

Instruction Manual

TX10-01 Digital Thermometer

Thank you for purchasing this instrument.
For proper use, please read through this instruction manual prior to operation.

YOKOGAWA 
Yokogawa M&C Corporation

IM TX10-01E
July 2001, 2nd Edition


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1. Cautionary Notes for Safe Use of the Product

■ The following safety symbols are used on this instrument and instruction manual to ensure safe use.

 **WARNING:** This symbol found on the back of the instrument, calls attention to a potential danger or hazard capable of resulting in a serious injury or loss of life, and the operator must refer to this instruction manual to avoid the danger or hazard.

 **WARNING:** This symbol in this manual indicates a potential danger or hazard capable of resulting in a serious injury or loss of life.

 **CAUTION:** This symbol in this manual indicates a potential danger or hazard capable of resulting in severe but not irreversible injury or damage. In some instances, the hazards may be those associated with WARNING symbols but are of significantly less magnitude.

 **NOTE:** This symbol draws attention to information that is essential for understanding how to operate the instrument and/or instrument features.

TIP: Gives information that complements the present topic.

■ To avoid accidents, such as an electrical shock, which may lead to injury or the loss of life to the operator, or damage to the equipment, be sure to observe the following precautions.

WARNING

- Do not use the instrument to measure where there is the risk of electrical shock.
- 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.

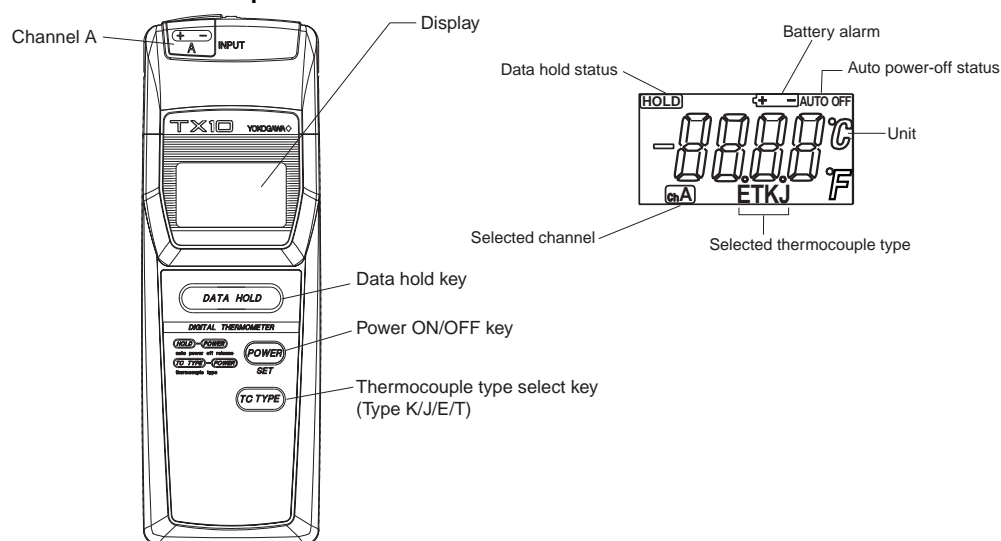
CAUTION



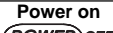

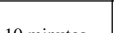






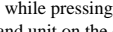
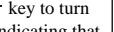

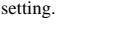
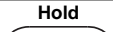

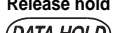
- When the instrument is stored for a long period of time, be sure to remove the batteries. Not doing so may result in a failure or malfunctioning of the instrument due to a leakage in battery liquid.
- Do not use deteriorated or damaged probes, as doing so will effect the precision of measurements.
- 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 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.

■ Regarding Disassembling and Modification

Do not disassemble or modify the instrument in any way. The instrument should only be disassembled by a service engineer of Yokogawa.

2. Functional Description

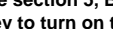


Key	Operation and description	Display
Using the unit °F 	To users who use Fahrenheit as the temperature unit: To use the unit °F, follow the instructions below. <ul style="list-style-type: none"> When turning on the power, keep the  key held down. Verify that the display shows the °F symbol, and then release the key. After completing this step, you can switch between °C and °F whenever you set the type of thermocouple. By following the same procedure as above, you can revert to the condition in which only the unit °C is available. 	°F
Power on 	■ Press this key to turn on the power. <ul style="list-style-type: none"> The auto power-off function turns off the power automatically about 10 minutes after the last key operation of any key other than the  key. To disable the auto power-off function, simultaneously press the  key and  key. With this function disabled, the instrument will stay powered continuously. 	After the power has been turned on, all the elements of the display light up.
Power off 	■ To turn off the power, press this key for 1 second or longer.	AUTO OFF
Select thermocouple type  +  ↓  ↓ 	To select a thermocouple type from K, J, E, and T: If the power is already turned on, turn it off. <ul style="list-style-type: none"> Press and hold down the  key while pressing the  key to turn on the power. The thermocouple type and unit on the display flash, indicating that the instrument is ready for changing thermocouple type. Every time the  key is pressed the thermocouple type and unit (°C/°F) changes. Press the  key to accept the setting. TIP: The factory-set default is type K.	K, J, E, T
Hold 	Use this key to hold the measured value on LCD. <ul style="list-style-type: none"> To hold, press this key. 	
Release hold 	<ul style="list-style-type: none"> To cancel holding, press this key again. 	
Burnout —	<ul style="list-style-type: none"> When the probe is not connected to the input connector (or the sensor opens), a burnout mark is displayed. For the 2-channel mode, the burnout mark is displayed when the probe is not connected to the selected channel (channel A and B, or channel A-B) 	

3. Measurement

This instrument can connect any of the 4 types of thermocouples: Type K, J, E, or T (it is set to Type K at shipment from the factory). Use an omega-type connector corresponding to the TC type for the probe.

(1) Load the batteries (see section 5, Battery Replacement).


(2) Press the  key to turn on the power.


When the power has been turned on, all indications on the display light up for about 2 seconds, then a measured value appears.

(3) Check the thermocouple type.

If you wish to change the current setting, turn off the power and follow the instructions in the section Select thermocouple type on the previous page.

(4) Connect the probe to the input connector.

(5) When you have finished measurement, turn off the power by pressing the  key.


- The power may be turned off by the auto power-off function during measurement. In this case, press the  key to restart the instrument and continue measurement.

4. Precautionary Notes

NOTE

- 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.

5. Battery Replacement

When the batteries approach the end of their lives, the  mark appears on the display. If this mark is displayed, replace the batteries. To replace the batteries:

- Remove the battery box cover from the back of the instrument. Then replace the two AA alkaline dry batteries (LR6).
- Refit the cover to the battery box.

NOTE

- When inserting batteries, be careful not to mistake the polarity as this can damage the instrument.
- When the instrument is to be stored for a long period of time, remove the batteries.
- Do not leave dead batteries in the instrument as doing so may result in a failure or malfunction of the instrument due to a leakage in battery liquid.
- Both batteries should be replaced with new ones at the same time as replacing only one of the batteries may result in the charge leaking from the new battery to the old.

6. Cleaning and Maintenance Service

- 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.
- For maintenance or repairs, contact Yokogawa Engineering Service (see the first page).

7. Specifications

Thermocouple type	K, J, E, T
Measuring range	Type K: -200°C to 1372°C [-328°F to 2501.6°F] Type J: -200°C to 1000°C [-328°F to 1832°F] Type E: -200°C to 700°C [-328°F to 1292°F] Type T: -200°C to 400°C [-328°F to 752°F]
Measurement resolution	-200.0°C to 199.9°C: 0.1°C 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 200.0°C or higher: 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
Operating environment	0 to 50°C, 20 to 80% RH (no condensation)
Storage environment	-10 to 60°C, 5 to 95% RH (no condensation)
Power requirements	Two AA alkaline dry batteries (LR6)
Battery life	Approx. 450 hours
Display	Reflective LCD; 7-segment, 4-digit display and 30 character segments
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)
Drip-proof construction	Protection Class IP-54
External dimensions	Approx. 151(H) × 56(W) × 33(D) mm (excluding protrusions)
Weight	Approx. 180 g (including batteries)
EMC standards	EMI (interference signal): EN55011:1998, EN61326-1:1998+A1 (Class B, Group 1) EMS (immunity): EN50082-1:1997, EN61326-1:1998+A1
Emission immunity	The accuracy ratings 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 (Tested at 3 V/m and for standard applications)

Accessories

Instruction manual, Two AA alkaline dry batteries (LR6)

8. Accessories (Options)

Temperature probes (for thermocouple type K)

Model	Probe type	Measuring range	Accuracy	Response time (second)	Sensor Diameter/Length (m/m)	Cord length
900 20	rounded end	-50 to 600 °C [-58 to 1112°F]	0.4% or ±1.5°C(±2.7°F)	1.4	ø3.2 / 200	1.2 m
900 21	rounded end	-50 to 600 °C [-58 to 1112°F]	0.4% or ±1.5°C(±2.7°F)	0.4	ø1.6 / 150	1.2 m
900 22	rounded end	-50 to 600 °C [-58 to 1112°F]	0.4% or ±1.5°C(±2.7°F)	1.4	ø3.2 / 500	1.2 m
900 23	needle	-50 to 500 °C [-58 to 932°F]	0.4% or ±1.5°C(±2.7°F)	0.4	ø1.6 / 100	1.2 m
900 24	needle	-50 to 500 °C [-58 to 932°F]	0.4% or ±1.5°C(±2.7°F)	1	ø2.1 / 100	1.2 m
900 30	Surface straight	-20 to 250 °C [-4 to 482°F]	0.75% or ±2.5°C(±4.5°F)	2	ø15 (temp. sensing portion)	1.2 m
900 31	Surface angled	-20 to 250 °C [-4 to 482°F]	0.75% or ±2.5°C(±4.5°F)	2	ø15 (temp. sensing portion)	1.2 m
900 32	Surface straight	-20 to 500 °C [-4 to 932°F]	0.75% or ±2.5°C(±4.5°F)	2	ø15 (temp. sensing portion)	1.2 m
900 33	Surface angled	-20 to 500 °C [-4 to 932°F]	0.75% or ±2.5°C(±4.5°F)	2	ø15 (temp. sensing portion)	1.2 m
2459 07	Bead TC	-40 to 260 °C [-40 to 500°F]	0.75% or ±2.5°C(±4.5°F)		1200 (including cord)	1.2 m

(90% response)

2459 21 Extension cable (5 m), 2459 22 Extension cable (10 m), 930 11 Waterproof cover (5 pcs), 930 12 Carrying case

9. Regarding This Manual

- The contents of this manual are subject to change without prior notice.
- This manual is intended to describe the functions of this product, not to guarantee that the functions are suited to the particular purpose of the user.