

# User's Manual

## TX1002, TX1003 Digital Thermometer

Store this manual in an easily accessible place for quick reference.

Printed in Japan

**YOKOGAWA** ◆

Yokogawa Test & Measurement Corporation

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IM TX10-02E  
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### Introduction

Thank you for purchasing the Digital Thermometer TX1002, TX1003. This User's manual contains useful information regarding the instrument's functions and operating procedures, as well as precautions that should be observed during use. Before using this product, thoroughly read this manual to understand how to use it properly.

The following manuals, including this one, are provided as manuals for the TX1002 and TX1003. Please read all manuals.

IM TX10-02E	Safety precautions, Specifications, etc. (this manual)
IM TX10-02-02EN	[ Operation Manual ]
IM CROHS-TX:	Document for China
IM TX10-93Z2:	Document for Korea







Contact information of Yokogawa offices worldwide is provided on the following sheet

PIM 113-01Z2	Inquiries	List of worldwide contacts
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### 1. Safety Precautions

This product is designed to be used by a person with specialized knowledge. When operating the instrument, be sure to observe the cautionary notes given below to ensure correct and safe use of the instrument. If you use the instrument in any way other than as instructed in this manual, the instrument's protective measures may be impaired. This manual is an essential part of the product; keep it a safe place for future reference. YOKOGAWA is by no means liable for any damage resulting from use of the instrument in contradiction to these cautionary notes.

The following safety symbols are used on the instrument and in the manual:

	Danger! Handle with Care. This symbol indicates that the operator must refer to an explanation in the User's Manual or Service Manual in order to avoid risk of injury or loss of life of personnel or damage to the instrument.
 <b>WARNING</b>	Indicates a hazard that may result in the loss of life or serious injury of the user unless the described instruction is abided by.
 <b>Avertissement</b>	Indique un danger risquant d'entraîner la mort ou de graves blessures si les instructions présentées ne sont pas respectées.
 <b>CAUTION</b>	Indicates a hazard that may result in an injury to the user and/or physical damage to the product or other equipment unless the described instruction is abided by.
 <b>Attention</b>	Indique un danger risquant d'entraîner une blessure et/ou un dégât physique du produit ou d'un autre équipement si les instructions présentées ne sont pas respectées.
 <b>NOTE</b>	Indicates information that is essential for handling the instrument or should be noted in order to familiarize yourself with the instrument's operating procedures and/or functions.
<b>TIP</b>	Indicates additional information to complement the present topic.

- **Be sure to comply with the following safety precautions. Failure to do so may result in loss of life or injury to personnel from such hazards as electrical shock, or damage to the instrument.**

#### **WARNING**

- This instrument is a thermometer (thermocouple used). Do not use this instrument for other purpose.
- Do not use the instrument if there is a problem with its physical appearance.
- Do not use the instrument to measure where there is the risk of electrical shock. Also, when using the 2-channel model, always keep the probe-to-probe potential below 1 V.
- When handling a needle-type probe, be careful not to point the tip in the direction of any person as doing so may result in an injury.
- After measuring anything with a high temperature, do not touch the metal part of the measuring probe as this may result in a burn.
- Do not open the case except when replacing batteries. Only qualified YOKOGAWA personnel may remove the case and disassemble or alter the instrument. Do not attempt to repair/modify the instrument yourself, as doing so is extremely dangerous.

#### **CAUTION**

- When the instrument is stored for a long period of time, be sure to remove the batteries. Not doing so may result in a failure or malfunctioning of the instrument due to a leakage in battery liquid.
- Do not use deteriorated or damaged probes, as doing so will effect the precision of measurements.
- Before you detach the probe from the instrument, always remove the probe from the object being measured.
- When using a needle-type probe, do not insert the metal part of the measuring probe more than half its the length into the object to be measured, as doing so may result in a burn or damage to the probe due to the handle of the probe heating up.
- Keep the handle of the probe and the cable that connects the probe to the instrument within a temperature range of -20°C to 50°C, as they are less resistant to heat than the metal part of the measuring probe.

#### **CAUTION**

The instrument is for domestic use (Class B) and meets the electromagnetic compatibility requirements.

- **Veillez respecter les consignes de sécurité suivantes. Le non-respect de ces consignes risquerait d'entraîner la mort ou des blessures dues à un choc électrique ou d'endommager l'instrument.**

#### **Avertissement**

- Cet instrument est un thermomètre (thermocouple utilisé). Ne pas utiliser cet instrument à d'autres fins
- Ne pas utiliser cet instrument si son aspect physique pose problème.
- Ne pas utiliser cet instrument pour évaluer le risque de choc électrique. De plus, lors de l'utilisation du modèle à 2 voies, toujours maintenir le potentiel sonde-contre-sonde à une valeur inférieure à 1 V.
- Lors de la manipulation d'une sonde de type aiguille, faire attention de ne pas la pointer en direction d'une personne, car cela risquerait de la blesser.
- Après avoir mesurer un élément à haute température, ne pas toucher la partie métallique de la sonde de mesure car cela risquerait d'entraîner une brûlure.
- Ne pas ouvrir le boîtier sauf pour remplacer les piles. Seul du personnel qualifié d YOKOGAWA est autorisé à retirer le boîtier et à démonter ou remplacer l'instrument. Ne pas tenter de réparer/modifier vous-même l'instrument, car il s'agit d'une opération extrêmement dangereuse.

#### **Attention**

- Si l'instrument est stocké pendant une longue période, s'assurer que les piles ont été retirées. Cela risquerait sinon d'entraîner une défaillance ou un dysfonctionnement de l'instrument dû(e) à une fuite du liquide des piles.
- Ne pas utiliser de sondes détériorées ou endommagées, car cela risquerait d'avoir un impact sur la précision des mesures.
- Avant de débrancher la sonde de l'instrument, toujours la retirer de l'objet en cours de mesure.
- Lors de l'utilisation d'une sonde de type aiguille, ne pas insérer la partie métallique de la sonde de mesure de plus de la moitié de sa longueur dans l'objet à mesurer, car cela risquerait de brûler ou d'endommager la sonde suite à une surchauffe de la poignée de la sonde.
- Maintenir la poignée de la sonde et son câble de raccordement à l'instrument à une température comprise entre -20 °C et 50 °C, car ces éléments sont moins résistants à la chaleur que la partie métallique de la sonde de mesure.

#### **Attention**

Cet instrument est destiné à un usage domestique (classe B) et respecte les exigences en matière de compatibilité électromagnétique.

### Measurement category

#### **WARNING**

- The instrument is designed for measurement category O (Other).
- Do not use the instrument for measurements in locations falling that fall under measurement categories II, III, and IV. Additionally, do not connect to above locations (categories) the temperature probe (accessory).
- Do not use the instrument to measure voltage or current.

#### **Avertissement**

- L'instrument est conçu pour la catégorie de mesures O (Autres).
- Ne pas utiliser cet instrument de mesure dans des emplacements de catégorie de mesure II, III et IV. De plus, ne pas connecter la sonde de température (accessoire) aux emplacements (catégories) mentionnés ci-dessus.
- Ne pas utiliser cet instrument pour mesurer la tension ou le courant.

Measurement Category	Description	Remarks
O (None, Other)	Other circuits that are not directly connect to MAINS.	Circuits not connected to a mains power source.
CAT II	For measurement performed on circuits directly connected to the low-voltage installation.	Appliances, portable equipment, etc.
CAT III	For measurement performed in the building installation.	Distribution board, circuit breaker, etc.
CAT IV	For measurement performed at the source of the low-voltage installation.	Overhead wire, cable systems, etc.

The estimated transient overvoltage that may appear at the instrument signal input is 350 V.

### 2. Cleaning and After-Sales Service

#### ■ **Cleaning**

- If the instrument becomes dirty, wipe the instrument with a cloth that has been dampened with water and well wrung.
- If the instrument is very dirty, use a cloth that has been dampened with a diluted neutral detergent. Do not use other detergents, solvents, or chemicals. Doing so may cause a failure of the instrument.
- Avoid any water or other liquids from splashing onto the connector, as this may cause a failure of the instrument.

#### ■ **After-Sales Service**

Please direct question about this product to the contact listed on the "Inquiries" or to your nearest Yokogawa dealer.

### 3. Handling Precautions

#### ⚠ CAUTION

- Each probe has its own maximum and minimum operating temperatures, so ensure that its temperature does not fall outside the specified range
- As the probe is susceptible to corrosion, do not use the instrument for the measurement of gas or liquid, and refrain from measuring semi-solid particles and semi-viscous substances. After measurement, wipe the probe with a dry cloth.
- Do not apply a strong force to the upper and lower parts of the probe as doing so may result in the bending of the probe connector.
- When using the instrument be careful not to bend, drop, or strike the measurement probe.
- When measuring surface temperature using a surface-type probe, position the probe perpendicular to the surface of the object. Also note that the application of oil to the probe for the means of providing better contact can improve measurement accuracy.
- When measuring non-metallic surface temperature, make sure the measurement time is long enough to compensate for poor thermal conductivity.
- To ensure stable measurement, the instrument should not be subjected to a sudden temperature change.
- This instrument, with the exception of the connector section, is water-resistant but not waterproof. Therefore the instrument should not be immersed in water. If it is mistakenly immersed in water, remove it immediately and check to ensure that no water has penetrated inside the case. Although this instrument is designed so that any water penetrating into the connector does not permeate into the circuit inside the case, try to prevent any water entering the connector. If water does enter the connector, the burnout display may be unavailable.

#### ⚠ Attention


- Chaque sonde possède ses propres températures de fonctionnement maximales et minimales. Il faut donc s'assurer que sa température ne tombe pas sous la plage spécifiée.
- La sonde étant sensible à la corrosion, ne pas utiliser l'instrument pour la mesure de gaz ou de liquide et éviter de mesurer des particules semi-solides et des substances semi-visqueuses. Après la mesure, essuyer la sonde avec un chiffon sec.
- Ne pas exercer une force puissance sur les parties supérieures et inférieures de la sonde, car cela risquerait de faire plier le connecteur de sonde.
- Lors de l'utilisation de l'instrument, faire en sorte de ne pas plier, faire tomber ou cogner la sonde de mesure.
- Lors de la mesure de la température de surface à l'aide d'une sonde de type sonde de surface, placer cette dernière perpendiculairement à la surface de l'objet. Noter que l'application d'huile sur la sonde afin d'assurer un meilleur contact peut améliorer la précision de la mesure.
- Lors de la mesure de la température sur une surface non-métallique, s'assurer que la durée de la mesure est suffisante pour compenser la mauvaise conductivité thermique
- Pour assurer une mesure stable, l'instrument ne doit pas subir de changement de température brutal.
- Cet instrument, à l'exception de la partie connecteur, est résistant à l'eau, mais pas étanche à l'eau. C'est pourquoi l'instrument ne doit pas être immergé dans l'eau. S'il se retrouve par erreur immergé dans l'eau, le retirer immédiatement et s'assurer que l'eau n'a pas pénétré à l'intérieur du boîtier. Même si l'instrument est conçu pour que toute quantité d'eau pénétrant dans le connecteur n'entre pas dans le circuit du boîtier, il faut essayer d'éviter que de l'eau entre dans le connecteur. Si de l'eau entre dans le connecteur, l'écran endommagé risque d'être indisponible.

### 4. Specification

#### Performance Specification

Thermocouple type:	K, J, E, T
Measurement channels:	1ch or 2ch (2ch, multi-function model only)
Measuring range:	Type K: -200°C to 1372°C Type J: -200°C to 1000°C Type E: -200°C to 700°C Type T: -200°C to 400°C
Measurement resolution:	-200.0°C to 199.9°C: 0.1°C or 1°C (when 1°C resolution is set) 200°C or higher: 1°C
Accuracy (instrument):	-200.0°C to -100.1°C: 0.1% of rdg + 1.0°C -100.0°C to 199.9°C: 0.1% of rdg + 0.7°C 200°C or higher, or when 1°C resolution is set: 0.2% of rdg + 1°C when the temperature at input jacks are stabilized
Temperature coefficient	±(0.015% of rdg + 0.06°C)/°C
Measurement cycle:	Approx. 1 second (1ch model; 2ch model when performing 1ch measurement) Approx. 2 seconds (2ch model when performing 2ch measurement; with no range switching)
Operating temperature/humidity:	0°C to 50°C, 20 to 80% RH (no condensation)
Storage temperature/humidity:	-10°C to 60°C, 5 to 95% RH (no condensation)
Power requirements:	Two AA alkaline dry batteries (LR6)
Battery life:	Approx. 450 hours

#### General Functions

Display:	Reflective LCD; 7-segment, 4-digit display and 30 character segments
Computing function:	MAX/MIN, REL Difference between 2 channels (2ch model only)
Battery alarm:	Displayed on LCD (  )
Key operation sound:	Internal buzzer sounds during key operation
Auto power-off:	Turns off the power 10 minutes after the last key operation (can be disabled)
Range hold function:	Controls the range switching between -200.0°C to 199.9°C (0.1°C resolution), and 200°C or higher (1°C resolution).
Simple memory function:	Stores up to 10 data items in memory. Displays memory number and stored data value.
Degree of protection provided by enclosures:	Equivalent to IP54 (when using the waterproof cover)
Simplified correction function	Based on the reference value entered manually

Dimensions:	Approx. 151 (H) × 56 (W) × 33 (D) mm (excluding protrusions)
Weight:	Approx. 180 g (including batteries)
Accessories:	User's manual, Two AA alkaline dry batteries (LR6)

Safety standards:	EN 61010-1, EN 61010-2-030 Measurement category O (Other) Indoor use, altitude 2000 m or less, pollution degree 2
EMC standards:	EN 61326-1 Class B, EN 55011 Class B Group 1 EMC Regulatory Arrangement in Australia and New Zealand EN 55011 Class B Group 1 Korea Electromagnetic Conformity Standard ( 한국 전자파적합성기준 )

The accuracy rating of all ranges are the sum of the accuracy levels in standard applications and the accuracy tolerances shown below, where the overall length of cable, including the probe, is assumed to be shorter than 3 m.

Accuracy tolerance of all available ranges: ±5% of span

Environmental standard: EN 50581

Monitoring and control instruments including industrial monitoring and control instruments

### 5. Accessories (Optional)

TC-K Probe (Temperature probes for thermocouple type K)

Model	Probe type	Measuring range	Sensor Diameter/Length (mm)	Tolerance
90020B	Rounded end	-50 to 600°C	φ 3.2/200	T < 375°C: ± 1.5°C
90021B	Rounded end	-50 to 600°C	φ 1.6/150	375°C ≤ T: ± 0.004 × T°C
90022B	Rounded end	-50 to 600°C	φ 3.2/500	
90023B	Needle	-50 to 500°C	φ 1.6/100	
90024B	Needle	-50 to 500°C	φ 2.1/100	
90030B	Surface straight	-20 to 250°C	φ 15 *1	(T-Ts) ≤ 100°C: ± 2.5°C 100°C < (T-Ts): -0.03 × T to +2.5°C T: -20°C to 250°C, Ts: 0°C to 40°C
90031B	Surface angled	-20 to 250°C	φ 15 *1	
90032B	Surface straight	-20 to 500°C	φ 15 *1	(T-Ts) < 333°C: +2.5°C 333°C ≤ (T-Ts): +0.0075 × T°C (T-Ts) < 167°C: -2.5°C 167°C ≤ (T-Ts): -0.015 × T°C T: -20°C to 500°C, Ts: 0°C to 40°C
90033B	Surface angled	-20 to 500°C	φ 15 *1	
90029B	Bead TC	-40 to 260°C	1200 mm *2	± 2.5°C

T: measurement temperature, Ts: ambient temperature

245921	Extension cable (5 m)
245922	Extension cable (10 m)
93011	Waterproof cover (5 pcs)
93012	Carrying case

[ Note ]

\*1: Diameter of thermosensitive part 15 mm dia.

\*2: Length of probe (included cord)

### 6. Sales in Each Country or Region

#### 6.1 Disposing the Product

##### Waste Electrical and Electronic Equipment (WEEE), Directive

(This directive is valid only in the EU.)

This product complies with the WEEE directive marking requirement.

This marking indicates that you must not discard this electrical/electronic product in domestic household waste.



##### Product Category

With reference to the equipment types in the WEEE directive, this product is classified as a "Monitoring and control instruments" product. When disposing products in the EU, contact your local Yokogawa Europe B.V. office. Do not dispose in domestic household waste.

#### 6.2 How to Replace and Dispose the Batteries

##### EU Battery Directive

(This directive is valid only 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: Alkaline dry cell



##### Notice:

This marking indicates they shall be sorted out and collected as ordained in the EU battery directive.

##### How to remove batteries safely:

For further details, see "9. Battery Replacement" in the User's Manual (IM TX10-02-02EN).

#### 6.3 Authorized Representative in the EEA

Yokogawa Europe B.V. is the authorized representative of Yokogawa Test & Measurement Corporation for this product in the EEA. (EEA: European Economic Area)

To contact Yokogawa Europe B.V., see the separate list of worldwide contacts, PIM 113-01Z2.

### ■ Regarding This Manual

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