



Thermo Recorder

TR-51A / TR-52

Compact Waterproof Data Logger

User's Manual

Thank you for purchasing this product. Carefully read and fully understand these instructions before using this unit.

T&D CORPORATION

5652-169 Sasaga Matsumoto City NAGANO 399-0033 JAPAN
Tel: +81-263-27-2131 Fax: +81-263-26-4281
Homepage: <http://www.tandd.jp/> E-mail: overseas@tandd.co.jp

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FCC Compliance Statement for American Users

This device complies with Part 15 of the FCC Rules.

Operation is subject to following two conditions: (1) this device may not cause harmful interference. and (2) this device must accept any interference received, including interference that may cause undesired operation.

NOTE: This equipment has been tested and found to comply with the limits for a Class A Digital Device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications.

However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Warning

This equipment has been verified to comply with the limits for a Class A personal digital device, pursuant to Subpart B of Part 15 of FCC Rules. Only peripherals (computer input/output devices, terminals, printers, etc.) certified or verified to comply with the Class A or B limits may be attached to this equipment. Operation with non-certified or non-verified personal computer and/or peripherals is likely to result in interference to radio and TV reception. The connection of a non-shielded equipment interface cable to this equipment will invalidate the FCC Certification of this device and may cause interference levels which exceed the limits established by the FCC for this equipment.

You are cautioned that changes or modifications not expressly approved by party responsible for compliance could void your authority to operate the equipment.

Product Specifications

	TR-51A	TR-52
Measurement Channels	1 channel (Sensor built in the main unit)	1 channel (External sensor type)
Measurement Item	Temperature	
Measurement Range	-40 to 80°C	-60 to 155°C
Measurement Accuracy	Typ. ±0.5°C	Typ. ±0.3°C (-20 to 80°C) Typ. ±0.5°C (-40 to -20°C / 80 to 110°C) Typ. ±1.0°C (-60 to -40°C / 110 to 155°C)
Measurement Display Resolution	0.1°C	
Recording Capacity	16,000 data	
Recording Interval	Select from 1, 2, 5, 10, 15, 20, 30 and 60 minutes	Select from 1, 2, 5, 10, 15, 20 and 30 seconds or from 1, 2, 5, 10, 15, 20, 30 and 60 minutes
Recording Mode	Endless (Overwrite oldest data when capacity is full) One-time (Stop reading when capacity is full)	
LCD Display Items	Temperature measured, recording conditions, battery life warning, memory FULL, sensor unconnected, over measurement range and temperature unit (°F / °C)	
Power	Lithium battery ER3V M x 1 (Measurement range from -40 to 80°C) Available for lithium battery CR2 (Measurement range from -20 to 60°C)	
Battery Life	Maximum 2 years (depending on measurement environment and quality of battery)	
Waterproof Capacity	IP67	IP64
External Dimensions	H62 x W47 x D19mm (excluding protrusions)	
Weight	Approx. 53g including battery	Approx. 55g including battery
Unit Temp. Resistance	-40 to 80°C	
Accessories Included	Lithium Battery ER3V M×1, Tube × 1, Strap × 1 User's Manual (Warranty) × 1	

Specifications for TR-5106

Standard Sensor	TR-5106 x 1
Sensor Heat-Durability	-70 to 180°C
Dimensions	Diameter: 2mm Cable length: 0.6m
Thermal-hour Constant	Approx. 15 seconds in the air, Approx. 2 seconds in agitated water
Shielding	Teflon® resin
Waterproof Capacity	IP67 (Sensor Cable)

Notices about this User's Manual

- Please read this manual carefully before using the product.
- All rights of this User's Manual belong to T&D Corporation. It is prohibited to use, duplicate and/or arrange a part or whole of this User's Manual without the permission of T&D Corporation.
- Please follow the safety precautions carefully. We cannot guarantee nor are we responsible for safety if this product is used in any manner other than was intended.
- T&D Corporation accepts no responsibility for any malfunction of and/or trouble with this product or with your computer that is caused by the improper handling of this product and will deem such trouble or malfunction as falling outside the conditions for free repair of the attached warranty.
- T&D Corporation accepts no responsibility for any result or effects from using this User's Manual.
- Figures and illustrations in this manual may be slightly simplified and may differ from the actual product.

- On screen messages, figures or illustrations in this manual may vary slightly or be simplified from the actual messages and product.
- We sincerely hope that the contents of this manual are true and complete. If you find any information to have been omitted, or if the information within is confusing or mistaken please contact your retailer or T&D Corporation.
- Microsoft®, Windows® and WindowsNT® are registered trademarks of Microsoft Corporation USA and are binding in the USA and all other countries. Company names and product names are trademarks or registered trademarks of each company.
- Please carefully read this User's Manual and Free Repair Warranty.
- The warranty that is included in this User's Manual cannot be reissued, so please keep it in a safe place.
- The User's Manual for this and all T&D products can be downloaded free of charge from our Web Site.

Safety Precautions and Instructions *Please carefully observe the following safety measures when using our product.

To prevent any loss or damage to our customers, other people and / or property, and to ensure the proper use of our products we ask that before using our product you carefully read, understand and follow the safety rules and precautions for our products as outlined below.

[Explanation of Warning Symbols]

	DANGER	These entries are actions that absolutely under no circumstance should be taken. The taking of such an action may cause serious personal physical damage or death.
	CAUTION	These entries are actions that if taken may lead to physical injury or damage to persons or things.

[Explanation of Picture Symbols]

	This symbol denotes an important warning or caution. Inside or near the symbol will appear another symbol giving details.
	This symbol denotes a forbidden action. Inside or near the symbol will appear another symbol giving details.
	This symbol denotes an action that you must take. Inside or near the symbol will appear another symbol giving details.

DANGER



Do not take apart, repair or modify the main unit.

It may cause fire, electrocution or damage. Ask the shop where you purchased the products or T&D Corporation to carry out any repairs.



If any smoke or strange smells are emitted from the unit, immediately cease using it.

Continued use may cause fire, electrocution or damage.



Do not use any batteries other than those that are recommended. It may cause fire or damage.



If water or a foreign object enters the case, immediately cease using it.



Store all batteries, sensors and Thermo Recorder units out of the reach of children. It is dangerous to swallow batteries.



Please be careful when using in overly hot or cold environments; touching the units may cause burns or frostbite.

CAUTION



We are not responsible for any malfunction or trouble caused by the use of our product or by any problem caused by the malfunction of our unit. Please be fully aware of this before using our product.



This product has been designed for private or industrial use only. It is not for use in situations where strict safety precautions are necessary such as in connection with medical equipment whether directly or indirectly.



Do not drop or expose the unit to strong impact.



A sudden change in widely different temperature environments may cause condensation to occur. Please use the unit in areas with a temperature range of 0 to 50°C and a humidity range of 10 to 90%RH (with no condensation).



Do not put your fingers or foreign matter into the sensor connection.



Battery terminals may provide insufficient contact due to age or vibration. Please be careful not to lose data due to insufficient contact



Battery life depends on the measurement environment, communication frequency, recording interval and battery quality.



Pay attention as water leakage or foreign objects entering into the unit case is possible in the following cases.

- The case was closed with dust, hair, etc., on the rubber packing or in the groove for the packing.
- The rubber packing becomes damaged. (In this case, please purchase the optional maintenance set.)
- The unit suffered from significant temperature change while wet. Especially in the case that the temperature changes from high to low.



Operate the units with the latest version of [T&D Recorder for Windows®(E)].

The latest version software can be downloaded from our home page.



Remove batteries from any unit that will not be used for a long period of time. Batteries left in a unit not being used for a long time may leak and cause a malfunction.



Do not use or store the unit in places such as listed below:

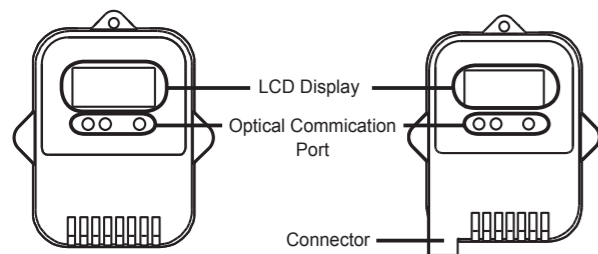
- It may cause electrocution, fire or damage to the unit or to your computer.
- Areas exposed to direct sunlight
- Areas exposed in water or high-pressure water flow.
- Areas exposed to organic solvents and corrosive gas.
- Areas exposed to strong magnetic fields
- Areas exposed to static electricity.
- Areas exposed to fire or overheating.
- Areas exposed to excessive dust or smoke.

1. TR-51A / 52 Overview

- Our TR-51A and TR-52 Thermo Recorders are compact, water resistant one channel temperature data loggers. They can be used in both normal outdoor conditions and in harsh environments such as underground, in snow and frozen conditions as well as in environments where temperatures vary greatly.
- Use our Communication Port TR-50C or our Data Collector RTR-57C to transmit settings to the data logger and download data to computer for processing.
- We have removed all switches from the main unit to assure nothing gets accidentally pushed during use, thus assuring you of no mistakes, no tampering and no loss of data.
- With one unit you can record up to 16,000 readings. If set at a one hour recording interval that gives you 666 days or almost two years of readings.
- We offer two types to fit your needs: the TR-51A with internal sensor with water resistant rating of IP 67 for temporary immersion and the TR-52 outfitted with external sensor with splash resistant proof rating of IP 64.
- The latest version of our software for TR-51A / 52 can be downloaded free of charge from our Homepage. Please visit us at [http://www.tandd.co.jp/english] for more information.

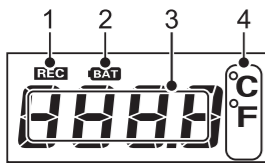
■TR-51A

■TR-52



4. LCD Display

When being used in cold environments the display may become difficult to read. This is not a malfunction.



- No Sensor Connected



1. Recording Status (REC)
LIT UP: displayed during recording or when FULL of data.
BLINKING: displayed when waiting for a programmed recording to start
2. Low Battery Life Warning Indicator (BAT): displayed when time to change the battery.
3. Measurement Reading and Message Display
4. Unit of Measurement: displays unit of measurement

Displayed when a sensor has not been connected, has been disconnected or the wire has been broken. Measurement and recording will continue and battery power consumed.

- Over measurement range (TR-52)



Temperature display blinks when the temperature goes below -60°C, or above 155°C.

- Full Memory



When using the One-time Recording Method, the REC mark appears when the number of recorded readings reaches 16,000 and the unit stops recording.

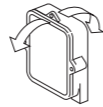
Estimates of time until FULL is displayed.

Recording intervals	1 second	30 seconds	1 minute	10 minutes	60 minutes
Period	about 4 hours	about 5 days	about 11 days	about 111 days	about 1 year and 10 months

2. Battery Installation

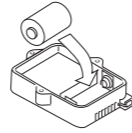
TR-51A

1. Remove screws and open the case.



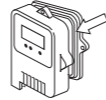
2. Insert the attached battery into the tube and mount the tube in the direction shown in the figure.

- Tube is not necessary in the case of using CR2.
- Make sure not to touch the circuit board.



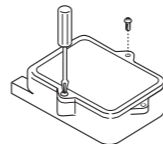
3. Confirm that the rubber packing does not have dust or defects.

- Dust or defects on the packing can adversely affect the waterproof characteristics.



4. Close the case and close the cover.

- Make sure the cover is closed in the correct direction.



5. Changing the Battery

1. When battery power becomes low, the battery indicator (BAT) will appear in the LCD display.
2. Make sure to download all data before the battery loses all power.
3. Replace with a new battery following directions as in [2. Battery Installation].

Caution!

After removing the old battery, all recorded data will be lost if a new battery is not inserted within 1 minute. Make sure to complete the battery change within 1 minute.

- Lithium Batteries (CR-2) can be used for this unit without the tube as shown above, however the possible temperature measurement will be -20 to 60°C.

*If you are measuring in an environment below -20°C or above 60°C, we recommend the Optional Battery Set TR-00P2.

- All data such as recorded data and recording interval settings will be lost during battery replacement.

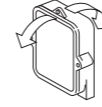
If the warning is displayed, replace with a new battery as soon as possible

(Communication frequency : 4 times / month)

	1 second	2 second	5 second	10 second
Battery Life	about 6 months	about 1 year	about 1 year and 6 months	about 2 years or more

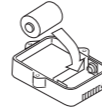
TR-52

1. Remove screws and open the case.



2. Insert the attached battery into the tube and mount the tube in the direction shown in the figure.

- Tube is not necessary in the case of using CR2.
- Do not touch the PCB.



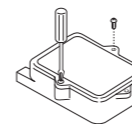
3. Confirm that the rubber packing does not have dust or defects.

- Dust or defects on the packing can adversely affect the waterproof characteristics.



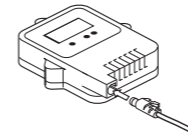
4. Close the case and close the cover.

- Make sure the cover is closed in the correct direction.



5. Connect the Sensor

- Make sure to fully push in the sensor to ensure good contact.



6. Communication

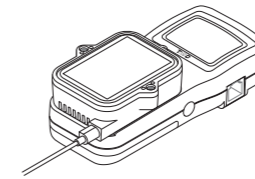
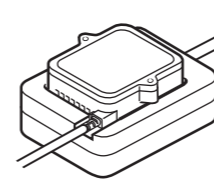
Setting Up for Communication

If you wish to make Recording Start settings or Download already recorded data, please follow the directions as written below.

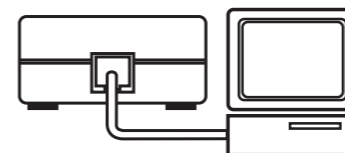
1. Place the Thermo Recorder TR-51A / TR-52 face down on the Communication Port TR-50C (sold separately) or on the Data Collector RTR-57C (sold separately).

■Communication Port

■Data Collector



2. Connect the Communication Port or Data Collector to your computer.



Note:

For details about making settings, see the User's Manual that comes with the Communication Port TR-50C or with the Data Collector RTR-57C or the [Help] Menu in the Software.

3. About Recording Data

Temperature is immediately measured when a battery is installed.

Initial Setting Values

Recording Interval : 10 minutes

Recording Mode : Endless loop

Recording Intervals TR-51A : 1,2,5,10,15,20,30,60 minutes
TR-52 : 1,2,5,10,15,20,30 seconds
1,2,5,10,15,20,30,60 minutes

Recording Modes (TR-51A/52) Immediate / One-time
Programmed / One-time
Immediate / Endless Loop
Programmed / Endless Loop

To find out more about settings and how to make them, see the User's Manual that comes with the Communication Port TR-50C or with the Data Collector RTR-57C or the [Help] Menu in the Software.

Note:

- In some cases recording will not start immediately and nothing will appear in the screen or the display will be jumbled. This sometimes happens when the circuit board is touched during battery installation. Remove the battery and install again following directions as in [2. Battery Installation].

- The display may appear black if exposed to high temperatures. This is not a malfunction and the logger is recording.

- The display may be difficult to read if exposed to low temperatures. This is not a malfunction and the logger is recording.

- To change the recording settings, see the User's Manual that comes with the Communication Port TR-50C or with the Data Collector RTR-57C.

The following settings can be made via computer communication.

Recording Intervals	TR-51A	Select from 1,2,5,10,15,20,30,60 minutes (Default Setting: 10 minutes)
	TR-52	Select from 1,2,5,10,15,20,30 seconds / 1,2,5,10,15,20,30,60 minutes (Default Setting: 10 minutes)
Recording Methods	Immediate / One-time	Recording starts immediately upon battery installation. When the unit reaches 16,000 readings, the LCD alternately displays the current reading and FULL and recording stops.
	Programmed / One-time	Recording starts at the programmed date and time. When the unit reaches 16,000 readings, the LCD alternately displays the current reading and FULL and recording stops.
	Immediate / Endless Loop	Recording starts immediately upon battery installation. When the unit reaches 16,000 readings, the oldest data is overwritten and recording continues.
	Programmed / Endless Loop	Recording starts at the programmed date and time. When the unit reaches 16,000 readings, the oldest data is overwritten and recording continues.
Unit of Temperature on Display	°F / °C (Initial setting value: °C)	

In addition to communication, the software is designed to help with data processing.

Computer Display and Printing	Display downloaded data in graphs or tables and print out.
Saving Downloaded Data	- Create Files to save downloaded data into. - Create data into Text File for exporting to spreadsheets.

* For details about all operations, see the User's Manual that comes with the Communication Port TR-50C or with the Data Collector RTR-57C or the [Help] Menu in the Software.