Thermo Recorder TR-51S/ TR-52S Warranty

Customer's name: Address: Phone No.:	
Dealer's name: Address: Phone No.:	
Guarantee period	12 months from date of purchase
Date of purchase	

Statement of Limited Warranty

1. This product is warranted to be free from defects in materials and workmanship for a period of one (1) year following the date of purchase. Should the product fail to operate per specification in normal use during this period T&D will repair the unit or provide a replacement free of charge. T&D will not accept returns for any reason other than defects during the warranty period, and will not accept any product that has been misused, dropped, abused or inappropriately used or mistreated at any time.
2. This warranty is strictly limited to repair or replacement-in-kind for defective product. T&D makes no other warranty, either express or implied, and will not accept liability beyond the remedies stated herein. Specifically, T&D will not accept liability for direct, indirect, special, consequential or incidental damages arising from the use of this product.
3. Customers wishing to submit a defective product for repair or replacement during the warranty period should first contact the dealer from whom it was originally purchased. After receiving a return authorization the defective product should then be packaged along with a description of the difficulties being experienced, proof of purchase and all included accessories and materials, and return it to the dealer. In the event of difficulty contacting the original dealer, customers should contact the nearest authorized T&D sales representative. A list of these can be found on the company' s website, www. tandd.com, or it can be obtained by contacting TandD US directly.
4. This limited warranty statement gives the customer specific legal rights. The customer may also have other rights which vary from state to state in the United States, from province to province in Canada, and from country to country elsewhere in the world. To the extent this limited warranty statement is inconsistent with local law, this statement shall be deemed modified to be consistent with such local law.
5. For further information relating to product repair or replacement, or for other service questions after the termination of the warranty period, customers should contact their local authorized T&D sales representative.

T&D CORPORATION

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 modi.cations not expressly approved by party responsible for compliance could void your authority to operate the equipment.

Thermo Recorder
TR-51S/52S User's Manual

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

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Product Specifications

	TR-51S	TR-52S
Measurement Item	Temperature	Temperature
Measurement Channels	1 Ch（Internal Sensor Type）	1 Ch（External Sensor type）
Measurement Range	−40 to 80℃	−60 to 155℃
Measurement Accuracy	Typ. ± 0.5℃	Typ. ± 0.3℃ : −20 to 80℃ Typ. ± 0.5℃ : −40 to −20℃ 80 to 110℃ Typ. ± 1.0℃ : −60 to −40℃ 110 to 155℃
Measurement Display Resolution	0.1℃	
Recording Capacity	16000 data	
Recording Start Method	Immediate / Programmed	
Recording Mode	Endless / One-time	
Recording Interval	Select from 1,2,5,10,15,20 and 30 seconds or from1,2,5,10,15,20,30 and 60 minutes	
LCD Display Items	Temperature measured, recording conditions, battery life warning, memory FULL, sensor unconnected, over measurement range, temperature unit（°F / °C) and Upper / Lower limit over	
Power（*1）	Lithium battery ER3V M x 1 （Lithium battery CR2 also Okay）	
Battery Life（*2）	Maximum 4 years	
Waterproof Capacity	IP67（Immersion proof）	IP64（Splash resistant）
External Dimensions	H62mm x W47mm x D19mm (Excluding protrusions)	
Weight	Approx. 54g including battery	Approx. 55g including battery
Standard Sensor	Built - in	TR-5106: Teflon resin sensor
Unit Temp. Resistance	−40 to 80℃	
Accessories Included	Lithium Battery ER3V M x 1, Tube x 1, Strap x 1, User's Manual (Warranty) x 1	

(*1) The lithium battery (ER3V M) is not sold in stores. It can be purchased through our distributors as (Optional Battery Set TR-10P2) Normal lithium batteries sold in stores (CR2) can be used, but the operating range is reduced to −20℃ to 60℃ . If you will be using the logger in an environment where temperatures may be lower than −20℃ or higher than 60℃ , we strongly suggest purchasing and using the "Optional Battery Set TR-10P2" .
(*2) Battery life depends upon the measuring environment, recording interval, and quality of the battery being used.

Specifications for TR-5106（Temperature Sensors for TR-52S）

Sensor Heat-Durability	−70 to 180℃
Dimensions	Diameter: 2mm / Cable length: 0.6m
Thermal Time Constant	in the air : Approx 15 sec. / in agitated water : Approx 2 sec.
Shielding	Teflon resin（FEP）
Waterproof Capacity	Only the sensor tip is waterproof, the rest is immersion proof (IPX7)

Notices about this User's Manual

- 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.
- 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.
- The warranty that is included in this User's Manual cannot be reissued, so please keep it in a safe place.
- This manual has been written using ℃ as the standard unit of temperature.

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.

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

Do not put your fingers or foreign matter into the communication port.

The units can be operated with "T&D Recorder for Windows (TR-5, 7xU)" version 1.50E or later.
The latest version of "T&D Recorder for Windows (TR-5, 7xU)" can be downloaded free of charge from our Web Site.

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

The TR-52S only becomes water resistant (IP64 splash resistant) if the temperature sensor has been connected.
Without the sensor connected, the connector part of neither the main unit nor the temperature sensor is water resistant; make sure not to get wet.

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.

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.

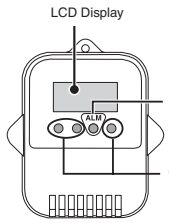
When using the included Sensor TR-5106, please take note of the following:
- Do no bend the sensor (tip section) or expose it to a strong impact. This may cause trouble or break the wire.
- The sensor and the cable are shielded by Teflon®. If the shield has a defect or tear, the waterproof capacity is lost as the shield is very thin. Inspect it before operation.
- Insert the sensor tip to at least 5cm or more to obtain on accurate temperature measurement.
- Only use the sensor within the sensor heat-durability range.

Contact with oil may cause cracks to appear in the casing of the unit.
If the unit is being used in an environment where there is a possibility of oil spraying or splashing, T&D strongly advises that the unit be placed in a Polyethylene bag before using.

Part Names

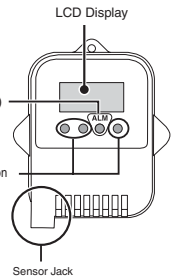
TR-51S

Internal Sensor Type
IP67 (Immersion proof)



TR-52S

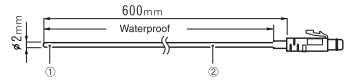
External Sensor Type
IP64 (Splash resistant)



*TR-52S is not water resistant unless the sensor has been connected.

TR-5106

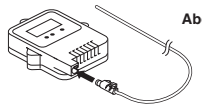
Temperature Sensor (for TR-52S)



① Thermistor ② Teflon Resin (FEP)-Shielded

Connecting the Sensor

Connect the sensor adapter to the sensor jack on the logger.
Make sure that the plug is completely inserted; until you hear a "click" sound.



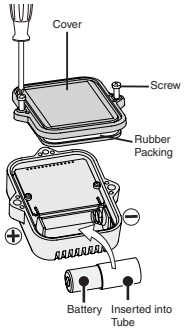
About Optional Sensors

Please see our Web Site for details about optional sensors available for the TR-52S.

Outline

- We offer two types to fit your needs: the TR-51S with internal sensor offers improved water resistance and the TR-52S with external sensor brings quicker response to changes in temperature. Both are ideal for measuring and recording temperature in normal outdoor conditions as well as harsher frozen environments or frozen storage. The compact design makes it no problem to place almost anywhere.
- For downloading data to computer for saving and processing use either one of our Communication Ports (TR-50U or TR-50C) or our handy Data Collectors (TR-57U or RTR-57U).
- By using with our newly released Communication Port TR-50U, it is possible to take advantage of the highest communication speeds for downloading data. (up to 8 times faster than our previous models)
- 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.
- Up to 16,000 measurement readings can be recorded; at a recording interval of 60 minutes that would equal about 666 days or about 2 years of non-stop consecutive recording.
- The latest version of our software can be downloaded free of charge from our Web Site. Please visit us at http://www.tandd.com for more information. The units can be operated with "T&D Recorder for Windows (TR-5,7xU)" version 1.50E or later (included with our Communication Ports and Handy Data Collectors).

Installing the Battery



When a battery is installed, temperature measurement will start at the default settings.

1. Remove screws and open the case.
   - Make sure to use the proper type and size screwdriver. (A Phillips head #1 is best)
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.
3. Confirm that the rubber packing does not have dust or defects. Close the case and screw on the cover.
   - Dust or defects on the packing can adversely affect the waterproof characteristics.
   - Make sure the cover is closed in the correct direction.
   - Please do not tighten the screw too tightly. (appropriate torque: 20N/cm – 30N/cm [2Kgf/cm – 3Kgf/cm])

Note

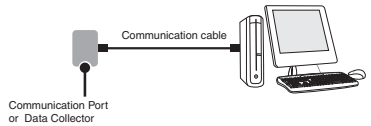
- If a new battery has been installed and recording does not immediately start, the display is jumbled, or nothing appears the circuit board may have been touched while installing the battery. Please remove the battery and try installing again.
- When inserting a battery, make sure no water or foreign objects get inside the case.
- Lithium batteries (CR2) sold in stores may also be used, but if you are using in an environment below − 20℃ , above 60℃ , or in a situation such as transportation where continued vibration is likely to occur, we suggest the purchase and use of the optional lithium battery ER3V M.
- Make sure that + and − are in the correct direction. If they are not correct, it may cause damage.
- After inserting the battery, it may occur that nothing appears in the display for about 10 seconds; this is not a malfunction.

Communication with your Computer

In order to make recording settings in the Logger and download data from the Logger to your computer it is necessary to carry out communication via optical communication using one of T&D's Communication Ports or Data Collectors (sold separately).
For details about how to make recording settings, download data and other operations; please see the User's Manual that comes with the Communication Port or Data Collector.

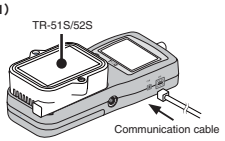
Set-up Procedure

1. Connect the Communication Port or Data Collector to your computer using the provided communication cable.

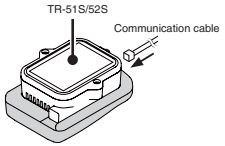


2. Place the TR-51S/52S Data Logger on top of the Port or Collector as shown in the figure, making sure that the optical communication spots are aligned properly.

Data Collector (*1)
Compatible Devices
RTR-57U
RTR-57C



Communication Port
Compatible Devices
TR-50U
TR-50C (*1)



- Communication errors may occur in environments where temperatures are very high or very low.
- Communication may not be possible if battery power is extremely low.

Recording Condition Settings which can be made via Optical Communication

The following settings can be made via computer communication.

Initial Setting Values: Recording Interval : 10 minutes / Recording Mode : Endless loop

Recording Intervals	Select from 1,2,5,10,15,20,30 seconds / 1,2,5,10,15,20,30,60 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.

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 - Convert data into Text File for exporting to spreadsheets

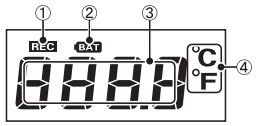
(*1) : Notes about the Device used for Communication

When using optical communication with Communication Port TR-50C or one of our Data Collectors, please take note of the following.

- When using these devices with our Software "T&D Recorder for Windows (TR-5, 7xU)" TR-51S will be recognized as TR-51A and TR-52S will be recognized as TR-52; please operate as such.
- Furthermore, the high speed data communication for downloading data and warning monitoring functions built into the TR-5S series cannot be used.

Reading the LCD

Basic LCD Display



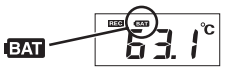
- When being used in cold environments the display may become difficult to read. This is not a malfunction.
- When being used in hot environments the display may become black. This is not a malfunction.

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 Battery Replacement Icon (BAT)
displayed when time to change the battery.
③ Measurement Reading and Message Display
④ Unit of Measurement: displays unit of measurement

Battery Replacement Icon

If the replacement icon appears, try to replace the battery with a new one as soon as possible.

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



2. After removing the battery, wait for about three seconds until the [bAtt] appears. Once this appears please change the battery as quickly as possible.

- If the battery is replaced before [bAtt] appears, even after replacing the [BAT] icon may remain.
- After a battery is installed, if [bAtt] remains on display for more than one minute, please check to make sure that the battery has been properly installed. If after checking, the icon continues to appear, please try to carry out some optical communication. If optical communication is psossible, the icon will disappear within an hour.
- Downloading of data cannot occur while the battery is removed.
- Recorded data will be saved and recording will continue.

3. If the battery is further left unchanged, the display will automatically shut off.
   - If, at this time, a new battery is placed in the unit, [CHEC] will appear on the display after which recording will begin again using the previously set recording conditions. Note however that all previously recorded data will have been lost.

[Estimating Battery Life]

These estimates are based on using a new battery. Battery Life will be greatly shortened if communication is carried out quite often and/or if the recording interval is set for 10 seconds or less.

(Communication frequency : 4 times / month)

Recording Interval	1 second	2 seconds	5 ~ 30 seconds	1 minute or more
Battery Life	about 16 months	about 2 years	about 3 years	about 4 years

- The [BAT] icon will appear based upon the calculation of battery use. It may appear sooner than noted above.
- If the unit is left with the warning LED blinking, battery life will be halved.

Notes about Changing the Battery

Replace with a new battery following directions as in "Installing the Battery". Recording will continue using the previously set recording settings or will restart using those settings.

- If + (plus) and – (minus) are mistaken, or if the battery terminals + and – are shorted, the recorded data that is stored in the logger will be lost.
- Before replacing a battery, please make sure to download any necessary data and proceed with changing the battery. For details, see the User's Manual that came with the software.
- Please store the ER3V M in a place that is 20℃ or less.

Other Icons

[Full Memory]

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

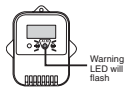
Estimates of time until FULL is displayed.

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

[Check]

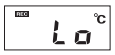
This will be displayed under the following conditions:
・The first time a battery was inserted after purchase
・If the battery is replaced after having been taken out for a long period
If this appears, all data that was stored in the Logger will have been erased.

Warning (exceeds set limit)



If a measured temperature exceeds one of the already set upper and lower limits, the warning LED on the Logger will flash. At the same time, one of the "Over Limit" icons will appear on the Logger LCD.

[Exceeds Upper Limit]
If a measured temperature exceeds the set upper limit, the Logger LED will alternately flash between [HI] and the current temperature.



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

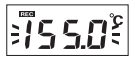
Starting the Warning Monitoring Function

If these settings 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 the current measurement falls within the set limits, the monitoring function will begin to operate.

Removing a Warning

Under the following conditions the warning display will be removed:
-When a Recording Start session is begun from the software.
-When [Clear Warning] is carried out from the software (only via TR-50U).
-When recorded data is downloaded and is successfully completed.
-When the battery is removed, or battery power has been lost and the [CHEC] icon appears.

Measurement Range Exceeded (for TR-52S only)



The current temperature display will blink when the temperature goes below − 60℃ or goes above + 155℃ .

Sensor Unconnected (for TR-52S only)

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