USER GUIDE

TR-51i

T&D

Distributed by AKRIBIS

Thermo Recorder

TR-51*i*/TR-52*i* Introductory Manual

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

T&D CORPORATION

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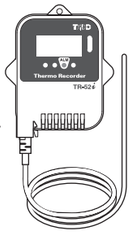
TR-51i

Internal Temperature Sensor Type
Immersion proof
Package Contents:
Data Logger and Common Accessories for TR-51i and TR-52i

TR-52i

External Temperature Sensor Type
Splash proof
Package Contents:
Data Logger, Temperature Sensor TR-5106, and Common Accessories for TR-51i and TR-52i.



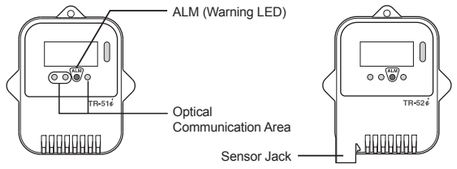
Common Accessories for TR-51i and TR-52i :
Lithium Battery (LS14250), Strap, Manual Set (Warranty included)

Specifications

	TR-51i	TR-52i
Measurement Channels	Temperature 1ch (Internal)	Temperature 1ch (External)
Sensor	Thermistor	
Measurement Units	°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	
Reponsiveness	Response Time (90 %): Approx. 35 min.	Response Time (90 %): Approx. 80 sec. (in air) Approx. 7 sec. (in agitated water)
Logging Capacity	Up to 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 Modes	Endless / One Time	
Communication Interfaces	Optical Communication	
Power	Lithium Battery LS14250 x 1	
Battery Life(*1)	Approx. 4 years	
Dimensions	H 62 ㎜ x W 47 ㎜ x D 19 ㎜ (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)
Data Collection Devices	TR-50U2 Other devices (*3)	

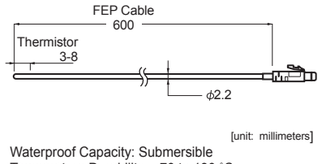
*1: Battery life depends upon multiple factors including measuring environment, recording interval, and quality of the battery being used.
*2: This is the waterproof capacity of the data logger with the sensor connected.
*3: Also compatible with the following discontinued products: TR-57DCi, TR-57U, RTR-57U, TR-50U, TR-50C
The specifications listed above are subject to change without notice.

Appearance Diagram and Part Names

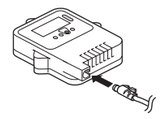


Thermo Recorder TR-51i/52i will be referred to as the "Unit" in this manual.

Temperature Sensor TR-5106 (Supplied with TR-52i)



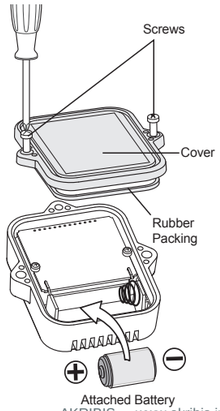
Waterproof Capacity: Submersible
Temperature Durability : -70 to 180 ˚C



Make sure that the sensor is completely inserted until you hear a "click" sound.

Installing the Battery

Recording will start after the battery is inserted.



1. Remove the screws and open the cover.
Make sure to use the proper size and type of screwdriver.
(Phillips head #1 screwdriver)

2. Insert the attached Battery.
Do not remove the battery from its tube casing. (Tube is not necessary for CR2.)

3. Check the rubber packing condition and close the cover.
- If dirt or scratches are present on the rubber packing, water resistance will be reduced. Please remove the dirt or replace the rubber packing if there're any cuts or scratches.
- Be sure to completely close the cover.
- Make sure not to over tighten the screws. (Appropriate torque: 20 to 30 N/cm [2 to 3 Kgf/cm])

Notes about Battery Installation
- After inserting the battery, it may occur that nothing appears in the display for about 10 seconds; this is not a malfunction.
- If a new battery has been installed and nothing appears in the display, please remove and re-insert the battery.
- When inserting a battery, make sure no water or foreign objects get inside the case.
- Make sure that + and – are in the correct direction.

About Lithium Batteries
- When using lithium batteries other than LS14250 produced by SAFT, such as CR2, product specifications cannot be guaranteed nor can the performance of some functions, such as the battery warning function.
- Please avoid using the CR2 in the following situations:
  Using the unit in an environment below 0 ˚C or above 60 °C.
  Exposing the CR2 to continuous vibration such as in transportation.
- Please store the lithium battery LS14250 in a place that is 20°C or less.
- To maintain waterproof capacity, when changing batteries also change the optional Maintenance Set (TR-00P1) to replace the rubber packing and silica gel.

Cautions for Using at Low Temperature (below -20 °C)
When using in an environment below -20 °C:
- The battery life will be halved.
- The Unit may not operate or a battery replacement mark may appear even if it works fine at normal temperature; we suggest replacing the battery as early as possible.

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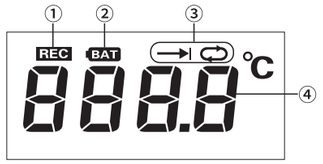
Reading the LCD

Basic LCD Display



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

① [REC] Mark	The recording status is shown here. ON: Recording in progress or Storage Capacity FULL. BLINKING: Waiting for programmed start.
② [BAT] Mark	When it is time for the battery to be replaced, this mark will appear.
③ Recording Mode	One-Time Endless
④ Measurements or operational messages are shown here.	

Battery Replacement Mark

When it is time for the battery to be replaced, the [BAT] mark will appear.

The battery mark will appear based upon the calculation of battery use. This mark may not appear correctly if the same battery is taken out and put in, therefore do not remove the battery until it can be replaced with a new one.

Please make sure to download any necessary data before replacing a battery.

1. Remove the battery.

2. Wait for about three seconds until the display shows "bAtt". Once this appears, please insert the new battery as quickly as possible.

If the battery is replaced before "bAtt" appears, the battery replacement mark (BAT) may remain even after the replacement.

If the battery is left unchanged, the display will automatically shut off and all previously recorded data will be lost.

When using the CR2, even though a new battery has been inserted the battery replacement mark may remain on for a while. In this case, after removing the battery, wait until the LCD display turns off and then insert a new battery.

Estimated Battery Life

When communication frequency is 4 times a month

Operational Environment	10 °C	-10°C	-20 °C	–30 °C
Battery Life	About 4 years	About 33 months	About 2 years	About 14 months

Battery life will be shortened if used under the following conditions:
- Downloading data very often.
- Setting the recording interval at less than 10 seconds.
- Leaving the Unit with the warning LED blinking.
- Measuring in an environment below 10 °C or above 60 °C.
- Leaving the Unit unconnected to the sensor for several months (TR-52i).

Operational Messages

Storage Capacity FULL
When the Unit reaches its storage capacity of 16,000 readings, recording will automatically stop and in the LCD the measurement reading and the word "FULL" will alternately appear. (When Recording Mode has been set to "One Time")

Recording Intervals & Estimated Time until Logging Capacity is Reached

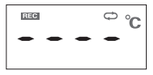
Recording Interval	1 second	30 seconds	1 minute	10 minutes	60 minutes
Period	About 4 hours	About 5 days	About 11 days	About 111 days	About 1 year and 10 months

[Check]
If this appears, all data that was stored in the Unit will have been erased.

This will be displayed under the following conditions:
- The first time a battery was inserted after purchase.
- If the battery is replaced after having been taken out for a long period.
- If the battery is replaced after the battery power has been lost.

Operational Messages for TR-52i only

Measurement Range Exceeded
The temperature display blinks when the temperature exceeds the measurement range (-60 °C or below / 155 °C or above).



Sensor Unconnected
This will be displayed when a sensor has not been connected or the wire has been broken.

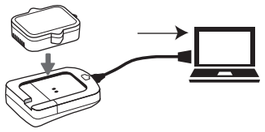
- Measurement and recording will continue so battery power will be consumed.
- If after re-connecting the sensor and measurements can still not be displayed, it is very possible that the sensor or the Unit are defective or have been damaged.

Recording Settings / Downloading Recorded Data

- You will need a Communication Port TR-50U2 (Sold Separately) and the software “T&D Recorder for Windows (TR-5,7xU)” ,which can be downloaded free of charge from our website, in order to change the recording settings and download recorded data.
- For details, please see the User’s Manual that comes with the Communication Port.

Communicate with a Computer

1. Start “T&D Recorder for Windows (TR-5,7xU)”.
2. Connect the Communication Port to your computer using the provided communication cable.
3. Place the Unit face down on the Communication Port, making sure that the optical communication areas are aligned properly.



Communication Port: TR-50U2

Recording Settings for the Unit

Recording Intervals	1, 2, 5, 10, 15, 20, 30 sec. 1, 2, 5, 10, 15, 20, 30, 60 min.
Recording Start Method	Immediate Start: Recording starts immediately upon battery installation. Programmed Start: Recording starts on the set date and time.
Recording Modes	One-Time: Upon reaching storage capacity of 16,000 readings, recording automatically stops (Measurements and the word "FULL" will alternately appear in the LCD). Endless: Upon reaching the storage capacity of 16,000 readings, the oldest data is overwritten and recording continues.

The factory default settings are as follows:
10-Min Recording Interval, Immediate Start, Endless Mode

It is possible to carry out the following data processing by using the software.
View and Print: View and print graphs and lists of recorded data.
Save: Create and save recorded data files and text files.

Warning (set limit exceeded)

Using the Software for the Communication Port , you can make settings for the Upper / Lower Limits and Judgment Time. If a measurement exceeds one of the set limits, the warning LED and a message will be displayed.

Upper Limit Exceeded

If a measured temperature exceeds the set upper limit, the Logger LED will alternately flash between [Hi] and the measurement.

Lower Limit Exceeded

If a measured temperature exceeds the set lower limit, the Logger LED will alternately flash between [Lo] and the measurement.

About Warning Monitoring Function

If warning settings (upper/lower limits) are made in an environment where one of the limits is being exceeded and recording is started, the monitoring function will enter “wait” mode. Once a measurement returns to within the set limits, the monitoring function will begin to operate.

How to Turn Off the Warning LED

If you wish to turn off the warning, do one of the following:
- Restart recording from the software.
- In the software use [Clear Warning].
- Download the recorded data (only when successfully completed).
- Produce a condition so that “CHEC” is displayed. (see [Operational Messages] section in this manual.)

Disclaimers

In order to properly use this product, please carefully read this manual before using.
- All rights of this document and attached documents belong to T&D Corporation (hereinafter referred to as “the Company”). It is prohibited to use, duplicate and/or arrange a part or whole of them without the permission of the Company.
- All registered trademarks, company names, product names and logos mentioned herein or for products being used are the property of the Company or of their respective owners.
- Specifications, design and other contents outlined in this document and attached documents are subject to change without notice.
- Please follow the safety precautions outlined in this document and attached documents carefully. We cannot guarantee nor are we responsible for safety if this product is used in any manner other than was intended.
- On-screen messages in this document may vary slightly from the actual messages.
- Please notify the distributor where you purchased this product or the Company of any mistakes, errors or unclear explanations in this document and attached documents.
- The Company’s liability for the product shall be limited to repair or replacement in accordance with our free repair policy, as stated on the included warranty card. The Company shall not be liable for any lost profits, business interruption, other consequential damages, indirect damages, punitive damages, or damages based on a claim for compensation from a third party that the Customer incurs as a result of a failure or malfunction of the product. However, if due to the Company’s intentional or gross negligence the Customer suffers damages, the Company shall be liable for damages up to the amount paid by the Customer for such product.
- This manual cannot be reissued, so please keep it in a safe place.
- Please read the warranty and provisions for free repair carefully.

Safety Precautions and Instructions

The following items should be strictly obeyed for the safe usage of this product, and for protecting yourself and other people from bodily harm and/or damage to property.
To ensure the proper use of this product, we ask that before using it you carefully read, understand and follow the safety rules and precautions as outlined below.

Explanation of Symbols

Warning Symbols

⚠ DANGER	These entries are actions that, if taken, 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.

Picture Symbols

Denotes an important warning or caution.	Denotes a forbidden action.	Denotes an action that should be carried out.

⚠ DANGER

- This Unit has been designed for private and/or industrial use only. It should not be used in situations where strict safety precautions are necessary such as with medical equipment, or in systems directly or indirectly connected with human life or well-being.
- Do not use the Unit in any environment that is exposed to chemicals and harmful gases. Also, coming in contact with hazardous substances may cause bodily harm to the user or people nearby.
- Do not take apart, repair or modify the Unit.
  It may result in malfunction or unexpected accidents.
- If water or a foreign object enters into the Unit, immediately remove the battery and stop using.
  It may result in malfunction or unexpected accidents.
- If the Unit is subjected to significant temperature change while wet, it may cause condensation inside the case. Especially be careful with temperature changes from high to low; if the Unit has condensation on the inside, it may cause malfunction, damage, and/or unexpected accidents.
- Store the Unit and accessories out of the reach of children. Touching them may result in unexpected accidents.
  Touching them may result in unexpected accidents.
- If any smoke, strange smells or sounds are emitted from the Unit, immediately remove the battery and stop using.
  Continued use may cause fire or electrocution.
- Please be careful not to touch the Unit during or after use in overly hot or cold environments; it may cause burns or frostbite.

⚠ CAUTION

- To prevent damage to the Unit from static electricity, remove static electricity from your body by touching metal around you (such as a door knob and window frame) before touching the Unit.
- Contact with oil may cause cracks to appear in the casing of the Unit. When using the Unit in such an environment, protect the Unit by placing it inside a polyethylene bag.
- Do not drop or expose the Unit to a strong impact.
  It may cause damage.
- If the Unit is not to be used for a long period of time, store it in a place where it is not exposed to high temperature and high humidity.
  If the Unit has condensation on the inside, it may cause malfunction and damage.
- To maintain waterproof capacity, we suggest periodically changing the parts inside the case. If the rubber packing should be damaged or deteriorated, please replace it along with the drying agent.
- Do not remove or reinsert the battery once it has been set; continue using until battery power is depleted. Always use a new battery for replacement.
  Not doing so may result in improper operation.
- Do not use or store the Unit in such places 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 near fire or exposed to excessive heat
  - Areas exposed to excessive dust and smoke

⚠ Cautions about the Battery

Improper handling of the battery could lead to leakage, overheating, explosion or fire.

- Do not use any batteries other than those specified.
- Do not charge it.
- Do not put the battery in a fire, attempt to heat it, disassemble or deform it.
- Do not peel off or scratch the battery resin film (label), as it prevents the battery from shorting.
  Avoid using batteries with scratched labels.
- If battery fluid gets on your eyes, skin or clothes, wash thoroughly with clean water. See a doctor immediately if it gets in your eyes.
- Use a new battery within the recommended usage period, and do not leave it in the Unit when it runs out of power.
- When mixing with other batteries for disposal, etc., insulate the battery terminals. Make sure not to mix with metal products such as necklaces, hairpins, coins and keys.

⚠ Cautions about the Temperature Sensor

When using the included Sensor TR-5106, please take note of the following:

- Make sure the sensor is inserted fully, so as not to cause an improper connection. Also, when unplugging the sensor from the unit, hold the connector to disconnect.
- Do not cut or process the sensor cables. Also, do not twist, pull on or swing them.
- Do not bend or press the last 5 cm to the tip of the sensor, as this may damage it.
  This may cause trouble or break the wire.
- If the fluoropolymer-coated section of the sensor and/or the cable has a defect or tear, the waterproof capacity will be lost.
- Insert the sensor tip to about 5 cm or more to obtain an accurate temperature measurement.
- Only use the sensor within the sensor temperature durability range.
- If the Unit is not to be used for a long period of time, store it without removing the sensor. Battery life will be shortened if the Unit has been left unconnected from the sensor for several months.
- The TR-52i becomes waterproof (splash proof) only after the temperature sensor has been connected.
  Without the sensor connected, neither the sensor jack of the Unit nor the connector part of the temperature sensor is waterproof; make sure not to get wet.

⚠ Compliance Information

FCC Statement

This device complies with Part 15 of the FCC rules. Operation is subject to the 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.

Responsible Party (US) :
TandD US, LLC
Santa Fe, New Mexico
https://tandd.com/

This equipment has been tested and found to comply with the limits for a Class B 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.

To comply with the limits for the Class B digital device, pursuant to Part 15 of the FCC Rules, this device must be installed in computer equipment certified to comply with the Class B limits.
All cables used to connect the computer and peripherals must be shielded and grounded. Operation with non-certified computers or non-shielded cables may result in interference to radio or television reception.

Caution: Changes or modifications not expressly approved by the party responsible for compliance could void the user’s authority to operate the equipment.

CE Statement

Hereby, T&D Corporation declares that this device is in compliance with EMC Directive. The full text of the EU declaration of conformity is available at the following internet address:
https://tandd.com/manual/pdf/doc-tr51i-52i.pdf

Responsible Party (EU):
ITO GmbH
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