## Compact Waterproof Data Logger

# TR-5*i* Series


Easy-to-Read Display
Durable Waterproof Loggers

TANDD

CE

# Simple Standalone Compact Logger
# No Network Necessary!

**Communication done the simple way provides battery life of up to 4 years**

**Tough compact design for wider measurement applications**


https://tandd.com/product/series/tr5i.html

## TR-5i Series Features

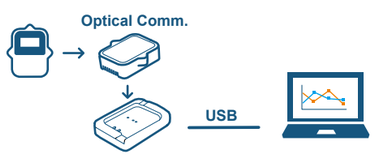
### Waterproof and Robust Body

Ideal for measurement in harsh environments, transport and outdoor use.

### Alarm LED and LCD Display

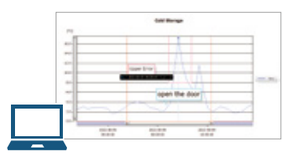
Easily view settings and device status on LCD.
Alarm LED flashes when measurement exceeds set range.
Quickly check time and type of warnings on software.

### Data Collection




Collecting data is made easy with the use of the TR-50U2 Communication Port connected to a PC.

### User-Friendly Software Available Free of Charge



**T&D Graph**
A powerful graphical tool for viewing and analyzing data recorded by T&D data loggers.

**T&D Recorder for Windows (TR-5,7xU)**
Software for making various detailed recording settings and downloading data.



# Product Lineup

## Data Loggers

### Temperature

Pt100 / Pt1000

Thermocouple

**TR-51i** EN 12830

Measurement Range: -40 to 80 °C
Water Resistance: IP67 (Immersion proof)
Temperature Sensor (Internal): Thermistor

**TR-52i** EN 12830

Measurement Range: -60 to 155 °C
Water Resistance: IP64 (Splash proof / rated for use in daily life)
Temperature Sensor TR-5106 Included

**TR-55i-Pt**

Measurement Range: -199 to 600 °C
Input Module PTM-3010 Included
(Sensor sold separately)

**TR-55i-TC**

Measurement Range:
K : -199 to 1370 °C
J : -199 to 1200 °C
T : -199 to 400 °C
S : -50 to 1760 °C
Input Module TCM-3010 Included
(Sensor not sold by T&D)

### Voltage

**TR-55i-V**

Measurement Range: 0 to 22 V
Input Module VIM-3010 Included
Measurement Resolution: Minimum of 0.1 mV
Preheat Function

### 4-20mA

**TR-55i-mA**

Measurement Range: 0 to 20 mA (Operational up to 40 mA)
Input Module AIM-3010 Included

### Pulse Count

**TR-55i-P**

Measurement Range: Pulse count 0 - 61439
Input Signal: Contact Input / Voltage Input
Input Frequency: 0 - 3.5 kHz
Input Cable PIC-3150 Included
For use with Voltmeters, Flow Meters and Passage Counters

EN 12830 Compliance

TR-51i and TR-52i data loggers comply with EN12830, the European Standard regarding temperature recorders for the transport, storage and distribution of chilled, frozen, deep-frozen and quick-frozen food.

## Data Collection Device

You will need a Communication Port and the software “T&D Recorder for Windows (TR-5,7xU)” in order to change the recording settings and download recorded data.


**USB Communication Port**

**TR-50U2**

Between Unit - Data Loggers: Optical Communication
Between Unit - PC: USB Communication

- Use for downloading data directly to a PC.
- Download data from a logger at full storage capacity in about 25 seconds.
- The unit operates via USB bus power so no need for more wires and plugs.
- Possible to specify a time period of data for downloading so you get only the data you want.

## Temperature Sensors for TR-52i

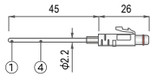
Measurement Range: -60 to 155 °C ,
Sensor Temperature Durability: -70 to 180 °C
Accuracy (TR-5620 excluded): Avg. ±0.3 °C at -20 to 80 °C , Avg. ±0.5 °C at -40 to -20 °C / 80 to 110 °C , Avg. ±1.0 °C at -60 to -40 °C / 110 to 155 °C

Materials: ① Thermistor ② Stainless Tube (SUS316) ③ FEP Shrink Tube ④ FEP Cable ⑤ Fluoropolymer Mold

### Fluoropolymer Coated Sensor

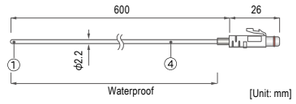
**TR-5101**

Response Time (90 %):
Approx. 80 sec. (in air)




**TR-5106**

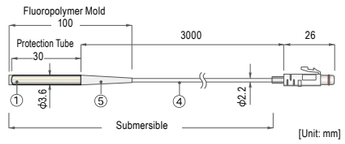
Response Time (90 %):
Approx. 80 sec. (in air)
Approx. 7 sec. (in agitated water)




### Underwater Sensor

**TR-5530**

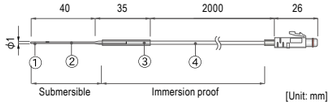
Response Time (90 %):
Approx. 150 sec. (in air)
Approx. 15 sec. (in agitated water)




### High Sensitivity Ultra-thin Sensor

**TR-5620**

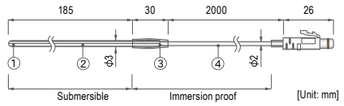
Accuracy
Avg. ±0.5 °C at -20 to 60 °C
Avg. ±1.0 °C at -60 to -20 °C
60 to 80 °C
Avg. ±2.0 °C at 80 to 155 °C
Response Time (90 %):
Approx. 50 sec. (in air)
Approx. 1 sec. (in agitated water)




### Stainless Protection Sensor

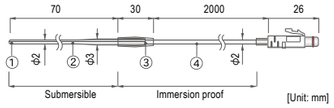
**TR-5220**

Response Time (90 %):
Approx. 150 sec. (in air)
Approx. 7 sec. (in agitated water)



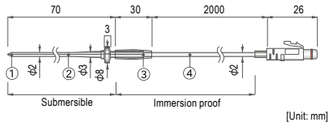

**TR-5320**

Response Time (90 %):
Approx. 90 sec. (in air)
Approx. 3 sec. (in agitated water)




**TR-5420**

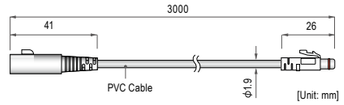
For Core Temperature
Response Time (90 %):
Approx. 90 sec. (in air)
Approx. 3 sec. (in agitated water)




### Extension Cable

**TR-2C30**

Waterproof Capacity:
Splash proof (rated for use in daily life)
Temperature Durability:
-25 to 60 °C




Note: Only one extension cable per Temperature sensor.

## Pt100 Sensor for TR-55i-Pt

TR-8 ### - #.# - #### - ## M
A B C D

To order, create the model number by selecting A , B , C , and D (See below).
A Sensor Type (3 digits)
B Protection Tube Diameter (2 digits)
C Protection Tube Length (2 - 4 digits)
D Cable Length (1 - 2 digits)

| | |
|---|---|
| Sensor Device | Pt100 |
| Electrical Current | less than 2mA |
| Insulation Resistance | DC100V over 100 MΩ<br>TR-8130: over 10 MΩ at DC500 V |
| Conductor | 3 wire type |

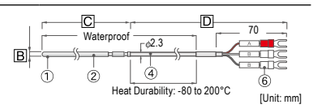
| | |
|---|---|
| Range of Error | ±(0.15 + 0.002 × t) °C<br>t = absolute value of measurement in °C |
| Water Resistance | TR-8200: Waterproof<br>Others: Only stainless protection tube is water resistant. |

- Pt100 sensors are produced only upon order, therefore please allow approximately 1.5 months from time of order until shipping. The lead time varies depending on the specifications and quantity.
- The thermistor (temperature detection section) is mounted in the tip of the sensor.

### A Sensor Type

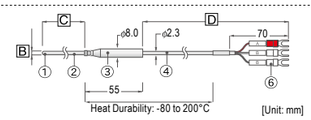
**TR-82[0][0] (Waterproof Type)**

Measurement Range: -50 to 200 °C
Response Time (90 %) :
Approx. 13 sec.* (in agitated water)



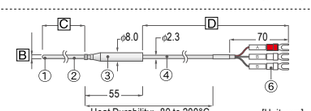

**TR-82[1][0] (Regular Type)**

Measurement Range: -200 to 300 °C
Response Time (90 %) :
Approx. 6 sec.* (in agitated water)



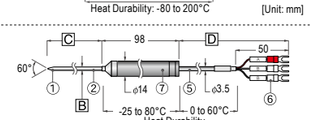

**TR-82[2][0] (Low to High Temp Type)**

Measurement Range: -200 to 500 °C
Response Time (90 %) :
Approx. 6 sec.* (in agitated water)




**TR-81[3][0] (Handy Type)**

Measurement Range: -50 to 200°C
Response Time (90%) :
Approx. 6 sec.* (in agitated water)




* Stated response time (90%) is for sensors with a protection tube diameter of ϕ3.2.

Materials: ① Sensor (Pt100) ② Stainless Protection Tube (SUS316) ③ Sleeve (SUS304) ④ FEP Cable ⑤ PVC Cable ⑥ Crimp Terminals ⑦ Grip (Bakelite)

### B Protection Tube Diameter

| | TR-8200 | TR-8210 | TR-8220 | TR-8130 |
|---|---|---|---|---|
| ϕ 2.0 | - | ○ | - | - |
| ϕ 2.3 | - | ○ | - | - |
| ϕ 3.0 | ○ | ○ | - | - |
| ϕ 3.2 | ◎ | ◎ | ◎ | ◎ |
| ϕ 4.8 | ○ | ○ | ○ | ○ |
| ϕ 6.0 | ○ | ○ | - | - |
| ϕ 6.4 | - | - | ○ | - |

◎ Recommended ○ Avaiable - Not available

### C Protection Tube Length

TR-8220: 50 to 2000 millimeters
Others: 50 to 1000 millimeters

Can be specified in 50 mm units.

### D Cable Length

1 to 99 meters

Can be specified in 1 m units.





## Input Modules for TR-55i

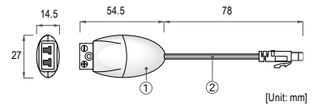
Operating Environment (PIC-3150 excluded): Temperature -40 to 80 °C, Humidity 90 %RH or less (no condensation)

Note: Input Module is not water resistant.

Materials: ① Polycarbonate ② PVC Cable ③ M3.5 Crimp Terminal

### Thermocouple Module

**TCM-3010**

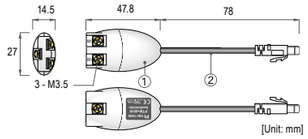



Compatible Sensors: Thermocouple: Type K, J, T, S
Measurement Range: within the sensor heat-durability range only
Measurement Resolution: Type K, J, T 0.1 °C, Type S about 0.2 °C
Measurement Accuracy (*1) :
Cold Junction Compensation:
±0.3 °C at at 10 to 40 °C: ±0.5 °C (*2)
±0.5 °C at -40 to 10 °C, 40 to 80 °C (*2)
Thermocouple Measurement:
Type K, J, T: ±(0.3 + 0.003 × t) °C
Type S: ±(1.0 + 0.003 × t) °C
t = absolute value of measurement in °C

Note: Make sure to use a thermocouple sensor with a miniature thermocouple plug attached. T&D does not make available these plugs or sensors for sale.

### Pt Module

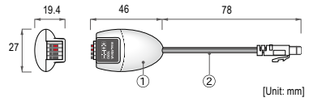
**PTM-3010**




Compatible Sensors:
Pt100 (3-wire, 4-wire), Pt1000 (3-wire, 4-wire)
In the case of a 4-wire sensor, one wire will be left unused.
Measurement Resolution: 0.1°C
Measurement Accuracy (*1) :
±(0.3 + 0.003 × t) °C at 10 to 40 °C (*2)
±(0.5 + 0.003 × t) °C at -40 to 10 °C, 40 to 80 °C (*2)
t = absolute value of measurement in °C
Included Items: Protection Cover

### 4-20mA Module

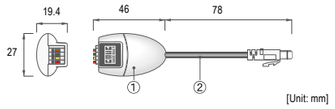
**AIM-3010**




Input Resistance: 0 to 20 mA (Operational up to 40 mA)
Measurement Resolution: 0.01mA
Measurement Accuracy:
±(0.05 mA + 0.3 % of reading) at 10 to 40 °C (*2)
±(0.1mA + 0.3 % of reading) at -40 to 10 °C, 40 to 80 °C(*2)
Input Resistance: 100 Ω ± 0.3 Ω
Sensor Connection: Cable Insertion Connection: Plus(+) 2 Parallel Terminals, Minus(-) 2 Parallel Terminals: Total 4 Terminals
Compatible Wires:
Single wire: ϕ 0.32 to ϕ 0.65 mm (AWG28 to AWG22), ϕ 0.65 mm (AWG22) recommended
Twisted wire: 0.32 mm² (AWG22), ϕ 0.12 mm or more in diameter
Strip length: 9 to 10 mm

### Voltage Module

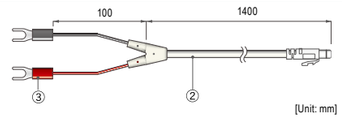
**VIM-3010**




Measurement Item: Voltage 0 to 22 V
Measurement Resolution:
Up to 400 mV: 0.1 mV, Up to 800 mV: 0.2 mV, Up to 999 mV: 0.4 mV,
Up to 3.2 V: 1 mV, Up to 6.5 V: 2 mV, Up to 9.999 V: 4 mV, Up to 22 V: 10 mV
Measurement Accuracy :
±0.5 mV + 0.3 % of reading at 10 to 40 °C (*2)
±1 mV + 0.5 % of reading at -40 to 10 °C, 40 to 80 °C (*2)
Preheat Function:
Voltage Range (Preheating): 3 V to 20 V (up to 100 mA)
Time Range (Preheating): 1 to 999 seconds (in units of one-second)
Capacitor Load: 330 µF or less

### Pulse Input Cable

**PIC-3150**




Measurement Item: Pulse Count
Input Signal: Non-voltage Contact Input, Voltage Input (0 to 27 V)
Detection Voltage: Lo: 0.5 V or less, Hi: 2.5 V or more
Chattering Filter:
ON: 15 Hz or less, OFF: 3.5 kHz or less
(when using square wave signals of 0-3 V or higher)
Response Polarity: Select either Lo → Hi or Hi → Lo
Maximum Count: 61439 / Recording Interval
Input Impedance: Approx. 100 kΩ pull up

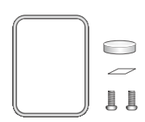
*1: Sensor error is not included.
*2: These temperatures [°C] refer to the operating environment of the input module.

## Common for Data Loggers

**Maintenance Set**

**TR-00P1**

Included Items:
Rubber Packing, Silica Gel, Double-Sided Adhesive Tape, Screws

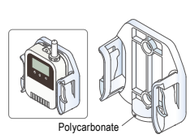


**Wall Attachment**

**TR-05K3**

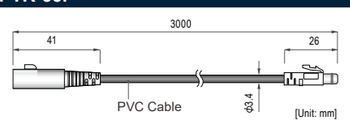
Included Items:
Double-sided adhesive tape, Screws

Note: Cracking may occur if polycarbonate is exposed to strong impact at temperatures of -30 °C or lower.




## Extention Cable for TR-55i

**TR-3C30**




Waterproof Capacity: Splash proof (rated for use in daily life)
Temperature Durability: -25 to 60 °C
Note: Only one cable per module.

## Software DVD-ROM

**T&D Software**

**SO-TD1**

Optional DVD-ROM that contains the Windows software for current T&D products.
T&D Recorder for Windows (TR-5, 7xU),
T&D Graph, etc.

## Data Loggers

| | TR-51i | TR-52i |
|---|---|---|
| Measurement Channels | Temperature 1ch (Internal) | Temperature 1ch |
| Sensor | Thermistor | Thermistor |
| Measurement Units | °C, °F | °C, °F |
| Measurement Range | -40 to 80 °C | -60 to 155 °C |
| Accuracy | Avg.±0.5 °C | Avg.±0.3 °C<br>at -20 to 80 °C<br>Avg.±0.5 °C<br>at -40 to -20 °C, 80 to 110 °C<br>Avg.±1.0 °C<br>at -60 to -40 °C, 110 to 155 °C |
| Measurement Resolution | 0.1 °C | 0.1 °C |
| Reponsiveness | Response Time (90 %): Approx. 35 min. | Response Time (90 %): Approx. 80 sec. (in air)<br>Approx. 7 sec. (in agitated water) |
| Logging Capacity | 16,000 readings | |
| Recording Interval | Select from 15 choices: 1, 2, 5, 10, 15, 20, 30 sec. or 1, 2, 5, 10, 15, 20, 30, 60 min. | |
| Recording Mode | Endless (Overwrite oldest data when capacity is full) or One Time (Stop recording when capacity is full) | |
| LCD Display Items | Measurements, Recording Status, Battery Life Warning, etc. | |
| Communication Interfaces | Optical Communication | |
| Power | Lithium Battery LS14250 x 1 | |
| Battery Life (*1) | Approx. 4 years (2 years with Infrared Communication Enabled) | |
| Dimensions | H 62 mm x W 47mm x D 19 mm (excluding protrusions and sensor) | |
| Weight | Approx. 45 g | |
| Operating Environment | -40 to 80 °C | |
| Waterproof Capacity | IP67: Immersion proof | IP64: Splash proof (rated for use in daily life) (*2) |
| Included Items | - | Temperature Sensor (TR-5106) |
| | Lithium Battery LS14250, Strap, Manual Set (Warranty Included) | |
| Data Collection Devices | TR-50U2<br>Other devices (*3) | |

*1: Battery life depends upon multiple factors including measuring environment, recording interval, and quality of the battery being used. When infrared communication function is enabled, battery life may be further shortened if the unit is used under the inverter type fluorescent lighting.
*2: This is the waterproof capacity of the data logger with the sensor connected.
*3: Also compatible with the following discontinued products: TR-57DCi, TR-57U, RTR-57U, TR-50U, and TR-50C.
The specifications listed above are subject to change without notice.

## Data Collection Devices

| | TR-50U2 |
|---|---|
| Compatible Devices | TR-51i / 52i / 55i-TC / 55i-Pt / 55i-V / 55i-mA / 55i-P<br>Other devices (*1) |
| Communication Interfaces | Optical Communication<br>USB 2.0 (Mini-B connector) |
| Communication Time | Data Download Time About 20 sec. |
| Power | USB bus power |
| Dimensions | H 80 mm x W 56 mm x D 16.5 mm (excluding protrusions) |
| Weight | Approx. 25 g |
| Operating Environment | Temperature: -10 to 60 °C<br>Humidity: 90 %RH or less (no condensation) |
| Included Items | USB Mini-B Cable US-15C, User's Manual Set (Warranty Included) |
| Software (*2) | PC Software (Windows):<br>T&D Recorder for Windows (TR-5, 7xU), T&D Graph |

*1: Also compatible with the following discontinued products: TR-51S/52S, and TR-51A/52.
*2: Free software download and information on OS compatibility is available on the Software page of our website. https://tandd.com/software/
The specifications listed above are subject to change without notice.



TR-5i Series - Specifications

## Data Loggers

| | TR-55i-TC | TR-55i-Pt | TR-55i-V | TR-55i-mA | TR-55i-P |
|---|---|---|---|---|---|
| Measurement Channels | Temperature 1ch | Temperature 1ch | Voltage 1ch | 4-20mA 1ch | Pulse Count 1ch |
| Sensor | Thermocouple:<br>Type K, J, T, S | Pt100, Pt1000<br>(3-wire, 4-wire *1) | - | - | - |
| Measurement Units | °C, °F | °C, °F | V, mV | mA | P |
| Measurement Range | Type K : -199 to 1370 °C<br>Type J : -199 to 1200 °C<br>Type T : -199 to 400 °C<br>Type S : -50 to 1760 °C | -199 to 600 °C | 0 to 22 V | 0 to 20 mA<br>Operational up to 40 mA | Input Signal:<br>Non-voltage Contact Input<br>Voltage Input (0 to 27 V)<br><br>Detection Voltage<br>Lo: 0.5 V or less<br>Hi: 2.5 V or more<br><br>Input Impedance<br>Approx. 100 kΩ pull up<br><br>Chattering Filter:<br>ON: 15 Hz or less<br>OFF: 3.5 kHz or less<br><br>Maximum Count<br>61,439 / Recording Interval |
| Accuracy (*2) | Thermocouple Measurement<br>Type K, J, T :<br>±(0.3 + 0.003 × t) °C<br>Type S :<br>±(1.0 + 0.003 × t) °C<br>t = absolute value of measurement in °C<br>Cold Junction Compensation<br>±0.3 °C<br>at 10 to 40 °C<br>±0.5 °C<br>at -40 to 10 °C, 40 to 80 °C | ±(0.3 + 0.003 × t) °C<br>at 10 to 40 °C<br>±(0.5 + 0.003 × t) °C<br>at -40 to 10 °C, 40 to 80 °C<br>t = absolute value of measurement in °C | ±(0.5 mV + 0.3 % of reading)<br>at 10 to 40 °C<br>±(1 mV + 0.5 % of reading)<br>at -40 to 10 °C, 40 to 80 °C | ±(0.05 mA + 0.3 % of reading)<br>at 10 to 40 °C<br>±(0.1 mA + 0.3 % of reading)<br>at -40 to 10 °C, 40 to 80 °C | |
| | Note: The temperature range shown above represents the operating environment of the Input Module. | | | | |
| Measurement Resolution | Type K, J, T : 0.1 °C<br>Type S : approx. 0.2 °C | 0.1 °C | Up to 400 mV: 0.1 mV<br>Up to 800 mV: 0.2 mV<br>Up to 999 mV: 0.4 mV<br>Up to 3.2 V : 1 mV<br>Up to 6.5 V : 2 mV<br>Up to 9.999 V: 4 mV<br>Up to 22 V : 10 mV | 0.01 mA | |
| Logging Capacity | 16,000 readings | | | | |
| Recording Interval | Select from 15 choices: 1, 2, 5, 10, 15, 20, 30 sec. or 1, 2, 5, 10, 15, 20, 30, 60 min. | | | | |
| Recording Mode | Endless (Overwrite oldest data when capacity is full) or One Time (Stop recording when capacity is full) | | | | |
| LCD Display Items | Measurements, Recording Status, Battery Life Warning, etc. | | | | |
| Communication Interfaces | Optical Communication | | | | |
| Power | Lithium Battery: LS14250 x 1 | | | | |
| Battery Life (*3) | Approx. 14 months | Approx. 24 months | Approx. 16 months | Approx. 16 months | Approx. 16 to 24 months |
| Dimensions | H 62 mm x W 47 mm x D 19 mm (excluding protrusions and Input Module) | | | | |
| Weight | Approx. 45 g | | | | |
| Operating Environment | -40 to 80°C | | | | |
| Waterproof Capacity | IP64: Splash proof (rated for use in daily life) (*4) | | | | |
| Included Items | Input Module TCM-3010<br>(Sensor not provided) | Input Module PTM-3010<br>(Sensor available as option) | Input Module VIM-3010 | Input Module AIM-3010 | Input Module PIC-3150 |
| | Lithium Battery LS14250, Strap, Manual Set (Warranty Included) | | | | |
| Data Collection Devices | TR-50U2<br>Other devices (*5) | | | | |

*1: In the case of a 4-wire sensor, one wire will be left unused.
*2: For TR-55i-TC and TR-55i-Pt, sensor inaccuracies are not included.
*3: Battery life varies depending upon multiple factors including ambient temperature, recording interval, frequency of communication, and battery performance. All estimates are based on operations carried out with a new battery and are in no way a guarantee of actual battery life.
*4: This is the waterproof capacity of the data logger with the Input Module connected. Input Module itself is not water resistant.
*5: Also compatible with the following discontinued products: TR-57DCi, and TR-50U.
The specifications listed above are subject to change without notice.

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