Remote Units and Base Units: What are they and what can they do?

Remote Units are Data Loggers that can measure and record data such as temperature and humidity. Base Units use wireless communication to collect the data recorded and saved in the Remote Units. Also, Base Units can be set up to periodically communicate with Remote Units to monitor for measurement abnormalities and other warnings. This collected data, as well as, current readings can be sent via FTP or E-mail to a specified location. Moreover, upon a warning occurrence warning reports can be sent via E-mail.

Select the Type of Data Logger and Base Station to Fit your Needs

Mobile Base Station RTR-500GSM with its built-in cellular phone communication capability is perfect for use in remote areas where a LAN connection is difficult or not available. The Network Base Station RTR-500W is designed as a Base Unit for use with a LAN connection and is perfect for use in places where no PC is available or as a quick addition to a network to create a measurement management system. The Wireless Base Station RTR-500 is an easy-to-use Base Unit for onsite use with a USB connection to a local computer. The handheld Wireless Data Collector RTR-500DC is a user-friendly wireless communication Data Collector designed for hand-held portability. The type of Data Logger can be selected to match your measurement items and range. And to further increase the possibilities, an array of optional sensors is also available.

High Speed Wireless Communication and Data Downloading

The RTR-500 Series is designed for powerful and reliable wireless communication. The wireless communication range, if unobstructed and direct, is about 150 meters (500 ft). It takes only about two minutes to download data from one Remote Unit at full capacity. The Loggers have been designed to keep on working in even harsh conditions; that is why wireless communication is still possible in conditions from minus 30˚C to 80˚C.

* Note: This is the range of temperature in which wireless communication is possible and does not represent the measurement range of Remote Units, nor the range in which Remote Units or Base Units can be operated.

Easy Expansion of the Wireless Communication Range

It is possible to expand the wireless communication range by simply registering a Repeater (RTR-500) or a number of Repeaters to relay communication between a Base Unit and Remote Units.
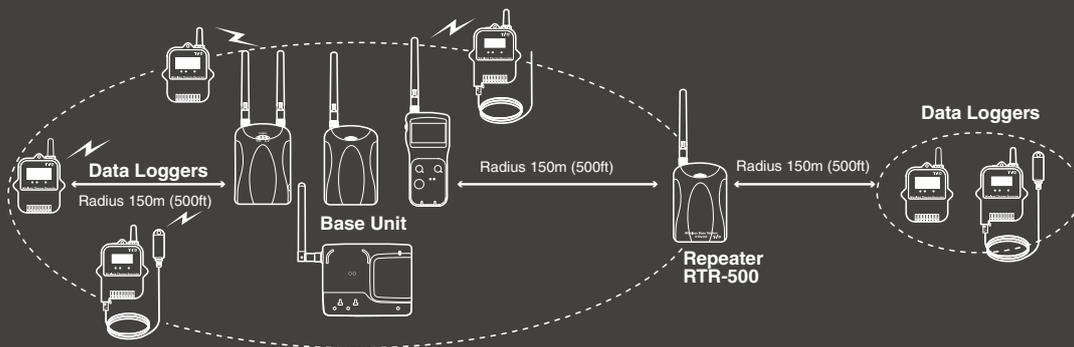
One Base Unit for Total Management of Multiple Remote Units

With just one Base Unit it is possible to simultaneously manage a large number of Remote Units. Groups of Remote Units and Repeaters can be created and registered to a Base Unit to match your situation: by location, by item, by user and so on. Each Group is assigned a Wireless Communication Frequency Channel to avoid interference and poor transmission.

| Base Unit Type	Remote Units	Groups	Repeaters
RTR-500GSM	Total of 20	4	5 Per Group
RTR-500NW / RTR-500AW	Total of 100	10	10 Per Group
RTR-500	32 Per Group	20	30 Per Group
RTR-500DC	32 Per Group, 16 Per Group (RTR-505 / 574)	7	15 Per Group

Dedicated Software Free of Charge

RTR-500 Series software is provided free of charge to our customers. This dedicated software makes settings a snap: from registration of Base Units, Remote Units and Repeaters to wireless and network communication settings.

Monitoring of Current Readings via a Web Browser (T&D WebStorage Service)

By sending the collected data to our online service "T&D WebStorage Service", it is possible to monitor current readings and/or warnings, as well as, share the data via a PC web browser. "T&D Webstorage Service" (http://www.webstorage-service.com/) is a free web-based storage service provided by T&D Corporation.

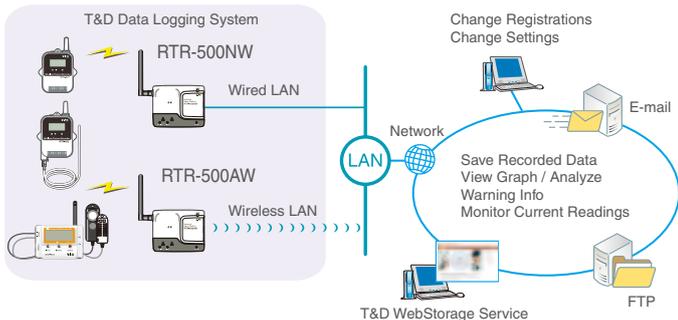## Base Unit for LAN Connection : Wired or Wireless
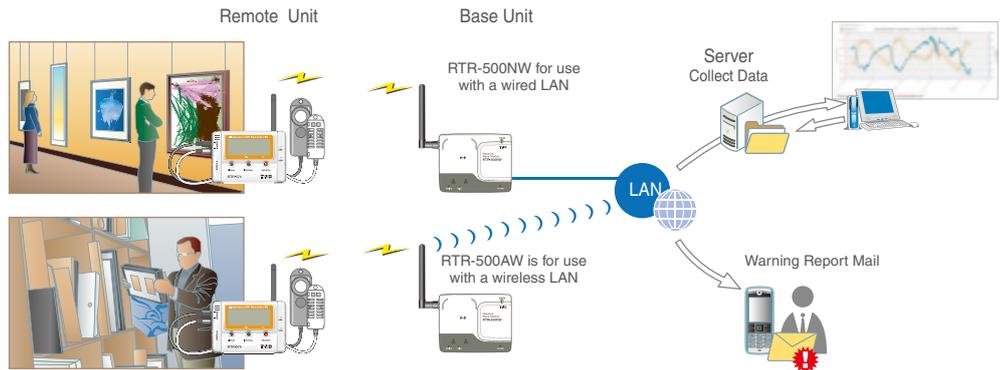
Application Examples

* For centralized monitoring and management of temperature and humidity in refrigerated cases across supermarkets or other chain stores
* For monitoring systems of pharmacy storage facilities
* For degradation prevention systems in art museums and other archival and exhibit forums
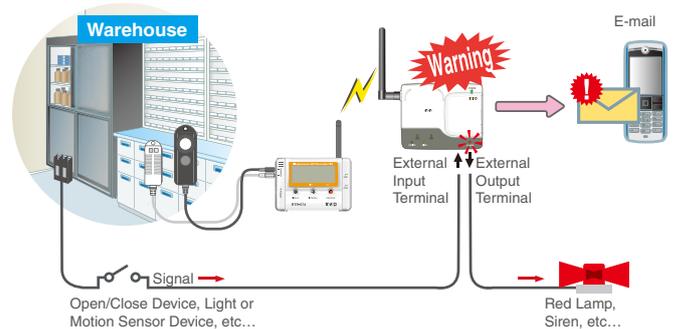
Automatically Download and Send Data

At the set interval, the RTR-500W will communicate via wireless communication to collect recorded data or current readings from Remote Units and send the received data via FTP, e-mail to a set address or send it to our "T&D WebStorage Service".

Register Remote Units and Change Settings via the Network

After having made initial settings you wish to add a new Remote Unit or change the registration info of a Remote Unit, it can be done easily by sending the settings info to the RTR-500W over the network. There is no need to retrieve the RTR-500W from its location to make these changes.
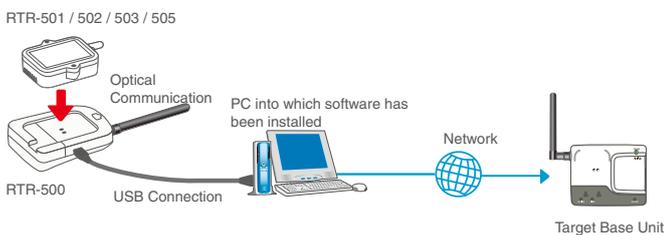
Note: * If you wish to add an RTR–501/502/503/505 Remote Unit via the network it is necessary to have an RTR–500 unit to which you can connect to the PC.

An Array of Warning Monitoring Functions

If and when a measurement exceeds the set Upper or Lower Limit or if an abnormality occurs in the Remote Unit the RTR-500W will go into "Warning" mode whereby the ALARM LED and the external contact output will be switched ON. In addition, a warning report e-mail can be sent.

ALARM LED Lamp
The ALARM LED lamp on the RTR-500NW/500AW will come on.
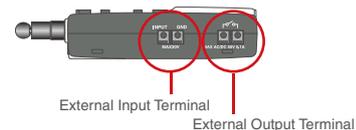
Warning Report Mail
A warning report mail will be sent to the specified e-mail address(es).

External Contact Output (Warning Output)
In conjunction with the ALARM LED the external contact output will switch to ON. It is possible to create an effective warning system by connecting a siren, light or other easily understandable warning device to the external output terminal.

External Contact Input
By connecting a surveillance system sensor such as a motion sensor, light sensor, or open/close sensor to the external input terminal it is possible to detect an external electronic signal (ON /OFF). When an ON signal is detected a warning report mail can be sent.

External Input Terminal

External Output Terminal

Simultaneous Management of Multiple Remote Units

Up to 10 groups can be registered to one RTR-500W Base Unit. Each RTR-500NW or RTR-500AW can simultaneously manage up to 100 Remote Units.

Software Included with Base Unit

Free of Charge! Software Updates and Info available on our WebSite!

RTR-500GSM for Windows
This software is made up of three applications:

RTR-500GSM Settings Utility
Temperature / Humidity Graph
Adjustment Tools

RTR-500 for Windows
This software is made up of five applications:

RTR-500 Settings Utility
RTR-500 for Windows
Temperature / Humidity Graph
Multi-Scale Graph

EU Version now comes in English, Spanish, French, Italian and German!

RTR-500W for Windows
This software is made up of five applications:

RTR-500W Settings Utility
Temperature / Humidity Graph
Multi-Scale Graph

RTR-500DC for Windows
This software is made up of six applications:

RTR-500DC Settings Utility
RTR-500 DC Manager
Temperature / Humidity Graph
Multi-Scale Graph

◘ "Settings Utility" Program makes Settings a Snap!

The Settings Utility application is used to take care of all Base Unit settings and registration of Remote Units and Repeaters. After having registered and placed the Remote Units and Repeaters in the field, it is possible to run communication tests to check signal strength between the various units to ensure stable communication.

◘ Easy-to-Understand Operation Guide

The Operation Guide that is part of the software uses easy to understand terms to help lead you through all the necessary steps and setting procedures. If during setup you get confused or have trouble, just simply open the Operation Guide in the same on-screen window and make settings while consulting the Guide.
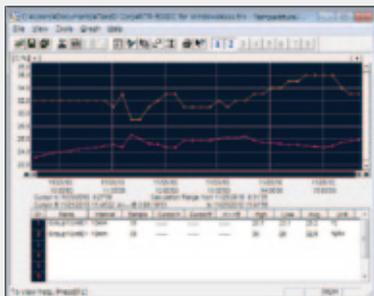
◘ Difficult Cellular Phone Network Settings made Easy

When using the RTR-500GSM, we have included an "Initial Settings Wizard" which guides you through what otherwise would be difficult process of setting up the unit for GSM network communication, just put in the SIM Card and turn on the Wizard.
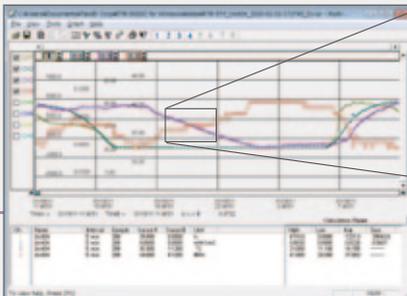
◘ Intuitive User-Friendly Graph Tools (Temperature / Humidity Graph and Multi-Scale Graph)

With either program you can view up to eight channels of data in one graph. The Graph programs intuitive operation allows the User to easily hide or view channels, zoom in and out on data, switch back and forth from °C to °F, and view data in table form.
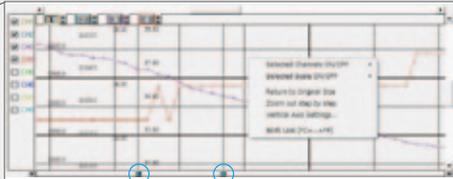
Temperature / Humidity Graph
(Recorded data from RTR-501/502/503)

Multi-scale Graph
(Recorded data from RTR-574)

Enlarged View

Data List Display

trz./ trx. /.iur Type Data   Print   Save

CSV Format

View in Table Form
Graph data can be easily viewed as a data list. The highest and lowest values are shown in easily distinguishable colors.

From Graph Editing to Data Analysis
It is possible to hide, re-order and delete channels, edit recording start times, and make changes to colors used for the graph scale lines, data lines and background. Also move the A and B cursor at the bottom of the graph to view data readings for those points and the calculated difference between the points. By saving graph data as CSV Format Text File data, that data can then be uploaded into common spreadsheet software for data analysis.
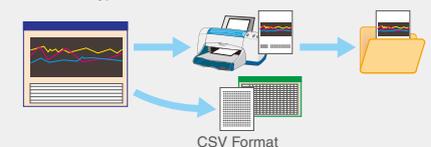
◘ Remote Unit Adjustment Settings

When using multiple measuring devices, this function allows the user to correct for inaccuracies found in measured values when compared to a standard measurement (the value measured by the standard device). Measurements can be adjusted and recorded based on a standard measurement. The RTR-500 Series Software allows for adjustment settings to be made to Remote Unit measurements by simply selecting the adjustment method from either "1 Point Adjustment" or "2 Point Adjustment" and entering the values for "Before AdjuStment" and "After Adjustment".

Sensors for RTR-574

Illuminance UV Sensor

**ISA-3151**

65 1500
23
12.6
① ② ① ③
[Unit: mm]

Measurement Range:
 Illuminance: 0 lx to 130 klx
 UV Intensity: 0 to 30 mW/cm²
Measurement Resolution:
 Illuminance: Minimum of 0.01 lx
 UV Intensity: Minimum of 0.001 mW/cm²
Accuracy:
 Illuminance: ±5 % (10 lx to 100 klx at 25 °C, 50 %RH)
 UV Intensity: ±5% (0.1 to 30 mW/cm² at 25 °C, 50 %RH) *1
Relative Spectral Response:
Illuminance: Approximated to the CIE standard response function V (λ).
UV Intensity: 260 to 400 nm
Operating Environment:
 Temperature: –10 to 60 °C, Humidity: under 90 %RH (no condensation)

Materials: ① Polycarbonate (Illuminance Sensor Area) ② Glass (UV Intensity Sensor Area) ③ Vinyl Coated Electrical Wire
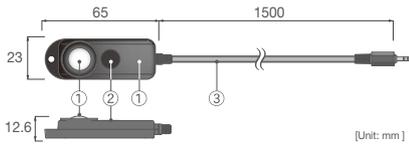
Temperature / Humidity Sensor

THA-3151

51.5 1500
18
① ② ③
10
[Unit: mm]
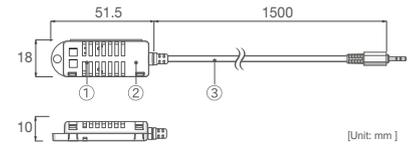
Measurement Range:
 Temperature: 0 to 55 °C
 Humidity: 10 to 95 %RH
 (No condensation)
Measurement Resolution:
 Temperature: 0.1 °C
 Humidity: 1 %RH
Accuracy:
 Temperature: ±0.5 °C
 Humidity: ±5%RH (at 25 °C and 50%RH)
Response Time (90%): Approx. 7 min.

Materials: ① Temp/Humidity Sensor ② Polypropylene Resin ③ Vinyl Chloride Coated Electrical Wire

High Precision Temperature / Humidity Sensor

HHA-3151

64.5 1500
20
① ② ③
10
[Unit: mm]

Measurement Range:
 Temperature: –30 to 80 °C
 Humidity: 0 to 99 %RH *3
Measurement Resolution:
 Temperature: 0.1 °C
 Humidity: 0.1 %RH
Accuracy (Temperature):
 ±0.3 °C (at 10 to 40 °C)
 ±0.5 °C (at all other temperatures)
Accuracy (Humidity):
 ±2.5 %RH (at 25 °C, 10 to 85 %RH), ±4 %RH (at 25 °C, 0 to 10 % or 85 to 99 %RH)
 At temperatures other than 25 °C and $\geq$ 0 °C, add ±0.1%RH per degree of difference from 25.
 Humidity Hysteresis: ±1.5 %RH or lower *3
Response Time (90%):
 Temperature: Approx. 7 min.
 Humidity: Approx. 20 sec.
Long Term Stability: ±1%RH/yr, ±0.1°C/yr (under normal operational conditions) *2

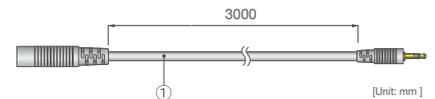Materials: ① Temp/Humidity Sensor Area ② Polycarbonate ③ Vinyl Chloride Coated Electrical Wire
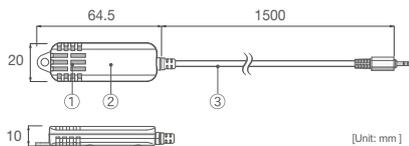
Sensor Extension Cable

TR-1C30

3000
①
[Unit: mm]

Temperature Durability: 25 to 60 °C

Materials: ① Vinyl Coated Electrical Wire

Note: Up to 3 extension cables can be connected to one sensor.

*1: Compared to the value measured by the T&D standard sensor for calibration under our calibration light source.
*2: Do not expose to condensation, dampness, corrosive gases or organic solvents.
*3: When used in environments where temperature and humidity are over the values of 50 °C 75 %, 60 °C 50 %, 70 °C 35 %, and 80 °C 25 %, sensor hysteresis may fluctuate by values greater than ±1.5 %RH. Under certain circumstances, it may take some time to return to normal measurement capability.
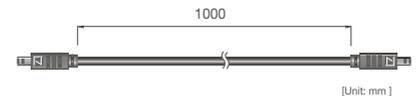
For RTR-574

Wall Attachment

TR-07K2

Contents:
 Lock Screw x 2
 Double-sided Adhesive tape
Screw Holes: 2 - ø4.2

Material: Polycarbonate

Communication Cable

TR-6C10

Cable Length: 1.0m
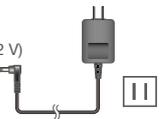For communication between RTR–500DC and RTR–574

1000
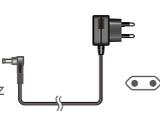[Unit: mm]

For RTR-500GSM

AC Adaptor

AD-0605

Cable Length: 1.8 m
Input: AC100 V (90 –132 V)
Output: DC 5V 2 A
Frequency: 50 / 60 Hz
Plug Type: A

AD-0605

Cable Length: 1.6 m
Input: AC100–240V
Output: DC 5 V 2 A
Frequency: 50 / 60Hz
Plug Type: C

Wall Attachment

TR-5GK1

Contents:
 Lock Screw x 2
 Double-sided Adhesive tape

Materials: ① Aluminum ② Rubber

External Power Cable

BC-0201

2000
② ①
[Unit : mm]

Power Source Conditions:
 Voltage: DC 8–34V
 Current: MAX 2A
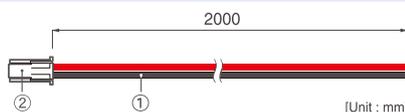
Materials: ① Cable: AWG#20, Red/ Plus (+), Black/ Minus (-) ② Connector: Housing/ XAP–02V–1, Contact/ SXA–01T-P0.6 (J.S.T. Mfg. Co., Ltd.)

For RTR-500NW / 500AW / 500 / 500DC

AC Adaptor

AD-0638

Cable Length: 1.8 m
Input: AC100–240 V
Output: DC6 V 500 mA
Frequency: 50 / 60 Hz
Plug Type: A

AD-0638-C

Cable length: 1.8 m
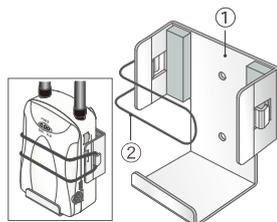Input: AC100–240 V
Output: DC6 V 500 mA
Frequency: 50 / 60 Hz
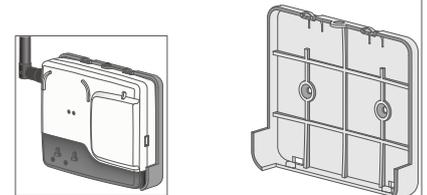Plug Type: C

For RTR-500NW / 500AW

Wall Attachment

TR-5WK1

Contents:
 Screw for fastening to wall x 2
 Double-sided Tape
 Screw for fastening Unit

Material: PC Resin

RTR-500 Series - Specifications

Mobile Base Station RTR-500GSM

UNIT

Compatible Devices	Remote Units: RTR–501 / 502 / 503 / 505-Pt / 505-TC (Including L Type) Repeater: RTR–500

Features and Functions	1. Auto-downloading of Recorded Data (E-mail or FTP),
	2. Automatic Sending of Current Readings (E-mail or FTP),
	3. Warning Monitoring (SMS, E-mail or Contacts)
	4. SMS Remote Control
	  - Stop and Start Functions 1, 2, 3, above
	  - Request Immediate Download of Data to Set Address

Types of Warning Monitoring	Remote Unit Measurement Warnings, Remote Unit Wireless Communication Error Warnings, Remote Unit Battery Level Warnings, Remote Unit Sensor Abnormality Warnings, Base Unit External Power Loss Warnings (only when batteries are installed), Base Unit Battery Level Warnings / Base Unit External Contact Input Warnings
Power	AA Alkaline Battery x 4 External Power (DC8 - 34V) AC Adaptor (AD–0605 / AD–0607)
Current Consumption	At most 2 A (5 V, with GSM in operation)
Communication Interfaces	USB (with PC) Optical Communication (with Remote Unit)
LED Display	POWER: Green / ERR: Orange / ALM: Red
Battery Life	10 days * of continued use if monitoring is carried out every 10 minutes (when not using GPS).
Dimensions	H 96 mm x W 65 mm x D 39 mm (Excluding protrusions) Antenna Length : 109 mm
Weight	About. 220 g (including batteries)
Operating Environment	Temperature: 10 to 55 ℃ (–10 to 55 ℃ when external power connected) Humidity: 20 to 80 %RH (No condensation)

Other	Not waterproof, moistureproof, or dustproof.
	The SIM card must adhere to the following conditions:
	  1. Compatible with GSM.
	  2. Able to use SMS (Short Message Service) and GPRS (General Packet Radio Service).
	  3. The card has been activated.

* Battery life varies depending upon the frequency of communication, the measuring environment, and the quality of the batteries being used.

Short Range Radio Communication

RF Power	FCC model 7mW CE model 5mW
Radio Standard Specifications	FCC Part15 Section247 / IC RSS–210 (Frequency Range: 902 to 928 MHz) ETSI EN 300 220 (Frequency Range: 869.7 to 870 MHz)
Transmission Range	About 150 meters (500ft) if direct and unobstructed.

Communication Time	When downloading 1 Remote Unit at full logging capacity:
	  About 2 min.
	  * The same amount of time will be necessary for each added Repeater.

Cellular Phone Communication

Band	GSM850/GSM1900(PTCRB Certified) GPRS(General Packet Radio Service) GSM900/GSM1800 GPRS(General Packet Radio Service)
Data Transfer Protocol	
Auto-Downloading of Recorded Data / Auto-Sending of Current Readings	FTP (PASV mode also supported) SMTP (SMTP-AUTH, POP-before SMTP) * SMTP-AUTH supports LOGIN only
Warning Monitoring Function	SMS / SMTP (SMTP-AUTH, POP-before SMTP) * SMTP-AUTH supports LOGIN only

Contacts (Warning Output / Input)

Output Terminal Open Drain Output	Voltage when OFF: DC less than 30 V Current when ON: less than 0.1 A Resistance when ON: 15 Ω
Input Terminal	Internal Pull-up: 3V 100 kΩ Maximum Input Voltage: 30 V

GPS Communication (Option)

GPS Interface	Connector: Mini DIN 6 Pin Female Communication Standard: ANSI / EIA/TIA–232-E Geographic Coordinate System:WSG84 Power Supply: 5 V MAX 100 mA
Other	Attach geographical positioning info to Current Readings

Network Base Station RTR-500W

UNIT

Compatible Devices	Remote Units: RTR–501 / 502 / 503 / 505-TC / 505-Pt / 505-V / 505-mA / 505-P (Including L Type) RTR–574 Repeater: RTR–500
Features and Functions	1. Auto-downloading of Recorded Data (E-mail /FTP) 2. Automatic Sending of Current Readings (E-mail / FTP) 3. Warning Monitoring (E-mail / Contacts)
Types of Warning Monitoring	Remote Unit Measurement Warnings, Cumulative Illuminance/Amount of UV Light Warnings (RTR-574), Remote Unit Wireless Communication Error Warnings, Remote Unit Battery Level Warnings, Remote Unit Sensor Error Warnings, and Base Unit External Contact Input Warnings
Power	AC Adaptor (AD–0638 / AD–0638-C)
Current Consumption	RTR–500NW: Approx. 300 mA RTR–500AW: Approx. 400 mA
Communication Interfaces	USB (with PC) Optical Communication (with Compatible Remote Units other than RTR–574) Wired LAN (RTR–500NW) / Wireless LAN (RTR–500AW)
LED Display	POWER, ACTIVE, DIAG, and ALARM
Dimensions	H83mm x W102mm x D28mm (excluding protrusions) Antenna Length: 87.3mm
Weight	RTR–500NW: About 130 g RTR–500AW: About 120 g (including antenna for each)
Operating Environment	Temperature: –10 to 60 ℃ Humidity: 20 to 80 %RH (no condensation)
Other	Not waterproof, moistureproof, or dustproof

Short Range Radio Communication

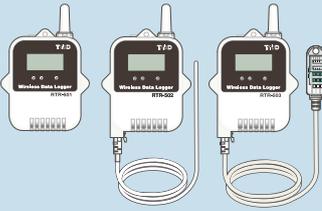|	
RF Power	FCC model 7mW / CE model 5mW
Radio Standard Specifications	FCC Part15 Section247 / IC RSS–210 (Frequency Range: 902 to 928 MHz) ETSI EN 300 220 (Frequency Range: 869.7 to 870 MHz)
Communication Range	About 150 meters (500ft) if direct and unobstructed.

Communication Time	When downloading one Remote Unit at full logging capacity:
	  About 2 min. (Remote Units excluding RTR–574)
	  About 4 min. (RTR–574)
	  *The same amount of time will be necessary for each added Repeater.

LAN Communication

Wired LAN (RTR–500NW)	RJ45 Connector 100Base-TX / 10Base-T AutoMDI / MDI-X
Wireless LAN (RTR–500AW)	Internal wireless LAN antenna IEEE 802.11b/g WEP, WPA/WPA2 (PSK)
Data Transfer Protocol	
Auto-Downloading of Recorded Data / Auto-Sending of Current Readings	FTP (PASV mode also supported) SMTP (SMTP-AUTH, POP-before SMTP) *SMTP-AUTH supports LOGIN only
Warning Monitoring Function	SMTP (SMTP-AUTH, POP-before SMTP) *SMTP-AUTH supports LOGIN only

Contacts (Warning Output / Input)

Output Terminal	Voltage when OFF: AC/DC 50V or less Current when ON: 0.1A or less Resistance when ON: 35 Ω
Input Terminal	Internal Pull-up: 3 V 100 kΩ Maximum Input Voltage: 30 V

Remote Unit
RTR-501 / 502 / 503
(Sensor Included)

Base Unit
RTR-500GSM

AA Alkaline
Battery x 4
Included

or

AC Adaptor
Sold Separately
AD-0605 or AD-05C1

or

External Power Cable
BC-0201
Included

Power

Install

Purchase Extra Items Separately for RTR-500GSM
We do not handle or sell these items.

SIM Card
Required item
for operation

External Output / Input
Compatible Connector

External Power
Supply
Voltage : DC 8-34V
Current : MAX 2A

GPS Reciever

Software

USB Cable (US-15C)

Install
Connect

RTR-505
(Input Module or
Input Cable Included)

Power

Base Unit / Repeater
RTR-500

Software

USB Cable (US-15C)

Install
Connect

Lithium Battery
inserted into a tube
(LS14250 (SAFT)
Included

Use as a Repeater
AA Alkaline
Battery x2
Not Included

AC Adaptor
Sold Separately
AD-0638 or
AD-0638-C

Power

RTR-500A1
External Power
Adaptor Kit
Sold Separately

RTR-500B1 *
Large Capacity
Battery Adaptor Kit
Sold Separately

* When using RTR-500B1 it is necessary
to purchase Lithium Battery (LS26500).

Install
Connect

Initial Settings
Function Settings

*It is not possible to
simultaneously connect
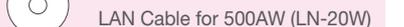more than one Base Unit to
a PC.

Base Unit
RTR-500NW
RTR-500AW
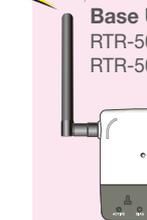
Software

USB Cable (US-15C)

LAN Cable for 500AW (LN-20W)

AC Adaptor
Sold Separately
AD-0638 or
AD-0638-C

Power

Install
Connect

Connect

Some devices such as a hub, wireless
LAN access point, server, and so on are
sold separately and may be necessary
to connect to a local network. T&D does
not manufacture or sell these items.

RTR-574
(Sensor Included)

Power

AA Alkaline Battery x1
Included

Base Unit
RTR-500DC

Software

USB Cable (US-15C)

AAA Alkaline
Battery x2

AC Adaptor
Sold Separately
AD-0638 or
AD-0638-C

Nickel Hydride
Battery x2
Not Included

Power

Install
Connect

Initial Settings
Function Settings

⚠ **Caution regarding safety**
For safe operation carefully read instructions before using the product.

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2012. 03. 16304590008D