Ideal for temperature measurement, monitoring and management of temperature data records

Thermometers
TM10,20/TX10

■ **The TM Series offers excellent data management functions**

● Collect up to 5000 data items with time-stamp, tag name and inspector name.
● Save 2 weeks continuous data logging with 1 minute interval, (up to 20000 data items, measuring interval is 1sec. to 24 houres.)
Information on when , by whom and what is measured is saved along with the data.

■ **The simplicity of the TX10 Series allows for ease of use.**

● For K, E, J, and T type thermocouples
● Easy display switching between channels A and B

TX10

Easy operation
TX Series

Data management
TM Series

A	B	C	D
Measured Date	Measured Time	Measured Value	Hi Judgeme
1999/7/15	15:09:52	75.1	OK
1999/7/15	15:09:48	78.2	OK
1999/7/15	15:09:45	30.3	OK
1999/7/15	15:09:43		OK
1999/7/15	15:09:33		

TM10
Thermistor Input

TM20
Thermocouple Input

C E

Yokogawa M&C Corporation

Improved data management with inclusion of information on **when**, **by whom** and **what** is measured

TM Series of Thermo-Collectors

TM10 for Food & HACCEP use
TM20 for Industrial use

TM10   Thermistor model

Effective for HACCP program implementation

TM10/TM20 Common Features

External probes (-30°C to 200°C) [-22°F to 392°F]

There are three types available: a needle probe for mid-point temperature, a rounded end probe for liquid temperature, and a surface probe for surface temperature.

Built-in sensor (-20°C to 50°C) [-4°F to 122°F]

Measures ambient temperature, and allows for continuous measurement inside a warehouse or during transportation.

Memory key

Each press of this key saves the measured data, along with 3 other monitoring items: the name of the object being measured, operator's name, and date and time of measurement.

Selection of registered tag name

Select from the list of up to 50 registered tag names (objects to be measured).

Input selection key

Collector/Logging mode selector key

Switches between the collector mode (saves measured data when necessary) and logging mode (saves measured data continuously).
- **When used in the collector mode only, saves up to 5000 data items.***
- **When used in the logging mode only, saves up to 20000 data items.***

Measuring interval: 1 second to 24 hours (Under simultaneous 2-channel measurement with the TM20, 2 seconds is the minimum.)

Start-of-measurement time: timer can be set.

* Under simultaneous 2-channel measurement, the TM20 saves 2 data items for one measurement.

User-friendly FUNC key

You can select setup items in the same way as you choose options from the built-in menu of a cellular phone.

Selection of operator name

With the (1) key, you can recall a list of up to 10 operator names and can also change any of these names.

Record-keeping on measurement failure handling

By pre-registering a list of up to 32 comments on how to handle particular measurement failures, you can keep records of how the measurement failure was dealt with by selecting the desired comment from the list using the (4) key.

(The TM10 supports this feature with TM10 Version 1.10 when used with application software version 1.30 or later.)

Setup keys

Register tag names, set alarm points, and define measuring conditions, such as the measuring interval for the logging mode. These setting tasks can also be carried out from a PC.

Digital input terminal

For connecting to an optional non-contact probe.

RS-232C I/O terminals

Used to exchange data with a PC or send data to a dedicated printer.

Full Size

Light Weight: 170 g

Drip-proof construction (TM10/TM20)

Conforming to IP54 standards, the TM10/TM20 can still function even if it becomes wet to some degree. In addition, the optional waterproof cover increases waterproofing and protects the instrument against possible dirt contamination.
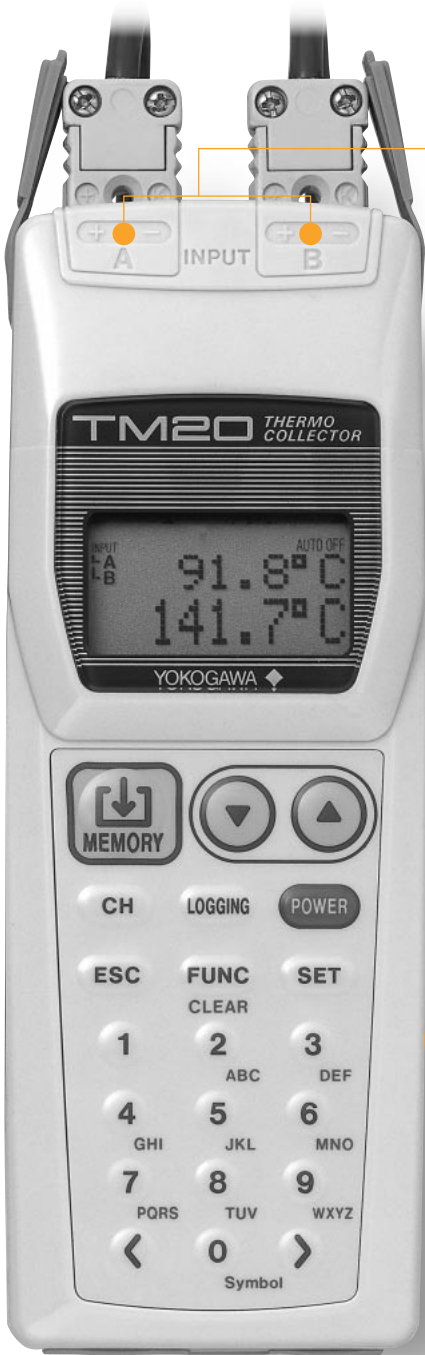
IP 5 4

Drip-proof: Immune to any harmful effects from liquid splashes from any direction.

Dust-proof: Prevents dust from entering the instrument.

TM20

Universal dual inputs model

Thermocouple probes (-200°C to 1372°C) [-328°F to 2501.6°F]

Type K : -200°C to 1372°C [-328°F to 2501.6°F]
Type E : -200°C to 700°C [-328°F to 1292°F]
Type J : -200°C to 1000°C [-328°F to 1832°F]
Type T : -200°C to 400°C [-328°F to 752°F]
(Possible temperature ranges with the TM20)

Analog signal input

The TM20 can accept inputs from a sensor that outputs voltage signals ranging ±100 mV or ±1 V.
* A U-shaped Miniature connector is required.

Full Size

Light Weight: 180 g

● **Products that can be connected to the TM20**

● Connecting the TM20 to various analog output sensors allows for data storage and management.
● The TM20 also has a scaling function that shows computed values on its display.

Model 900 01/U temperature and humidity probe

TM20-dedicated probe that connects via a U-shaped Miniature connector

Model 310 03 leak clamp tester

Digital illuminance meters (510 Series)

● **Waterproof Cover and Soft Carrying Case**

Waterproof cover
Model 930 11 (for TM10/TM20)

With the waterproof cover, you can keep the TM10 clean and increase its waterproofing qualities.

Soft Case
Model 930 10 (for TM10)
Model 930 12 (for TM10/TM20)

Can be attached to your belt.

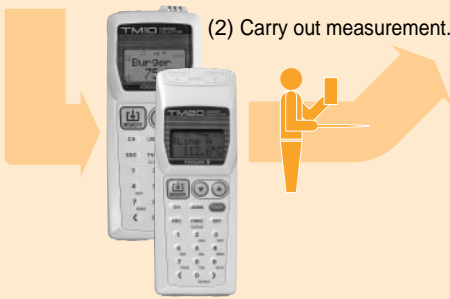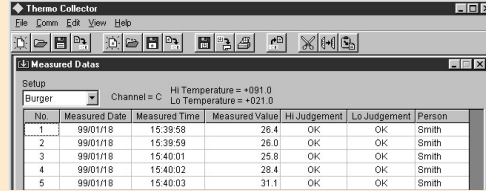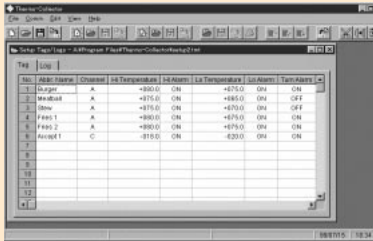# Data management is made easy because the TM10/TM20 records data items that tell you when, by whom, and what along with the temperature data.
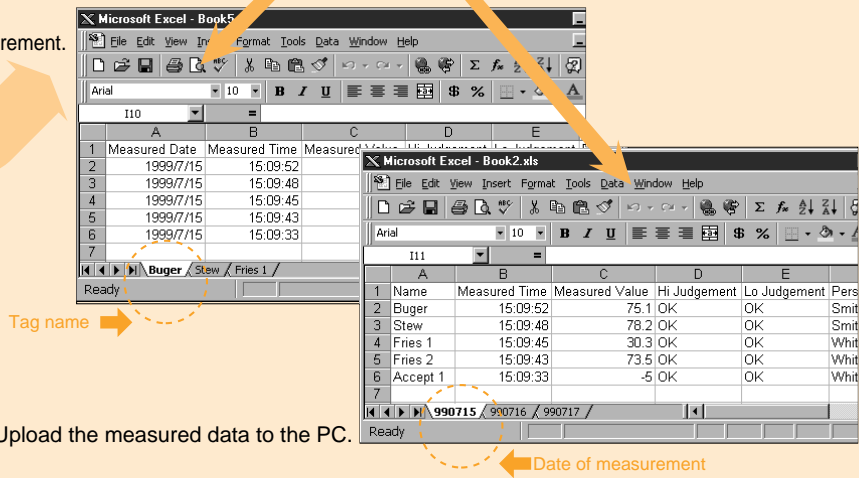
Easy data management using a PC (data management software included)

Setting measurement conditions from the PC.

(1) Download the measurement conditions to the TM10/TM20.

(2) Carry out measurement.

Tag name

(3) Upload the measured data to the PC.

Date of measurement

● Microsoft Excel spreadsheets are automatically generated for each object being measured (tag name) and each date of measurement. Data collected later can also be added to these spreadsheets.
The TM10 supports this feature with TM10 Version 1.10 when used with application software version 1.30 or later.

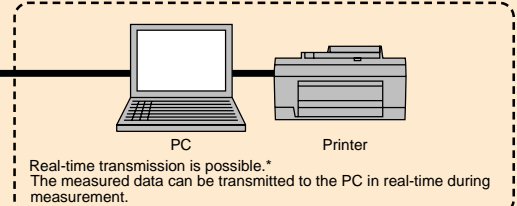## Configuration of a system based on the TM10/TM20 Thermo-collector

● **Probes for contact thermometry**

ch A   ch C

ch A

ch B

ch D
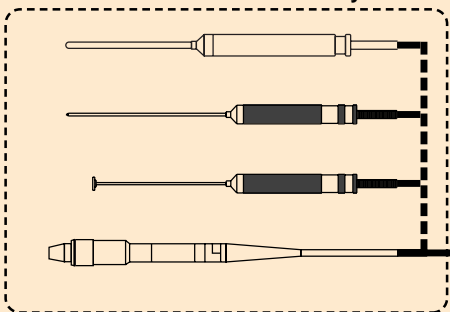
● **Probes for non-contact thermometry**
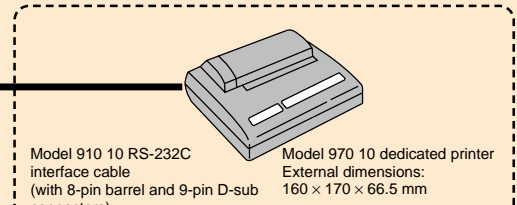
Non-contact probe
(Model 900 03)
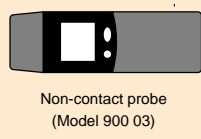
● **Data management based on easy-to-use application software**
(The software is supplied together with the TM10/TM20.)

PC   Printer

Real-time transmission is possible.*
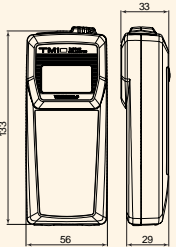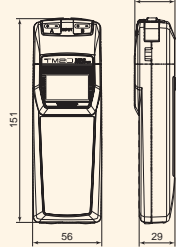The measured data can be transmitted to the PC in real-time during measurement.

* When performing real-time transmission, always use the non-contact probe.

RS-232C interface cables:
Model 910 11 (with 8-pin barrel and 9-pin D-sub connectors)

● **Data management through direct printing**

Model 910 10 RS-232C interface cable
(with 8-pin barrel and 9-pin D-sub connectors)

Model 970 10 dedicated printer
External dimensions:
160 × 170 × 66.5 mm

Product name (Model)	TM10 Thermo-collector Thermistor model (540 51)	TM20 Thermo-collector Thermocouple model (540 11)
Number of measuring channels	1 (Selectable from 3 channels) One channel is provided for each of the external thermistor probe, built-in thermistor sensor, and external non-contact probe.	2 (when A and B channels are used for thermocouple or voltage input) 1 (when D channel is used with the non-contact probe)
Measuring range (only the main unit)	External thermistor -30°C to 200°C [-22°F to 392°F] Built-in thermistor -20°C to 50°C [-4°F to 122°F] Thermal emission (external probe) -20°C to 400°C [-4°F to 752°F]	Thermocouple 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] Thermal emission -20°C to 400°C [-4°F to 752°F] Voltage input ±100 mV, ±1 V
Resolution	External thermistor: 0.1°C Built-in thermistor: 0.1°C Thermal emission (external probe): 1°C	Thermocouple: 0.1°C Thermal emission: 1°C Voltage input: 0.1 mV or 0.001 V
Accuracy (only the main unit)	External thermistor Temperature range (T) / Accuracy -30°C ≤ T < -20°C / ±1.0°C -20°C ≤ T ≤ 0°C / ±0.4°C 0°C < T < 100°C / ±0.3°C 100°C ≤ T < 150°C / ±0.4°C 150°C ≤ T ≤ 200°C / ±0.7°C Built-in thermistor Temperature range (T) / Accuracy -20°C ≤ T ≤ 0°C / ±1.0°C 0°C ≤ T < 40°C / ±0.8°C 40°C ≤ T ≤ 50°C / ±1.0°C * For the accuracy when using a non-contact probe (900 03), see the accuracy ratings of the probe.	Thermocouple -100°C ≤ T: ±(0.1% of rdg + 0.3°C) T < -100°C: ±(0.1% of rdg + 0.6°C) Reference junction compensation is ±0.4°C when the temperature of the input terminal is in equilibrium Thermal emission ±(1% of rdg + 1°C) or ±3°C, depending on the accuracy of the non-contact probe. Voltage input ±(0.1% of rdg + 0.2% of range)
Measuring mode	Collector mode or Logging mode	
Measuring interval	Collector mode: 1 second or longer Logging mode: 1 second to 24 hours	Collector mode: 0.5 seconds or longer when 1 channel is used. 1 second or longer when 2 channels are used. Logging mode: 1 second to 24 hours when 1 channel is used. 2 seconds to 24 hours when 2 channels are used.
Data capacity	5000 data items when used in collector mode only. 20000 data items when used in logging mode only. Measurement data obtained in collector mode and logging mode can coexist.	5000 data items when used in collector mode only. 20000 data items when used in logging mode only. Measurement data obtained in collector mode and logging mode can coexist. Under simultaneous 2-channel measurement, 2 data items are recorded at the same time.
Drip-proof construction	Conforms to IP54 standards (dust-proof and drip-proof requirements of IEC529)	
Display	LCD with backlight	
Operating temperature and humidity	-20°C to 50°C, 20 to 80% RH (no condensation)	0°C to 50°C, 20 to 80% RH (no condensation)
Power requirements	Two AA-size alkaline dry batteries (LR6)	
Battery life	Approx. 3 months when operated in logging mode at 10-minute intervals; Approx. 1 month when operated in logging mode at 1-minute intervals; Approx. 2 weeks when operated in collector mode 8 hours a day.	Approx. 1.5 months when operated in logging mode at 10-minute intervals; Approx. 1 month when operated in logging mode at 1-minute intervals; Approx. 5 days when operated in collector mode 8 hours a day including 30 minutes of communication.
Registration of tag names	A maximum of 50, each comprising up to 8 alphanumeric characters	
Registration of operator names	A maximum of 10, each comprising up to 8 alphanumeric characters	
Registration of comments	A maximum of 32, each comprising up to 8 alphanumeric characters	
Alarm function	Upper- and lower-limit alarms	
Computing function	Maximum, minimum, and average	Maximum, minimum, and average Reading of difference between the 2 channels is possible.
Communication function	Conforms to EIA RS-232C standard.	
Simplified correction function	None	Corrects the measured data from thermocouple input within the range of ±20.0°C.
Scaling function	None	Scales the voltage input x according to the formula "Ax + B," which is defined from the thermo-collector software.
Other functions	Chime, function lock, clock display, auto power-off, and battery alarm	
Thermo-collector software system requirements	CPU: i486DX or higher OS: Windows 95/Windows 98/Windows NT 4.0 FDD: 3.5", 1.44 MB-formatted Required space on the HDD: 10 MB or greater	Recommended memory capacity: 16 MB or greater Serial I/O capability: A serial port conforming to RS-232C standard should be available. Software: Microsoft Excel 95, Microsoft Excel 97
Compliance with standards	EMC standards EMI (interference signal): EN55011;1998, EN61326-1;1998+A1 (Class B, Group 1) EMS (immunity): EN50082-1;1997, EN61326;1998+A1	
External dimensions	Approx. 133(H) × 56(W) × 33(D) mm (excluding protrusions) Weight: Approx. 170 g (including batteries)	Approx. 151(H) × 56(W) × 33(D) mm (excluding protrusions) Weight: Approx. 180 g (including batteries)
Supplied accessories	Software, two AA-size alkaline dry batteries (LR6), a waterproof cover, and an instruction manual	
Optional accessories	Standard needle probe (900 10) High-speed needle probe (900 11) Surface probe (900 12) Rounded end probe (for liquid) (900 13) Soft case (930 10)	Temperature probes (for K type thermocouple): Rounded end probe (900 20, 900 21, 900 22) Needle probe (900 23, 900 24) Surface probe (900 30, 900 31, 900 32, 900 33) Bead TC (2459 07) Extension cable 5 m (2459 21) /10 m (2459 22) Soft case (930 12)
	Non-contact probe (900 03) ●RS-232C cable for PC connection:9-pin (910 11) ●AC adapter for printer:Europe (940 06) / USA (940 07) ●Printer (970 10) ●RS-232C cable for printer connection (910 10) ●Thermal paper for printer (10 rolls) (970 80)●Waterproof cover (5 per package) (930 11)	

TX SERIES

Simplicity Allows for Ease of Use

TX10 Series of Digital Thermometers

TX10 Series offers thermocouple thermometers that support K, J, E and T type thermocouples. There are three models available: 1-channel single-function, 1-channel multi-function, and 2-channel multi-function models.

TX10 -01

1-channel Single-function Model (TX10-01)

TC TYPE

Operation

Select the thermocouple type (K, J, E, and T) for the initial setting.
(The type K is factory-set at shipment)

Press and hold down the TC TYPE key while pressing the POWER key.
The TX10 enters the thermocouple type selection mode, and each press of the TC TYPE key switches between the thermocouple types.
Then accept the setting with the POWER key.
(Make sure that the characters in the display have changed.)

DATA HOLD

Press this key to hold the measured value.

Multi-function Models (TX10-02/-03)

● **Memory-in Function**

Up to ten data items can be stored. When recalled, the stored data value is displayed with its memory number.

● **User calibration function**

Calibration and adjustment can be mode easily by operating the panel keys on instrument and a measurement-standard.

TX10 -02/-03

TC TYPE

Thermocouple type (K, J, E, and T) select key
(Operation is the same as TX10-01)

CH

(TX10-03 only)

Input channel select key
With each press, the channel switches through the sequence of "chA," "chB," and then "chA-chB."

DATA HOLD

Data hold key
A held measured value, can be stored in the memory of an optional memory number, which is selected with the ▲, ▼ keys.

RECORD

· Maximum and minimum record key
Stores the maximum and minimum values from the time the RECORD key is pressed.

· Data record key
Stores the held measured value in memory. (Up to ten)

RANGE

Resolution select key
With each press, resolution alternates between 0.1°C and 1°C.
(Within the range of -200.0°C to 199.9°C)

READ

Maximum and minimum values, and stored data read key
Every time this key is pressed, the maximum and minimum values, stored data, and the current measured data are displayed in sequence.

REL/ADJ

· Relative display select key
Displays measured values with reference to the value obtained immediately before this key was pressed (relative value). Each press of this key can select or release the relative display.

· Simplified correction mode key
Sets the correction value, and selects active/inactive of the simplified correction function.

▲, ▼ Data call-up key
Used to select a memory number when calling up stored data. Also used to adjust the correction value for simplified correction mode.

Light Weight: 180 g

(Shown above is the TX10-03. The TX10-02 has no CH key.)

Can Be Used in Wide Variety of Applications

- Temperature management in a refrigerated warehouse
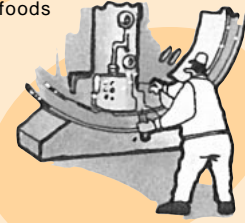- Frozen food products quality control
- Perishable foods quality control
- Temperature management in production processes
- Product temperature measurement test
- Temperature checks in equipment maintenance
- Temperature management for research and development

Product name	Digital Thermometer		
	Single-function, 1 channel	Multi-function, 1 channel	Multi-function, 2 channels
Model	TX10-01	TX10-02	TX10-03
Number of input channels	1		2
Measuring range (only the main unit)	Thermocouple type Type K: -200°C to 1372°C [-328°F to 2501.6°F] Type E: -200°C to 700°C [-328°F to 1292°F] Type J: -200°C to 1000°C [-328°F to 1832°F] Type T: -200°C to 400°C [-328°F to 752°F]		
Resolution	-200.0°C to 199.9°C: 0.1°C 200°C or above: 1°C	-200.0°C to 199.9°C: 0.1°C or 1°C (when 1°C resolution is set) +200°C or above: 1°C	
Accuracy (only the main unit)	-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 above, or when 1°C resolution is set: ±(0.2% of rdg + 1°C)		
Temperature coefficient	± (0.015% of rdg +0.06°C)/°C		
Measurement interval	Approx. 1 sec.		Approx. 1 sec. (1 channel measurement) Approx. 2 sec. (2 channel measurement)
Data storage	None	Capable of storing up to 10 measured data items	
Simplified correction	None	Correction range: ±20°C of measured value	
Display items	HOLD,°C, ch A, TC type K, J, E, T, Battery alarm	HOLD, RCD, REL, ADJ, MAX, MIN, MEM, °C chA, TC type K, J, E, T Battery alarm	HOLD, RCD, REL, ADJ, MAX, MIN, MEM, °C chA, chB, chA-chB TC type K, J, E, T Battery alarm
Other functions	Auto power-off, battery alarm		
Display	LCD		
Operating temperature and humidity	0°C to 50°C, 20 to 80% RH (no condensation)		
Power requirements	Two AA-size alkaline dry batteries (LR6)		
Battery life	About 450 hours		
Drip-proof construction	Conforms to IP54 (dust-proof and drip-proof requirements of IEC529)		
Compliance with standards	EMC standards EMI (interference signal): EN55011;1998, EN61326-1;1998+A1 (Class B, Group 1) EMS (immunity): EN50082-1;1997, EN61326;1998+A1		
External dimensions	 Approx. 151(H) × 56(W) × 33(D) mm (excluding protrusions) Weight: Approx. 180 g (including batteries)		
Supplied accessories	Two AA-size alkaline dry batteries (LR6) and instruction manual		

Optional accessories	Temperature probes (for K type thermocouple)
	      Surface probe (2459 01, 2459 02)
	      Rounded end probe (2459 03, 2459 04, 2459 06)
	      Needle probe (2459 05)
	      Bead TC (2459 07)
	 Extension cable 5 m (2459 21) /10 m (2459 22)
	 Soft case (930 12)
	 Waterproof cover (5·per package) (930 11)		

Specifications of Accessories

Probes for TM10

900 10 Standard Needle Probe
900 13 Rounded end Probe (for Liquid)

● Measuring range: -30°C to 200°C [-22°F to 392°F]

Temperature range (T)	Accuracy	
-30°C ≤ T < -20°C	±1.0°C	(Typical)
-20 ≤ °C ≤ 0	±0.5°C	(Typical)
0 < °C < 100	±0.5°C	
100 ≤ °C < 150	±1.0°C	(Typical)
150 ≤ °C ≤ 200	±2.0°C	(Typical)

● Response: Approx. 6 seconds for 90% of final value

900 03 Non-contact probe

● Measuring range: -20°C to 400°C [-4°F to 752°F]
● Accuracy: ±1% of reading ±1°C or ±3°C whichever is greater.
● Response: 0.8 seconds for 90% of final value

900 11 High-speed Needle Probe
900 12 Surface Probe

● Measuring range: -30°C to 200°C [-22°F to 392°F]

Temperature range (T)	Accuracy	
-30°C ≤ T < -20°C	±2.0°C	(Typical)
-20 ≤ °C ≤ 0	±1.5°C	(Typical)
0 < °C < 100	±1.5°C	
100 ≤ °C < 150	±1.5°C	(Typical)
150 ≤ °C ≤ 200	±2.5°C	(Typical)

● Response: Approx. 2 seconds for 90% of final value (900 11)
Approx. 6 seconds for 90% of final value (900 12)

Note: The accuracy ratings above were obtained with the measurement of liquids being agitated.

Probes for TM20/TX10

Temperature Probe (for type K)

Model	Probe type	Measuring range	Accuracy	Response time (second)	Sensor Dimenter / 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	φ3.2 / 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	φ1.6 / 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	φ3.2 / 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	φ1.6 / 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	φ2.1 / 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	φ15 (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	φ15 (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	φ15 (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	φ15 (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 (included cord)

(90% response)

Temperature and Humidity Probe (900 01 / U: for TM20 only)

	Humidity	Temperature
Measuring range	0 to 95% RH	-10 to 50°C(°C only)
Accuracy	20 to 80% RH:±3% RH	20°C±5°C:±0.5°C
	0 to 20% RH, 80 to 90% RH:±4% RH	other than those above:±0.7°C
Output	1 mV /% RH	1 mV / °C
Response time	15 sec	15 sec

Printer

Communications function	RS-232C
Serial connector	9-pin D-sub connector

Optional Accessories for TM10

Product name	Model
Standard needle probe	900 10
High-speed needle probe	900 11
Surface probe	900 12
Rounded end probe (for liquid)	900 13
Soft case	930 10

Optional Accessories for TM10/TM20

Product name	Model
Non-contact probe	900 03
RS-232C cable for PC connection (9-pin)	910 11
Printer	970 10
AC adapter for printer (Europe)	940 06
AC adapter for printer (USA)	940 07
Thermal paper for printer (10 rolls)	970 80
RS-232C cable for printer connection	910 10

Optional Accessories for TM20/TX10

| Product name	Model
Temperature probe (for type K)	900 20/21/22/23/24/30/31/32/33
Bead TC (for type K)	2459 07
K-shape connector	990 09
U-shape connector (for input voltage) (for TM20 only)	990 08
Extension cable (5 m)	2459 21
Extension cable (10 m)	2459 22
Soft case	930 12
Waterproof cover (5 per package) (for TM10, TM20, TX10)	930 11

External Dimensions

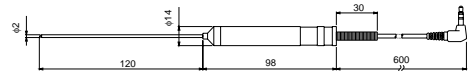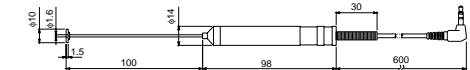**TM10 / TM20** — Non-contact probe (900 03) — Unit: mm
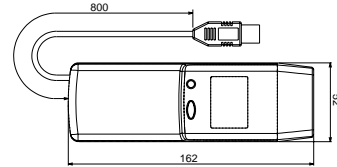
TM10 — Standard needle probe (900 10) / Rounded end probe (900 13) / Material: SUS316
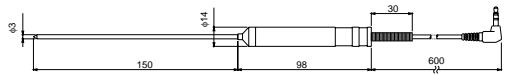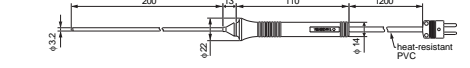
High-speed needle probe (900 11) / Material: SUS316

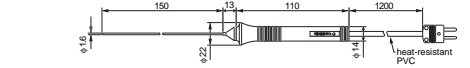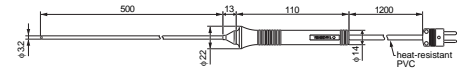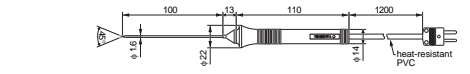Surface probe (900 12) / Material: SUS316

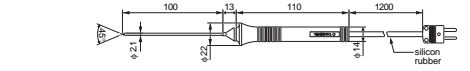
TM20 / TX10

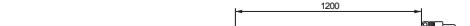900 20 Material: SUS316
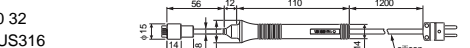900 21 Material: SUS316
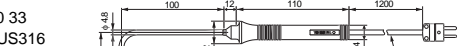900 22 Material: SUS316
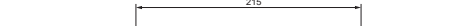900 23 Material: SUS316
900 24 Material: SUS316
2459 07
900 30/900 32 Material: SUS316
900 31/900 33 Material: SUS316
900 01/U

[Ed: 02/b]   Printed in Japan: Jul. 2000(C)/3,000(YG)