USER GUIDE

RTR500BM

T&D

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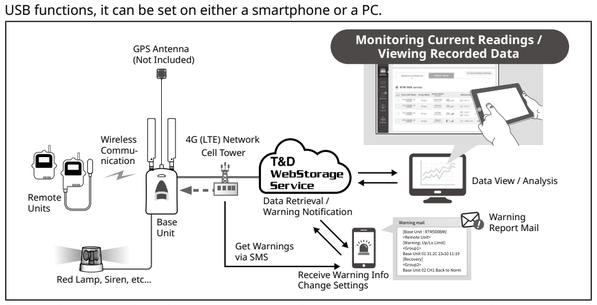
Mobile Base Station

RTR500BM User's Manual

Thank you for purchasing our product. This document describes basic settings and simple operations for using this product with T&D WebStorage Service. For information about the SIM card and device preparation, please refer to [**RTR500BM: Getting Ready**].

What can the RTR500BM do?

The RTR500BM is a Base Unit supporting 4G mobile network. Measurement data gathered via wireless communication from target Remote Units can be automatically uploaded to our cloud storage service "T&D WebStorage Service". Remote monitoring, warning monitoring and device settings can also be carried out via the cloud. Also equipped with Bluetooth® and USB functions, it can be set on either a smartphone or a PC.



For details about using without the cloud service and for other operational info, please see the **RTR500B Series HELP**.

https://tandd.com/support/webhelp/rtr500b/eng/

T&D Corporation

https://tandd.com/

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Product Specifications (US Model)

Compatible Devices	Remote Units: RTR500B Series (RTR501B / 502B / 503B / 505B / 507B) Including L Type RTR-500 Series (RTR-574 /576) Including S Type (*1) Repeaters: RTR500BC Other devices (*2)
Maximum Number of Registrations	Remote Units: 20 units Repeaters: 5 units x 4 groups
Communication Interfaces	Short Range Wireless Communication Frequency Range: 902 to 928MHz RF Power: 7mW Transmission Range: About 150 meters (500 ft) if unobstructed and direct LTE Communication LTE-FDD: B2/B4/B12 WCDMA: B2/B5 Bluetooth 4.2 (Bluetooth Low Energy) For Settings USB 2.0 (Mini-B connector) For Settings Optical Communication (proprietary protocol)
Communication Time	Data Download Time (for 16,000 readings) Via wireless communication: Approx. 2 minutes An additional 30 seconds should be added for each Repeater. (*3) Does not include communication time from Base Unit to server over LTE.
External Input/ Output Terminal (*4)	Input Terminal: Contact Input Internal Pull-up: 3V 100kΩ Maximum Input Voltage: 30V Output Terminal: PhotoMOS Relay Output OFF-State Voltage: AC/DC 50V or less ON-State Current: 0.1 A or less ON-State Resistance: 35Ω
Communication Protocol (*5)	HTTP, HTTPS, FTP, SNTP, SMS, DNS
Power	AA Alkaline Battery LR6 x 4 AC Adaptor (AD-05A3) External Battery (DC 9-38V) with the Connection Adaptor (BC-0204)
Battery Life (*6)	Expected battery life with only AA alkaline batteries: Approx. 2 days under the following conditions (only one Remote Unit and no Repeaters, downloading data once a day, sending current readings at 10-min interval)
Dimension	H 96 mm x W 66 mm x D 38.6 mm (excluding antenna) Antenna Length (Cellular/Local): 135 mm
Weight	Approx. 135 g
Operating Environ-ment	Temperature: -10 to 60 °C, Humidity: 90 %RH or less (without condensation)
GPS Interface (*7)	Connector: SMA Female Power Supply: 3.3V
SIM Card (*8) (*9)	nano SIM Card which supports 4G/LTE data communication (with a minimum speed of 200Kbps)
Software (*10)	PC Software (Windows): RTR500BM for Windows, T&D Graph Mobile Application (iOS): T&D 500B Utility

*1: RTR-500 Series does not have Bluetooth capability.
*2: Also compatible with the following discontinued products: RTR-501/502/503/507S/505, RTR-500. Please refer to "Compatibility Info for RTR500B and RTR-500 Series" (https://tandd.com/information/compatible-rtr500b-loggers.html)
*3: When using RTR500BC as Repeater. Depending upon conditions it may take up to an additional 2 minutes.
*4: In order to use the external alarm terminal, please purchase the optional alarm connection cable (AC0101).
*5: Client Function
*6: Battery life depends on several factors, including number of warning reports sent, ambient temperature, radio environment, frequency of communication, and quality of the battery being used. All estimates are based on operations carried out with a new battery and are in no way a guarantee of actual battery life.
*7: In order to use the GPS function (to attach geographical positioning info to current readings data), please purchase a compatible GPS antenna (SMA Male Connector).
*8: In order to enable sending of warning messages by SMS, a SIM card with SMS functionality is required.
*9: Please prepare a contracted SIM card separately. For the supported SIM cards, contact your local T&D distributor.
*10: Free software download and information on OS compatibility is available on the Software page of our website at https://tandd.com/software/.

AC5008 www.ukthis.info contact@ukthis.info

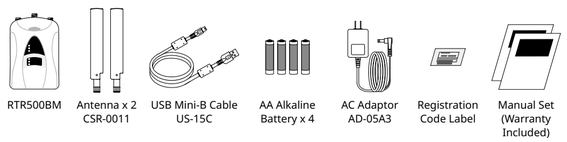
The specifications listed above are subject to change without notice.

Terms used in this Manual

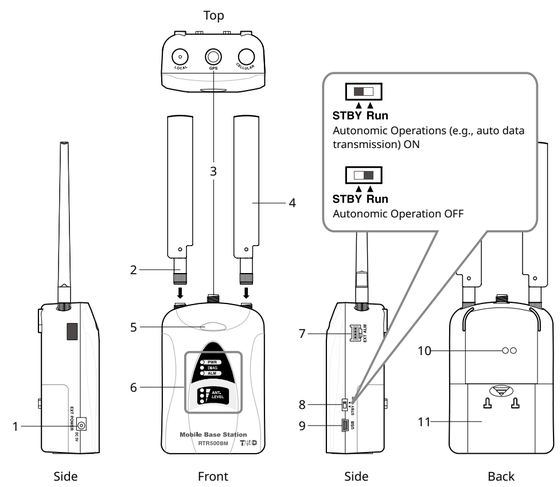
Base Unit	RTR500BM
Remote Unit	RTR501B / 502B / 503B / 505B / 507B, RTR-574 / 576
Repeater	RTR500BC (when used as a Repeater)
Current Readings	The most recent measurements recorded by a Remote Unit
Recorded Data	Measurements stored in the Remote Unit
Wireless Communication	Short Range Radio Communication

Package Contents

Before using this product, please confirm that all of the contents are included.



Part Names



1 Power Connector
2 Wireless Communication Antenna (Local)
3 GPS Antenna Connector (with Protective Cover)
4 LTE Antenna (Cellular)
5 Bluetooth Communication LED (Blue)
ON: Bluetooth Communication is set to ON
BLINKING: Bluetooth Communication in progress...
OFF: Bluetooth Communication is set to OFF
6 LED Display area
See below for details.
7 External Input/Output Terminal
8 Operation Switch
9 USB Connector (Mini-B)
10 Optical Communication Port
11 Battery Cover

LED Display

	Status	Details
PWR (POWER) Green	BLINKING	• Running on battery power only
	ON	• Running on AC Adaptor or external power source • Connected via USB
	BLINKING (rapidly)	• During communication via mobile network, short range radio commu-nication, or USB connection
	OFF	• In low energy consumption mode (functions not operable)
DIAG (Diagnosis) Orange	ON	• No SIM card inserted • Poor SIM card contact
	BLINKING	• Starting up after power on • No Remote Units have been registered. • Auto-download of recorded data cannot be carried out due to other improperly made settings or unmade settings.
ALM (ALARM) Red	BLINKING	• A measurement has exceeded one of the set limits. • The contact input is ON. • Remote Unit Events (low battery, poor sensor connection, etc.) • Low battery in the Base Unit, power failure or low voltage in the AC adaptor/external power supply • Wireless communication with the Repeater or Remote Unit failed.

4G Network Reception Level <ANT. LEVEL>

Interference Level	Strong	Average	Weak	Outside of commu-nication range
LED	ANT. LEVEL	ANT. LEVEL	ANT. LEVEL	ANT. LEVEL

Settings: Making via smartphone

STEP 1 Installing the Mobile App

Download and install "T&D 500B Utility" from the App Store on your mobile device.

* The app is currently available for iOS only. For details visit our website.

STEP 2 Making Initial Settings for the Base Unit

1. Open T&D 500B Utility.
2. Connect the Base Unit with the supplied AC adaptor to a power source.

* Make sure that the operation switch on the RTR500BM is set to the <STBY> position.

3. From the list of [Nearby Devices] tap the one you wish to use as a Base Unit; the Initial Settings wizard will open.

The factory default password is "password".

If the Initial Settings wizard does not start, you can start it from [System] at the bottom of the Base Unit settings menu.

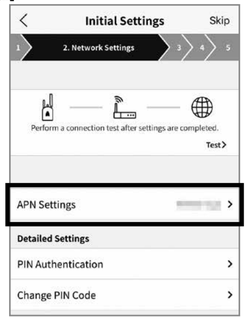
4. Enter the following information in the [Basic Settings] screen and click the [Next] button.

Base Unit Name	Assign a unique name for each Base Unit.
Base Unit Password	Enter a password here for connecting to the Base Unit via Bluetooth.

* If you forget the password, reset it by connecting the Base Unit to a PC via USB. For details, see Settings: Making via PC on the back of this manual.

STEP 3 Making Mobile Communication Settings

1. Tap [APN Settings].



2. Enter the APN settings for your mobile service provider and tap the [Apply] button.

3. Test the connection.

STEP 4 Registering a Base Unit to T&D WebStorage Service

Enter the User ID and Password for the T&D WebStorage Service account to which you wish to transfer data, and tap the [Add this Account] button.

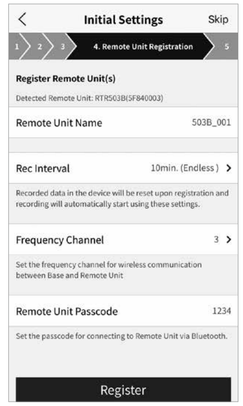
* If you do not have an account yet, create one by tapping [Register a new user].

STEP 5 Registering a Remote Unit

1. From the list of detected nearby Remote Units, tap the Remote Unit you wish to register to this Base Unit in STEP 2.

- It is also possible to register Remote Units using optical communication.
- To register RTR-574(-S) and RTR-576(-S) loggers as Remote Units it is necessary to use a PC. See Step 4 of Settings: Making via PC on the back of this document.
- For information about registering a Repeater, refer to [Using as a Repeater] in the RTR500BC User's Manual.

2. Enter the Remote Unit Name, Recording Interval, Frequency Channel, and the Remote Unit Passcode; then tap the [Register] button.



* When more than one Base Unit is registered, make sure to select channels that are far apart in order to prevent interference of wireless communication between the Base Units.

The Remote Unit passcode is used when communicating with the Remote Unit via Bluetooth. Enter an arbitrary number of up to 8 digits. When registering subsequent Remote Units and there is only one registered passcode, the set passcode will be displayed as already entered and you can skip entering the passcode.

3. If you wish to register multiple Remote Units, tap [Register the next Remote Unit] and repeat the registration process as necessary. To complete the registration of Remote Units, tap [Finish registration].
4. Upon completion of the initial settings, turn the Operation Switch on the Base Unit to the <Run> position to start automatic transmission of current readings and/or recorded data.

* After the switch is set to <Run>, the unit will start operating in 2 minutes or less (depending on the number of registered devices).

The default settings are as follows:

Current Readings Transmission: ON, Sending Interval: 10 min.
Recorded Data Transmission: ON / Once daily (triggered by and depending on the time of first communication between the Base Unit and the mobile or Windows app)

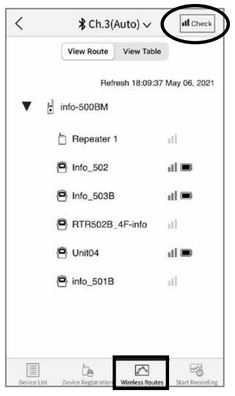
5. Log into the "T&D WebStorage Service" with a browser and confirm that measurements of the registered Remote Unit(s) are displayed in the [Data View] window.

STEP 6 Installing the Device

1. Place the Remote Unit(s) in the measurement location.

* The wireless communication range, if unobstructed and direct, is about 150 meters (500ft.).

2. In the Settings Menu, tap on the [Registered Device] menu.
3. At the bottom of the screen tap on the [Wireless Routes] tab. Here it is possible to check the route for wireless communication.
4. At the top right of the screen, tap on the [Check] button.
5. Select the devices for which you wish to check the signal strength and tap [Start].
6. Upon completion of the test, return to the wireless route screen and confirm the signal strength.



* If a Repeater is part of your installation, you can also check the signal strength of the registered Repeaters.

Settings: Making via PC

STEP 1 Installing the Software

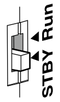
Download RTR500BM for Windows from the T&D Website and install it to your PC.

* Do not connect the Base Unit to your computer until the software has been installed.

https://tandd.com/software/rtr500bmwin.html

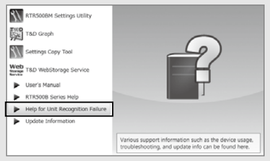
STEP 2 Making Initial Settings for the Base Unit

1. Open RTR500BM for Windows, and then open RTR500BM Settings Utility.
2. Connect the Base Unit with the supplied AC adaptor to a power source.
3. Turn the operation switch on the unit to <STBY>, and connect it to the computer with the supplied USB cable.
   - For the location of the operation switch, refer to the [Part Names] on the front side of this document.



- The USB driver installation will start automatically.
- When the USB driver installation is completed, the settings window will open.

If the settings window does not automatically open:
The USB driver may not have been installed correctly. Please see [Help for Unit Recognition Failure] and check the USB driver.

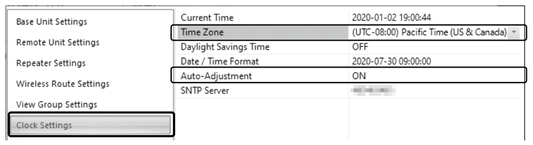


About the Operation Switch:
In order to prevent unnecessary or unexpected data transmission, we suggest turning the Operation Switch on the Base Unit to <STBY> until the units have all been set up and ready for communication. Once the Operation Switch has been turned to the <Run> position, auto-sending of current readings and/or recorded data becomes activated.

4. Enter the following information in the [Base Unit Settings] window.

Base Unit Name	Assign a unique name for each Base Unit.
Mobile Data Communication	Enter the information provided by your carrier.

5. Check the contents of your selections and click the [Apply] button.
6. In the [Clock Settings] window, select the [Time Zone]. Make sure [Auto-Adjustment]* is set to ON.



* Auto-Adjustment is a function to automatically adjust the date and time of the Base Unit using the SNTP server. Clock adjustment is made when the Operation Switch is turned to the <Run> position and once a day.

The default settings are as follows:

- Current Readings Transmission: ON, Sending Interval: 10 min.
- Recorded Data Transmission: ON, Send at 6:00 am every day.

STEP 3 Registering the Base Unit to T&D WebStorage Service

1. Open your browser and log in to "T&D WebStorage Service".

   https://webstorage-service.com/

* If you have not already registered as a User, use the above URL and carry out a New User Registration.

2. From the screen's left-side menu, click [Device Settings].
3. In the upper right of the screen, click on [+Device].
4. Enter the serial number and registration code for the Base Unit, then click [Add].

   When registration is complete, the registered device will be displayed in a list on the [Device Settings] screen, and it will be shown to be in waiting for its first communication.

The serial number (SN) and registration code can be found on the supplied Registration Code Label.

If you have lost or misplaced the Registration Code Label, you can check it by connecting the Base Unit to your computer via USB and selecting [Settings Table] - [Base Unit Settings] in the RTR500BM Settings Utility.

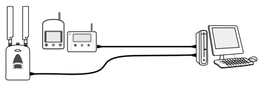
STEP 4 Registering a Remote Unit

1. Have the target data logger on hand and in the [Remote Unit Settings] window click on the [Register] button.
2. Follow the on-screen instructions and connect the Remote Unit to the RTR500BM.
   Upon recognition of the logger the [Remote Unit Registration] window will appear.

Optical Communication by placing Remote Unit on RTR500BM

Make sure the optical communication area faces down and is aligned with the optical communication area of the Base Unit.

For RTR-574/576 units, connect directly to PC with a USB cable.



Do not connect more than one Remote Unit to your computer at one time.

If the screen does not change after connecting RTR-574 / 576:
The USB driver installation may not have been installed correctly. Please see [Help for Unit Recognition Failure] and check the USB driver.

3. Enter the following information, and click [Register].

⚠ **Upon Remote Unit Registration, changes in Recording Interval, and the starting of a new recording, all recorded data stored in the Remote Unit will be deleted.**

Wireless Group	Enter a name for each Group to make it identifiable depending on which frequency channel it is using. If you wish to register a logger to an already registered Group, select the name of the target Group.
Remote Unit Name	Assign a unique name for each Remote Unit.
Communication Frequency Channel*	Select a frequency channel for wireless communication between the Base Unit and Remote Units. When more than one Base Unit is registered, make sure to select channels that are far apart in order to prevent interference of wireless communication between the Base Units.
Recording Mode	Endless: Upon reaching logging capacity, the oldest data will be overwritten and recording will continue.
Recording Interval	Select the desired interval.
Warning Monitoring	To carry out Warning Monitoring, select "ON". Settings can be made in each Remote Unit for "Upper Limit", "Lower Limit" and "Judgement Time".
Download to PC	To enable auto download and transmission of recorded data, select "ON".
Channels for Alternating Display	Here you can select the measurement items you wish displayed in the RTR-574 LCD when the unit is using "Alternating Display" as the display mode.
Button Lock	To lock the operation buttons on RTR-574/576 units, select ON. Only the <DISPLAY> button will be functional for Remote Units when the button lock has been set to ON.
Bluetooth	When making settings from the smartphone app, make sure that Bluetooth is set to ON.
Bluetooth Passcode	Assign an arbitrary number with up to 8 digits to be used for Bluetooth communication.

* This setting can only be made when creating a new wireless group. Once a Registration has been made, changes cannot be made. If you wish to make changes to the communication frequency channel, you need to delete and re-register the Remote Unit as a new wireless group.

Examples of Recording Intervals and Maximum Recording Times

RTR501B / 502B / 505B (Logging Capacity: 16,000 readings)

EX: Recording Interval of 10 minutes x data readings of 16,000 = 160,000 minutes or about 111 days.

RTR503B / 507B / RTR-574 / 576 (Logging Capacity: 8,000 readings)

EX: Recording Interval of 10 seconds x data readings of 8,000 = 80,000 minutes or about 55.5 days.

4. Upon completion of Remote Unit Registration, the logger will automatically start recording. If you wish to register other Remote Units, repeat procedures ***1 to 3***.

If you want to start recording at a desired time, open the [Remote Unit Settings] widow, and click the [Start Recording] button to start a new recording session.

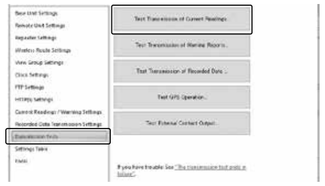
Remote Unit Settings can also be changed or added later.
For details see RTR500B Series HELP - [RTR500BM for Windows] - [Remote Unit Settings].

STEP 5 Making Transmission Tests

In the [Transmission Tests] window, click on the [Test Transmission of Current Readings] button.

Run the test and make sure it ends in **success**.

* The test data will not be displayed in T&D WebStorage Service.



If the Test Fails:
Refer to the explanation and error code shown on the screen, and check the SIM status, mobile data communication settings, and whether the SIM card is activated, etc.

Error Code:
Refer to [**RTR500B Series HELP**] - [RTR500BM for Windows] - [Error Code List].

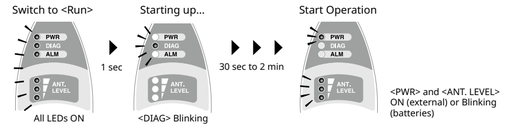
STEP 6 Installing the Device

1. Connect the Base Unit to the supplied AC adaptor or an external power supply*.
   * The optional battery connection adaptor (BC-0204) can be used to connect to a car battery or other power supply.
2. Place the Base Unit, Remote Units and, if necessary, Repeaters in their actual positions.
   If the target Base Unit is connected to a PC, disconnect the USB cable.
3. Turn the Operation Switch on the Base Unit to the <Run> position.

<Run>
The following functions are operable: Auto-Downloading and Sending of Recorded Data, Warning Monitoring, and Auto-Sending of Current Readings.

<STBY> (Standby)
The unit is in a low energy consumption mode and functions are not operable.

After the switch is set to <Run>, the unit will start operating in 2 minutes or less (depending on the number of registered Remote Units and Repeaters).



Operations

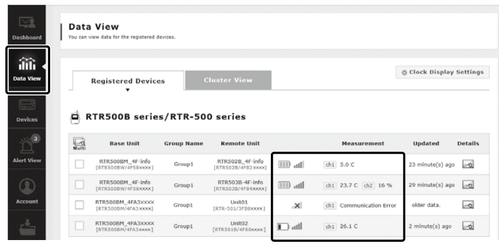
View Current Readings via Browser

1. Open your browser and log in to "T&D WebStorage Service".

   https://webstorage-service.com/

2. From the screen's left-side menu, click [Data View]. This screen displays data such as battery level, signal strength and measurement (current readings).

   Click [Details] (Graph Icon) on the right side of the [Data View] window to view the measurement data in graph form.



Checking Signal Strength

The signal strength between Base Unit and Remote Unit can be checked by color and number of antennas.

Blue (3-5 antennas)	Communication is stable.
Red (1-2 antennas)	Communication is unstable. Reposition the device(s) for more stable communication.
Red (no antenna)	Failed to check the signal strength due to wireless communication error.

- If wireless communication errors repeatedly occur, please review the "Notes and Precautions for Installing Wireless Communication Devices" section in the attached [RTR500B Series Safety Instruction].
- A low battery on a Remote Unit may cause communication errors.
- The <CH. BUSY> LED will blink when a wireless communication channel is not available. Wireless communication can be affected by radio interference, such as noise from computers or noise from other wireless devices on the same frequency channel. Try keeping the device(s) away from all noise sources and changing the frequency channel of the RTR500B series devices.

The signal strength between Base Unit and Remote Unit can be checked by color and number of antennas. When using Repeaters, the signal strength displayed here is only that for between the Remote Unit and the nearest Repeater. To check the signal strength between the Base Unit and Repeater or between Repeaters, please use the RTR500BM Settings Utility or T&D 500B Utility.

* While the RTR500BM is communicating with the mobile device via Bluetooth, data transmission will not be performed.

Downloading Recorded Data

1. From the screen's left-side menu of T&D WebStorage Service, click [Download].
2. Click the [By Product] tab and for the target devices click the [Details] button.
3. Click the [Download] button for the data you wish to download.
   If you wish to download multiple recorded data files, place a check next to the data, and click [Download].

   Click the magnifying glass icon to open the Graph screen and see details for that data.

- You can select the recorded data to download or delete by file or by product.
- You may see a message about downloading archived data files. For information about storage capacity and archiving, see the T&D WebStorage Service Details.
  https://webstorage-service.com/info/

Analyzing Recorded Data using T&D Graph

T&D Graph is software that allows you to open recorded data saved on your computer. In addition to displaying and printing graphs, T&D Graph can open data by specifying conditions, extract data, and perform various data analysis.

It is also possible to directly access and open recorded data stored in the T&D WebStorage Service and save it to your PC.

1. Download T&D Graph from the T&D Website and install it to your PC.

   https://tandd.com/software/td-graph.html

2. Open T&D Graph and go to the [File] Menu - [Web Storage Service].
3. Enter the user ID and password registered with T&D WebStorage Service, and click [Login] button.
4. All data stored in your WebStorage account will be displayed in a list. Right click on the selected recorded data and click [Download] to download for analysis.

What can you do with T&D Graph ?

- Insert shapes and post comments and/or memos directly on the displayed graph.
- Search and open only data that matches the criteria.
- Save the data in CSV format for use in a spreadsheet program.

Refer to Help in T&D Graph for details about operations and procedures.