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.

<table>
<thead>
<tr>
<th>Base Unit Type</th>
<th>Remote Units</th>
<th>Groups</th>
<th>Repeaters</th>
</tr>
</thead>
<tbody>
<tr>
<td>RTR-500GSM</td>
<td>Total of 20</td>
<td>4</td>
<td>5 Per Group</td>
</tr>
<tr>
<td>RTR-500NW / RTR-500AW</td>
<td>Total of 100</td>
<td>10</td>
<td>10 Per Group</td>
</tr>
<tr>
<td>RTR-500</td>
<td>32 Per Group</td>
<td>20</td>
<td>30 Per Group</td>
</tr>
<tr>
<td>RTR-500DC</td>
<td>32 Per Group, 16 Per Group (RTR-505 / 574)</td>
<td>7</td>
<td>15 Per Group</td>
</tr>
</tbody>
</table>

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.

**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.

**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!

"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.

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".

Data List Display
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.
**RTR-500 Series - Options**

**Illuminance UV Sensor**

**ISA-3151**

**Measurement Range:**
- Illuminance: 0 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)

**Relative Spectral Response:**
- Illuminance: Approximated to the CIE standard response function V (λ).

**Materials:**
- Aluminum

**High Precision Temperature / Humidity Sensor**

**HHA-3151**

**Measurement Range:**
- Temperature: -30 to 80 °C
- Humidity: 0 to 99 %RH

**Measurement Resolution:**
- Temperature: ±0.3 °C (at 10 to 40 °C)
- Humidity: ±0.5 % C (at all other temperatures)

**Accuracy (Temperature):**
- ±0.3 %RH per degree of difference from 25 °C

**Humidity Hysteresis:**
- ±1.5 %RH or lower

**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)

**Materials:**
- Polypropylene Resin
- Vinyl Chloride Coated Electrical Wire

**For RTR-574**

**Wall Attachment Communication Cable**

**TR-07K2**

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

**Material:** Polycarbonate

**For RTR-500GSM**

**AC Adaptor**

**AD-0605**

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

**Wall Attachment**

**TR-5K1**

**Contents:**
- Lock Screw x 2
- Double-sided Adhesive tape

**Materials:**
- Aluminum
- Rubber

**For RTR-500NW / 500AW / 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

**Wall Attachment**

**TR-5WK1**

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

**Material:** PC Resin

**For RTR-500NW / 500AW**

**External Power Cable**

**BC-0201**

**Power Source Conditions:**
- Voltage: DC 8 – 34V
- Current: MAX 2A

**Materials:**
- Cable: AWG20, Red/Plus (+), Black/Minus (-)
- Connector: Housing ‘XAP’-02V-1, Contact/ S3A-01T-P0.6 (J.S.T. Mfg. Co., Ltd.)

**Sensors for RTR-574**

**Illuminance UV Sensor**

**ISA-3151**

**Measurement Range:**
- Illuminance: 0 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)

**Relative Spectral Response:**
- Illuminance: Approximated to the CIE standard response function V (λ).

**Materials:**
- Aluminum

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

**AC Adaptor**

**AD-0638-C**

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

**Wall Attachment**

**TR-5WK1**

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

**Material:** PC Resin

**Communication Cable**

**TR-6C10**

**Cable Length:** 1.0 m

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

**Material:** Vinyl Chloride Coated Electrical Wire

**Temperature / Humidity Sensor**

**THA-3151**

**Measurement Range:**
- Temperature: 0 to 55 °C
- Humidity: 10 to 95 %RH

**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:**
- Approx. 7 min.

**Materials:**
- Temp/Humidity Sensor
- Polypropylene Resin
- Vinyl Chloride Coated Electrical Wire

**Sensor Extension Cable**

**TR-1C30**

**Temperature Durability:** 25 to 60 °C

**Materials:** Vinyl Chloride Coated Electrical Wire

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

**For RTR-500GSM**

**AC Adaptor**

**AD-0605**

**Cable Length:** 1.6 m
**Input:** AC100V (90 – 132 V)
**Output:** DC 5 V 2 A
**Frequency:** 50 / 60 Hz
**Plug Type:** A

**Wall Attachment**

**TR-5GK1**

**Contents:**
- Lock Screw x 2
- Double-sided Adhesive tape

**Materials:**
- Aluminum
- Rubber

**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

**For RTR-500NW / 500AW**

**Wall Attachment**

**TR-5WK1**

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

**Material:** PC Resin

**External Power Cable**

**BC-0201**

**Power Source Conditions:**
- Voltage: DC 8 – 34V
- Current: MAX 2A

**Materials:**
- Cable: AWG20, Red/Plus (+), Black/Minus (-)
- Connector: Housing ‘XAP’-02V-1, Contact/ S3A-01T-P0.6 (J.S.T. Mfg. Co., Ltd.)
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 / FTP),
2. Automatic Sending of Current Readings (E-mail / 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,
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 °C (40 to 122 °F) when external power connected
Humidity: 20 to 80 %RH (No condensation)

**Other**

Not waterproof, moistureproof, or dustproof

---

**Network Base Station RTR-500W**

| UNIT |
|---|---|
| **Compatible Devices** | Remote Units: RTR-501 / 502 / 503 / 505-PT / 505-TC / 505-V / 505-mA / 505-P (including L Type) Repeater: RTR-547 |

**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,
Base Unit External Contact Input Warnings

**Power**

AC Adapter (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-500)
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 °C
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)

**Transmission Range**

About 150 meters (492 ft) when direct and unobstructed.

**Communication Time**

When downloading one Remote Unit at full logging capacity:
About 4 min. (RTR-501, 502, 503, 505-PT, 505-TC)
About 2 min. (Real Units excluding RTR-547)
About 4 min. (RTR-574)
*The same amount of time will be necessary for each added Repeater.

**Cellular Phone Communication**

**Band**

GSM850/GSM1800/PTCRB Certified / GPRS(G)PRC(Genral Packet Radio Service)
GSM900/GSM1800 GPRS(Genral Packet Radio Service)

**Data Transfer Protocol**

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

---

**LAN Communication**

**Wired LAN (RTR-500NW)**

10Base-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: DC 50V or less
Current when ON: 0.1A or less
Resistance when ON: 15 Ω

**Input Terminal**

Internal Pull-up: 3 V 100 kΩ
Maximum Input Voltage: 30 V

---

**GPS Communication (Option)**

**GPS Interface**

Connector: Mini DIN 6 Pin: Female
Geographic Coordinate System: WGS84
Power Supply: 5 V MAX 100 mA

**Other**

Attach geographical positioning info to Current Readings
System Setup

Remote Unit
RTR-501 / 502 / 503 (Sensor Included)
RTR-505 (Input Module or Input Cable Included)
RTR-500A1 External Power Adaptor Kit Sold Separately
RTR-500B1 * Large Capacity Battery Adaptor Kit Sold Separately
RTR-574 (Sensor Included)

AA Alkaline Battery x1 Included
Lithium Battery inserted into a tube (LS14250 (SAFT) Included)

Base Unit
RTR-500GSM
Base Unit / Repeater
RTR-500
Base Unit
RTR-500NW
RTR-500AW
Base Unit
RTR-500DC

AA Alkaline Battery x 4 Included or AC Adaptor Sold Separately AD-0605 or AD-05C1 or External Power Cable BC-0201 Included
USB Cable (US-15C)
Software

Use as a Repeater AA Alkaline Battery x2 Not Included
AC Adaptor Sold Separately AD-0638 or AD-0638-C
USB Cable (US-15C)

USB Cable (US-15C)

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

LAN Cable for 500AW (LN-20W)

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

AAA Alkaline Battery x2
Nickel Hydride Battery x2 Not Included
USB Cable (US-15C)

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

Initial Settings Function Settings
Initial Settings Function Settings

Initial Settings Function Settings

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