

# Compact Waterproof Data Logger

## TR-5*i* Series



Infrared Interface  
Easy-to-Read Display  
Durable Waterproof Loggers



# User Friendly Interface means: Power through Simplicity

The TR-5i Series is a family of data loggers designed to measure and record a variety of items: from temperature to pulse. The recorded data can then be easily collected with a compatible portable Data Collector or downloaded directly to a PC with a Communication Port.

Record → Collect → Analyze  
The TR-5i Series makes it easy as 1-2-3

## Data Loggers

### Measure / Record

- Temperature ● Pt100 / Pt1000
- Thermocouple ● Voltage ● 4-20mA
- Pulse



## Compact Design means Wider Application Possibilities

The compact size allows it to be placed almost anywhere. Also, its durable body with water-proof and dust proof capacity makes it possible to be used in harsh environments.



## Low Energy Consumption Design means Longer Battery Life

Over one year of continuous use possible. Battery replacement mark lets you know when it is time for a new battery.



## Warning LED on Unit

When a set limit has been exceeded the Warning LED will flash and a message will be displayed to give you the cause.



## Data Collection Devices

### Collect and Download Data

Via Infrared or Optical Communication



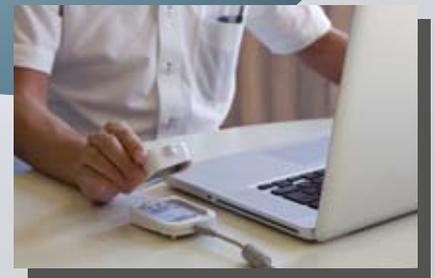
**On-site Data Collection**  
**On-the-spot Data Checking**

Data collection via IR communication makes it possible to collect recorded data without ever having to move or touch the logger. The collected data can then be checked there on the spot...no need for a PC.



**Simple!**  
**Quick!**

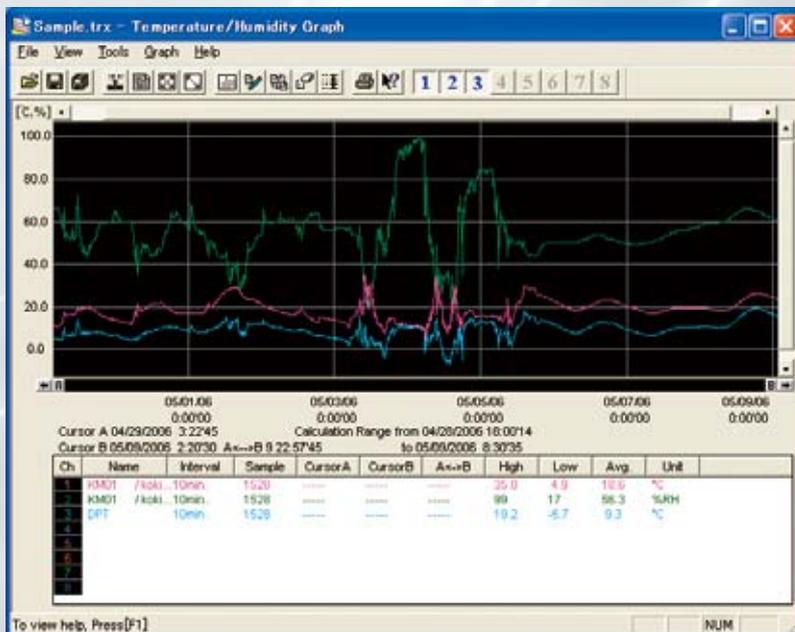
Recorded Data can be downloaded directly to a PC using a Communication Port: just connect and place logger on port. One unit of full data can be downloaded in just 25 seconds!



## Software

### Manage Settings and Analyze Data

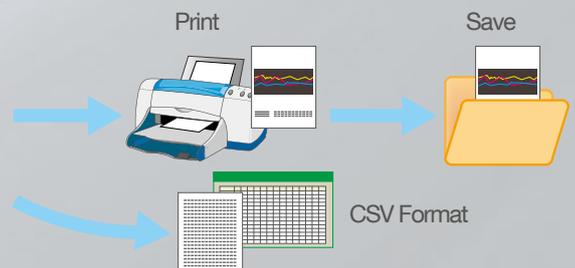
This free of charge software is bundled with the Data Collection Device. Our user-friendly software makes all types of settings a snap: from setting up recording conditions and warning monitoring to carrying out adjustments and other functions. An easy to use graph program is also included for viewing, analyzing, and printing data.



Graph View

Date/Time	°C	%RH	ch.3	ch.4	ch.5	ch.6	ch.7	ch.8
05/04/2006 03:00:24	11.3	97						
05/04/2006 03:10:24	11.1	96						
05/04/2006 03:20:24	10.8	96						
05/04/2006 03:30:24	11.1	95						
05/04/2006 03:40:24	10.9	95						
05/04/2006 03:50:24	11.1	95						
05/04/2006 04:00:24	11.3	96						
05/04/2006 04:10:24	10.7	96						
05/04/2006 04:20:24	10.7	95						
05/04/2006 04:30:24	10.4	96						
05/04/2006 04:40:24	10.5	93						

Table View



## Temperature



TR-51i

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

TR-52i

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

## 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

## Temperature - Thermocouple



TR-55i-TC

Measurement Range:

K: -199 to 1300 °C

J: -199 to 750 °C

T: -199 to 400 °C

S: -20 to 1700 °C

Input Module (TCM-3010) Included (Sensor not sold by T&D)

## Temperature - Pt100 / Pt1000



TR-55i-Pt

Measurement Range: -199 to 600 °C

Input Module (PTM-3010) Included (Sensor sold separately)

## Pulse Count



TR-55i-P

Measurement Range: Pulse count 0-61,439

Signal Input: 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.

### Portable Data Collector TR-57DCi

- ▶ Collect data on site; No PC necessary.
- ▶ Data can be downloaded via Infrared or Optical Communication.
- ▶ One logger at full storage capacity can be downloaded via IR communication in 55 seconds or via optical communication in about 24 seconds.
- ▶ The collected data can be immediately viewed on site and checked for warning occurrences.
- ▶ The Data Collector can store recorded data from up to 16 loggers at full capacity.



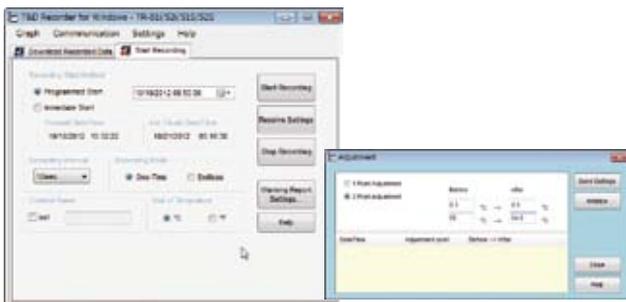
### Communication Port TR-50U2

- ▶ 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.

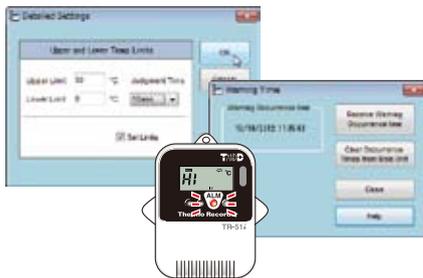


## Intuitive User Friendly Graph

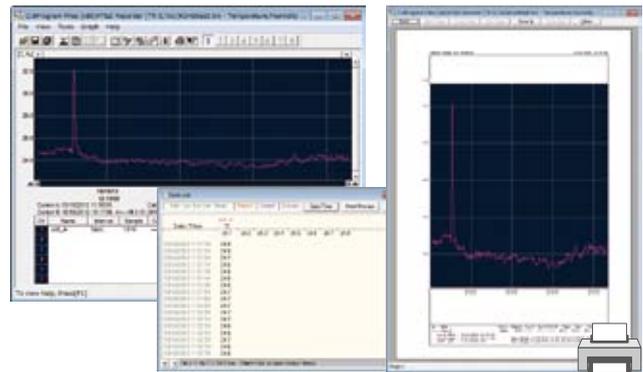
- The software makes it possible to make various detailed recording settings such as the interval at which you want recording to occur and the timing of recording start.



- By making upper and lower limit settings it is possible to monitor measurements for warnings and when one occurs the unit's LED will flash. It is also possible to find out the time of the warning.



- The included Graph application enables easy analysis of the recorded data.

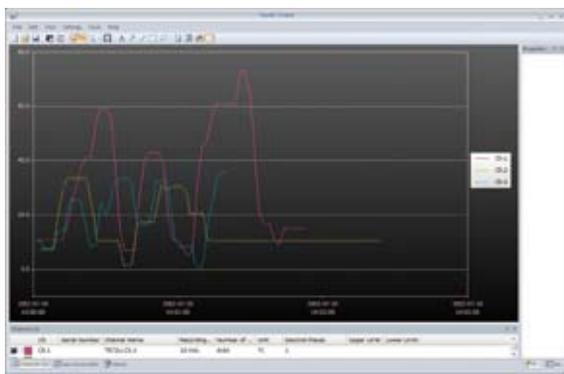


- It is possible to output data as text format file (CSV) for use with common spreadsheet software.



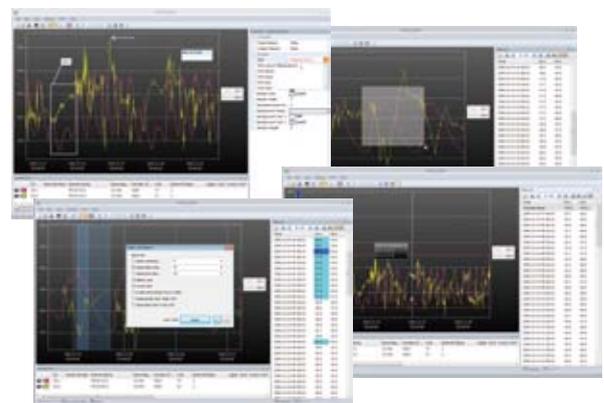
## Next Generation Graph Application: "T&D Graph (beta version)"

- All data can be viewed in one graph window, regardless of the data format or from what type of device the data came from.



- Compatible with recorded data of any format from all T&D loggers
- Even from multiple sets of data it is possible to open only the data you wish to view by specifying filters.

- Provides even more visual ways to display and analyze recorded data.



- Save memos, comments and figures with the graph.
- Search and filter recorded data to get only the data you need
- Merge multiple sets of data

For the latest information about compatible devices or update versions, please check our T&D Website.

<http://www.tandd.com/support/download/software/index.html>

**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)

[Unit: mm]

**TR-5106**  
 Response Time (90%):  
 Approx. 80 sec. (in air)  
 Approx. 7 sec. (in agitated water)

[Unit: mm]

**Underwater Sensor**

**TR-5530**  
 Response Time (90%):  
 Approx. 150 sec. (in air)  
 Approx. 15 sec. (in agitated water)

[Unit: mm]

**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)

[Unit: mm]

**Stainless Protection Sensor**

**TR-5220**  
 Response Time (90%):  
 Approx. 150 sec. (in air)  
 Approx. 7 sec. (in agitated water)

[Unit: mm]

**TR-5320**  
 Response Time (90%):  
 Approx. 90 sec. (in air)  
 Approx. 3 sec. (in agitated water)

[Unit: mm]

**TR-5420**  
 Response Time (90%):  
 Approx. 90 sec. (in air)  
 Approx. 3 sec. (in agitated water)

[Unit: mm]

**Temperature Sensor Extension Cable for RTR-502 / 502L**

**TR-2C30**  
 Waterproof Capacity:  
 Splash proof (rated for use in daily life)  
 Temperature Durability: -25 to 60°C

[Unit: mm]

**Note:** Only one extension cable per sensor.

**Input Modules for TR-55i**

**Thermocouple Module (TR-55i-TC)**

**TCM-3010**  
 Compatible Sensors:  
 Thermocouple: Type K, J, T, S  
 Sensor Connection:  
 Miniature Thermocouple Connector  
 Operating Environment:  
 Temperature: -40 to 80°C  
 Humidity: 90%RH or less (no condensation)

[Unit: mm]

**Pt Module (TR-55i-Pt)**

**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.  
 Sensor Connection:  
 Screw Clamp Terminal Block: 3-Terminal  
 Square Washer (3-M3.5)  
 Operating Environment:  
 Temperature: -40 to 80°C, Humidity: 90%RH or less (no condensation)

[Unit: mm]

**4-20mA Module (TR-55i-mA)**

**AIM-3010**  
 Measurement Range:  
 0 to 20mA (Operational up to 40 mA)  
 Accuracy:  
 ±0.05 mA + 0.3 % of reading (10 to 40 °C)  
 Operating Environment:  
 Temperature: -40 to 80°C, Humidity: 90%RH or less (no condensation)

[Unit: mm]

**Pulse Input Cable (TR-55i-P)**

**PIC-3150**

[Unit: mm]

**Voltage Module (TR-55i-V)**

**VIM-3010**  
 Measurement Range: 0 to 22 V  
 Accuracy:  
 ±0.5 mV + 0.3 % of reading (10 to 40 °C)  
 Measurement Resolution:  
 Minimum of 0.1mV  
 Preheat Function: 3V to 20V, 100mA  
 Operating Environment:  
 Temperature: -40 to 80°C, Humidity: 90%RH or less (no condensation)

[Unit: mm]

**Extension Cable**

**TR-3C30**  
 Waterproof Capacity:  
 Splash proof (rated for use in daily life)  
 Temperature Durability:  
 -25 to 60 °C

[Unit: mm]

**Note:** Only one extension cable per input module.

**Common for TR-51i / 52i / 55i**

**Maintenance Set**

**TR-00P1**  
 Included:  
 Rubber Packing, Silica Gel,  
 Double-Sided Adhesive Tape,  
 Lock Screw

**Wall Attachment**

**TR-05K3**  
 Accessories: Screws and Double-sided adhesive tape  
 Materials: Polycarbonate  
**Note:** Cracking may occur if polycarbonate is exposed to strong impact at temperatures of -30°C or lower.

Material: Polycarbonate

**Pt100 Sensors for TR-55i-Pt**

**A Sensor Type**

**TR-8100 (Economical Type)**  
 Temperature Measurement Range: -50 to 200°C  
 Thermal Time Constant: Approx. 4.5 sec. (in agitated water)

Heat Resistance : -70 to 180°C [Unit: mm]

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**TR-8110 (Regular Type)**  
 Temperature Measurement Range: -50 to 350°C  
 Thermal Time Constant: Approx. 2 sec. (in agitated water)

Heat Resistance : -70 to 180°C [Unit: mm]

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**TR-8120 (Low to High Temp Type)**  
 Temperature Measurement Range: -200 to 600°C  
 Thermal Time Constant: Approx. 2 sec. (in agitated water)

Heat Resistance : -70 to 180°C [Unit: mm]

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**TR-8130 (Handy Type)**  
 Temperature Measurement Range: -50 to 200°C  
 Thermal Time Constant: Approx. 2.5 sec. (in agitated water)

Heat Resistance : -25 to 80°C -25 to 60°C [Unit: mm]

**Note:** Stated thermal time constant is for sensors with a protection Tube diameter of  $\phi 3.2$ .  
 Materials: ① Sensor (Pt100), ② Stainless Protection Tube (SUS316), ③ Sleeve (SUS304), ④ FEP Cable, ⑤ PVC Cable, ⑥ Crimp Terminals

**Sensor Configuration & Ordering**

To order, create the model number by selecting **A**, **B**, **C**, **D**. (See below).  
 Pt100 Sensors are produced only upon receipt of order; therefore please allow three weeks from the time of order until shipping.

**Sensor Specification**

Sensor Device	Pt100	Range of Error	$\pm (0.15 + 0.002 \times t) ^\circ\text{C}$ (t = absolute value of measurement)
Electrical Current	less than 2mA	Water Resistance	None ( only stainless protection tube is wter resistant )
Insulation Resistance	DC500V over 10M $\Omega$	Conductor	3 wire type

**TR-81 **A** - **B** - **C** - **D** M**

**A Sensor Type**  
 00, 10, 20, or 30

**B Sensor Protection Tube Diameter**  
 Please select from below:

	TR-8100	TR-8110	TR-8120	TR-8130
$\phi 2.0$	-	○	-	-
$\phi 2.3$	○	○	-	-
$\phi 3.0$	○	○	-	-
$\phi 3.2$	◎	◎	◎	◎
$\phi 4.8$	○	○	○	○
$\phi 6.0$	○	○	-	-
$\phi 6.4$	-	-	○	-

◎ Recommended ○ Available - Not available

**C Sensor Protection Tube Length**  
 The protection Tube is available in 50 millimeter units in lengths from 50mm to 2000mm.

**D Sensor Cable Length**  
 The sensor cable is available in 1 meter units in lengths from 1 meter to 99 meters.

**Sensor Model Number Examples:**  
 EX1: Economical type with 2.3mm diameter x 50mm sheath with 1m of cable:  
 Model Number: TR-8100-2.3-50-1M  
 EX2: Low to high temp type with 3.2mm diameter x 200 mm sheath with 5m of cable:  
 Model Number: TR-8120-3.2-200-5M

**TR-51i / 52i Specifications**

Unit Type	TR-51i	TR-52i
Measurement Channels	Temperature 1ch	Temperature 1ch
Sensor	Thermistor( Internal )	Thermistor
Measurement Units	$^{\circ}\text{C}$ , $^{\circ}\text{F}$	$^{\circ}\text{C}$ , $^{\circ}\text{F}$
Measurement Range	-40 to 80 $^{\circ}\text{C}$	-60 to 155 $^{\circ}\text{C}$
Accuracy	Avg. $\pm 0.5^{\circ}\text{C}$	Avg. $\pm 0.3^{\circ}\text{C}$ at -20 to 80 $^{\circ}\text{C}$ Avg. $\pm 0.5^{\circ}\text{C}$ at -40 to -20 $^{\circ}\text{C}$ , 80 to 110 $^{\circ}\text{C}$ Avg. $\pm 1.0^{\circ}\text{C}$ at -60 to -40 $^{\circ}\text{C}$ , 110 to 155 $^{\circ}\text{C}$
Measurement Resolution	0.1 $^{\circ}\text{C}$	0.1 $^{\circ}\text{C}$
Reponsiveness	Thermal Time Constant: Approx. 15 min. Response Time ( 90% ): Approx. 35 min.	Thermal Time Constant: Approx. 30 sec. ( in air ) Approx. 4 sec. ( in agitated water ) Response Time ( 90% ): Approx. 80 sec. ( in air ) 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 / Infrared Communication: IrPHY 1.2 low power	
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 $^{\circ}\text{C}$	
Waterproof Capacity	IP67: Immersion proof	IP64: Splash proof ( rated for use in daily life ) (*2)
Accessories	Lithium Battery LS14250, Strap, Manual Set ( Warranty Included )	
Data Collection Devices	Communication Port: TR-50U2 Data Collector: TR-57DCi	

\*1: Battery life depends upon the 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.  
 The specifications listed above are subject to change without notice.

# TR-5i Series - Specifications

Specifications for TR-55i					
Unit Type	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: Type K, J, T, S	Pt100, Pt1000 (3-wire, 4-wire *1)	-	-	-
Measurement Units	°C, °F	°C, °F	V, mV	mA	P
Measurement Range	K: -199 to 1370 °C J: -199 to 1200 °C T: -199 to 400 °C S: -50 to 1760 °C	-199 to 600 °C	0 to 22 V	0 to 20 mA (Operational up to 40 mA)	Input Signal: Non-voltage Contact Input Voltage Input (0 to 27 V)  Detection Voltage Lo: 0.5 V or less Hi: 2.5V or more  Input Impedance Approx. 100 KΩ pull up  Chattering Filter: ON: 15 Hz or less OFF: 3.5 kHz or less  Maximum Count 61,439 / Recording Interval
Accuracy (*2)	Thermocouple Measurement K, J, T : ±(0.3 °C + 0.3 % of reading) S : ±(1 °C + 0.3 % of reading)  Cold Junction Compensation ±0.3 °C at 10 to 40 °C ±0.5 °C at -40 to 10 °C, 40 to 80 °C	±(0.3 °C + 0.3 % of reading) at 10 to 40 °C ±(0.5 °C + 0.3 % of reading) at -40 to 10 °C, 40 to 80 °C	±(0.5 mV + 0.3 % of reading) at 10 to 40 °C ±(1 mV + 0.5 % of reading) at -40 to 10 °C, 40 to 80 °C	±(0.05 mA + 0.3 % of reading) at 10 to 40 °C ±(0.1 mA + 0.3 % of reading) 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	K, J, T : 0.1 °C S : approx. 0.2 °C	0.1 °C	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	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 / Infrared ( IR ) Communication: IrPHY 1.2 low power				
Power	Lithium Battery: LS14250 x 1				
Battery Life (*3)	Approx. 14 months (10 months with IR Communication Enabled)	Approx. 24 months (14 months with IR Communication Enabled)	Approx. 16 months (11 months with IR Communication Enabled)	Approx. 16 months (11 months with IR Communication Enabled)	Approx. 16 to 24 months (11 to 18 months with IR Communication Enabled)
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 (*4)	IP64: Splash proof ( rated for use in daily life )				
Accessories	Input Module TCM-3010	Input Module PTM-3010	Input Module VIM-3010	Input Module AIM-3010	Input Module PIC-3150
Lithium Battery LS14250, Strap, Manual Set ( Warranty Included )					
Data Collection Devices	Communication Port: TR-50U2 Data Collector: TR-57DCi				

\*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. Battery life may be shortened further if the unit is used under inverter type fluorescent lighting.

\*4: This is the waterproof capacity of the data logger with the Input Module connected. Input Module itself is not water resistant.

The specifications listed above are subject to change without notice.

Data Collection Device Specifications		
Device Name	TR-57DCi	TR-50U2
Compatible Devices	TR-5i Series: TR-51i / 52i / 55i-TC / 55i-Pt / 55i-V / 55i-mA / 55i-P TR-7Ui Series: TR-73U / 74Ui / 76Ui ( including S Type ) VR-71	TR-5i Series: TR-51i / 52i / 55i-TC / 55i-Pt / 55i-V / 55i-mA / 55i-P
Storage Capacity	Up to 256,000 readings When downloading from units filled to logging capacity - 16 units of TR-51i/52i - 15 units of TR-55i - 16 units of TR-71Ui/72Ui - 10 units of TR-73U/76Ui - 7 units of TR-74Ui  When downloading from units of any type containing small amounts of data, it can store and manage up to 250 download sessions.	-
Communication Interfaces	Between TR-57DCi - Data Logger(s) Optical Communication : TR-5i Series Infrared Communication : IrPHY 1.2 low power :TR-5i Series, TR-7Ui Series (*1) Serial Communication ( RS-232C ) : VR-71(*2)  Between TR-57DCi - PC USB Communication Serial Communication ( RS-232C ) (*3)	Between TR-50U2 - Data Logger(s) Optical Communication ( proprietary protocol )  Between TR-50U2 - PC USB Communication
Power	AAA Alkaline Battery x 2, AAA Ni-MH Battery x 2, USB bus power, AC adaptor AD-06A1 or AD-06C1	USB bus power
Battery Life	About 100 days at 1 hour of daily use (*4)	-
Dimensions	H 125 mm x W 58 mm x D 25.8 mm ( excluding protrusions )	H 80 mm x W 56 mm x D 16.5 mm ( excluding protrusions )
Weight	Approx. 90 g	Approx. 25 g
Operating Environment	Temperature: 0 to 50 °C Humidity: 90 %RH or less ( no condensation )	Temperature: -10 to 60 °C Humidity: 90 %RH or less ( no condensation )
Accessories	AAA Alkaline Battery LR03 x 2, USB Mini-B Cable US-15C, Serial Communication Cable TR-6C10, Software CD-ROM, User's Manual Set ( Warranty Included ) x 1	USB Mini-B Cable US-15C, Software CD-ROM, User's Manual Set ( Warranty Included ) x 1
Software (*5)	T&D Recorder for Windows (TR-5, 7xU)	
Compatible OS (*6)	Microsoft Windows 10 32 / 64 bit Microsoft Windows 8 32 / 64 bit Microsoft Windows 7 32 / 64 bit Microsoft Windows Vista 32 bit (SP1 or later)	
Display Languages (*7)	English	
Other	The Microsoft .NET Framework 3.5 SP1 is required.	

\*1: Infrared Communication can be used only to download recorded data, and not to make recording settings.

\*2: The following cables are necessary for serial communication with data loggers : TR-6C10 ( included ) for TR-7Ui series, and TR-TR-4C10 ( optional ) for VR-71.

\*3: The optional serial communication cable TR-07C is necessary for serial communication with PC.

\*4: Battery life varies depending upon multiple factors including ambient temperature, 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.

\*5: For TR-74Ui and TR-76Ui, only the data downloaded via TR-57DCi can be used with "T&D Recorder for Windows (TR-5, 7xU)".

\*6: For installation, it is necessary to have Administrator ( Computer Administrator ) rights.

\*7: We recommend using an operating system in the same language as the display language. Operation in different languages is not guaranteed.

The specifications listed above are subject to change without notice.

# www.tandd.com

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