Compact Waterproof Data Logger

TR-5*i* Series

Infrared Interface
Easy-to-Read Display
Durable Waterproof Loggers

T&D

CE

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 waterproof 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.
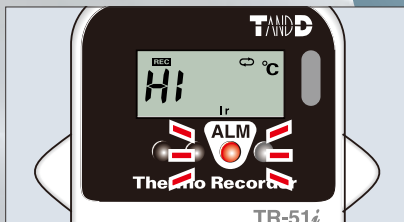
Data Collection Devices

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!

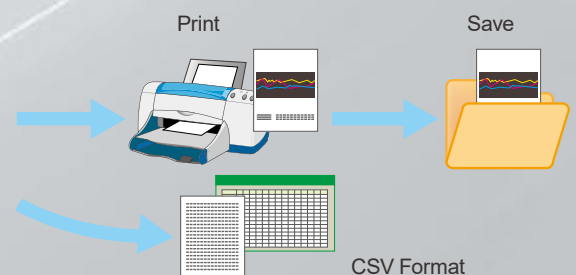## Software

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

Table View

Print

Save

CSV Format

Variety of Data Loggers to Meet Your Needs

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

Pulse

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

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.

Downloading Recorded Data / Graph Display

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.

# High Performance Software

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.
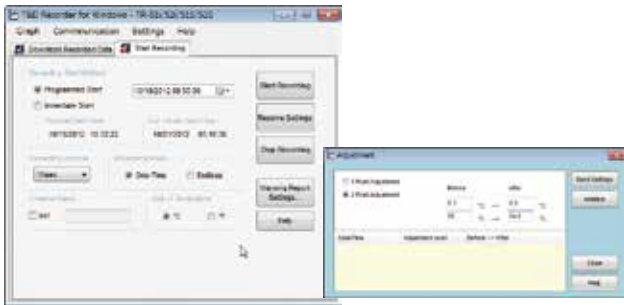
■ By making upper and lower limit settings it is possible to monitor measurements for warnings and when one occurs the unit's LED will flash. It is also possible to find out the time of the warning.
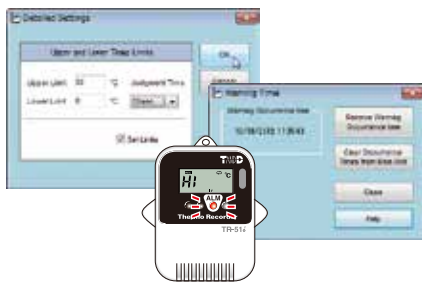
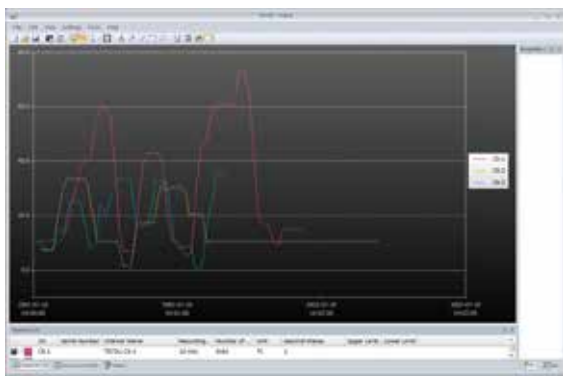■ The included Graph application enables easy analysis of the recorded data.
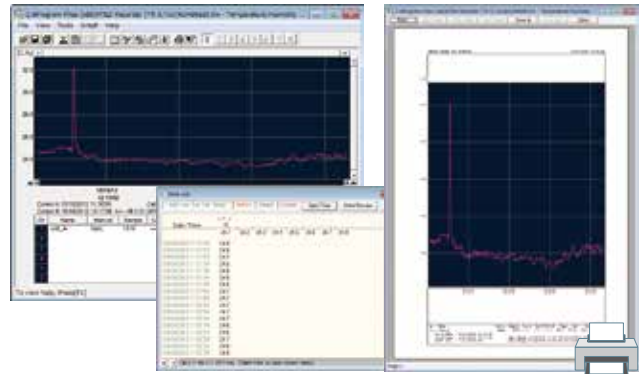
■ It is possible to output data as text format file (CSV) for use with common spreadsheet software.


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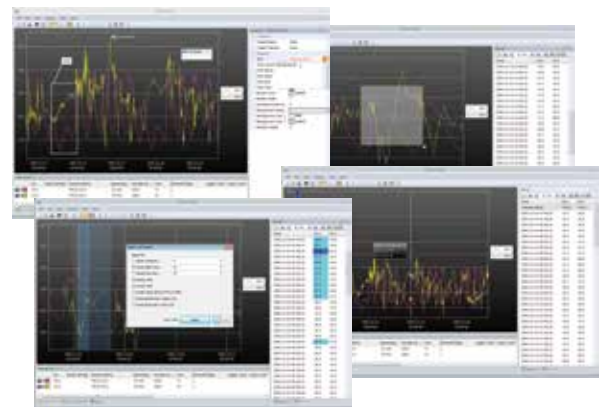
- Save memos, comments and figures with the graph.
- Search and filter recorded data to get only the data you need
- Merge multiple sets of data

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
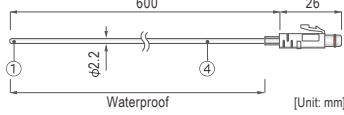
Fluoropolymer Coated Sensor

TR-5101
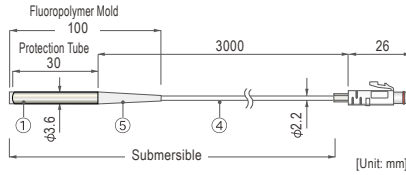Response Time (90%):
  Approx. 80 sec. (in air)

[Unit: mm]
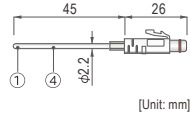
TR-5106
Response Time (90%):
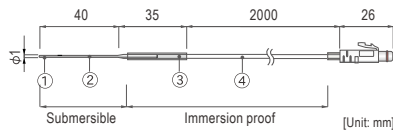 Approx. 80 sec. (in air)
  Approx. 7 sec. (in agitated water)

Waterproof
[Unit: mm]

Underwater Sensor

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

[Unit: mm]

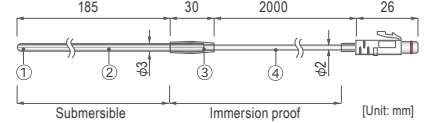### High Sensitivity Ultra-thin Sensor

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]
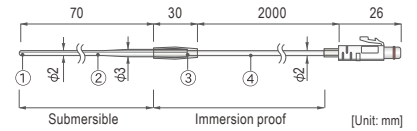
Stainless Protection Sensor

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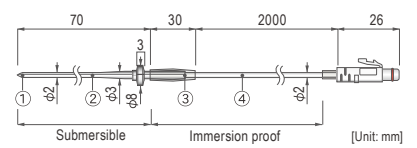Response Time (90%):
  Approx. 150 sec. (in air)
  Approx. 7 sec. (in agitated water)

Submersible   Immersion proof
[Unit: mm]

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

Submersible   Immersion proof
[Unit: mm]

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

Submersible   Immersion proof
[Unit: mm]

Temperature Sensor Extension Cable for RTR-502 / 502L

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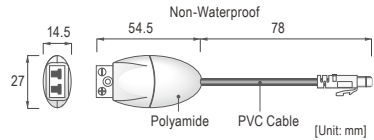Temperature Durability: −25 to 60˚C

PVC Cable
[Unit: mm]
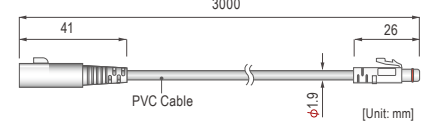
Note: Only one extension cable per sensor.

Input Modules for TR-55i

Thermocouple Module (TR-55i-TC)
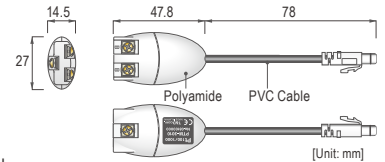
TCM-3010
Compatible Sensors:
  Thermocouple: Type K, J, T, S
Sensor Connection:
  Miniature Thermocouple Connector
Operating Environment:
  Temperature: −40 to 80˚C
  Humidity: 90%RH or less (no condensation)

Non-Waterproof
Polyamide   PVC Cable
[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℃)
Operating Environment:
  Temperature: −40 to 80℃, Humidity: 90%RH or less (no condensation)

Non-Waterproof
Polyamide   PVC Cable
[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 ℃)
Measurement Resolution:
  Minimum of 0.1mV
Preheat Function: 3V to 20V, 100mA
Operating Environment:Temperature: −40 to 80℃, Humidity: 90%RH or less (no condensation)

Non-Waterproof
Polyamide   PVC Cable
[Unit: mm]

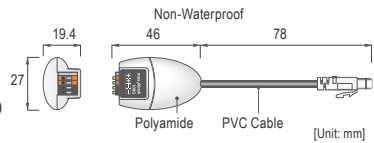### Pt Module (TR-55i-Pt)

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℃, Humidity: 90%RH or less (no condensation)

Polyamide   PVC Cable
[Unit: mm]

Pulse Input Cable (TR-55i-P)

PIC-3150

Non-Waterproof
M3.5 Crimp Terminal   PVC Cable
[Unit: mm]

Extension Cable

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

PVC Cable
[Unit: mm]
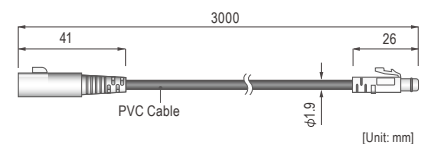
Note: Only one extension cable per input module.

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

Maintenance Set

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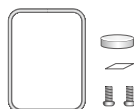
Wall Attachment

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]

TR-8110 (Regular Type)
Temperature Measurement Range:
−200 to 350°C
Thermal Time Constant:
Approx. 2 sec. (in agitated water)

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

TR-8120 (Low to High Temp Type)
Temperature Measurement Range:
−200 to 500°C
Thermal Time Constant:
Approx. 2 sec. (in agitated water)

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

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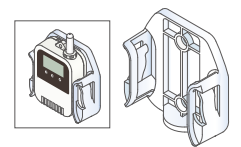Temperature Measurement Range:
−50 to 200°C
Thermal Time Constant:
Approx. 2.5 sec. (in agitated water)

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 ϕ3.2.

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	± (0.15 + 0.002 × t) °C
Electrical Current	less than 2mA		(t = absolute value of measurement)
Insulation Resistance	DC500V over 10MΩ	Water Resistance	None (only stainless protection tube is wter resistant)
Conductor	3 wire type		

$$TR\text{-}81\boxed{A}\text{-}\boxed{B}\text{-}\boxed{C}\text{-}\boxed{D}M$$

A Sensor Type
00, 10, 20, or 30

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.

B Sensor Protection Tube Diameter
Please select from below:

	TR-8100	TR-8110	TR-8120	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

Sensor Model Number Examples:
EX1: Economical type with 2.3mm diameter x 50㎜ sheath with 1m of cable:
Model Number: TR-8100-2.3-50-1M
EX2: Low to high temp type with 3.2 ㎜ diameter x 200 ㎜ 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	°C, °F	°C, °F
Measurement Range	−40 to 80°C	−60 to 155°C
Accuracy	Avg.±0.5°C	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
Measurement Resolution	0.1°C	0.1°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°C	
Waterproof Capacity	IP67: Immersion proof	IP64: Splash proof (rated for use in daily life) (*2)
Accessories	-	Temperature Sensor (TR-5106)
	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

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
				±(0.1mA + 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	Maximum Count 61,439 / Recording Interval
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)	TR–5i Series: TR–51i / 52i / 55i-TC / 55i-Pt / 55i-V / 55i-mA / 55i-P
Storage Capacity	Up to 256,000 readijngs 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) : TR–7Ui Series(*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)
Accessaries	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	
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.
*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