configurator to the field wireless gateway. Store the file carefully.

■ **Provisioning work**

This subsection describes provisioning work using FieldMate as the provisioning device.

Provisioning work performs provisioning for each field wireless device using FieldMate and an infrared adapter.

When using the Yokogawa recommended near infrared adapter for the provisioning device, the distance between the front glass (Infrared port) of this transmitter and the infrared surface of the near infrared adapter should be within 30 cm. For details on the Yokogawa recommended infrared adapter, refer to section 8.2 “Calibration Instruments Selection”.

Perform the following provisioning tasks.

- Setting provisioning information
- Creating a provisioning information file

1) Setting provisioning information

Set the device tag and Network ID using a FieldMate provisioning function. The device tag, Network ID, and join key are set in the field wireless device. It is not necessary to input a join key because FieldMate automatically generates it.

■ Connecting to a field wireless network

The action after installing the battery pack varies depending on the silence setting. With the factory setting, installing the battery pack automatically starts a search for the field wireless network and the transmitter goes into the join state when the field wireless gateway is found. If the field wireless integrated gateway is not found, a cycle of a 1-hour pause and 6-minute search is repeated after a specified time has elapsed until the transmitter can join the field wireless network. For details on the silence setting, refer to subsection 7.3.12 "Switching to the Silence Mode".

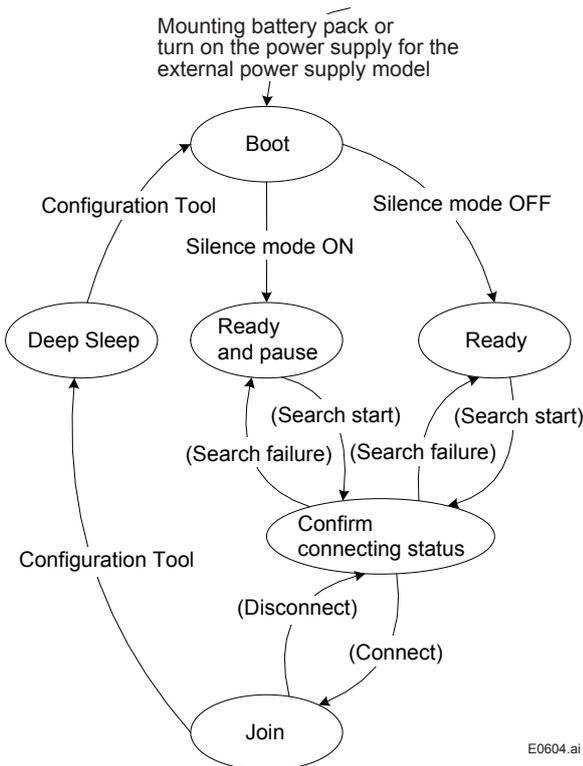


Figure 6.3 Wireless Status Transition

### 6.5 Shutting Down the Transmitter

In the case of the external power supply model, turn off the power supply. In the case of the battery model, remove the battery pack to turn off the power, or set the transmitter to deep sleep mode from the field wireless device configuration tool.



#### NOTE

- Refer to subsection 8.4.1 "Replacing the Battery Pack" for the battery pack removing.
- When storing the transmitter with a battery pack inserted, it is recommended to put the transmitter into deep sleep mode to conserve battery power. For details on how to switch to deep sleep mode, refer to subsection 7.3.11 "Switching to the Deep Sleep Mode."

### 6.6 Restarting

In the case of the external power supply model, turn on the power supply. In the case of the battery model, the battery pack must be removed and then inserted, or infrared communication must be received. If you acquire data from the transmitter using a provisioning device tool or a wireless field device configuration tool (for infrared), it will wake the transmitter from deep sleep.

# 7. Setting Parameters

This transmitter can remotely handle sensor type changes, range changes, Tag No. setup, monitoring of self-diagnostic results, according to communication with the field wireless configuration tool or the device configuration tool.

## 7.1 Environment for parameter setting

After installing the battery pack, perform provisioning and have the transmitter join the field wireless network.

This transmitter supports the OOB (out-of-band) method using infrared communication. For details on how to provisioning, refer to section 6.4 “Connection to Field Wireless network”

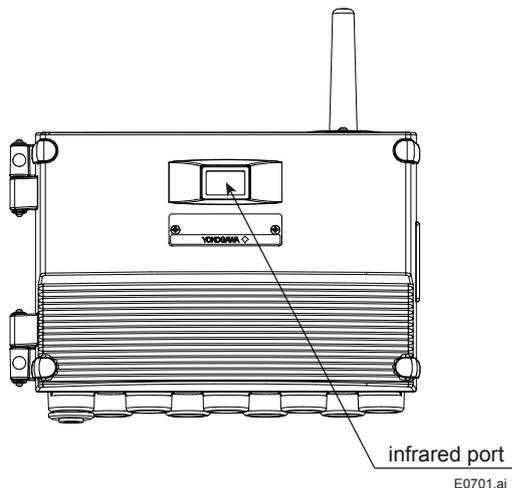


Figure 7.1 Connecting the configuration Tool

## 7.2 Preparing Software

### 7.2.1 Softwares for the Field Wireless Configuration Tool and the Device Configuration Tool

Before using the device configuration tool, confirm that CF/DD and DeviceDTM for your transmitter ( YTMX580 ) are installed in the device configuration tool.

For the latest information on CF/DD and DeviceDTM, refer to the following website.

< <http://www.field-wireless.com/> >

### CF (Capabilities File) / DD (Device Description)

A CF file contains information, such as the vendor of the field device, its model and revision, available types of process data (flow rate, temperature, pressure, etc.), and number of data items. A DD file contains the information on parameters, such as data structures and attributes.

### DeviceDTM

DeviceDTM, (Device Type Manager) is driver software for field devices provided based on the FDT (Field Device Tool) technology.

The field wireless configuration tool or the device configuration tool allows confirming the device information. For details on how to confirm the device information using the field wireless configuration tool or the device configuration tool, refer to YFGW710 Field Wireless Integrated Gateway (IM 01W01F01-01EN) or YFGW410 Field Wireless Management Station (IM 01W02D01-01EN).

Refer to section 8.2 “Calibration Instruments Selection” for the field wireless configuration tool or the device configuration tool of our recommendation.

### 7.2.2 Software Download

Software download function permits to update wireless field device software (Update radio firmware, Update sensor board firmware) via ISA100 wireless communication. For details, refer to YFGW710 Field Wireless Integrated Gateway (IM 01W01F01-01EN) or YFGW410 Field Wireless Management Station (IM 01W02D01-01EN).

### 7.3 Setting Parameters

When the data of AI Block (AI1 Temp to AI8 Temp) parameters is rewritten, it is necessary to set the operational mode (Mode.Target) of the block to O/S (Out of Service). When the setting is completed, change the operational mode (Mode.Target) to the Auto.

Block Mode:

Block modes are universal parameters that display each block's operating condition, and comprises the following modes.

Target : Sets the operating condition of the block.

Actual : Indicates the current operating condition.

Permit : Indicates the operating condition that the block is allowed to take.

Normal: Indicates the operating condition that the block will usually take.

In Target mode, if you change the function block mode to O/S (Out of Service), the function block

operation stops. Settings can be changed while in this state. If you change the Function block mode to Man (Manual), updating of the function block output values stops. If you change the Function block mode to Auto, measured values are updated. The mode should usually be set to Auto.

#### 7.3.1 Parameter Usage and Selection

Before setting a parameter, please see the following table for a summary of how and when each parameter is used.



#### IMPORTANT

After setting and sending data with the field wireless configuration tool or device configuration tool, wait 30 seconds before turning off the transmitter. If it is turned off too soon, the settings will not be stored in the transmitter.

**Table 7.1 Parameter Usage and Selection**

Item	Description
Tag No	Sets the tag No. for Device Tag (software tag). The tag No. can be set Sixteen characters (alphanumeric characters, including “ - ” and “ . ”).
Output mode	Allows outputting process value and self-diagnostic information via field wireless network. Either or all of temperature / voltage / resistance (AI1 to AI8:Process Value), and self-diagnostic information (UAPMO : Diagnostic Status) can be set output data.
Range	Range corresponding for 0% to 100% signal is set with actual input applied.
Display temperature unit setting	Sets the temperature unit to display.
Burnout setting	Sets the output status when the input sensor has burned out.
Zero-gain adjustment setting	Sets the input adjustment function using two adjustment points..
Reset adjustment value	Reset the trim adjustment to the factory setting. The zero-gain adjustment set by user can be returned to the factory setting.
Software write protect	Prohibit writing the setting data.
Adjustment information and memo field	Memo field available to write the check date, checker and others (as an adjustment information ), or anything.
Operational mode	Set the operational mode of the sensor and integral indicator, etc.



#### NOTE

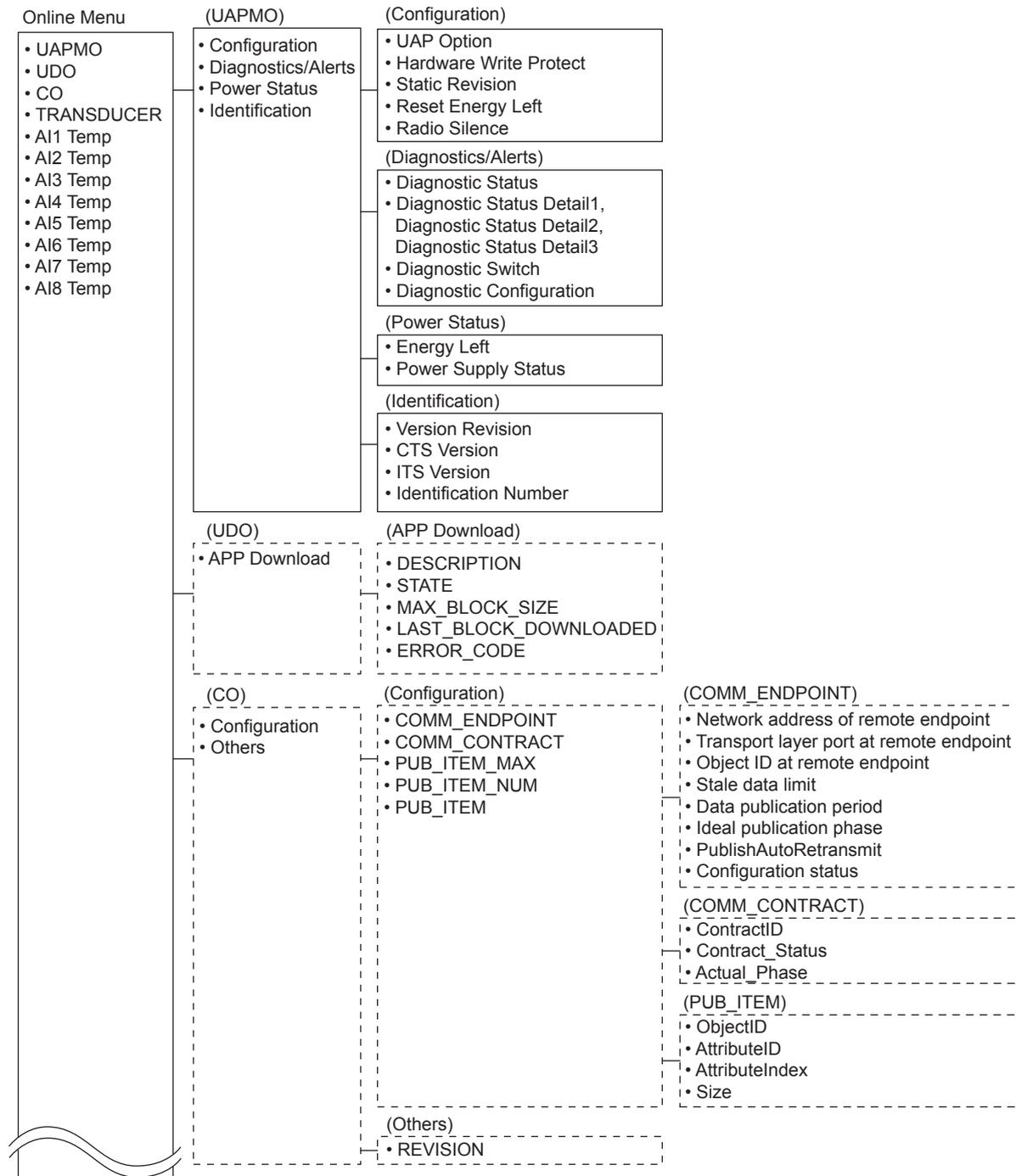
Some of the parameter settings are in the dialogue form called method, the on-line instructions you can configure the parameters easily.

### 7.3.2 Function Block and Menu Tree

#### (1) Function Block

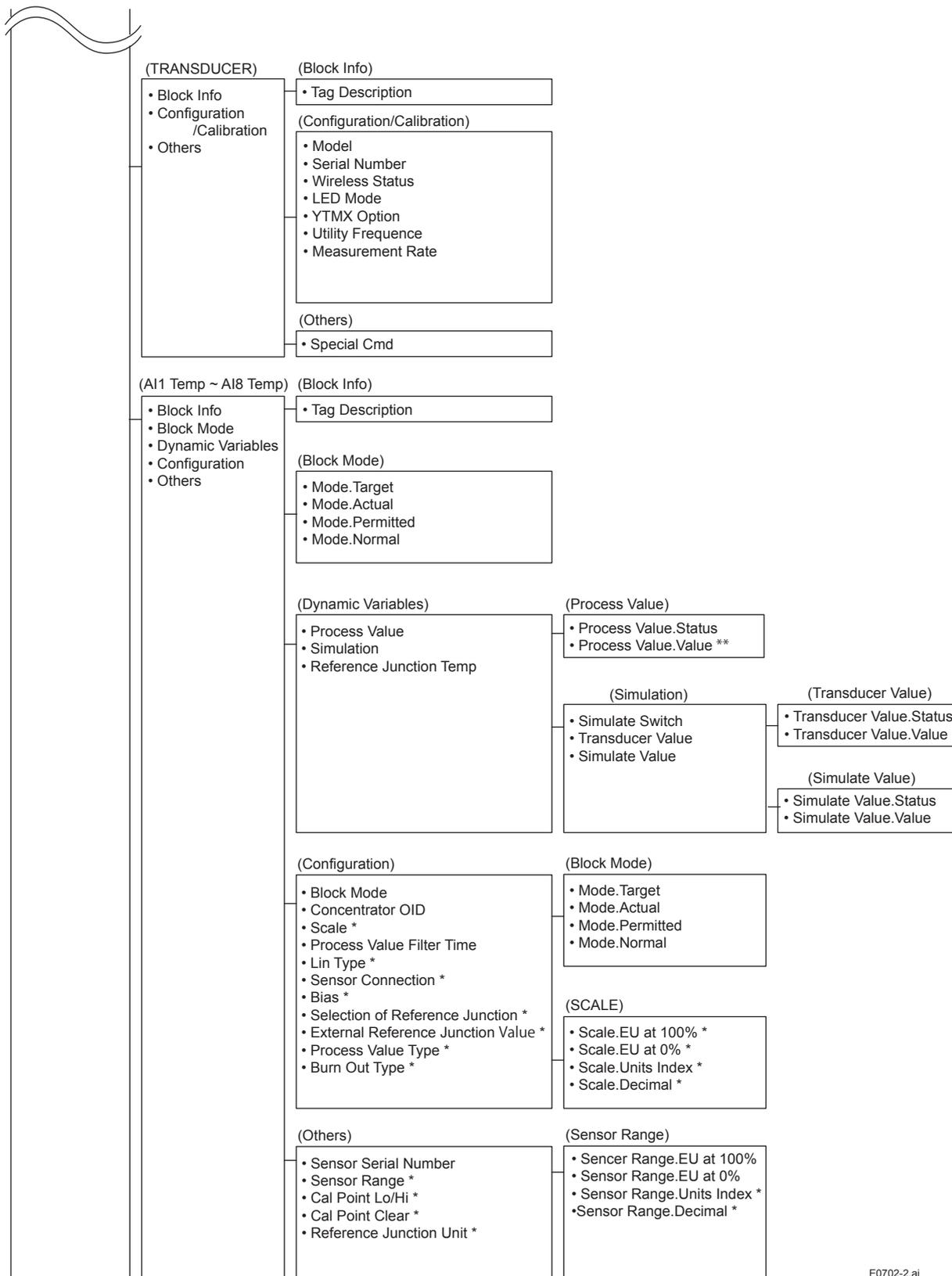
The function of this transmitter is shown below. A specific function might not be able to be used according to the field wireless configuration tool used. When the field wireless configuration tool of our recommendation is used, the software ( CO block: Field Wireless Configurator, UDO block: Field Wireless Management Tool ) attached to the Field Wireless Gateway is necessary for setting the dotted line part.

Refer to section 8.2 “Calibration Instruments Selection” for the field wireless configuration tool of our recommendation.



E0702-1.ai

Online Menu (Continued)

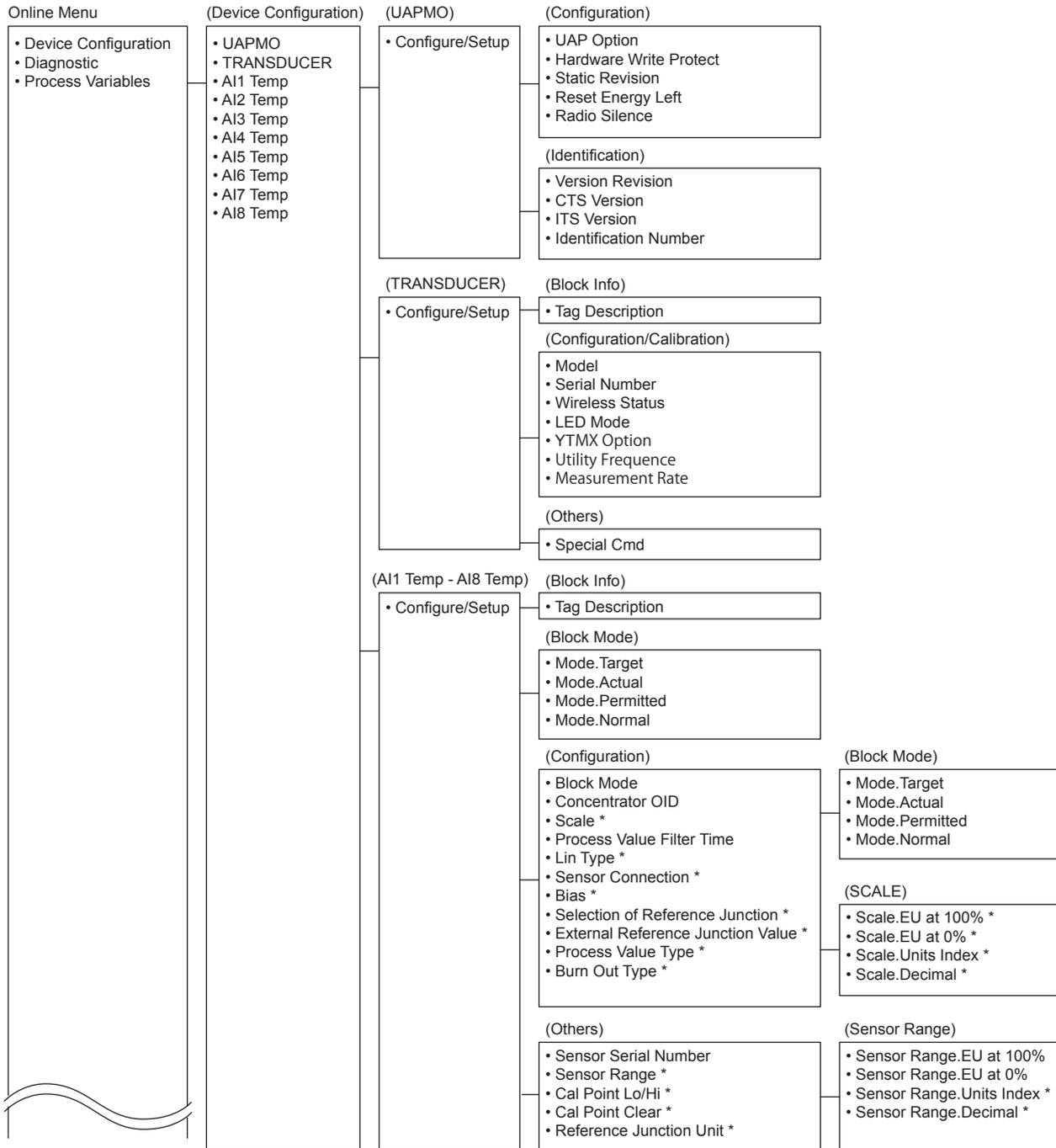


E0702-2.ai

\*: When the data of these parameters is rewritten, it is necessary to set the operational mode (Mode.Target) of the AI block (AI1 Temp to AI8 Temp) to O/S (Out of Service).  
 \*\*: When the data of these parameters is rewritten, it is necessary to set the operational mode of the AI block to Manual.

(2) Menu Tree

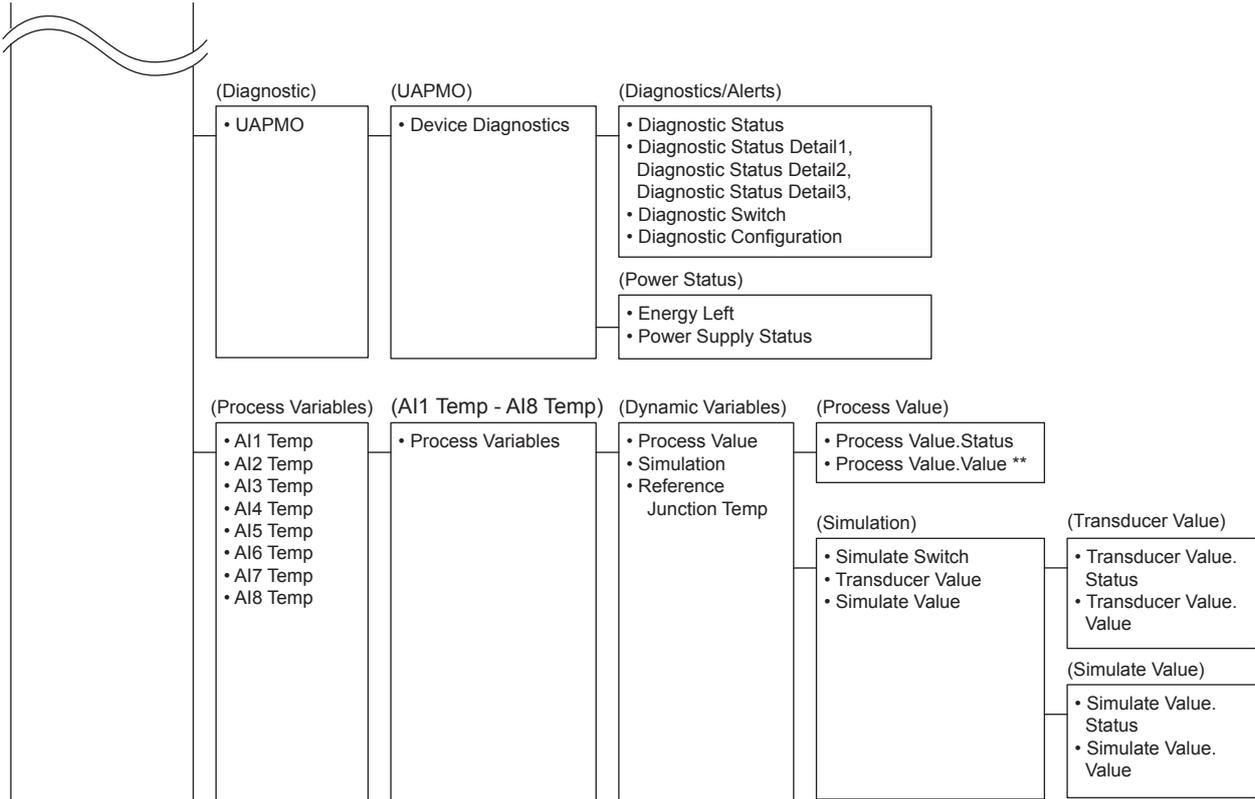
The menu tree of the device configuration tool of our recommendation is shown below. Refer to section 8.2 “Calibration Instruments Selection” for the device configuration tool of our recommendation.



E0703-1.ai

\*: When the data of these parameters is rewritten, it is necessary to set the operational mode (Mode.Target) of the AI block (AI1 Temp to AI8 Temp) to O/S (Out of Service).

Online Menu (Continued)



E0703-2.ai

\*\*:  
When the data of these parameters is rewritten, it is necessary to set the operational mode (Mode.Target) of the AI block (AI1 Temp to AI8 Temp) to Manual.

### 7.3.3 Parameters for Wireless Communication

#### (1) Network Information

CO block

The network-related information can be checked.

#### (2) Publication Period (Update Time)

CO block : Data publication period

Sets the publication period value to 1 to 3,600 seconds. The setting affects the battery life.

When the publication period is set to 1 second, the maximum number of measurement points is 3. When used with the 1 second publication period, set 5 or more sensor types (Lin Type) to "NOT\_USED".

When the publication period is set to 1 second and the number of measurement points is set to 4 or more, the mode of all inputs becomes O/S (Out of Service) and data is not updated.

When publication period is set 0 seconds, the transmitter is stopped to update process variables by way of the field wireless network. And the transmitter continues to measure process variables with special interval time internally.

#### (3) Remaining battery life

UAPMO block : Energy Left

In the case of the battery model, an estimated number of remaining days when the ambient temperature is assumed to be room temperature (23°C) is shown.

It takes a few days for the parameter to display the correct values after restart.

In the case of the external power supply model, the value does not change from the factory default value.

UAPMO block : Reset Energy Left

In the case of the battery model, the battery level calculation is initialized and returned to a mode that assumes new batteries.

Before changing battery, initialization of the remaining battery life is performed by Reset Energy Left parameter.

It takes a few days for the parameter to display the correct values.

In the case of the external power supply model, initialization is not necessary.



### NOTE

Reset the remaining battery power calculation before changing battery.

#### (4) LED display mode

TRANSDUCER block : LED Mode

This parameter is used to set the display mode of the status display LED.

The power consumption of the batteries can be reduced by setting "Always off (1)."

LED ON : On during operation in accordance with the display specification

LED OFF : Always off

For the display specifications, refer to table 3.1 "Display Description of Status Display LED."

### 7.3.4 Tag and Device Information

If these are specified when ordering, the designated Tag No. and device information are set and shipped.

Tag No. and device information can be checked as follows.

- Procedure to call up the tag No. and device information
  - Device Tag (Software Tag)
 

This is specified when writing characters (up to 16 characters) that differ from those specified in Tag No. to the amplifier tag. For details on how to confirm this, refer to section 6.4. "Connecting to the Field Wireless Network".

- Tag Description  
This is a universal parameter to store the comment that describes the content of the tag located in the TRANSDUCER and AI1 to AI8 blocks.
- Limitation of Device Information  
When changing the device information, input the information based on the following limitation on the number of characters.
- Message function (up to 32 characters)  
TRANSDUCER block : Tag Description  
AI1 to AI8 block : Tag Description

### 7.3.5 Unit

The unit for the process value is set at the factory. The specified unit of the input sensors set (°C if not specified).

When the unit of the temperature, voltage, and resistance is displayed, set the Process Value Type parameter to actual target value (Direct).

And sensor type set by the sensor type setting parameter (Lin Type) must be corresponded with the unit displayed.

When using the resistance temperature sensor or the thermocouple sensor, unit displayed set °C or others, using voltage, set mV or V, and using resistance, set ohm.

The unit can be set by following the procedure below.

- Procedure to call up the unit parameter (Units Index)  
AI1 to AI8 block : Scale : Units Index  
Sensor Range : Units Index  
Reference Junction Unit

To change the unit, select the desired unit from the displayed unit list.

### 7.3.6 Measurement Range

The unit parameter is set at the factory before shipment if specified at the time of order. To change the measurement range, follow the procedure below.

- Procedure to call up the lower limit setting parameter (EU at 0%)  
AI1 to AI8 block : Scale : EU at 0%
- Procedure to call up the upper limit setting parameter (EU at 100%)  
AI1 to AI8 block : Scale : EU at 100%

Set the lower limit setting parameter (EU at 0%) and upper limit setting parameter (EU at 100%) to the unit specified in the unit parameter (Units Index).

### 7.3.7 Input Sensor

When changing the sensor type, it is necessary to change the parameters related to the sensor type. The setting items are the sensor type and the number of cables. The input terminal of YTMX580 supports the following sensor types.

Thermocouple: TYPE B, E, J, K, N, R, S, T (IEC 60584)  
Resistance thermometer (RTD): Pt100, Pt200, Pt500 (IEC 60751)  
Resistance ohm (0 to 2000 ohm)  
DC voltage mV (-10 to 100mV), V (-0.01 to 1V)  
Current mA (4 to 20mA, with external shunt resistors)

When a 50 Ω shunt resistor is used for the current input, set the range to 0.2 to 1 V.

Check the connections between the input terminals and temperature sensors and set the correct sensor type and the number of wire connections for the parameters. (Refer to Figure 7.2)



## CAUTION

Explosion proofing not applicable during DC voltages, DC milliamperes input.

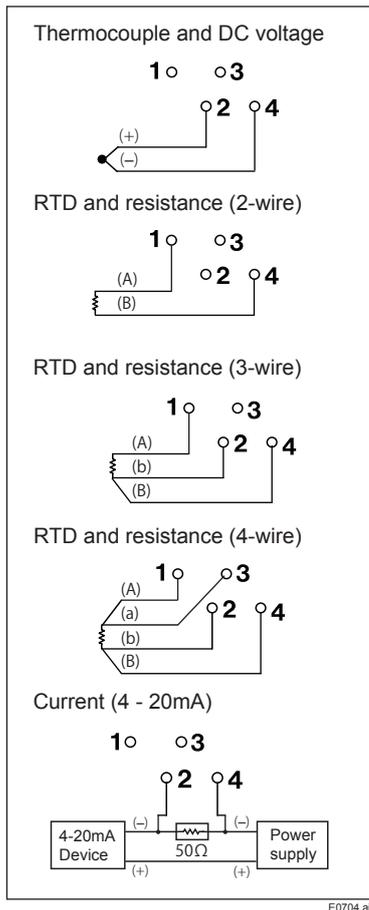


Figure 7.2 YTMX580 Wire Connection Diagram

1) **Setting the Sensor Type**

- Procedure to call up the sensor type setting parameter (Lin Type)  
AI1 to AI8 block : Lin Type  
Set the sensor type.
- Procedure to call up the sensor type information parameter (Sensor Range)  
AI1 to AI8 block : Sensor Range : EU at 0%  
AI1 to AI8 block : Senesor Range : EU at 100%  
Displays the lower and upper limit values that can be measured by the sensor type set in the sensor type setting parameter (Lin Type) as the lower limit information parameter (EU at 0%) and the upper limit information parameter (EU at 100%).

2) **Setting the Temperature Sensor and Resistance Connection**

This is set when using the resistance temperature sensor and resistance.

- Procedure to call up the connection setting parameter (Sensor Connection)

AI1 to AI8 block : Sensor Connection

Select and set any of the 2-, 3-, or 4-wire methods corresponding to the resistance temperature sensor and resistance.

3) **Setting the Cold Junction Compensation (CJC) of the Thermocouple Sensor**

This is set when using the thermocouple sensor.

- Procedure to call up CJC function parameter (Selection of Reference Junction)

AI1 to AI8 block : Selection of Reference Junction

Select the CJC function.

To calibrate voltage for the thermocouple input, set the cold junction temperature to No Reference.

- Procedure to call up external temperature Compensation parameter (External Reference Junction Value)

AI1 to AI8 block : External Reference Junction Value

In the CJC function parameter (Selection of Reference Junction), the cold junction temperature value of the thermocouple is selected the external, set the external compensation temperature.

The CJC is also called reference junction compensation.



**IMPORTANT**

Setting the sensor type automatically resets the zero-gain adjustment value to the factory setting.

7.3.8 **Assignment to AI Object**

Output of the process value via field wireless network is set by AI1 to AI8 block.

Either actual target value or % value of the temperature, the voltage, and resistance is set as the output of process value from the AI1 to AI8 block.

### 7.3.9 Write Protect

Hardware write protection and software write protection functions are available for this transmitter.

#### 1) Procedure to call up the protection setting parameter (UAP Option)

The following settings can be configured in the UAP Option parameter.

- Setting to enable or disable changing the setting to the Diagnostic Switch and Diagnostic Configuration parameters.
- Setting to enable or disable the hardware write protection switch.
- Setting to enable or disable software write protection.

#### 2) Procedure to call up the protection setting display parameter (Hardware Write Protect)

UAPMO block : Hardware Write Protect

The Hardware Write Protect parameter enables the switch status of hardware write protection to be displayed.

For the relationship between hardware write protection and software write protection, refer to Chapter 9. "Parameter Summary".

### 7.3.10 Input Calibration

The input calibration function is used to adjust to the transmitters internal interpretation of the input signal.

Two points, namely, the lower adjustment point called Zero point and the upper adjustment point called Gain, are adjusted, respectively. There are two adjustment methods. One method uses a reference signal generator (e.g. a voltage generator or variable resistor) and the other uses the signal from a temperature sensor immersed in the solution with a known temperature.

Input adjustment is performed by inputting (writing) the signals (voltage, and resistance values) currently being input as the parameters. This transmitter automatically corrects the error between the written data and the internally calculated value.

#### 1) Setting the Input Adjustment Value

- a) Setting the AI1 to AI8 block write mode
  - AI1 to AI8 block : Block Mode : Target

Set the Target parameter to O/S.

- b) Setting the sensor type

- AI1 to AI8 block : Lin Type

Set the sensor type used in the Lin Type parameter.

- c) Setting the cold junction compensation

- AI1 to AI8 block : Selection Reference Junction

Set the Selection Reference Junction parameter to No Reference (0) in order to remove the effect of the cold junction compensation when using the thermocouple for the sensor type.

- d) Perform Zero Point Adjustment using a reference signal generator. The input value is adjusted near the zero point within the measurement range used. e) Set the Zero Point Adjustment value when the input is stabilized.

- AI1 to AI8 block : Cal Point Lo

Set the Cal Point Lo parameter to the voltage value (unit: mV) when the temperature sensor is the thermocouple, and set the resistance value (unit:  $\Omega$ ) when the temperature sensor is the resistance temperature sensor.

- f) Perform gain-point adjustment using a reference signal generator. The input value is adjusted near the gain point within the measurement range used.

- g) Set the gain-point adjustment value when the input is stabilized.

- AI1 to AI8 block : Cal Point Hi

Set the Cal Point Hi parameter to the voltage value (unit: mV) when the temperature sensor is the thermocouple, and set the resistance value (unit:  $\Omega$ ) when the temperature sensor is the resistance temperature sensor.

- h) Setting the AI1 to AI8 block write mode

- AI1 to AI8 block : Block Mode : Target

Set the Target parameter to Auto and ensure that the setting error of the adjustment value has not occurred

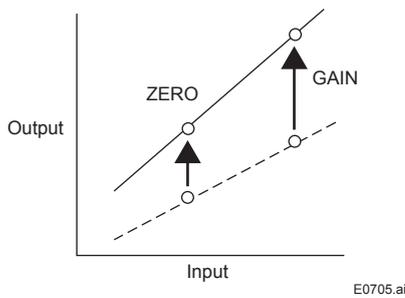


Figure 7.3 Trim function images



**IMPORTANT**

Setting the sensor type automatically resets the zero-gain adjustment value to the factory setting.

**2) Clearing the Adjustment Value**

The adjustment value set with input adjustment can be cleared and reset to the factory setting. When the setting is completed, change the Mode.Target to the Auto.

- Procedure to call up the adjustment value reset parameter (Cal Point Clear)

AI1 to AI8 block : Cal Point Clear

Set the Cal Point Clear parameter to Clear.

**7.3.11 Switching to the Deep Sleep Mode**

When the battery model transmitter will not be used for a long time, switch the transmitter to the deep sleep mode to conserve battery power. To switch to deep sleep mode, follow the procedure below.

- Procedure to call up the switch-to-deep-sleep parameter (Special Cmd)

TRANSDUCER block : Special Cmd

Set deep sleep mode (Standby) to the Special Cmd parameter for the TRANSDUCER block.

To start from deep sleep mode, either remove and insert the battery pack, or use the device configuration tool.



**CAUTION**

After setting the deep sleep mode by infrared device configuration tool, keep the infrared port of device away from any other infrared signals.



**NOTE**

- This procedure to switch to deep sleep mode can only be use for wireless communication. Transmitter becomes the stop state after setting deep sleep mode and cannot reply any request from Communication Tool.
- For this reason, there is the case that an error is display on Communication Tool. To wake up from deep sleep mode, please pull battery pack and wait more than 30 seconds before attaching battery pack.

**7.3.12 Switching to the Silence Mode**

This is a function to pause the transmitter when it cannot join the field wireless network after a specified time has elapsed. This function is effective in conserving battery power when, for example, the installation of the field wireless gateway is delayed compared to that of field wireless devices. The default value is 28800 seconds (about 8 hours). Thereafter, a cycle of a one-hour pause and six-minute search is repeated until the transmitter can join the field wireless network.

- Procedure to call up the switch-to-silence parameter (Radio Silence)

UAPMO block : Radio Silence

Set 0 to 2<sup>31</sup> seconds for the Radio Silence parameter of the UAPMO block. If 0 is set, the Radio Silence parameter is invalid.

To start from the silence mode, the battery pack must be removed and then inserted in the case of the battery model or the power supply must be turned off and then turned on in the case of the external power supply model or infrared communication must be received.

Use the device configuration tool.

## 7.4 Self-Diagnostics

### 7.4.1 Identify Problems by Using the Device Configuration Tool

The device configuration tool allows checking the self-diagnosis results and setting errors of this transmitter.

First, check Diagnostic Status of the self-diagnostic result.

- Procedure to call up the self-diagnostic parameter

UAPMO block : Diagnostic Status

Any of the four categories ( Failure status, Function check status, Out of specification status, Maintenance required status ) according to NAMUR NE107\* is supplied to Diagnostic Status of each diagnostic result.

**Table 7.2 Diagnostic Status**

Bits	Contents	Example NAMUR NE107 Categorization(*)	Diagnostic Configuration
Bit31(MSB)	F: Failure status	---	Diagnostic Configuration.1
Bit30	C: Function check status	---	Diagnostic Configuration.2
Bit29	O: Out of specification status	---	Diagnostic Configuration.3
Bit28	M: Maintenance required status	---	Diagnostic Configuration.4
Bit27	Faults in electronics	F	Diagnostic Configuration.5
Bit26	Faults in sensor or actuator element	F	Diagnostic Configuration.6
Bit25	Installation, calibration problem	C	Diagnostic Configuration.7
Bit24	Out of service	C	Diagnostic Configuration.8
Bit23	Outside sensor limits	O	Diagnostic Configuration.9
Bit22	Environmental conditions out of device specification	O	Diagnostic Configuration.10
Bit21	Fault prediction: Maintenance required	M	Diagnostic Configuration.11
Bit20	Power is critical low: maintenance need short-term	M	Diagnostic Configuration.12
Bit19	Power is low: maintenance need mid-term	M	Diagnostic Configuration.13
Bit18	Software update incomplete	C	Diagnostic Configuration.14
Bit17	Simulation is active	C	Diagnostic Configuration.15
Bit16-Bit08	reserved by WCI	---	Diagnostic Configuration.16 to 24
Bit07-Bit01	vendor specific area	---	Diagnostic Configuration.25 to 31
Bit00	Detail information available	---	Diagnostic Configuration.32
	1: available		
	0: no available		

NAMUR NE107 "Self-Monitoring and Diagnosis of Field Devices"

Checking the Diagnostic Status category allows taking the proper action. The Diagnostic Status contents are common for all ISA devices, and the setting for the Diagnostic Status category can be changed. For further details, refer to Diagnostic Status Detail

To change the alert category set in Out of Service to Failure in Diagnostic Status Contents that can be diagnosed in the transmitter, perform the following procedure.

Alternatively, the category setting can be changed in Diagnostic Configuration (1 to 32) corresponding to Diagnostic Status Contents (Bit 31 to 00).

- UAPMO block : Enable Diagnostic Status Configuration in UAP Option.
- UAPMO block : Change Out of Service in Diagnostic Configuration 8 from Function Check to Failure.
- UAPMO block : Disable Diagnostic Status Configuration in UAP Option.

In Diagnostic Configuration, set any one of F: Fail status, C: Function check status, O: Out of specification status, and M: Maintenance required status.

The contents of diagnostic status are defined either valid or invalid at Diagnostic Switch parameter. Follow the example below to change “Out of Service” to invalid.

- a) UAPMO block : Enable Diagnostic Status Configuration in UAP Option.
- b) UAPMO block : Diagnostic Switch turn “Off” for Out of Service.
- c) UAPMO block : Disable Diagnostic Status Configuration in UAP Option.UAP Option select “disable”.

Note: Be careful when changing the alert category and turning detection on and off as described above. Be sure to set UAP Option Diagnostic Status configuration to disable again to prevent setting errors.  
 \* NAMUR NE107 “Self-Monitoring and Diagnosis of Field Devices”  
 In Diagnostic Configuration setting, select one from the followings; F: Failure status, C: Function check status, O:Out of specification status, or M: Maintenance required status.

**Table 7.3 Diagnostic Results Summary**

Diagnostic Status Contents	NAMUR NE107 Category	Diagnostic Status Detail	Description
Faults in electronic	F	AMP ERR	Amplifier failure
		MEMORY ERR	Memory failure
		ADC ERR	ADC failure
		Firm Update ERR	Firmware write error
Faults in sensor or actuator element	F	SENSOR1 to 8 FAILURE	Sensor 1 to 8 burnout
		TERM SNS FAILURE	CJC sensor burnout
Installation, calibration problem	C	SENSOR1 to 8 SPAN ADJ ERR	Sensor 1 to 8 faulty input of span adjustment value
		SENSOR1 to 8 ZERO ADJ ERR	Sensor 1 to 8 faulty input of zero adjustment value
Out of service	C	AI1 to AI8 O/S MODE	AI1 to AI8 O/S Mode
Outside sensor limits	O	---	---
Environmental conditions out of device specification.	O	SENSOR1 to 8 TEMP HI	Sensor 1 to 8 temperature higher limit scale out
		SENSOR1 to 8 TEMP LO	Sensor 1 to 8 temperature lower limit scale out
		AMB TEMP HI	Ambient temperature higher limit scale out
		AMB TEMP LO	Ambient temperature lower limit scale out
Fault prediction: Maintenance required.	M	FIRMWARE CONDITION CHECK	Firmware internal error
Power is critical low: maintenance need short-term	M	LOWBAT FOR DEEPSLEEP	Deep sleep due to low battery (Battery model only)
Power is low: maintenance need mid-term	M	LOWBAT	Low battery (Battery model only)
Software update incomplete	C	---	---
Simulation is active	C	AI1 to AI8 SIMULATE MODE	AI1 to AI8 SIMULATE Mode

### 7.4.2 Checking Using the Status Display LED



#### NOTE

If there is an error in the self-diagnostic result, ALM (red) of the status display LED of the transmitter turns on.

If ALM turns on, check the self-diagnostic result in the field wireless device configuration tool.

If an error indication is displayed, refer to subsection 8.6.3 “Alarms and Countermeasures” and fix the problem.

#### Correct use of the ALM (red) LED display

If, for example, thermocouple is selected for the input sensor type (Lin Type) and the sensor does not connect to terminals, sensor burnout is detected and the ALM (red) LED turns on. If the LED is being lit, the battery life of the device will be affected. It is therefore recommended to set the unused input sensor type (Lin Type) to NOT\_USED.

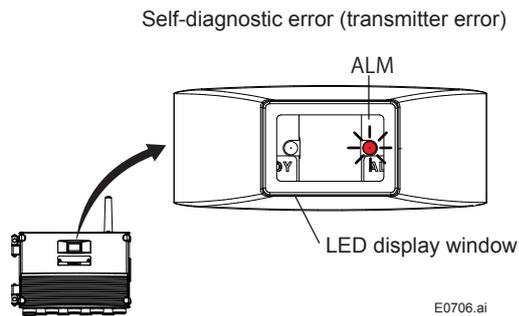


Figure 7.4 Checking Using the Status Display LED

# 8. Maintenance

## 8.1 General

Maintenance of the transmitter is easy due to its modular construction.

This chapter describes the procedures for calibration and adjustment as well as the replacement of parts such as a battery pack required for the maintenance of the transmitter.

Transmitters are precision instruments. Please carefully and thoroughly read the following sections for information on how to properly handle them while performing maintenance.



### IMPORTANT

- As a rule, maintenance of this transmitter should be done in a shop that has all the necessary tools.
- When you open the door, pay great attention to the environmental conditions in order to prevent dust and water droplets entering inside the transmitter.
- When you carry out work with the battery pack removed, pay sufficient attention to the environmental conditions, in particular, in order to prevent foreign matter entering the compartment in the transmitter for inserting the battery pack.

## 8.2 Calibration Instruments Selection

Table 8.1 lists the instruments that can be used to calibrate a transmitter. When selecting an instrument, consider the required accuracy level. Exercise care when handling these instruments to ensure they maintain the specified accuracy.

For the configuration tools recommended by Yokogawa and the latest information on Device File, refer to the following website.

< <http://www.field-wireless.com/> >

**Table 8.1 Instruments Required for Calibration**

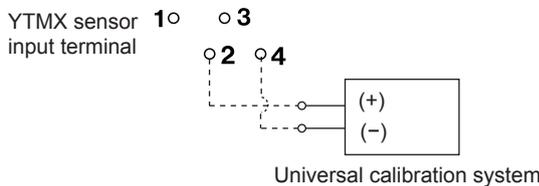
Name	Yokogawa-recommended Instrument	Remarks
Provisioning device tool	<ul style="list-style-type: none"> <li>• FieldMate (R2.03.00 or later)</li> <li>• Provisioning Device Tool</li> <li>• Infrared Adapter certified by Yokogawa Supplier: ACTISYS Product name: IrDA InfraRed USB Adaptor Product number: ACT-IR224UN-LN96 (9600 bps)</li> </ul>	
Field wireless configuration tool	<ul style="list-style-type: none"> <li>• Field Wireless Integrated Gateway attached Software Field Wireless Configurator Field Wireless Management Tool</li> <li>• Field Wireless System related Product Plant Resource Manager (PRM) (R3.05 or later)</li> <li>• Device Configuration Tool via ISA100 Wireless Communication FiledMate (R2.03.00 or later) DeviceFile (R3.02.12 or later)</li> <li>• Device Configuration Tool via Infrared Communication FiledMate (R2.03.00 or later) DeviceFile (R3.02.12 or later)</li> </ul>	
Universal calibration system	<ul style="list-style-type: none"> <li>• Model 9100 type (FLUKE)</li> </ul>	For calibration of DC voltage or thermocouple input)
Variable resistor	<ul style="list-style-type: none"> <li>• 279301 type 6-dial variable resistor (accuracy: ±0.005%)</li> </ul>	For calibration of resistance thermometer (RTD) input

### 8.3 Calibration Procedure

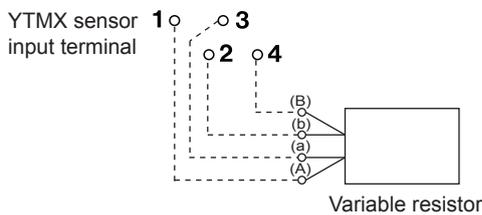
The transmitter is tested adequately before it is shipped from the factory to guarantee a certain accuracy level even without calibration. So perform the calibration described in this section only under special circumstances, such as when the need to evaluate uncertainty arises during operation.

- 1) After inserting the battery pack in the case of the battery model or after turning on the power supply in the case of the external power supply model, perform provisioning to make the transmitter join a field wireless network for calibration, or prepare for infrared communication.
- 2) Set the publication period to 1 or 2 second using the configuration tool to set continuous for the transmitter. If the number of measurement points is 3 or less, select 1 second, and if the number of measurement points is 4 or more, select 2 seconds.  
For details of publication period, refer to subsection 7.3.3 “Parameters for Wireless Communication”.
- 3) Connect the devices as shown in Figure 8.1 and allow the transmitter to warm up for at least 5 minutes.

Example of wiring for thermocouple or DC voltage input



Example of wiring for RTD 4-wire type



E0801.ai

**Figure 8.1** Example of wiring for calibration equipment

- 4) Calibration Procedure
  - a) For DC voltage input  
With a universal calibration system, deliver input signals corresponding to 0, 25, 75, or 100% of the input span to the temperature transmitter.
  - b) For thermocouple input  
Since this instrument is equipped with a cold junction compensating function, use a cold junction compensating function in universal calibration system 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 from the universal calibration system to the temperature transmitter. Check the output value for that input value.
  - c) For resistance thermometer (RTD) input  
Using a thermometer resistor as input, calibration of the temperature transmitter is carried out via a 4-core wire connection. As defined in the reference resistor value table of the resistance thermometer (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. Check the output value for that input value.
- 5) When the inspection is completed, change the publication period back to the original value using Field Wireless Configuration Tool.
- 6) Apply a specified input signal following steps a) to c) above. If the output signal is outside the accuracy range, perform output adjustment using the device configuration tool. For details on how to perform adjustment, refer to subsection 7.3.10 “Input calibration”.

### 8.4 Battery

This section describes the procedure for replacing the battery pack and batteries of battery model. Table 8.2 shows the tools needed to replace the battery pack and batteries. A battery pack means the specified batteries enclosed in a battery case.

Table 8.2 Tools for Disassembly and Reassembly

Tool	Quantity	Remarks
Phillips screwdriver	1	ISO 8764-1, Tip No.2 ( JIS B 4633, No. 2 )
Hex Key	1	across-flats 4mm

#### 8.4.1 Replacing the Battery Pack



### WARNING

To ensure the installation minimizes the risk from electrostatic discharge.

To prevent electrostatic discharge caused by static charge built up on the operator, ground the operator through conductive shoes and floors and by wearing anti-static work clothes to prevent charge build-up.

Avoid any actions that cause the generation of electrostatic charge, such as rubbing with a dry cloth on face of the Battery Pack and product. If static electricity cannot be suppressed, check that the surrounding atmosphere does not contain explosive gas or steam before replacing the Battery Pack.

The battery pack in an intrinsically safe explosion-proof transmitter can be replaced in the installed condition in a hazardous area.

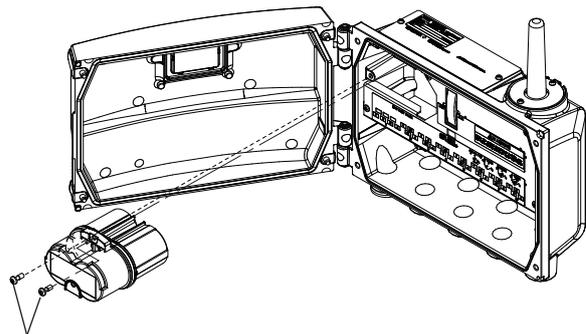
#### ■ Preliminary

Reset the remaining battery power calculation. For details on how to reset the remaining battery power calculation, refer to subsection 7.3.3 "Parameters for Wireless Communication."

In case that the battery runs out already, reset the remaining battery power calculation promptly after replacing the battery pack.

#### ■ Removing

- 1) Loosen the four M5 Hexagon socket head cap bolts at each corner of the front door and then open the front cover. Use a hex wrench of 4 mm hexagon width across flats to unscrew the bolts. The front door can be opened by turning the four front door bolts seven times counterclockwise. Please note that the bolts are held by the friction force of the rubber but may fall out if turned more than necessary.
- 2) Loosen the two battery pack mounting screws (see Figure 8.2).
- 3) Pull the battery pack.



The screw has the dropout prevention mechanism, it is not separated from the battery pack

E0802.ai

Figure 8.2 Removing the Battery Pack

#### ■ Remounting

- 1) Insert the new battery pack lightly.
- 2) Push the center of the battery pack and insert it securely.
- 3) Tighten the two battery pack mounting screws to a torque of approximately 0.7 N•m.
- 4) Close the front door and tighten the four fastening bolts.



### CAUTION

Be sure to use the dedicated battery pack in an intrinsically safe transmitter. For details on the battery pack, refer to section 8.4.3 "Handling Batteries."

### 8.4.2 Replacing the Batteries

The batteries in the battery pack can be replaced.

 **WARNING**

Be sure to replace the batteries or disassemble and assemble the battery pack in a non-hazardous area. Doing so in an hazardous area could cause an explosion.

 **CAUTION**

When replacing the batteries, be sure to replace the two batteries at the same time and do not use an old and a new battery together.

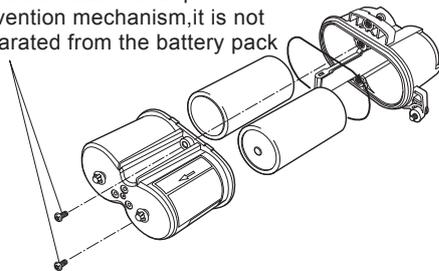
■ **Disassembling**

- 1) Loosen the two battery case mounting screws.
- 2) Separate the battery case into two parts.
- 3) Remove the old batteries.

■ **Assembling**

- 1) Insert new batteries into the battery case. Be careful to polarity.
- 2) Attach the two parts of the battery case to each other. Be careful to polarity of battery case.
- 3) Tighten the two battery case mounting screws to a torque of approximately 0.7 N•m.

The screw has the dropout prevention mechanism, it is not separated from the battery pack



E0803.ai

Figure 8.3 Disassembling the Battery Pack

### 8.4.3 Handling Batteries

This battery pack contains two primary lithium/thionyl chloride batteries. Each battery contains approximately 5 grams of lithium, for a total of 10 grams in each pack. Under normal conditions, the battery materials are self-contained and are not reactive as long as the batteries and the pack integrity are maintained. Care should be taken to prevent thermal, electrical or mechanical damage. Protect the electrode of the battery pack to avoid rapid electrical discharge. Discharged a battery may lead to fluid leakage and excessive heat. Batteries should be stored in a clean and dry area. For maximum battery life, storage temperature should not exceed 30°C.

 **WARNING**

Handling the battery pack

The following precautions must be observed in order to safely and effectively use a battery pack. Improper use may lead to fluid leakage, excessive heat, ignition, or explosion.

- Never charge it.
- Do not short-circuit it.
- Do not disassemble, transform, or modify it.
- Do not heat it or throw it into a fire.
- Do not soak it in fresh water or seawater.

 **CAUTION**

Observe the following precautions for the safe disposal of batteries.

- Do not incinerate the battery, and do not expose it to a high temperature of 100°C or more. This may lead to fluid leakage or explosion.
- Dispose of the battery according to laws and regulations.

Use the following dedicated parts for the battery pack and batteries.

- Battery pack  
Part number: F9915MA \*1
- Battery case  
Part number: F9915NS \*2 ( Battery case only )
- Batteries  
Part number: F9915NR  
Alternatively, Tadiran TL-5930/S or SL-2780/S batteries may be purchased and used.

\*1 If you need F9915MA, please purchase F9915NQ.  
F9915NQ is a set of F9915MA and instruction manual.  
\*2 If you need F9915NS, please purchase F9915NK.  
F9915NK is a set of F9915NS and instruction manual.

 **WARNING**

Be sure to use the dedicated battery pack in an intrinsically safe transmitter.  
Be sure to use a battery pack that is indicated as “Rev.1” for the TIIIS intrinsically safe explosion-proof transmitter (suffix code /JS37).

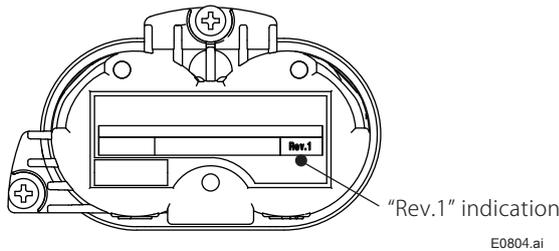


Figure 8.4 Where “Rev.1” appears on the battery pack

**Transportation of products containing lithium batteries**

The battery pack contains lithium batteries. When transporting this transmitter with the battery pack inserted, keep it in deep sleep mode in order to conserve battery power. For details on how to switch to deep sleep mode, refer to subsection 7.3.11 “Switching to Deep Sleep Mode.”

Primary lithium batteries are regulated in transportation by the U.S. Department of Transportation, and are also covered by the International Air Transport Association (IATA), the International Civil Aviation Organization (ICAO), and the European Ground Transportation of Dangerous Goods (ARD). It is the responsibility of the shipper to ensure compliance with these or any other local requirements. Consult current regulations and requirements before shipping.

**Procedure to replace and dispose of the batteries of the product**

This is an explanation about the new EU Battery Directive(DIRECTIVE 2006/66/EC). This directive is only valid in the EU. Batteries are included in this product. When you remove batteries from this product and dispose them, discard them in accordance with domestic law concerning disposal. Take a right action on waste batteries, because the collection system in the EU on waste batteries are regulated.

Battery type: Primary lithium-thionyl chloride battery

Crossed-out dustbin symbol



 **NOTE**

The symbol (see above), which is marked on the batteries, means they shall be sorted out and collected as ordained in ANNEXII in DIRECTIVE 2006/66/EC

**8.5 Replacing the Front Door Gasket**

When the gasket is damaged, exchange of the gasket is recommended for protection against water and dust.

Please fit gasket (B8808DE) into the ditch of the door in the direction of the figure not to slack.

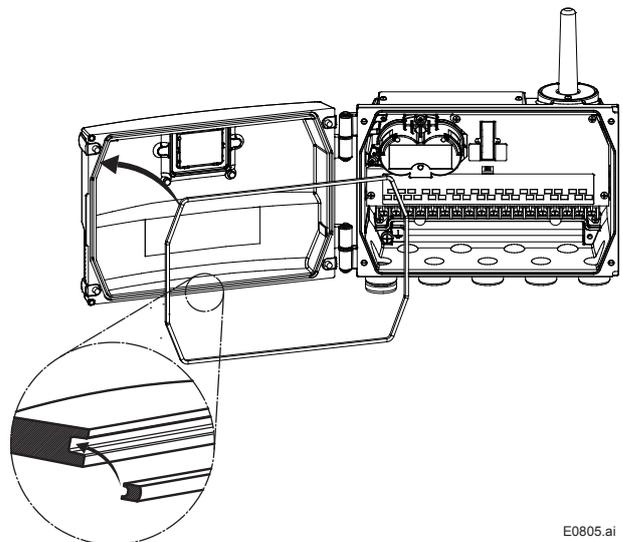


Figure 8.5 Fit the Front Door Gasket

### 8.6 Troubleshooting

If any abnormality appears in the measured values, use the troubleshooting flow chart below to isolate and remedy the problem. Since some problems have complex causes, these flow charts may not identify all. If you have difficulty isolating or correcting a problem, contact Yokogawa service personnel.

#### 8.6.1 Basic Troubleshooting Flow

First determine whether the process variable is actually abnormal or a problem exists in the measurement system.

If the problem is in the measurement system, isolate the problem and decide what corrective action to take.

This transmitter is equipped with a self-diagnostic function which will be useful in troubleshooting.

If an error occurs with the transmitter, ALM of the status display LED turns on. Check the self-diagnostic result in the field wireless device configuration tool.

Refer to subsection 8.6.3 "Alarms and Countermeasures".

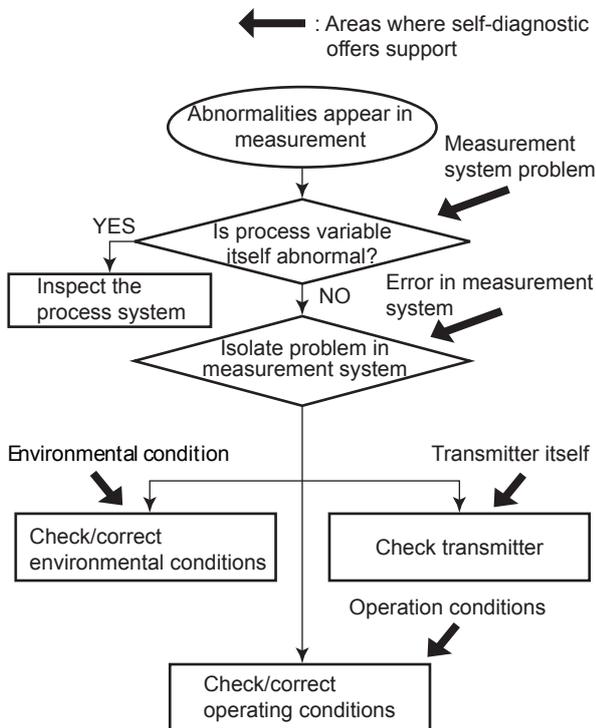


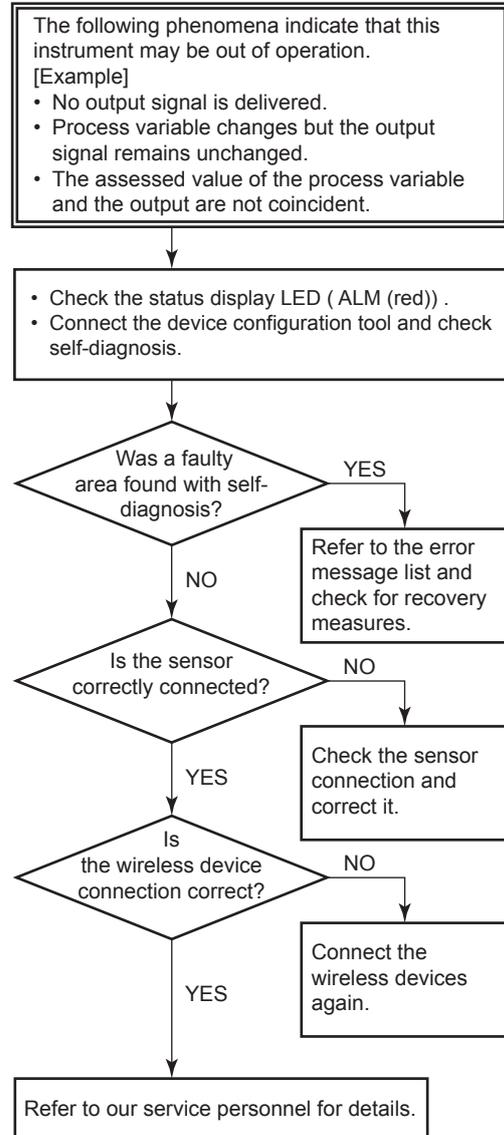
Figure 8.6 Basic Troubleshooting Flow

E0806.ai

#### 8.6.2 Example of Troubleshooting Flow

The following shows an example of the flow for troubleshooting.

Refer to this example and Table 8.3 "Problems, Causes and Countermeasures" and locate the problem and take the corresponding countermeasure.



E0807.ai

Figure 8.7 Example of Troubleshooting Flow

Table 8.3 Problems, Cause and Countermeasure

Observed Problems	Possible Cause	Countermeasure	Related Parameter
Output fluctuates greatly.	Input adjustment by user was not correctly done.	Set or clear the user adjustment value.	<ul style="list-style-type: none"> <li>• Lin Type</li> <li>• Sensor Range</li> </ul>
	Damping adjustment is not correct.	Set the damping adjustment to 0.	<ul style="list-style-type: none"> <li>• Process Value Filter Time</li> </ul>
Transmitter outputs fixed current.	Input adjustment by user was not correctly done.	Set or clear the user adjustment value.	<ul style="list-style-type: none"> <li>• Lin Type</li> <li>• Sensor Range</li> </ul>
	The simulation function is set to ON.	Set the simulation function to OFF.	<ul style="list-style-type: none"> <li>• Simulate Switch</li> </ul>
Output is reversed.	The lower limit value is greater than the upper limit value.	Set the correct value to the upper limit value and the lower limit value.	<ul style="list-style-type: none"> <li>• Lin Type</li> <li>• Sensor Range</li> <li>• Cal Point Lo</li> <li>• Cal Point Hi</li> </ul>
Parameters cannot be changed.	The transmitter is in write protect status.	Release write protect.	<ul style="list-style-type: none"> <li>• UAP Option</li> <li>• Hardware Write Protect</li> </ul>
AI1 to AI8 become all O/S and data is not updated.	publication period is set to 1 second and the number of measurement points is set to 4 or more.	Set the publication period to 2 seconds or more, or set the number of measurement points to 3 or less. Refer to "publication period" of subsection 7.3.3 "Parameters for Wireless Communication".	<ul style="list-style-type: none"> <li>• Lin Type</li> </ul>
AI parameter cannot be changed.	The Permitted setting of Block Mode is not correct.	Set the Permitted setting in Target.	<ul style="list-style-type: none"> <li>• Mode</li> </ul>

8.6.3 Alarms and Countermeasures

Table 8.4 Alarm Message Summary

Factory NAMUR category	Bit	Diagnostic Status	Diagnostic Status Detail	Cause	Release/recovery conditions (except restart)	Output Operation	Action
F	Bit 27	Faults in electronics	AMP ERR	Amplifier temperature sensor error	None	The output is fixed to $\pm 999999^{\circ}\text{C}$ . The sign is dependent on the setting of Burn Out Type.	Replace the amplifier. Contact Yokogawa service personnel.
			MEMORY ERROR	Amplifier memory failure	None	Same as above	Replace the amplifier. Contact Yokogawa service personnel.
			ADC ERROR	Amplifier AD converter failure	None	Same as above	Replace the amplifier. Contact Yokogawa service personnel.
			Firm Update ERR	Firmware update write error	None	---	Replace the amplifier. Contact Yokogawa service personnel.
	Bit 26	Faults in sensor or actuator element	SENSOR1 to SENSOR 8 FAILURE	Sensor 1 to Sensor 8 burnout	None	The output is fixed to $\pm 999999^{\circ}\text{C}$ . The sign is dependent on the setting of Burn Out Type	Replace the sensor.
			TERM SNS FAILURE	CJC sensor burnout	None	Operable at the CJC value ( $0^{\circ}\text{C}$ ).	Replace the amplifier. Contact Yokogawa service personnel.
M	Bit 19	Power is low: maintenance need mid-term	LOWBAT (Battery model only) *2	Low remaining battery power	None	Normal action	Replace the batteries.
	Bit 20	Power is critical low: maintenance need short-term	LOWBAT FOR DEEPSLEEP (Battery model only)	Low remaining battery power causes switching to deep-sleep mode.	None	Normal action, but power turns off 15 minutes after alarm is generated.	Replace the batteries.
	Bit 21	Fault prediction: Maintenance required	FIRMWARE CONDITION CHECK	Firmware internal error	None	Normal action	Restart.

(Cont. on next page.)

Factory NAMUR category	Bit	Diagnostic Status	Diagnostic Status Detail	Cause	Release/recovery conditions (except restart)	Output Operation	Action
O	Bit 22	Environmental conditions out of device specification	SENSOR1 to SENSOR8 TEMP HI	The temperature of sensor 1 to sensor 8 is higher than the temperature specified in the Sensor Range parameter.	Recovers when the temperature falls within the range.	Normal action	Check the sensor type setting and connection method.
			SENSOR1 to SENSOR8 TEMP LO	The temperature of sensor 1 to sensor 8 is lower than the temperature specified in the Sensor Range parameter.	Recovers when the temperature rises within the range.	Normal action	Check the sensor type setting and connection method.
	Bit 22	Environmental conditions out of device specification	AMB TEMP HI	The ambient temperature is higher than +85°C.	Recovers when the temperature falls below +85°C.	Normal action	Check the temperature in the vicinity of the transmitter.
			AMB TEMP LO	The ambient temperature is lower than -40°C.	Recovers when the temperature rises above -40°C.	Normal action	Check the temperature in the vicinity of the transmitter.
C	Bit 25	Installation, calibration problem	SENSOR1 to SENSOR8 SPAN ADJ ERR	Sensor 1 to sensor 8 input adjustment range error	Recovers when the input is within the range.	Normal action	Check the input adjustment setting.
			SENSOR1 to SENSOR8 ZERO ADJ ERR	Sensor 1 to sensor 8 input adjustment value error	Recovers when the input value is a normal value.	Normal action	Check the input adjustment setting.
	Bit 24	Out of service	AI1 to AI8 O/S MODE	AI1 to AI8 block is O/S mode.	Recovers when the mode target of AI1 to AI8 block is other than O/S.	Hold	Check the AI1 to AI8 block setting.
	Bit 17	Simulation is active	AI1 to AI8 SIMULATE MODE	Simulate Switch of the AI1 to AI8 block is enabled	Recovers when the Simulate Switch of AI1 to AI8 block is set to DISABLE.	Normal action	Check the AI1 to AI8 block setting.

\*1: "Factory NAMUR category" refers to the four categories (C: Function check status, M: Maintenance required status, F: Failure status, and O: Out of specification status) according to NAMUR NE107\*.

\* NAMUR NE107 "Self-Monitoring and Diagnosis of Field Devices"

\*2: If a search for the field wireless network continues for a long period of time in a low ambient temperature environment, the LOWBAT alarm may occur even if new batteries are used. This is attributed to a battery characteristic. If there is not any problem with the batteries, the LOWBAT alarm will be cleared within one hour after the transmitter joins the field wireless network.

# 9. Parameter Summary

Table 9.1 Parameter Summary

Object ID	Attribute ID	Label	Description	Default value	Handling																							
1. UAPMO block	1	Version Revision	Indicates the application revision of YTMX580. This revision changes when the application software is downloaded.	R***.***	R																							
	10	Static Revision	When a parameter is changed, +1 is added to the previous value. This can be used to determine whether or not the parameter was changed.	0	R																							
	64	Identification Number	Indicates the vendor ID, model ID, and revision of the device. 1. Vender ID 2. Model ID 3. Device Revision	1. 00594543 2. 1802 3. ---	R																							
	65	CTS Version	Indicates the version of the communication stack test system (CTS).	0	R																							
	66	ITS Version	Indicates the version of the interoperability test system (ITS).	0	R																							
	67	Diagnostic Status	Indicates the diagnostic results of the device based on the NAMUR NE0107+ model. Setting Diagnostic Status to ON allows turning OFF and ON the display of the diagnostic results for each summary, and changing Categorize. For Categorize at the time of shipment, refer to tables 7.2 "Diagnostic Status".	---	R																							
	68	UAP OPTION	Allows setting the Diagnostic Status and write protection of UAP. Diagnostic Status configuration 1: Enable, 0: Disable (default) Hardware write protect 1: Enable, 0: Disable (default) Software write protect 1: On, 0: Off (default) The following table shows the relationship between the hardware write protection and software write protection.	0. Disable	W																							
				<table border="1"> <thead> <tr> <th rowspan="2">Write protect switch</th> <th colspan="2">Parameter ( UAPMO.UAP Option)</th> <th rowspan="2">Write protect status</th> </tr> <tr> <th>Hardware write protect</th> <th>Software write protect</th> </tr> </thead> <tbody> <tr> <td>Off or On</td> <td>Disable</td> <td>Off</td> <td>No</td> </tr> <tr> <td>Off or On</td> <td>Disable</td> <td>On</td> <td>Protected</td> </tr> <tr> <td>Off</td> <td>Enable</td> <td>Off or On</td> <td>No</td> </tr> <tr> <td>On</td> <td>Enable</td> <td>Off or On</td> <td>Protected</td> </tr> </tbody> </table>	Write protect switch	Parameter ( UAPMO.UAP Option)		Write protect status	Hardware write protect	Software write protect	Off or On	Disable	Off	No	Off or On	Disable	On	Protected	Off	Enable	Off or On	No	On	Enable	Off or On	Protected		
	Write protect switch	Parameter ( UAPMO.UAP Option)		Write protect status																								
		Hardware write protect	Software write protect																									
Off or On	Disable	Off	No																									
Off or On	Disable	On	Protected																									
Off	Enable	Off or On	No																									
On	Enable	Off or On	Protected																									
69	Diagnostic Switch	When UAP Option is set to Enable and Diagnostic Status is set to Enable, enable or disable can be set for each bit of Diagnostic Status.	0	W																								
70	Diagnostic Configuration	When UAP Option is set to Enable and Diagnostic Status is set to Enable, categories based on NAMAR NE107 can be set for each bit of Diagnostic Status.	Refer to Table 9.2.	W																								
102	Diagnostic Status Detail	Detailed information on Diagnostic Status. For Categorize at the time of shipment, refer to Table 9.2.	Refer to Table 9.2.	R																								
103	Energy Left	Indicates the number of days of remaining battery life assuming ambient temperature condition as 23 degrees Celsius. The unit is day.	2190 (Battery model) 32767 (External power supply model)	R																								
104	Reset Energy Left	Resets the remaining battery power calculation to restore it to a remaining battery power calculation which is based on new batteries. 0: Continue 1: Reset	0 (reading value is always 0)	W																								

(Cont. on next page.)

Note: TSAP ID is 2.

Object ID	Attribute ID	Label	Description	Default value	Handling
1. UAPMO (continued)	105	Power Supply Status	Indicates remaining battery life and power supply of device. 0: external powered 1: battery powered, greater than 75% remaining capacity 2: battery powered, between 25% and 75% remaining capacity 3: battery powered, less than 25% remaining capacity	---	R
	110	Hardware Write Protect	Allows recognizing the status of the hardware write protection switch. 0: Switch OFF 1: Switch ON	0 : OFF	R
	111	Radio Silence	Repeats a cycle of a 1-hour pause and 6-minute search if the transmitter cannot join the network after a time specified in Radio Silence has elapsed.	28800	W
2. UDO block	2	DESCRIPTION	Indicates the version and model information of the downloaded data.	---	R
	3	STATE	Indicates the present transition state. 0: Idle 1: Downloading 2: Uploading 3: Applying 4: DLComplete 5: ULComplete 6: DLError 7: ULError	0 : Idle	R
	5	MAX_BLOCK_SIZE	Maximum download block size. This value is smaller than the maximum data size of APDU.	64	R
	14	LAST_BLOCK_DOWNLOADED	Indicates the last downloaded block number. 0 means that no block has been downloaded.	0	R
	16	ERROR_CODE	Indicates the error codes for DLError. 0: noError 1: Timeout 2: ClientAbout 64: Apply failure	0 : noErro	R
3. CO block	1	REVISION	Indicates the version level of Comm_endpoint, etc.	---	R
	2	COMM_ENDPOINT	Indicates the Endpoint information. The following shows the components. 1. Network address of remote endpoint 2. Transport layer port at remote endpoint 3. Object ID at remote endpoint 4. Stale data limit 5. Data publication period 6. Ideal publication phase 7. PublishAutoRetransmit 8. Configuration status	1. 0000:000 :0000:0000 :0000:0000 :0000:0000 2. 0 3. 0 4. 0 5. 30 6. 0 7. 0 8. 0	W
	3	COMM_CONTRACT	Indicates the Contract information. The following shows the components. 1. ContractID 2. Contract_Status 3. Actual_Phase	1. 0 2. 0 3. 0	R
	4	PUB_ITEM_MAX	Displays the maximum number of items that can be published.	---	R
	5	PUB_ITEM_NUM	Displays the number of items that are set in PUB_ITEM.	---	R
	6	PUB_ITEM	Sets items that are published (up to 9 items). The following shows the components. 1. ObjectID 2. AttributeID 3. AttributeIndex 4. Size	1.0 2.0 3.0 4.0	W

(Cont. on next page.)

Object ID	Attribute ID	Label	Description	Default value	Handling
4. TRANSDUCER block	1	Tag Description	Memo field available to write anything. ( up to 32 letters )	Transducer	W
	2	Model	Indicates the model name of the transmitter.	YTMX580	R
	3	Serial Number	Indicates the device number of the transmitter.	---	R
	5	Wireless Status	Indicates the wireless communication status. 0: Indicates the Idle status. 1: Indicates the Join status. 2: Indicates whether Contract (Pub) has been established. (Not established / Established) 4: Indicates whether Contract (R/W) has been established. (Not established / Established)	0. Idle status	R
	7	LED Mode	Selects the mode of the status display LED (RDY/ALM). 0: On during operation in accordance with the display specification.(LED ON) 1: Always Off.(LED OFF) * For the display specifications, refer to table 3.1 "Display Description of Status Display LED."	0. On in accordance with the display specification	W
	8	YTMX Option	Indicates the optional function supported by the device. This cannot be changed by the user. 1.Indicates the unit system used. (SI system / Other)	Specify when ordering	R
	9	Special Cmd	Special function parameter. 0. Initial value at the time of reading (None) 1. Squawk mode (Squawk) 2. Deep-sleep mode (Standby) To start from the deep-sleep mode, either remove and reinsert the battery pack or use the configuration tool.	0 (reading value is always 0)	W
5. to 12. AI1 to AI8 block	10	Utility Frequency	Sets commercial power frequency cut-off filter. 0: 50Hz 1: 60Hz	0. 50Hz	W
	11	Mearurement Rate	Displays the measurement period (unit: second). 1 to 3600	30	R
	1	Process Value	AI1 to AI8is a temperature output object. Displays analog value (or the corresponding process value) and status. Setting this in CO block PUB_ITEM enables data to be updated via wireless communication. 1. Status: Indicates the status of the AI1 to AI8 output value. Refer to Table 9.3. "Process Value.status." 2. Value: AI1 to AI8 output value.	1. --- 2. ---	W
	2	Mode	A universal parameter to indicate the block's operation status. O/S, Auto, and Man can be selected. 1. Target: Specifies the AI1 to AI8 mode. 2. Actual: Indicates the present AI1 to AI8 mode. 3. Permitted: Indicates the mode that can be specified in Target. 4. Normal: Indicates the AI1 to AI8 normal status mode. 0x01: O/S 0x08: Manual 0x10: Auto	1. 0x10: Auto 2. 0x10: Auto 3. 0x19: O/S + Manual + Auto 4. 0x10: Auto	W
	3	Concentrator OID	Indicates the Concentrator object value that corresponds to the data update of the Process Value.	---	R
	4	Scale	Allows specifying the upper or lower limit for the Process Value scaling, unit code, etc. Fahrenheit (°F) and Rankine (°R) cannot be set if the temperature unit of the option code is -A. 1. EUat 100%: Indicates the upper limit to the Process Value. 2. EU at 0%: Indicates the lower limit to the Process Value. 3. Units Index: Indicates the set unit used for the Process Value. < Unit > 1000: Kelvin 1001: degC ( °C ) 1002: degF ( °F ) 1003: Rankin 1240: V 1243: mV 1281: Ohm 4. Decimal: 1	1. 100.0f 2. 0.0f 3. 1001 : degC ( °C ) 4. 1	W

(Cont. on next page.)

Object ID	Attribute ID	Label	Description	Default value	Handling
5. to 12. AI1 to AI8 block (continued)	26	Tag Description	A universal parameter to store the comment that describes the tag. ( up to 32 letters )	Sensor* The asterisk (*) indicates the sensor input number.	W
	27	Process Value Filter Time	Allows adjusting the damping time constant for the Process Value. Damping time constant set longer than publication period. Setting unit: Second.	15. of	W
	28	Simulate Switch	Switch for enabling or disabling of the simulation function for the AI1 to AI8 objects. 1: Disable 2: Enable	1: Disable	W
	29	Transducer Value	When Simulate Switch is set to Disable, this value is used as the input value for the AI1 to AI8 object. The temperature value calculated from the physical value of the sensor. The Bias value is added to the temperature value. 1. Status: Indicates the status of the AI1 to AI8 output value. Refer to Table 9.3. "Process Value.status." 2. Value: AI1 to AI8 output value.	1. --- 2. ---	R
	30	Simulate Value	When Simulate Switch is set to Enable, this value is used as the input value for the AI1 to AI8 object. The input value can be changed, but technical unit is not converted to output value of the AI object. 1. Status: Indicates the status of the AI1 to AI8 output value. Refer to Table 9.3. "Process Value.status." 2. Value: AI1 to AI8 output value.	1. --- 2. ---	W
	51	Lin Type	Sets the sensor type. 0: Not used, 102: Pt100 (IEC 60751), 103: Pt200 (IEC 60751), 104: Pt500 (IEC 60751), 128: Type B (IEC 60584), 131: Type E (IEC 60584), 133: Type J (IEC 60584), 134: Type K (IEC 60584), 135: Type N (IEC 60584), 136: Type R (IEC 60584), 137: Type S (IEC 60584), 138 Type T (IEC 60584), 240: mV, 241: Ohm, 242: V	102: Pt100	W
	52	Bias	Adds the BIAS temperature value to the temperature value. This is set as a temperature value to which a value converted to the unit set in the Units Index of Sensor Range is added.	0.0f	W
	53	Sensor Range	Indicates the basic information on the sensor used. 1. EU at 100%: Indicates the upper limit of the sensor set in Lin Type. 2. EU at 0%: Indicates the lower limit of the sensor set in Lin Type. 3. Units Index: Sets the unit for Transducer Value, Simulate Value, Bias, EU at 100%, EU at 0%, Reference Junction Temp and External Reference Junction Vale. 4. Decimal: 0	1. 850.0f 2. -200.0f 3. 1001: degC ( °C ) 4. 0	W
	57	Reference Junction Temp	Indicates the terminal block temperature value for the cold junction compensation.	---	R
	58	Selection of Reference Junction	Sets the cold junction compensation when using the thermocouple sensor. 0: No cold conjunction compensation (No Reference). 1: Internal temperature value (Internal). 2: External temperature value (External).	1: Internal temperature value	W
59	External Reference Junction Value	Sets the external temperature Sets the external temperature when setting the cold junction temperature value of the thermocouple to the external temperature value in Selection of Reference Junction.	0.0f	W	
61	Sensor Connection	Sets the number of connections when Lin Type is the resistance temperature sensor. 0: 2-wire (Two Wires) 1: 3-wire (Three Wires) 2: 4-wire (Four Wires)	1: 3-wire	W	

(Cont. on next page.)

Object ID	Attribute ID	Label	Description	Default value	Handling
5. to 12. AI1 to AI8 block (continued)	102	Sensor Serial Number	Indicates the serial number of the sensor, which corresponds to the tag assigned to the temperature sensor.	---	W
	103	Cal Point Lo	Sets the zero-point adjustment for the input adjustment (zero-gain adjustment ) of the sensor. Be sure to perform adjustment with Cal Point (zero-point) first.	---	W
	104	Cal Point Hi	Sets the gain-point adjustment for the input adjustment (zero-gain adjustment) of the sensor.	---	W
	105	Cal Point Clear	Resets the input adjustment value of the sensor to the factory setting. 0: None 1: Clear	0: None	W
	106	Process Value Type	Selects data to output to Process Value.Value. 0. % value after the scaling process is performed. (Indirect) 1. Actual target value after the filter process is performed. (Direct)	0: % value after the scaling process is performed	W
	107	Reference Junction Unit	Sets the unit for Reference Junction Temp and External Reference Junction Value. Select any of °C (Celsius), K (Kelvin), °F (Fahrenheit), and °R (Rankine). Fahrenheit (°F) and Rankine (°R) cannot be set if the temperature unit of the option code is -A. * Refer to the units for the " Scale ".	1001: degC ( °C )	W
	108	Burn Out Type	Sets the burnout. Enabled when " Lin Type " is set to other than mV or V. 0: OFF. Burnout is not set. 1: UP. If the sensor burns out, the measurement result is fixed to + over range. 2: DOWN. If the sensor burns out, the measurement result is fixed to - over range.	1. Up	W

(Note) R: Read only, W: Read and Write

(Note) "Factory NAMUR category" refers to the four categories (C: Function check status, M: Maintenance required status, F: Failure status, and O: Out of specification status) according to NAMUR NE107\*.

\* NAMUR NE107 "Self-Monitoring and Diagnosis of Field Devices"

**Table 9.2 Diagnostic Status Detail**

Bit	Diagnostic Status Detail	Description	Diagnostic Status assignment bit	NAMUR
Diagnostic Status Detail.1				
31	AMP ERR	Amplifier failure	Bit27	F
30	MEMORY ERR	Memory failure	Bit27	F
27	Firm Update ERR	Firmware write error	Bit27	F
26	ADC ERR	AD Converter failure	Bit27	F
21	TERM SNS FAILURE	CJC sensor burnout	Bit26	F
20	AMB TEMP HI	Ambient temperature higher limit scale out	Bit22	O
19	AMB TEMP LO	Ambient temperature lower limit scale out	Bit22	O
15	LOWBAT	Low battery (Battery model only)	Bit19	M
14	LOWBAT FOR DEEPSLEEP	Deep sleep due to low battery (Battery model only)	Bit20	M
11	FIRMWARE CONDITION CHECK	Firmware internal error	Bit21	M
Diagnostic Status Detail.2				
31	SENSOR1 FAILURE	Sensor 1 burnout	Bit26	F
30	SENSOR2 FAILURE	Sensor 2 burnout	Bit26	F
29	SENSOR3 FAILURE	Sensor 3 burnout	Bit26	F
28	SENSOR4 FAILURE	Sensor 4 burnout	Bit26	F
27	SENSOR5 FAILURE	Sensor 5 burnout	Bit26	F
26	SENSOR6 FAILURE	Sensor 6 burnout	Bit26	F
25	SENSOR7 FAILURE	Sensor 7 burnout	Bit26	F
24	SENSOR8 FAILURE	Sensor 8 burnout	Bit26	F
15	SENSOR1 TEMP HI	Sensor 1 temperature higher limit scale out	Bit22	O
14	SENSOR2 TEMP HI	Sensor 2 temperature higher limit scale out	Bit22	O
13	SENSOR3 TEMP HI	Sensor 3 temperature higher limit scale out	Bit22	O
12	SENSOR4 TEMP HI	Sensor 4 temperature higher limit scale out	Bit22	O
11	SENSOR5 TEMP HI	Sensor 5 temperature higher limit scale out	Bit22	O
10	SENSOR6 TEMP HI	Sensor 6 temperature higher limit scale out	Bit22	O
9	SENSOR7 TEMP HI	Sensor 7 temperature higher limit scale out	Bit22	O
8	SENSOR8 TEMP HI	Sensor 8 temperature higher limit scale out	Bit22	O
7	SENSOR1 TEMP LO	Sensor 1 temperature lower limit scale out	Bit22	O
6	SENSOR2 TEMP LO	Sensor 2 temperature lower limit scale out	Bit22	O
5	SENSOR3 TEMP LO	Sensor 3 temperature lower limit scale out	Bit22	O
4	SENSOR4 TEMP LO	Sensor 4 temperature lower limit scale out	Bit22	O
3	SENSOR5 TEMP LO	Sensor 5 temperature lower limit scale out	Bit22	O
2	SENSOR6 TEMP LO	Sensor 6 temperature lower limit scale out	Bit22	O
1	SENSOR7 TEMP LO	Sensor 7 temperature lower limit scale out	Bit22	O
0	SENSOR8 TEMP LO	Sensor 8 temperature lower limit scale out	Bit22	O
Diagnostic Status Detail.3				
31	SENSOR1 SPAN ADJ ERR	Sensor 1 faulty input of span adjustment value	Bit25	C
30	SENSOR2 SPAN ADJ ERR	Sensor 2 faulty input of span adjustment value	Bit25	C
29	SENSOR3 SPAN ADJ ERR	Sensor 3 faulty input of span adjustment value	Bit25	C
28	SENSOR4 SPAN ADJ ERR	Sensor 4 faulty input of span adjustment value	Bit25	C
27	SENSOR5 SPAN ADJ ERR	Sensor 5 faulty input of span adjustment value	Bit25	C
26	SENSOR6 SPAN ADJ ERR	Sensor 6 faulty input of span adjustment value	Bit25	C
25	SENSOR7 SPAN ADJ ERR	Sensor 7 faulty input of span adjustment value	Bit25	C
24	SENSOR8 SPAN ADJ ERR	Sensor 8 faulty input of span adjustment value	Bit25	C
23	SENSOR1 ZERO ADJ ERR	Sensor 1 faulty input of zero adjustment value	Bit25	C
22	SENSOR2 ZERO ADJ ERR	Sensor 2 faulty input of zero adjustment value	Bit25	C
21	SENSOR3 ZERO ADJ ERR	Sensor 3 faulty input of zero adjustment value	Bit25	C
20	SENSOR4 ZERO ADJ ERR	Sensor 4 faulty input of zero adjustment value	Bit25	C
19	SENSOR5 ZERO ADJ ERR	Sensor 5 faulty input of zero adjustment value	Bit25	C
18	SENSOR6 ZERO ADJ ERR	Sensor 6 faulty input of zero adjustment value	Bit25	C
17	SENSOR7 ZERO ADJ ERR	Sensor 7 faulty input of zero adjustment value	Bit25	C
16	SENSOR8 ZERO ADJ ERR	Sensor 8 faulty input of zero adjustment value	Bit25	C

(Cont. on next page.)

Bit	Diagnostic Status Detail	Description	Diagnostic Status assignment bit	NAMUR
15	AI1 O/S MODE	AI1 O/S Mode	Bit24	C
14	AI2 O/S MODE	AI2 O/S Mode	Bit24	C
13	AI3 O/S MODE	AI3 O/S Mode	Bit24	C
12	AI4 O/S MODE	AI4 O/S Mode	Bit24	C
11	AI5 O/S MODE	AI5 O/S Mode	Bit24	C
10	AI6 O/S MODE	AI6 O/S Mode	Bit24	C
9	AI7 O/S MODE	AI7 O/S Mode	Bit24	C
8	AI8 O/S MODE	AI8 O/S Mode	Bit24	C
7	AI1 SIMULATE MODE	AI1 SIMULATE MODE	Bit17	C
6	AI2 SIMULATE MODE	AI2 SIMULATE MODE	Bit17	C
5	AI3 SIMULATE MODE	AI3 SIMULATE MODE	Bit17	C
4	AI4 SIMULATE MODE	AI4 SIMULATE MODE	Bit17	C
3	AI5 SIMULATE MODE	AI5 SIMULATE MODE	Bit17	C
2	AI6 SIMULATE MODE	AI6 SIMULATE MODE	Bit17	C
1	AI7 SIMULATE MODE	AI7 SIMULATE MODE	Bit17	C
0	AI8 SIMULATE MODE	AI8 SIMULATE MODE	Bit17	C

Table 9.3 Process Value.Status

Status value	Description
0x80	Normal (Good_NonCascade::NonSpecific:NotLimited)
0x03	Sensor unused (Bad::NonSpecific:Constant)
0x0F	Device error (Bad::DeviceFailure::Constant)
0x13	Sensor burnout (Bad::SensorFailure:Constant)
0x1F	O/S Mode (Bad::OutOfService:Constant)
0x48	Manual mode (Uncertain::SubstitutedOrManualEntry:NotLimited)
0x50	Outside of the measurement range (Uncertain::SensorConversionInaccurate:NotLimited)
0x54	Maladjustment (Uncertain::RangeLimitsExceeded:NotLimited)

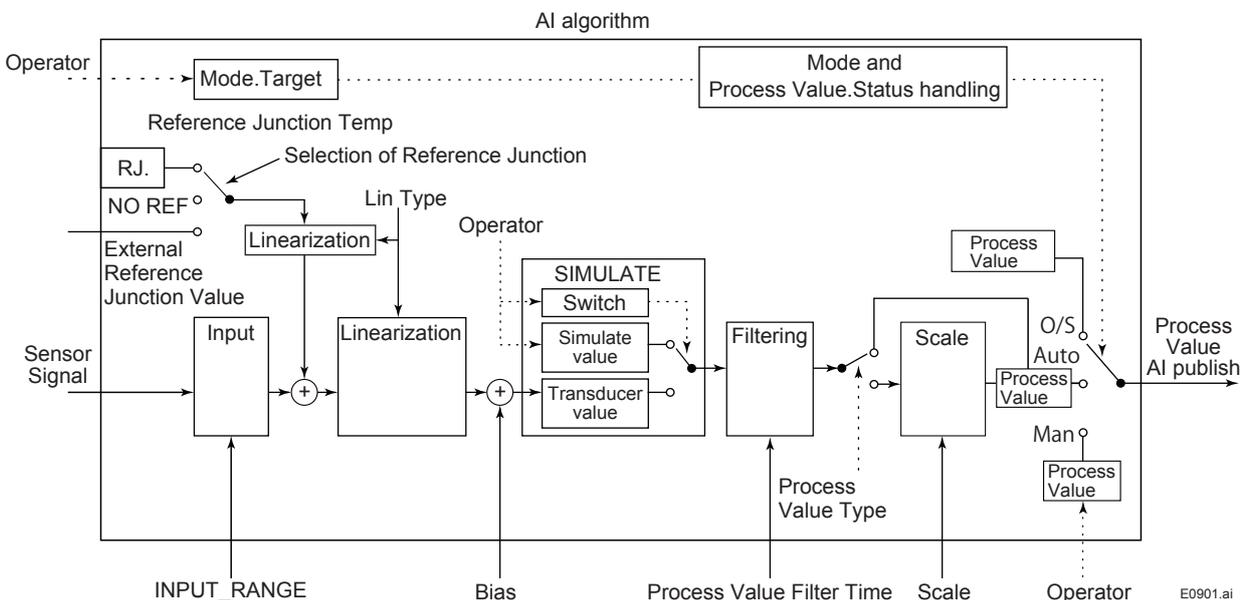


Figure 9.1 Example schema of analog input object

# 10. General Specifications

## 10.1 General Specification

### ■ WIRELESS SPECIFICATIONS

#### Communication Protocol

ISA100 Wireless ( IEEE802.15.4 )

#### Data Rate

250 kbps

#### Frequency

2400 - 2483.5 MHz license free ISM band

#### Radio Security

AES 128 bit codified

#### RF Transmitter Power

Max. 11.6 dBm ( fixed )

#### Antenna

+2 dBi Omni directional type

### ■ MEASUREMENT RANGE

See Table 10.1

### ■ PERFORMANCE SPECIFICATIONS

#### Accuracy

See Table 10.1

#### Cold Junction Compensation Accuracy

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

#### Ambient Temperature Effect ( per $1.0^{\circ}\text{C}$ change )

See Table 10.2

#### Battery Pack (Battery Model)

Battery pack with long life lithium-thionyl chloride batteries. With the intrinsically safe type, the battery pack is replaceable in a hazardous area. Typical battery life is 6 years at 60 seconds publication period in the following conditions.\*

- Network connection: JOIN status
- Ambient temperature:  $23\pm 2^{\circ}\text{C}$
- Device role: IO function only
- LED indicator: off

\* Environmental condition such as ambient temperature and vibration may affect the battery life.

### ■ FUNCTIONAL SPECIFICATIONS

#### Number of Input

channels: 8 points

#### Input Signal

Thermocouples: B, E, J, K, N, R, S, T ( IEC 60584 ) RTDs: Pt100, Pt200, and Pt500 ( IEC 60751 )

2-, 3-, and 4-wire

DC volts: mV ( -10 to 100mV )

V ( -0.01 to 1V )

Resistance: 2-, 3-, and 4-wire resistance ( 0 to 2000 Ohm )

DC miliamperes: mA ( 4 to 20mA, with external shunt resistors. ).

Note: Explosion proofing not applicable during DC voltages, DC miliamperes input.

#### Maximum Allowable Input Voltage

$\pm 2.5$  V DC

Category O (Transient overvoltage 330V)

#### Input Resistance

10 M $\Omega$  or more

#### Input Signal Source Resistance ( for T/C, mV )

1 k $\Omega$  or lower

#### Input Lead Wire Resistance ( for RTD, Ohm )

10  $\Omega$  per wire or lower

#### Output

ISA100 Wireless ( IEEE802.15.4 ) 2.4 GHz signal.

#### Publication Period ( Update Time )

1 to 3600 sec selectable

Minimum of 2 seconds with 4 or more measuring points.

#### Zero-gain Adjustment

Set the amount of zero-gain point adjustment

#### Status Display

The RDY ( green ) and ALM ( red ) LEDs indicate the following statuses: Starting, Running, Waiting to "JOIN" ( network ), Squawk, Alarm, Deep Sleep

**Sensor Burnout**

Select HIGH, LOW or OFF as the configuration.  
( set using software )

**Self Diagnostics**

Amplifier failure, sensor failure, configuration error, battery alarm, wireless communication alarm and over-range error for process variables.

**Software Download Function**

Software download function permits to update wireless field device software via ISA100 Wireless wireless communication.

**Device Role**

The following 2 device roles are supported depending on the network topology.

- IO Function only ( IO )
- IO Function and Routing Function ( IO + Router )

**Infrared Communication**

Data rate:9600bps  
Distance:Infrared surface of the near infrared adapter should be within 30 cm

**Power Supply**

- Battery Model  
2x primary lithium-thionyl chloride batteries (size D)  
With battery case (batteries sold separately)
- External Power Supply Model  
Rated supply voltage: 24 VDC  
Allowable power supply voltage range: 10.5 to 26.4 VDC  
Power consumption: Max 1.2W

**Insulation Resistance**

Measuring input terminal to ground terminal:  
100 M $\Omega$  or greater ( at 500 VDC )

**Dielectric Strength**

Dielectric strength that can withstand the following conditions

- Battery Model  
Measuring input terminal to ground terminal:  
500 VAC ( 50/60 Hz ), 1 min, leakage current of 5 mA or less  
Between measuring input terminal:  
200 VAC ( 50/60 Hz ), 1 min, leakage current of 5 mA or less

- External Power Supply Model  
Power terminal to ground terminal:  
500 VAC ( 50/60 Hz ), 1 min, leakage current of 5 mA or less

Note: The power supply terminal has a built-in surge protection device.  
The terminal without the surge protection device has the dielectric strength shown above.

Measuring input terminal to ground terminal:  
500 VAC ( 50/60 Hz ), 1 min, leakage current of 5 mA or less

Between measuring input terminal:  
200 VAC ( 50/60 Hz ), 1 min, leakage current of 5 mA or less

**Explosion-proof Construction**

FM, CSA, ATEX, IECEx, TIIS intrinsically safe approval

- \* FM: Nonincendive ( Class I )
- CSA: Non-incendive ( Class I )

■ **NORMAL OPERATING CONDITION**

( Optional features or approval codes may affect limits. )

**Ambient Temperature Limits**

- 40 to 85°C ( - 40 to 185°F )  
As for explosion protect type, see  
REGULATORY COMPLIANCE STATEMENTS

**Ambient Humidity Limits**

0 to 100 % RH

**Storage Temperature**

- 40 to 85°C ( - 40 to 185°F )

**Vibration**

3 G or less, at resonant frequencies from 10 to 2000 Hz ( IEC 60770-1 )

■ **REGULATORY COMPLIANCE STATEMENTS**

**Safety Standards**

EN 61010-1, EN 61010-2-030,  
CSA C22.2 No.61010-1-12,  
CSA C22.2 No.61010-2-030-12,  
UL 61010-1, UL 61010-2-030 ( CSA NRTL/C )  
Overvoltage Category I Pollution Degree 2  
Indoor/Outdoor use

**EMC Conformity Standards**

EN 61326-1 Class A Table 2 ( For use in industrial locations ), EN 61326-2-3  
\* During the test, the transmitter continues to operate under the electromagnetic effects of within ±1% of the span.  
EN 301 489-1, EN 301 489-17

**RE Conformity Standards** 

ETSI EN 300 328, ETSI EN 301 489-1,  
ETSI EN 301 489-17, EN 62311

**Regulation Conformity of the Wireless Module**

- FCC Approval: Part15
- IC Approval: RSS GEN, RSS 210
- Japanese Radio Law:  
Wireless equipment specified in No.19, Clause 1, Article 2 of the Certification Rule; 2.4 GHz Sophisticated Low Power Data Communication System ( Construction Design Attestation Number: 007WWCUL0480 )

**Korea Certification ( Radio Wave Act )**

**한국어** (Korean)

본제품은, KC마크 적합품입니다.  
등록번호: KCC-REM-YHQ-WEN007

**기기명칭** :특정소출력 무선기기  
(무선데이터통신시스템용 무선기기)  
**제조 년월** :제품본체의 주명판에 기재  
**신청자** :요꼬가와전기(주)  
**제조사** :요꼬가와전기(주)  
**제조국가** :일본

**영어** (English)

This is a conforming product to KC marking ( Korean Certification ).

Registration No.: KCC-REM-YHQ-WEN007

EQUIPMENT NAME : WIRELESS TRANSMITTER

DATE OF MANUFACTURE : See the nameplate of the product.

APPLICANT : YOKOGAWA ELECTRIC CORP.  
MANUFACTURER : YOKOGAWA ELECTRIC CORP.

COUNTRY OF ORIGIN : JAPAN



**EMC and Radiocommunications regulatory arrangement in Australia and New Zealand (RCM)**

AS/NZS 4268  
AS/NZS 2772.2  
EN 61326-1 Class A, Table2 (For use in industrial location)

**Explosion Protect**

## FM Intrinsically safe, nonincendive Approval

Intrinsically Safe for Class I, Division 1, Groups A, B, C & D, Class II, Division 1, Groups E, F & G and Class III, Division 1, Class I, Zone 0, in Hazardous

Locations, AEx ia IIC

Nonincendive for Class I, Division 2, Groups A, B, C & D, Class II, Division 2, Groups F & G and Class III, Division 1, Class I, Zone 2, Group IIC, in Hazardous Locations

Input Parameter:  $U_i = 28\text{ V}$ ,  $I_i = 135\text{ mA}$ ,  
 $P_i = 850\text{ mW}$ ,  $C_i = 0.013\text{ }\mu\text{F}$ ,  $L_i = 0.24\text{ mH}$

Sensor Circuit Parameter:  $V_{oc} = 5.88\text{ V}$ ,  
 $I_{sc} = 130.1\text{ mA}$ ,  $P_o = 191.2\text{ mW}$ ,  
 $C_a = 1\text{ }\mu\text{F}$ ,  $L_a = 1\text{ mH}$

Ambient Temperature:  $-50\text{ to }70^\circ\text{C}$  ( $-58\text{ to }158^\circ\text{F}$ )

Enclosure: NEMA Type 4X

## CSA Intrinsically safe Approval

Certificate No.: 2495456

Intrinsically Safe for Class I, Division 1, Groups A, B, C & D, Class II, Division 1, Groups E, F & G, Class III, Division 1

Non-incendive for Class I, Division 2, Groups A, B, C & D, Class II, Division 2, Groups F & G, Class III, Division 1

Enclosure: Type 4X, IP66/IP67

Temperature Code: T4

Ambient Temperature:  $-50\text{ to }70^\circ\text{C}$

Ex ia IIC T4

Input Parameter:  $U_i = 28\text{ V}$ ,  $I_i = 135\text{ mA}$ ,  
 $P_i = 850\text{ mW}$ ,  $C_i = 0.013\text{ }\mu\text{F}$ ,  $L_i = 0.24\text{ mH}$

Sensor Circuit Parameter:  $U_o = 5.88\text{ V}$ ,  
 $I_o = 130.1\text{ mA}$ ,  $P_o = 191.2\text{ mW}$ ,  $C_o = 1\text{ }\mu\text{F}$ ,  
 $L_o = 1\text{ mH}$

## ATEX Intrinsically safe Approval

Certificate No.: DEKRA 12ATEX0068 X

II 1 G Ex ia IIC T4 Ga

Input Parameter:  $U_i = 28\text{ V}$ ,  $I_i = 135\text{ mA}$ ,  
 $P_i = 850\text{ mW}$ ,  $C_i = 0.013\text{ }\mu\text{F}$ ,  $L_i = 0.24\text{ mH}$

Sensor Circuit Parameter:  $U_o = 5.88\text{ V}$ ,  
 $I_o = 130.1\text{ mA}$ ,  $P_o = 191.2\text{ mW}$ ,  $C_o = 1\text{ }\mu\text{F}$ ,  
 $L_o = 1\text{ mH}$

Ambient Temperature:  $-50\text{ to }70^\circ\text{C}$

Enclosure: IP66/IP67

## IECEx Intrinsically safe Approval

Certificate No.: IECEx DEK 12.0013X

Ex ia IIC T4 Ga

Input Parameter:  $U_i = 28\text{ V}$ ,  $I_i = 135\text{ mA}$ ,  
 $P_i = 850\text{ mW}$ ,  $C_i = 0.013\text{ }\mu\text{F}$ ,  $L_i = 0.24\text{ mH}$

Sensor Circuit Parameter:  $U_o = 5.88\text{ V}$ ,  
 $I_o = 130.1\text{ mA}$ ,  $P_o = 191.2\text{ mW}$ ,  $C_o = 1\text{ }\mu\text{F}$ ,  
 $L_o = 1\text{ mH}$

Ambient Temperature:  $-50\text{ to }70^\circ\text{C}$

Enclosure: IP66/IP67

## TIIS Intrinsically safe Approval

Battery Model (Integral antenna)

Approval number: TC20543

Ex ia IIC T4 X

Power Supply : Battery pack (F9915MA) or  
battery case (F9915NS) DC 7.2 V

Sensor Circuit Parameter:  $U_o = 5.88\text{ V}$ ,  
 $I_o = 130.1\text{ mA}$ ,  $P_o = 191.3\text{ mW}$ ,  $C_o = 1\text{ }\mu\text{F}$ ,  
 $L_o = 1\text{ mH}$

Ambient Temperature:  $-20\text{ to }60^\circ\text{C}$

Enclosure: IP66/IP67

Battery Model (Remote antenna)

Approval number: TC20816

Ex ia IIC T4 X

Power Supply : Battery pack (F9915MA) or  
battery case (F9915NS) DC 7.2 V

Sensor Circuit Parameter:  $U_o = 5.88\text{ V}$ ,  
 $I_o = 130.1\text{ mA}$ ,  $P_o = 191.3\text{ mW}$ ,  $C_o = 1\text{ }\mu\text{F}$ ,  
 $L_o = 1\text{ mH}$

Antenna Circuit:  $U_o = 5.88\text{ V}$ ,  $I_o = 177.4\text{ mA}$ ,  
 $P_o = 349.5\text{ mW}$

Ambient Temperature:  $-20\text{ to }60^\circ\text{C}$

Enclosure: IP20

External Power Supply Model (Integral antenna)

Approval number: TC21262

Ex ia IIC T4 X

Input Parameter:  $U_i = 28\text{ V}$ ,  $I_i = 135\text{ mA}$ ,  
 $P_i = 850\text{ mW}$ ,  $C_i = 0.013\text{ }\mu\text{F}$ ,  $L_i = 0.24\text{ mH}$

Sensor Circuit Parameter:  $U_o = 5.88\text{ V}$ ,  
 $I_o = 130.1\text{ mA}$ ,  $P_o = 191.2\text{ mW}$ ,  $C_o = 1\text{ }\mu\text{F}$ ,  
 $L_o = 1\text{ mH}$

Ambient Temperature:  $-50\text{ to }70^\circ\text{C}$

Enclosure: IP20

External Power Supply Model (Remote antenna)  
 Approval number: TC21344  
 Ex ia IIC T4 X  
 Input Parameter:  $U_i = 28\text{ V}$ ,  $I_i = 135\text{ mA}$ ,  
 $P_i = 850\text{ mW}$ ,  $C_i = 0.013\text{ }\mu\text{F}$ ,  $L_i = 0.24\text{ mH}$   
 Sensor Circuit Parameter:  $U_o = 5.88\text{ V}$ ,  
 $I_o = 130.1\text{ mA}$ ,  $P_o = 191.2\text{ mW}$ ,  $C_o = 1\text{ }\mu\text{F}$ ,  
 $L_o = 1\text{ mH}$   
 Antenna Circuit:  $U_o = 5.88\text{ V}$ ,  $I_o = 177.4\text{ mA}$ ,  
 $P_o = 349.5\text{ mW}$   
 Ambient Temperature:  $-50\text{ to }70^\circ\text{C}$   
 Enclosure: IP20

Enclosure  
 In the examination, IP20 enclosure, which is the lowest intrinsically safe explosion-proof requirement, has been verified, but both the integrated antenna model and remote antenna model can be used in an environment that requires IP66/IP67.

■ **PHYSICAL SPECIFICATIONS**

**Enclosure**

**Housing**

Low copper cast aluminum alloy

**Coating**

- Standard coating  
 polyurethane, mint-green paint. (Munsell 5.6BG 3.3/2.9 or its equivalent)
- High anti-corrosion coating (Option Code /X2)  
 Base coating: epoxy resin coating  
 Finish coating: polyurethane coating  
 The color is same as standard type.

**Degrees of Protection**

IP66/IP67, NEMA Type 4X  
 Note: For Intrinsically safe Approval, refer to REGULATORY COMPLIANCE STATEMENTS

**Connections**

G 1/2 female, 1/2-14 NPT female, or M20 X 1.5 female

**Connection Terminal**

4mm screw terminal

**Name plate and tag**

316 SST

**Mounting Bracket**

316 SST  
 Select pipe mounting or wall mounting

**Weight**

3.2 kg (7.05 lb)  
 Without mounting bracket.

■ **Accessories**

**Remote Antenna Cable (optional accessories)**

(Only by order of option)  
 Specification of Cable: 8D-SFA(HDPE)  
 Outside Diameter of Cable: 11.1 mm  
 Minimum Bend Radius: 67 mm (when fixing)  
 167 mm (when wiring)  
 Cable End Treatment: N type connector, one end is male and the other is female.  
 Operationl Temperature Range:  $-40\text{ to }+85^\circ\text{C}$   
 (  $-40\text{ to }185^\circ\text{F}$  )

- \* “When fixing” shows the bending radius for fixing (thestate is maintained for a long time). “When wiring” shows the bending radius while checking the wiring position. This bending radius is set larger than that for fixing in order to prevent damage to the cable because the cable is likely to be repeatedly bent when checking the final wiring position.

Table 10.1 Sensor type, measurement range, and accuracy

Sensor Type		Standard	Measurement Range	Accuracy
T/C	B	IEC 60584	100 to 1820°C ( 212.0 to 3308.0°F )	Accuracy not guaranteed for less than 400°C ( 752.0°F ) ± 2.54°C ( ± 4.57°F ) in the range from 400°C ( 752.0°F ) or more to less than 800°C ( 1472.0°F ) ± 1.54°C ( ± 2.78°F ) for 800°C ( 1472.0°F ) or more
	E		-200 to 1000°C ( -328.0 to 1832.0°F )	± 0.80°C ( ± 1.44°F ) for less than 0°C (32.0°F ) ± 0.40°C ( ± 0.72°F ) for 0°C ( 32.0°F ) or more
	J		-180 to 760°C ( -292.0 to 1400.0°F )	± 0.80°C ( ± 1.44°F ) for less than 0°C (32.0°F ) ± 0.70°C ( ± 1.26°F ) for 0°C ( 32.0°F ) or more
	K		-180 to 1372°C ( -292.0 to 2501.6°F )	± 1.10°C ( ± 1.98°F ) for less than 0°C (32.0°F ) ± 1.00°C ( ± 1.80°F ) for 0°C ( 32.0°F ) or more
	N		-200 to 1300°C ( -328.0 to 2372.0°F )	± 2.00°C ( ± 3.60°F ) for less than 0°C (32.0°F ) ± 1.00°C ( ± 1.80°F ) for 0°C ( 32.0°F ) or more
	R		0 to 1768°C ( 32.0 to 3214.4°F )	± 2.00°C ( ± 3.60°F ) for less than 200°C ( 392.0°F ) ± 1.50°C ( ± 2.70°F ) for 200°C ( 392.0°F ) or more
	S		0 to 1768°C ( 32.0 to 3214.4°F )	± 2.00°C ( ± 3.60°F ) for less than 200°C ( 392.0°F ) ± 1.40°C ( ± 2.52°F ) for 200°C ( 392.0°F ) or more
	T		-200 to 400°C ( -328.0 to 752.0°F )	± 0.70°C ( ± 1.26°F )
RTD	Pt100	IEC 60751	-200 to 850°C ( -328.0 to 1562.0°F )	± 0.30°C ( ± 0.54°F ) for less than 400°C ( 752.0°F ) ± 0.40°C ( ± 0.72°F ) in the range from 400°C ( 752.0°F ) or more to less than 500°C ( 932.0°F ) ± 0.50°C ( ± 0.90°F ) for 500°C ( 932.0°F ) or more
	Pt200		-200 to 850°C ( -328.0 to 1562.0°F )	± 0.54°C ( ± 0.98°F ) for less than 400°C ( 752.0°F ) ± 0.64°C ( ± 1.15°F ) in the range from 400°C ( 752.0°F ) or more to less than 500°C ( 932.0°F ) ± 0.74°C ( ± 1.33°F ) for 500°C ( 932.0°F ) or more
	Pt500		-200 to 850°C ( -328.0 to 1562.0°F )	± 0.38°C ( ± 0.68°F ) for less than 400°C ( 752.0°F ) ± 0.48°C ( ± 0.86°F ) in the range from 400°C ( 752.0°F ) or more to less than 500°C ( 932.0°F ) ± 0.58°C ( ± 1.04°F ) for 500°C ( 932.0°F ) or more
mV		-	-10 to 100 [mV]	± 0.035 [mV]
V		-	-0.01 to 1 [V]	± 0.001 [V]
Ohm		-	0 to 2000 [Ω]	± 1.0 [Ω]

- Note1: For T/C input, add Cold Junction Compensation Accuracy (± 0.5°C) to the total accuracy.  
 Note2: For RTD input of the 2-wire connection, add a corrected value (± 0.1°C) to the total accuracy.  
 Note3: For DC milliamperes (4 to 20 mA), connect external shunt resistors.  
 Note4: Explosion proofing not applicable to [DC volts, DC milliamperes].

Table 10.2 Effects of ambient temperature

Sensor Type		Temperature Effects per 1.0 °C Change in Ambient Temperature	Measurement Range
T/C	B	0.2°C - ( 0.066 % of ( t - 100 ) )	t < 300°C
		0.07°C - ( 0.0057 % of ( t - 300 ) )	300°C ≤ t < 1000°C
		0.037°C	t ≥ 1000°C
	E	0.035°C - ( 0.00492 % of t )	t < 0°C
		0.035°C - ( 0.00146 % of t )	t ≥ 0°C
	J	0.0039°C - ( 0.00529 % of t )	t < 0°C
		0.0039°C + ( 0.00149 % of t )	t ≥ 0°C
	K	0.00521°C - ( 0.00707 % of t )	t < 0°C
		0.00521°C + ( 0.00182 % of t )	t ≥ 0°C
	N	0.0077°C - ( 0.00918 % of t )	t < 0°C
		0.0077°C + ( 0.00136 % of t )	t ≥ 0°C
	R, S	0.04 °C0 + ( 0.0102 % of t )	t < 100°C
		0.0316°C - ( 0.001 % of t )	100°C ≤ t < 600°C
		0.0175°C + ( 0.00173 % of t )	t ≥ 600°C
T	0.00513°C - ( 0.00631 % of t )	t < 0°C	
	0.00513°C + ( 0.0008 % of t )	t ≥ 0°C	
RTD	Pt100	0.0048°C + ( 0.0016 % of absolute value t )	Entire Sensor Input Range
		0.0038°C + ( 0.0015 % of absolute value t )	t < 650°C
	Pt200	0.0028°C + ( 0.0016 % of t )	t ≥ 650°C
		Pt500	0.003°C + ( 0.0014 % of absolute value t )
	0.002°C + ( 0.0016 % of t )		t ≥ 650°C
mV		0.0002 mV + ( 0.0015 % of reading )	Entire Sensor Input Range
V		0.005 mV + ( 0.0015 % of reading )	Entire Sensor Input Range
Ohm		0.001 Ω + ( 0.0009 % of reading )	Entire Sensor Input Range

Note1: The "t" on Table 10.2 means the value of the reading in °C.  
 Note2: The "absolute value t" on Table 10.2 means the absolute value of the reading in °C.  
 [ Example of absolute value t ]  
 When the temperature value is 250 Kelvin, abs reading is 23.15, absolute (250 - 273.15).

## 10.2 Model and Suffix Codes

Model	Suffix Code	Descriptions
YTMX580		Multi-Input Temperature Transmitter
Output Signal	-L	Wireless communication ( ISA100 Wireless)
Housing	7	Always 7
Electrical Connection	0	G 1/2 female, nine electrical connections
	2	1/2 NPT female, nine electrical connections
	4	M20 female, nine electrical connections
Integral Indicator	N	None
Mounting Bracket	L	316 SST 2-inch pipe mounting
	W	316 SST wall mounting <sup>*1</sup>
	N	None
Power Supply	-A	Battery ( case only, battery not included ), with a blind plug
	-B	24 VDC, without a blind plug
Antenna <sup>*5</sup>	A	Integral antenna
	B	Remote antenna <sup>*4</sup>
Temperature unit	-A	Cel, K <sup>*2</sup>
	-B	Cel, K, degF, degR <sup>*3</sup>
---	A	Always A
Option Codes		Optional specifications ( See Option Code )

\*1: For wall mounting, please prepare bolts and nuts.

\*2: This is a Japan-only specification (only available to end users inside Japan).

\*3: In Japan, degF (°F) and degR (°R) are non-statutory measurement units. Suffix code -B can only be specified by end users outside of Japan.

\*4: Order the remote antenna cables separately from accessory option.

\*5: Use of antenna is limited by local regulation of radio and telecommunication law. Consult Yokogawa for details.

Note: " Cel " means " °C ", " degF " means " °F " and " degR " means " °R " .

## 10.3 Optional Specification

Item	Description	Option Code
Coating	High anti-corrosion coating	/X2
Factory configured settings	Factory configured setting with multiple inputs/ ranges	/FC1 <sup>*1</sup>
Customized product	Details in IM YTMX-S#E <sup>*2</sup>	/S#

\*1: If the option code related to explosion protection is specified, Either DCV (mV) or DCV (V) as sensor type is should NOT be applied.

\*2: Contact your supplier in case your instrument has option /S# (where '# is a number), and you are not in the possession of IM YTMX-S#E.

**Table A. Settings upon shipment**

Tag No.	"Blank" or as specified in order
Sensor type	As specified in order
Number of wires for RTD	" 3-wires " or as specified in order
Calibration range lower limit	See Table 10.1. Measurement Range or as specified in order
Calibration range Upper limit	
Calibration unit	

## 10.4 Optional Specifications (For Explosion Protected type)

Item	Description	Option Code
Canadian Standards Association (CSA)	CSA Intrinsically safe and Approval non-incendive approval	/CS17 <sup>*1</sup>
Factory Mutual (FM)	FM intrinsically safe and nonincendive approval	/FS17 <sup>*1</sup>
Japanese Industrial Standards (TIIS)	TIIS intrinsically safe approval	/JS37 <sup>*1</sup>
ATEX	ATEX intrinsically safe approval	/KS27 <sup>*1</sup>
IECEX Scheme	IECEX intrinsically safe approval	/SS27 <sup>*1</sup>

\*1: /CS17, /FS17, /JS37, /KS27, /SS27 cannot be specified together.

## 10.5 Standard Accessories

Product	Qty
User's manual ( Booklet )	1
Mounting bracket*1 ( 2-inch pipe mounting or wall mounting )	1 set
Battery case ( installed in the main body. ) <sup>3</sup>	1
Remote antenna <sup>2</sup>	1

\*1: Not included if specifying no mounting brackets (Mounting bracket suffix code is N).

\*2: With the remote antenna option (Antenna type suffix code is B).

\*3: When battery is specified for the power supply (power supply suffix code is -A)

## 10.6 Optional Accessories

Product	Model code (part number)	Specification
Antenna cable*1	F9193UA	Antenna cable 1 m, Operationl temperature range: -40 to +85°C, With remote antenna mounting bracket.
	F9193UB	Antenna cable 3 m, Operationl temperature range: -40 to +85°C, With remote antenna mounting bracket.
	F9193UC	Antenna cable 4 m (1 m+3 m) with arrestor, Operationl temperature range: -40 to +85°C, With remote antenna mounting bracket.
	F9193UD	Antenna cable 6 m (3 m+3 m) with arrestor, Operationl temperature range: -40 to +85°C, With remote antenna mounting bracket.
	F9193UE	Antenna cable 13 m (3 m+10 m) with arrestor, Operationl temperature range: -40 to +85°C, With remote antenna mounting bracket.
Antenna*1	F9193DH	+2 dBi Remote Antenna (White)

\*1: Use of remote antenna cable is limited by local regulation of radio and telecommunication law. Consult Yokogawa for details.

Product	Model code (part number)	Specification
Battery pack assembly	F9915NQ *1	Battery case, Lithium-thionyl chloride batteries 2 pieces
Battery case	F9915NK *2	Battery case only
Batteries	F9915NR	Lithium-thionyl chloride batteries, 2 pieces
Front door part	B8808DE	Front door Gasket, 1 piece
	B8808DM	Front door Bolt Cap (Long) , 1 piece
	B8808DN	Front door Bolt Cap (Short) , 1 piece
	B8808EM	Front door Bolt SUS316, 1 piece
Bracket	B8808DW	2B Pipe Mounting Bracket SUS316
	B8808DV	Wall Mounting Bracket SUS316
Shunt resistor	X010-050-1	50 Ω ± 0.1 %, for 4 mm screw terminals, Operationl temperature range: -25 to +80°C

\*1: If you need F9915MA, please purchase F9915NQ. F9915NQ is a set of F9915MA and instruction manual.

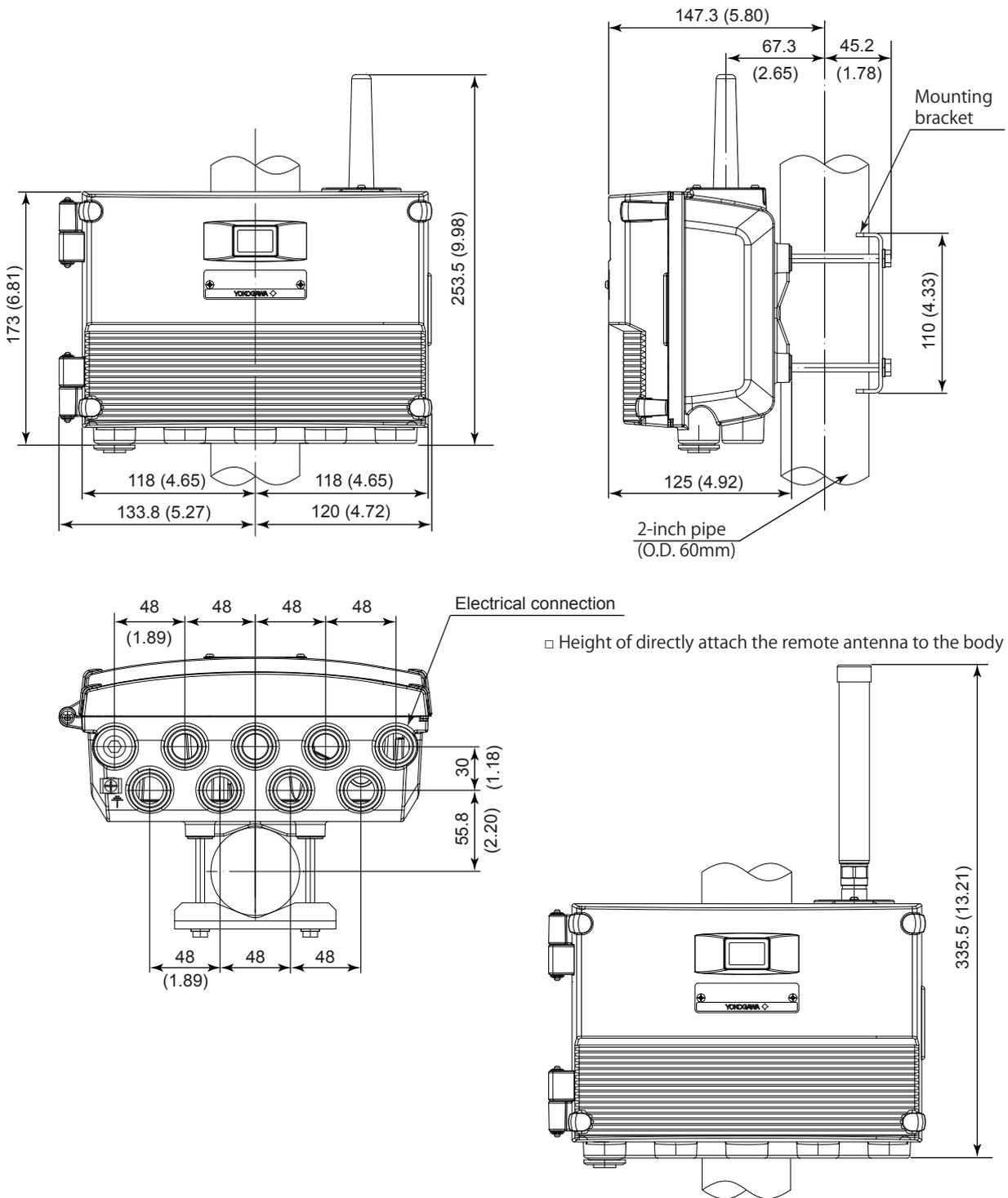
\*2: If you need F9915NS, please purchase F9915NK. F9915NK is a set of F9915NS and instruction manual.

Model	Surffix Code	Description
YTMXBP		Blind plug for electrical connection
Type and Quantity	-A1	G 1/2, 1piece
	-A4	G 1/2, 4pieces
	-A7	G 1/2, 7pieces
	-C1	1/2 NPT, 1piece
	-C4	1/2 NPT, 4pieces
	-C7	1/2 NPT, 7pieces
	-D1	M20, 1piece
	-D4	M20, 4pieces
-D7	M20, 7pieces	

### 10.7 Dimensions

- 2-inch vertical pipe mounting

Unit: mm (approx. inch)

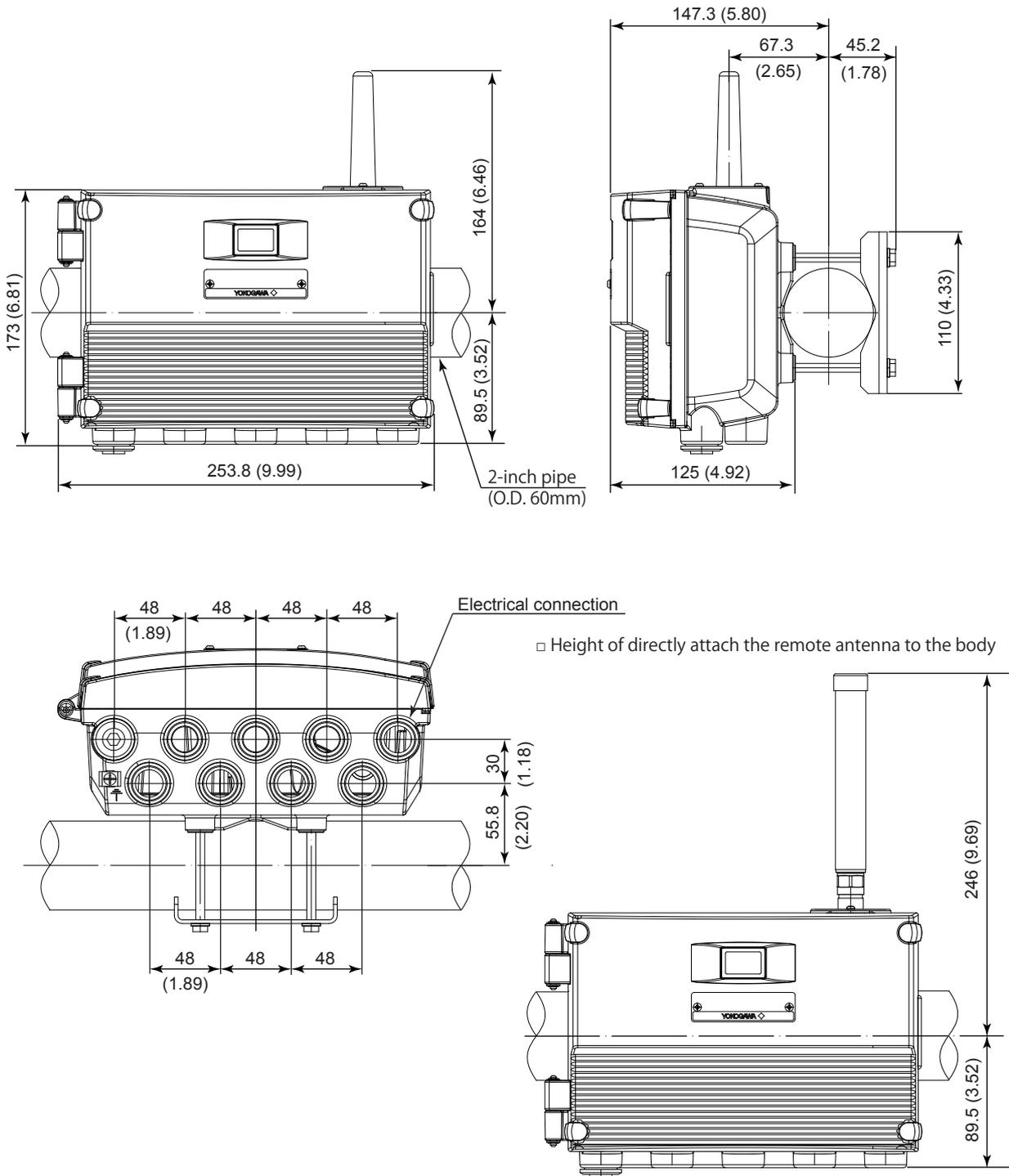


E1001.ai

Note: If not specified, the tolerance is  $\pm 3\%$ . However, for dimensions less than 10mm, the tolerance is  $\pm 0.3\text{mm}$ .

● 2-inch horizontal pipe mounting

Unit: mm (approx. inch)

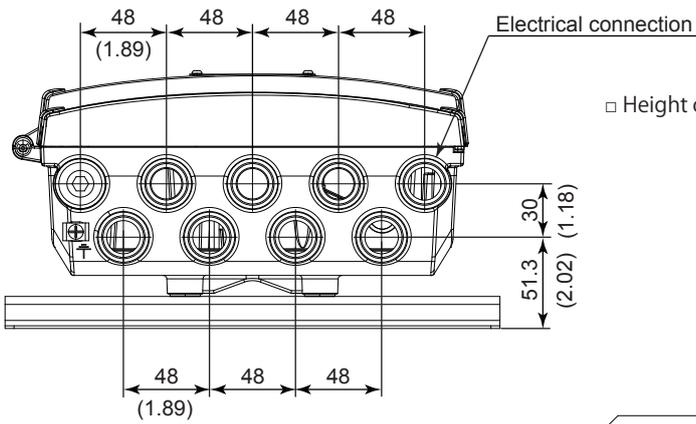
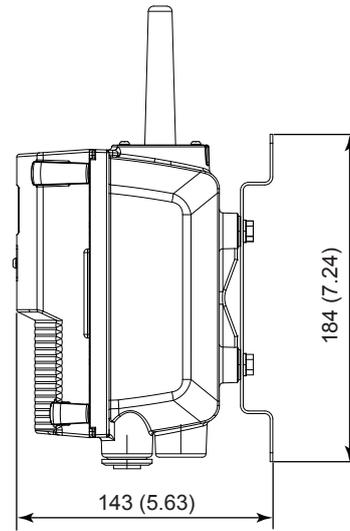
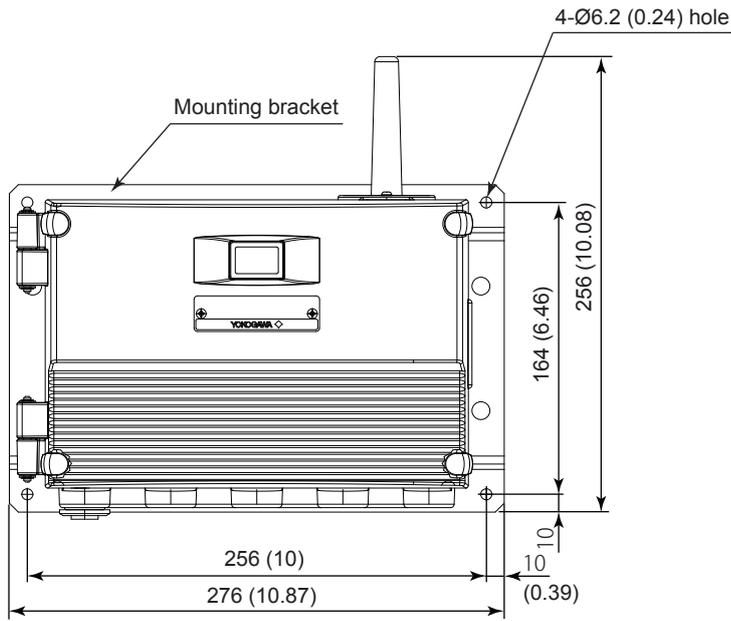


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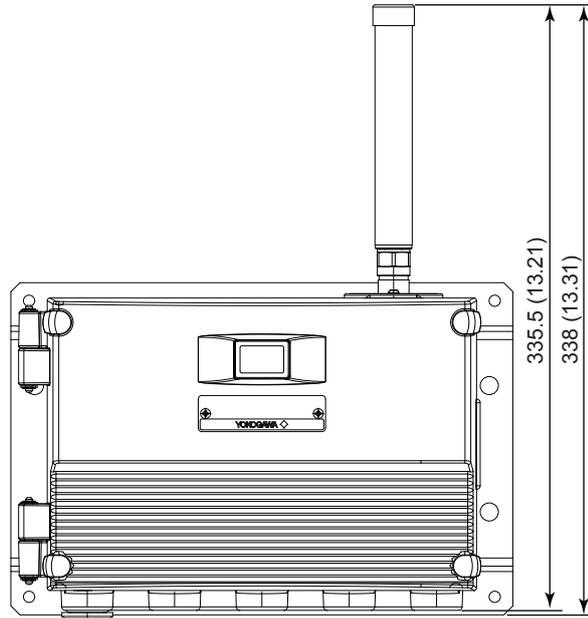
Note: If not specified, the tolerance is  $\pm 3\%$ . However, for dimensions less than 10mm, the tolerance is  $\pm 0.3\text{mm}$ .

● Wall mounting

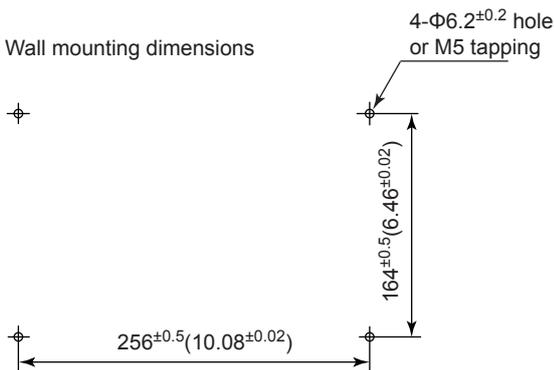
Unit: mm (approx. inch)



□ Height of directly attach the remote antenna to the body



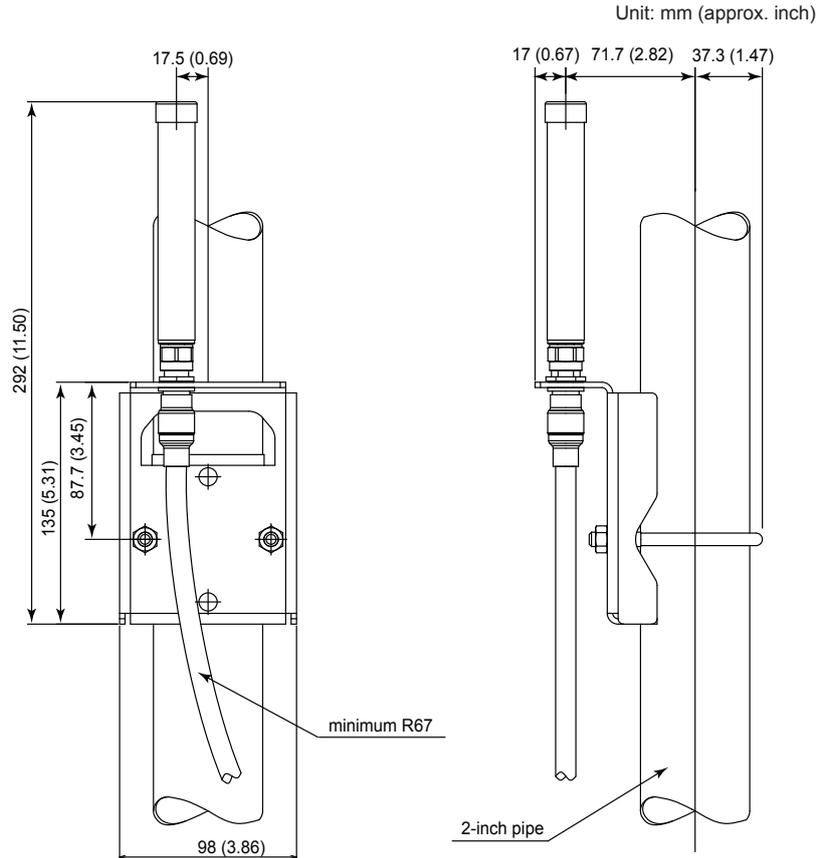
□ Wall mounting dimensions



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Note: If not specified, the tolerance is ±3%. However, for dimensions less than 10mm, the tolerance is ±0.3mm.

● Remote antenna bracket



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● Remote Antenna / Cable

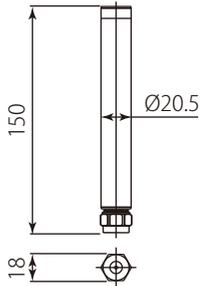
□ Antenna

Antenna

\* Non-direction antenna

\* Gain : +2 dBi

\* Part Number : F9193DH



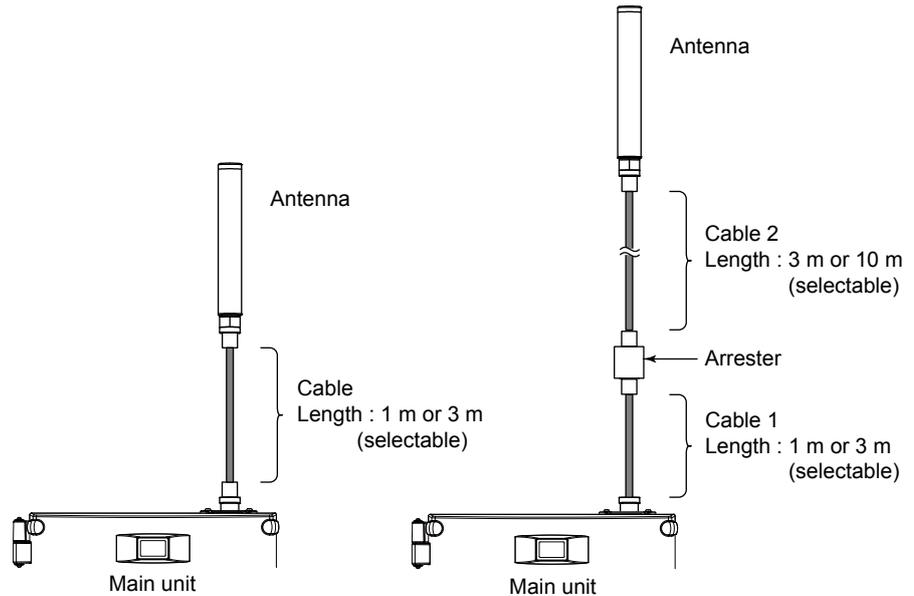
□ Remote antenna

High-frequency coaxial cable

\*Sheath dia. : 11.1 mm

<Without arrester>

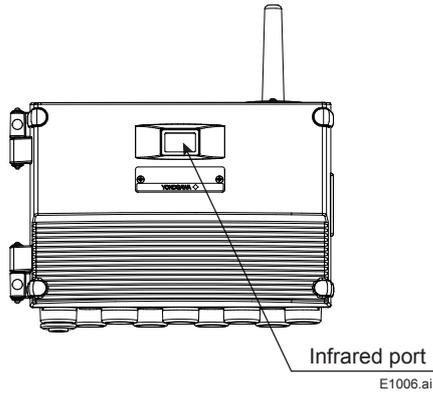
<With arrester>



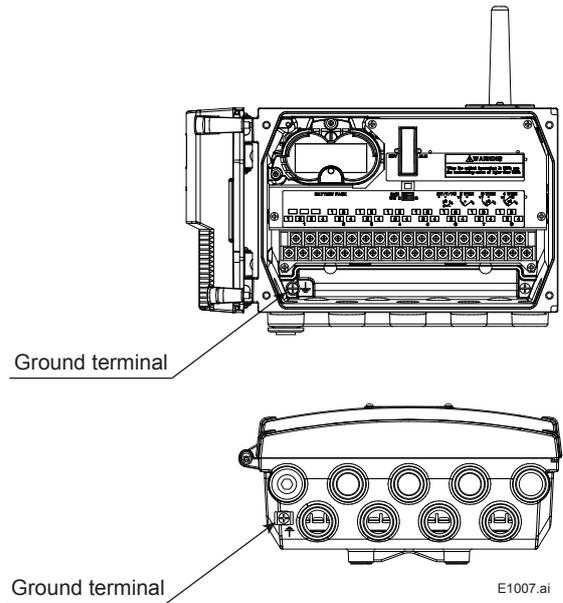
E1005.ai

Note: If not specified, the tolerance is  $\pm 3\%$ . However, for dimensions less than 10mm, the tolerance is  $\pm 0.3$ mm.

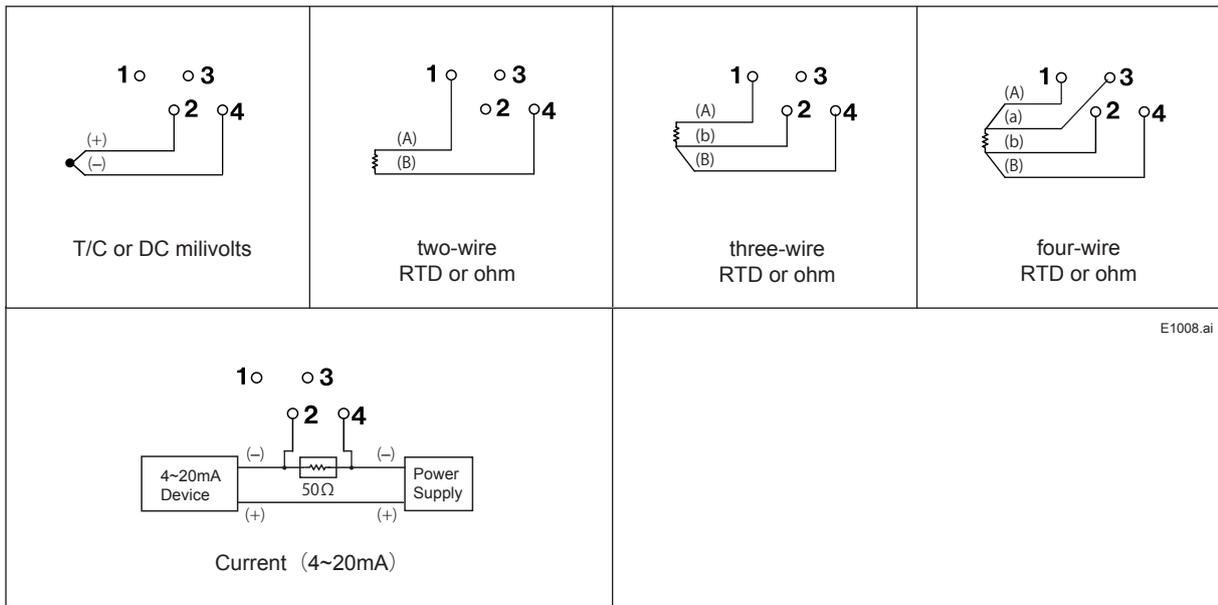
● Infrared Configuration



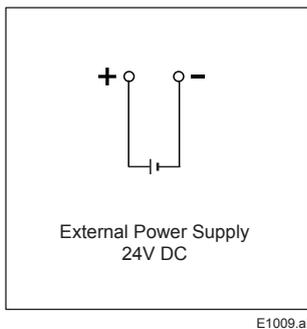
● Terminal Configuration



● Input Wiring



● External Power Supply Wiring



# Revision Information

- Title : YTMX580  
Multi-Input Temperature Transmitter
- Manual No. : IM 04R01B01-01EN

Edition	Date	Page	Revised Item
1st	Sep. 2011	—	New publication
2nd	Feb. 2012	1-2, 2-1, 2-4, 2-5, 10-2 10-3, 10-7 —	<ul style="list-style-type: none"> <li>• Additions of descriptions for regulatory compliance statements ( CE, FCC, IC, KC ).</li> <li>• additions of operational temperature range for remote antenna cable.</li> <li>• Corrections</li> </ul>
3rd	July. 2012	2-3 to 2-10 —	<ul style="list-style-type: none"> <li>• Added support for Explosion Protected Type Instrument.</li> <li>• Change the KC Marking Certification No.</li> <li>• Corrections</li> </ul>
4th	Feb. 2014	1-2	Addition of the Control of Pollution Caused by the Product.
		1-3	Addition of the safety symbols.
		2-1, 4-3, 10-13	Change of dimension (Remote antenna and mounting hardware).
		2-1, 2-8, 2-9	Change the name plate.
		2-11, 10-1, 10-2	Support for Compliant with Safety Standards (IEC/EN/UL/CSA 61010-1 3rd edition).
		2-9 to 2-11, 8-3, 8-5, 10-2, 10-3, 10-7	Support for TIIS intrinsically safe approval.
		2-11	Change for EMC Conformity Standards, Safety Standard.
		2-13, 10-3	Addition of the EMC and Radiocommunications regulatory arrangement in Australia and New Zealand(RCM).
		10-6	Correct (Temperature Effects per 1.0 °C Change in Ambient of sensor Temperature of sensor type B).
		2-4, 2-5, 2-11, 2-12, 3-1, 4-3, 5-1, 5-5, 7-14, 8-1, 10-2, 10-4, 10-5, 10-6, 10-7, 10-8	Other addition and correct.
10-4, 10-8	Change of operational temperature range (antenna cable).		
10-8	Addition of the optional accessories.		
5th	Mar, 2017	1-1, 2-3, 2-4 to 2-8, 2-10 to 2-18, 5-1 to 5-3, 6-1, 6-4, 7-7, 7-11, 7-13, 8-2, 8-3, 8-8, 9-1, 9-6, 10-2, 10-4, 10-5, 10-8, 10-15	TIIS, FM, CSA, ATEX, IECEx intrinsically safe approval description for the 24 VDC external power supply model (remote antenna model)
		5-1, 7-8, 9-4, 10-1, 10-6	Modifications for RTD IEC standard number
		2-2, 6-1, 7-1, 8-1, 10-1, 10-8	Notation change to ISA100 Wireless
6th	Aug, 2018	--- <b>1-3</b> 5-6	Delete the ATEX Documentation. Changes of Control of Pollution Caused by the Product Addition of the IMPORTANT for Grounding.
7th	Oct, 2018	10-4, 10-5	Changes of Po value
		2-20, 10-3	Notation change to RE