RADIONODE®

Multi-channel Gas Data Logger

RN400-T2GS User Manual

2021 | Rev. 1.01

Keep this document nearby so that it may be referred to when needed.

CONTENTS

About this Manual

This document contains instructions for usage and installation of the RADIONODE® RN400-T2GS. Product specifications and certain features herein may be subject to change without prior notice. Figures used in this manual are for explanatory purposes only, and may differ from your system depending on installation conditions. Software screenshots may change after software updates.

Intellectual Property Rights

Notational Conventions

Failure to follow instructions marked with "Warning" may result in slight injury to the user.

Failure to follow instructions marked with "Caution" may result in equipment damage or malfunction.

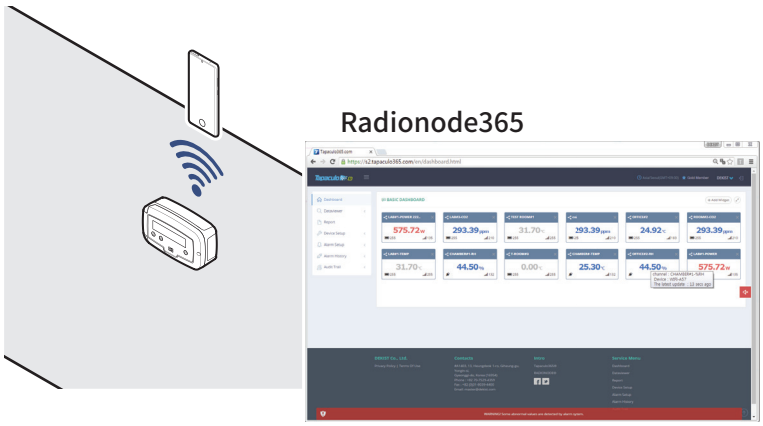
Additional helpful information is marked with "Note".

Introduction

The RADIONODE RN400-T2GS Data Logger periodically measures ammonia (NH_3) or hydrogen sulfide (H_2S) and sends measurement data to the Radionode365 server.

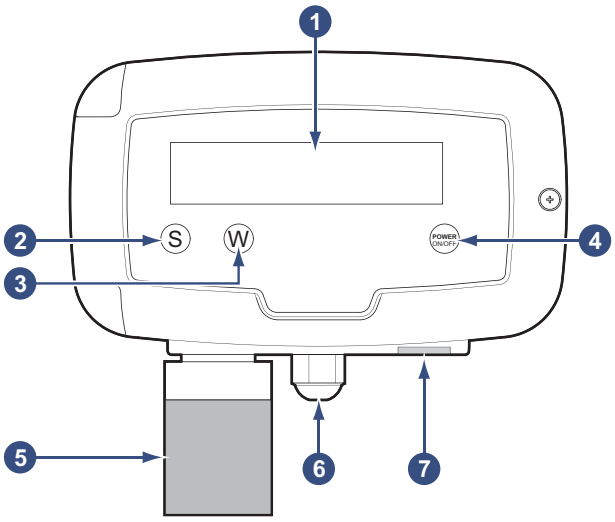
Key Features

Key features of the RN400-T2GS include:



- Gas sensor available for use with Data Logger at your discretion.
- Use Wi-Fi connection to easily configure your Data Logger.
- Measurement data can be viewed remotely from Radionode365 website. See Radionode365 on page 31.
- Measurement data can be logged on a micro SD card.
- Modbus RTU (RS-485) communication allows PLC to access Data Logger.

Exterior



1 Display
2 Menu button
3 Display button
4 Power button
5 Gas sensor
6 Cable gland
7 Sensor slot

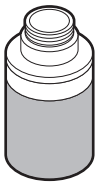
Data Logger is installed with a RG10-NH3 Ammonia Sensor or RG10-H2S Hydrogen Sulfide Sensor. Data loggers equipped with a RG10-NH3 sensor can also be equipped with an additional RG10-H2S via using sensor slot, or vice versa.

Power cables and PLC or other device cables are connected via cable glands to the internal terminal block.

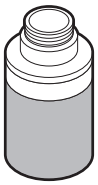
For instructions on how to use the buttons, see Operation on page 16.

Accessories

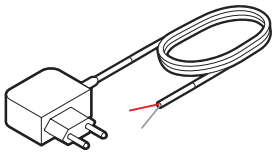
All accessories, including batteries, are sold separately.



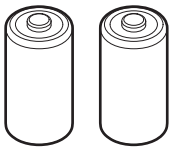
RG10-NH3
Ammonia Sensor



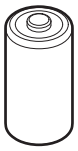
RG10-H2S Hydrogen
Sulfide Sensor



DC Adapter (12 V, 500 mA)



1.5 V Battery × 2

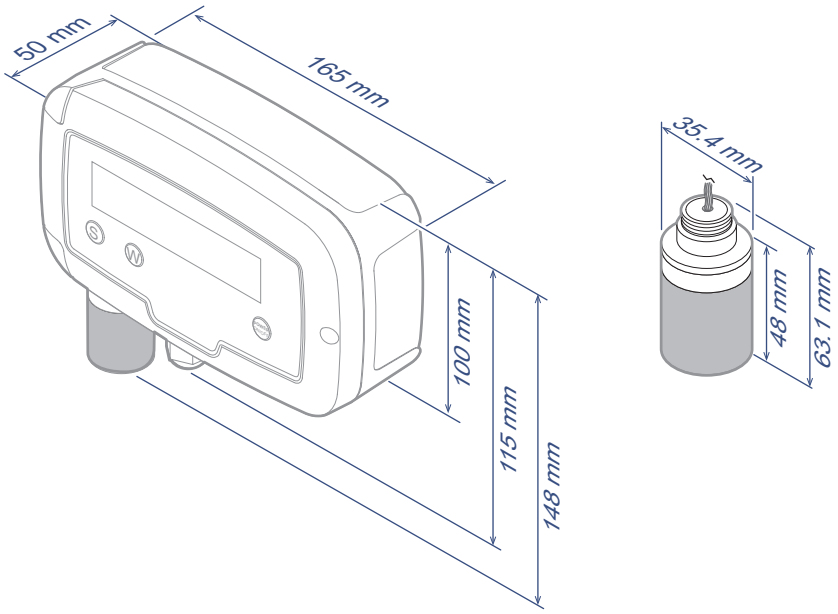


3.6 V Battery

In the event of power failure, two C-type 1.5 V batteries or one 3.6 V battery must be placed in the Data Logger. RADIONODE Data Logger is designed to not operate without a battery, even when external power is connected.

Only use Energizer® batteries. The Data Logger's power consumption varies significantly depending on operation functions. Only Energizer batteries can keep performance stable despite extreme battery usage fluctuations.

Specifications



RN400-T2GS Data Logger

Wi-Fi	2.4 GHz IEEE 802.11 b/g/n, WPA2-Enterprise
RS485	Modbus RTU
Cable Gland	PG-9
Water Resistance Rating	IP65
External DC power	5 ~ 30 V (Built in UPS)
Size	165 × 50 × 148 mm
Operating conditions	-20 ~ 60 °C, 0 ~ 95% RH (non-condensed)

Optional acc. RG10-NH3 Ammonia Sensor

M. Range	0 ~ 100 ppm (angular resolution: 1 ppm)
Operating conditions	-10 ~ 40 °C, 15 ~ 90% RH (non-condensed)
Size	63.1 mm, ø35.4

Optional acc. RG10-H2S Hydrogen Sulfide Sensor

M. Range	0 ~ 50 ppm (angular resolution: 1 ppm)
Operating conditions	-20 ~ 50 °C, 15 ~ 90% RH (non-condensed)
Size	63.1 mm, ø35.4

Installation

The following procedure will guide from the installation procedure to the Radionode365 registration process.

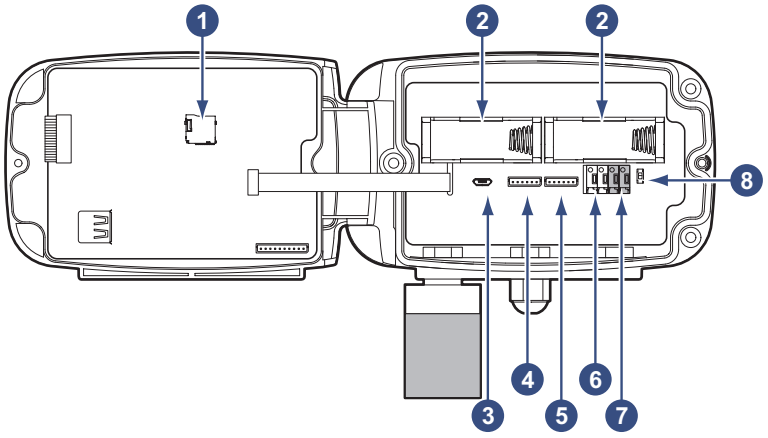
1. Install sensors or connect other devices to the Data Logger as needed.
2. Connect power and insert the battery.
3. Use the virtual Wi-Fi router feature to configure the Data Logger. See Configuration on page 20.
4. Now that the Data Logger has been installed, it must be registered to Radionode365. See Radionode365 on page 31.

Depending on your installation circumstances and conditions, your installation process may vary. For example, if you are installing multiple Data Loggers, you might find it easier to:

1. Insert batteries into all Data Loggers before running.
2. Configure one Data Logger first.
3. Use a micro SD card to set up additional Data Loggers. For this method, see Memory Card Usage Configuration on page 29.
4. Register the Data Loggers onto Radionode365.
5. Finally, install the Data Loggers.

Terminal Block

Terminal Blocks can be found inside of a Data Logger, with other components arranged as follows:



1. Micro SD card slot
2. Battery holder
3. USB port for calibration
4. Sensor connector
5. Sensor connector
6. RS485 terminal
7. Power outlet
8. Battery DIP switch

Micro SD card is used to log measurement data. See Memory Card for Data Logging on page 19.

The micro USB port is used for sensor calibration. As RN400 Series sensors are shipped after calibration, no further calibration is required. However, if the sensor malfunctions, contact DEKIST for inspection.

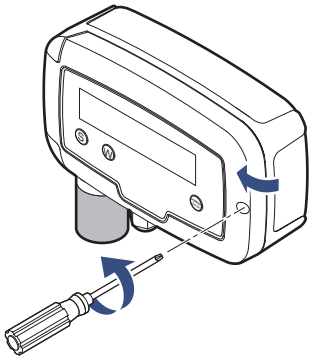
For more information on the terminal block, see Connecting Terminal Block on page 13.

- The USB port on the front panel is unused.
- Do not use the '3 USB port for calibration' on the bottom while the product is in operation after installation is complete.

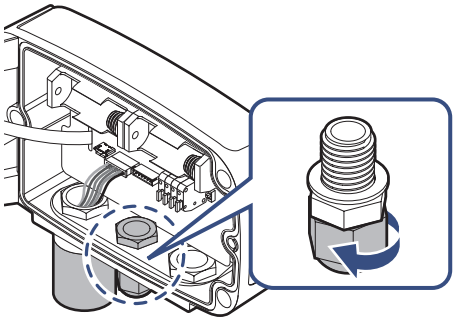
Data Logger Installation

The general procedure for installing a Data Logger is as follows:

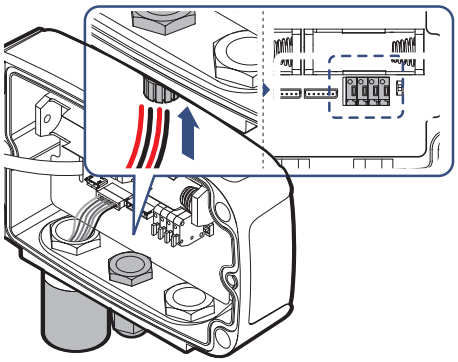
1. Loosen the screw on the right side of the front panel and open the front panel.



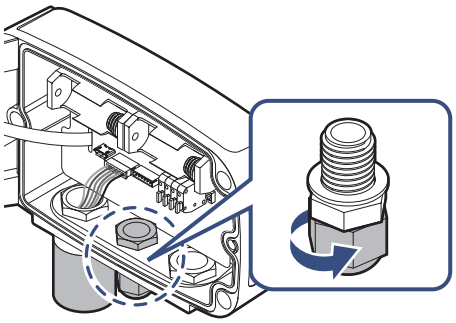
2. Loosen the cable gland.



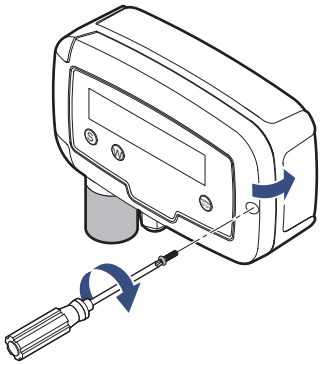
3. Route the cables of the device that will be connected through the gland and connect to the terminal block. Then, connect external DC power and insert the battery. For more information on terminal block connection, see Connecting Terminal Block on page 13.



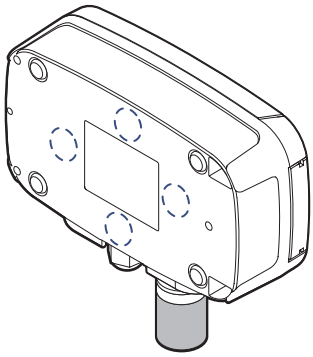
4. Tighten the gland firmly.



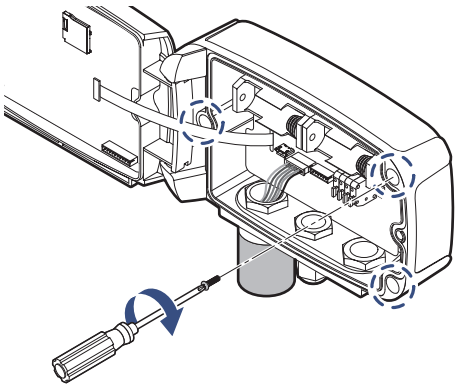
5. Cover the front panel and tighten the screws.



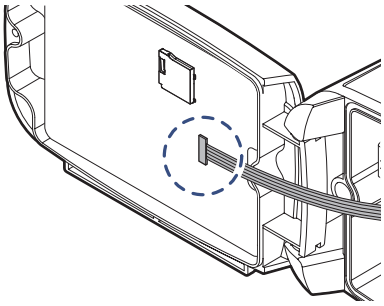
6. There Data Logger is equipped with a magnet at the rear. Place the Data Logger on a steel panel.



If necessary, use screws to secure. There are three screw holes on the back of the device.



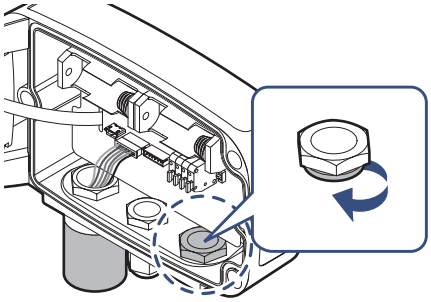
Connecting Terminal Block



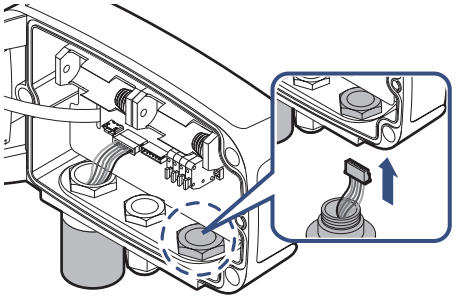
When connecting cables to the terminal block, ensure that the flat cable does not get disconnected from the front connector.

RG10 Gas Sensor

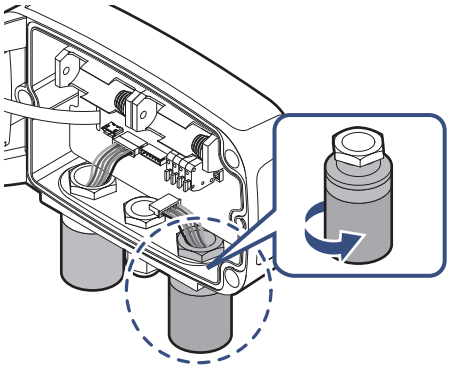
1. Unscrew and remove the cap bolt from the sensor slot.



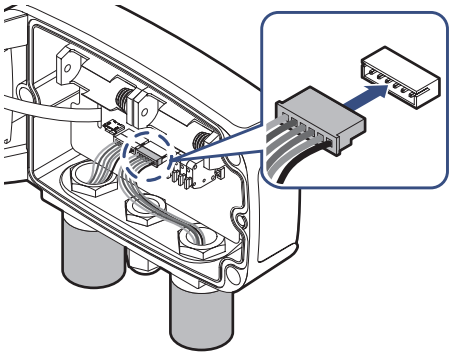
2. Route the sensor cable through the sensor slot and nut.



3. Insert the sensor into the nut and tighten.



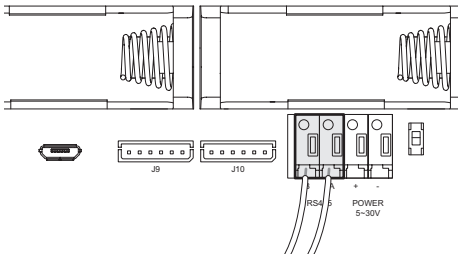
4. Connect the sensor cable to the sensor connector.



RS485

Connect the RS485 cable to the **RS485** terminal. Connect the cable linked to the **A** terminal of the other device to the **A** terminal, and the remaining cables to the **B** terminal.

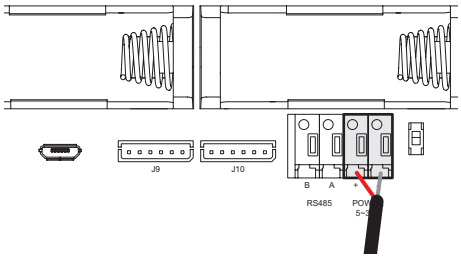
For more information on how to change Modbus communication settings, see RS-485 Modbus Communication on page 30.



If no external DC power is supplied, the RS485 terminal will not function.

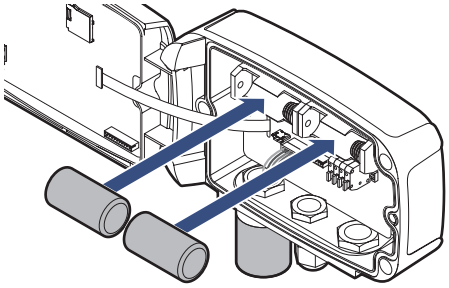
DC power

Connect the Power cable to the **POWER** terminal. Connect the red cable to the **+** terminal, and the remaining cables to the **-** terminal.



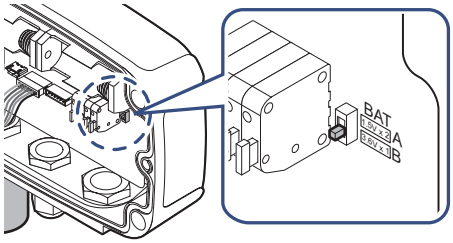
Batteries

Insert two C-type 1.5 V batteries into the battery holder, or one 3.6 V battery into the left-hand battery holder.



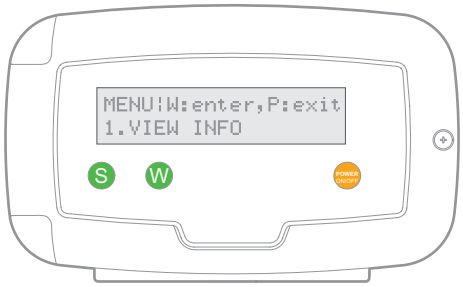
Be careful not to connect batteries with opposite polarities. Doing so may damage the device.

If you are using a 3.6 V battery, move the **BAT** jumper to the **B** position.



Operation

When the data logger is turned on, the model number and other key information is displayed with the corresponding measurements. If no external power is supplied, the display will turn off shortly and the Data Logger will enter sleep mode.



- **Viewing Channel Information**: To view channel information, including measurements on sleep mode, press the W button. Press the W button repeatedly to display different status information.
- **Selecting a Menu**: Press the W button, then press the S button. Press the S button repeatedly to display different menu items. Press the W button to open the displayed menu. Press the P button to exit the menu.
- **Turning Data Logger Off**: Press the W button and hold the P button until `PRESS 'P' ONE MORE TO POWER IT OFF` appears. Hold the P button again.
- **Turning Data Logger On**: Press the P button.

Viewing Channel Information

Press the W button repeatedly to display the below channel data. A sensor channel that is not connected will appear as (none).

LAST SENSING !S:menu 1.NH3-100: 1.25ppm	Measurement of Channel 1
LAST SENSING !S:menu 2.H2S-50: 0.65ppm	Measurement of Channel 2
LAST TRANSMIT!S:menu 5 Min Ago, 9 smpl	Elapsed time since last transfer of measurement data to the server & number of datasets to transfer in the next cycle
WIFI SSID dB!S:menu xxxxxxxx, -50dB	Wi-Fi network name and signal strength
LOCAL TIME !S:menu 2020-11-30 17:00	Current date and time
BATTERY STAT.!S:menu OK. !1.5Vx2!2.88V	Type of battery inserted and current voltage. If the voltage is low, LOW will be displayed.
DATA FILTER.!S:menu SLOW LEVEL(1-15):1	You can select the level of the digital filter. The higher the number, the less sensitive the sensor reacts (1 level: highest sensitive, 15 level: lowest sensitive). You can choose from the settings menu.
GS CELL TEMP.!S:menu CELL Temp: 22 C	[ONLY RN400-T2GS] Displays the temperature value of the chemical cell inside the product.

Viewing Device Information

To view device information, select `1.VIEW INFO`. To view the next item, press the S button. To exit, press the P button.

```
INFO¦S:next, P:exit
1.HOLDING DATA: 4
```

Number of datasets to send to the server in the next cycle.

(number of datasets to send = Transfer Interval ÷ Measurement Interval)

When measurement interval is set to 5 minutes and the transfer interval set to 20 minutes, 4 datasets are saved until the next transfer. If data transfer fails, datasets accumulate until successful.

```
INFO¦S:next, P:exit
2.POWER: External DC
```

If no external power is connected or power failure occurs, `Bat` will appear.

```
INFO¦S:next, P:exit
3.SENSING: 1 Min
```

Measurement interval

```
INFO¦S:next, P:exit
4.SENDING: 5 Min
```

Measurement data transmission to server interval

```
INFO¦S:next, P:exit
5.UPDATE: 1 Min Ago
```

Time elapsed since last transmission of measurement data to server

```
INFO¦S:next, P:exit
6.ID: xxxxxxxx
```

Radionode365 account ID

```
INFO¦S:next, P:exit
7.IP:192.168.10.13
```

Data Logger IP Address

```
INFO¦S:next, P:exit
8.GW:192.168.1.1
```

Gateway IP address

```
INFO¦S:next, P:exit
9.DN:210.220.163.82
```

DNS server IP address

```
INFO¦S:next, P:exit
10.MAC:508CB16FA1B3
```

Data Logger MAC address

```
INFO¦S:next, P:exit
11.SW BUILD:20200720
```

Firmware version

```
INFO¦S:next, P:exit
12.MODEL:RN400T2GS
```

Model No.

Resetting Data Logger

All setting options (except for Wi-Fi network) can be reset. Select `4.FACTORY DEFAULT`.

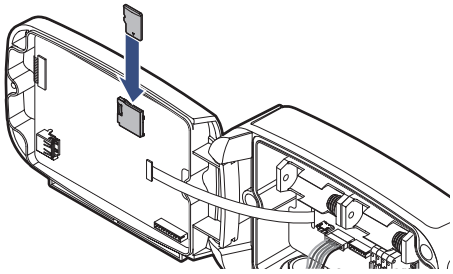
Memory Card for Data Logging

If a memory card is installed in the Data Logger, measurement data will be written to the memory card as a CSV file as follows:

Measurement date, timestamp, Mac address, value for Channel 1, value for Channel 2

	A	B	C	D	E
1	CALENDAR(GMT 9)	TIMESTAMP	MACADDR	CH1	CH2
2	2020-11-27T12:14:23Z	1606446863	E415F64F43FA	1.36	n/a
3	2020-11-27T12:14:23Z	1606446863	E415F64F43FA	1.36	n/a
4	2020-11-27T12:23:03Z	1606447383	E415F64F43FA	2.03	n/a
5	2020-11-27T12:28:03Z	1606447683	E415F64F43FA	0.79	n/a
6	2020-11-27T12:33:03Z	1606447983	E415F64F43FA	0.58	n/a

Open the front of the Data Logger and insert a micro SD card into the card slot inside the front panel.



⚠ Use an SD card (up to 16 GB) formatted with the FAT32 file system. Other file systems are not supported.

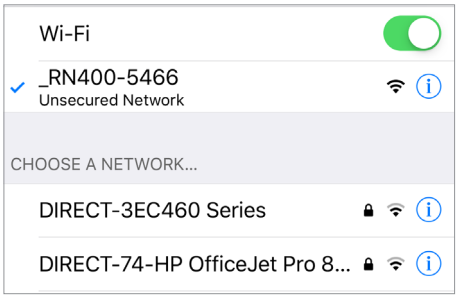
Configuration

The Data Logger is equipped with a virtual Wi-Fi router. The virtual router allows your smartphone or tablet to be linked to Data Logger for configuration.

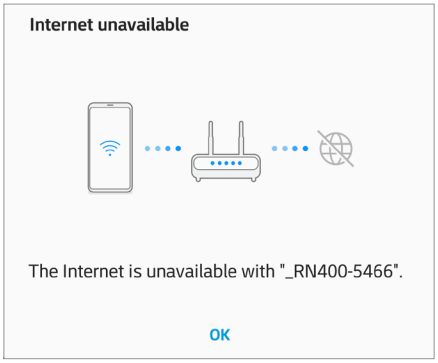
1. `Select 2.CONFIG MODE(AP)` to enable the virtual router. The following will appear in the display:

```
SOFTAP: _RN400-A1B3
ACCESS: 192.168.1.1
```

2. On your smartphone, find the Wi-Fi network with the same name as shown on the display and connect to the network.

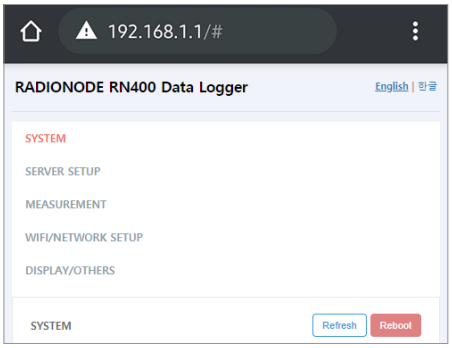


Depending on the version of your Android phone, user identification may be required, as Data Logger is not connected to the Internet.



Multiple mobile devices cannot be connected to the Data Logger at the same time.

3. Open your smartphone's web browser and type **"192.168.1.1"** in the address bar. The Settings page wiill appear.



4. Change the settings on each page, then tap **Save**.

5. To finish configuration, tap **Reboot**.

Device Information

Tap **SYSTEM** to view Data Logger device information.

Radionode365 Owner	Radionode365 account ID
Mac ADDRESS	Data Logger MAC address
Model Name	Data Logger model number
Firmware version	Firmware version
OTA Release Version	OTA Release Version
SDCARD Inserted	If a memory card is not inserted, **No SDCard** will appear.
WIFI SSID	The Wi-Fi network used by the Data Logger
IP address	Data Logger IP Address
Gateway Address	The gateway IP address to which the Data Logger is connected
DNS	DNS server IP address

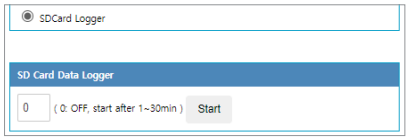
Server

Tap **SERVER SETUP** to configure server receipt of measurement data.

Destination	▪ Select **Radionode365** to send measurement data to the Radionode365 server. ▪ Select **User HTTP Server** to send to a customer or third-party server, and configure the below items accordingly. ▪ Select **SDCard Logger** to operate Data Logger independently without a server.
Host	Server IP address
Port	Server port number
Checkin URL	URL of the server program that processes check-in requests
Datain URL	URL of the server program that processes data-in requests.

For check-in and data-in request formats, see HTTP Radionode Protocol V2 on page 44.

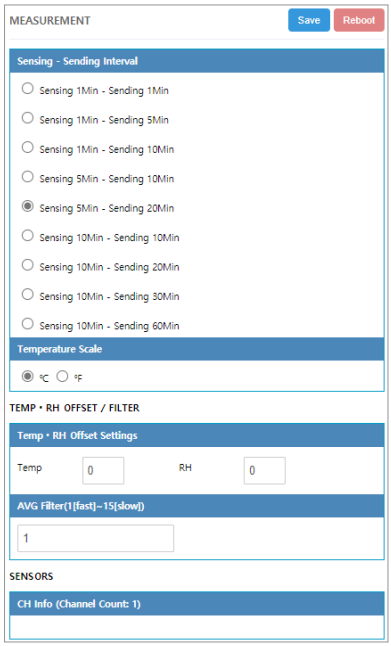
This item will appear if **Destination** is set to **SDCard Logger**.



SD Card Data Logger	If set to "0", measurement data will begin to be written to the memory card as soon as booting completes. If set to "10", data will be written 10 minutes after booting completes. For more information, see Memory Card for Data Logging on page 19.

Measurement

Tap **MEASUREMENT** to configure sensor operation.

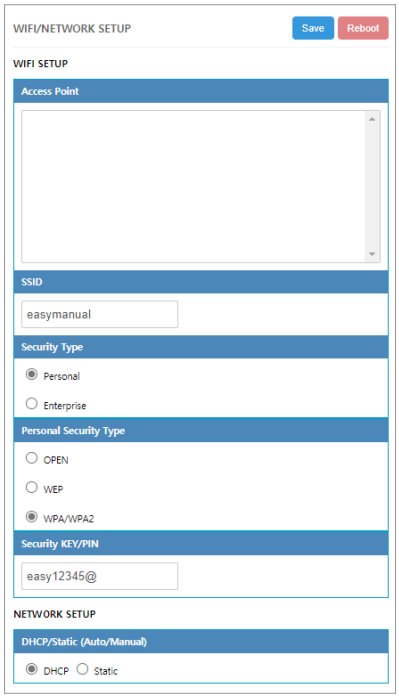


Sensing - Sending Interval	Select the interval between sensor measurement and data transmission. For instance, if **Sensing 1Min - Sending 5Min** is selected, sensor measures every 1 minute, and measurement data is sent to the server every 5 minutes, or written on a memory card.
Temperature Scale	Ignore this item.
Temp	Ignore this item.
RH	Ignore this item.
AVG Filter	Adjusts the sensor sensitivity. The margin of error ranges from 1 to 15, and the higher the value, the lower the sensitivity.
CH info	Displays a list of output channels.

On the **SERVER SETUP** page, set the **Destination** to **User HTTP Server** to add seconds to the list of selectable options.

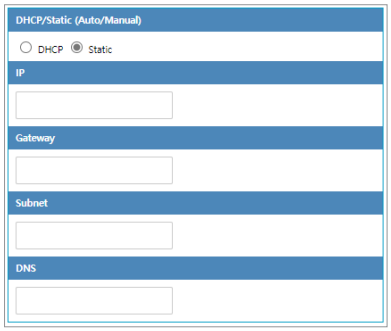
Wi-Fi Network

Tap **WIFI/NETWORK SETUP** to configure the Wi-Fi network that will be used by the Data Logger.



Access Point	Select a network to use from the list of searched Wi-Fi networks. The closer the signal strength is to 0 dBM, the stronger the connection. If possible, use a Wi-Fi network with a signal strength of -70 dBm or higher.
SSID	The selected SSD will appear.
Security Type	Select the type of security that your Wi-Fi network uses.
Personal Security Type	If **Security Type** is set to **Personal**, select the current security type.
Security KEY/PIN	Enter your Wi-Fi password.
DHCP/Static (Auto/ Manual)	If **DHCP** is selected, the router will randomly assign an IP Address. If a static IP address is needed, select **Static** and configure additional settings.

If a static IP address is needed, select **Static** and configure additional settings as follows:



IP	Data Logger IP Address
Gateway	Gateway IP address
Subnet	Subnet mask
DNS	DNS server IP address

Enterprise Security (WPA Enterprise)

When connecting to a Wi-Fi network that uses enterprise security, the certificate is passed from Data Logger to the RADIUS server along with the RADIUS server account. Once user's access is authorized by the RADIUS server, access to the network is granted.

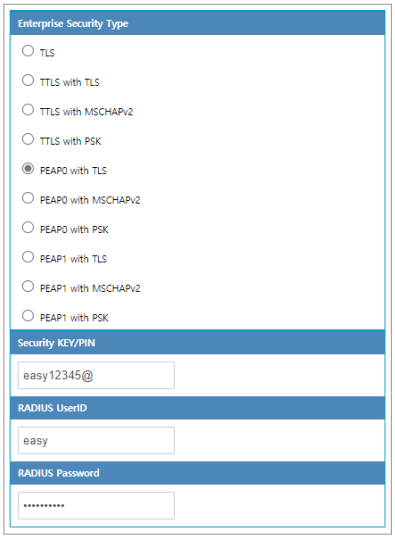
To connect to a network that uses enterprise security, adhere to the following procedure:

1. Copy the RADIUS server certificate to a micro SD card with the following path and filename:

```
/cert/ca.pem
```

> Ask your network administrator for a certificate in a PEM format. Certificates in other formats are not supported.

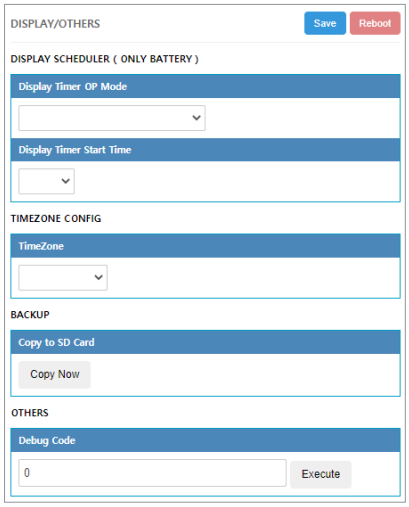
2. On the **WIFI/NETWORK SETUP** page, set the **Security Type** option to **Enterprise** and configure the following additional settings:



Personal Security Type	Security type
RADIUS UserID	RADIUS server account ID
RADIUS Password	RADIUS ID password

Display

Tap **DISPLAY/OTHERS** to configure display and other options.



Display Timer OP Mode	This setting can be configured with other settings to set the display operation interval during sleep mode. Select how long the display will stay on in minutes. Select **Always** to disable sleep mode.
Display Timer Start Time	Select what time the display will turn on.
Timezone	Select which timezone to use.
Copy Now	See Memory Card Usage Configuration on page 29.
Debug Code	Enter a command to perform a specific function. See the following section for a detailed explanation.

Commands

On the **DISPLAY/OTHERS** page, the following commands can be entered in **Debug Code**. Enter a command in uppercase, then tap **Execute**.

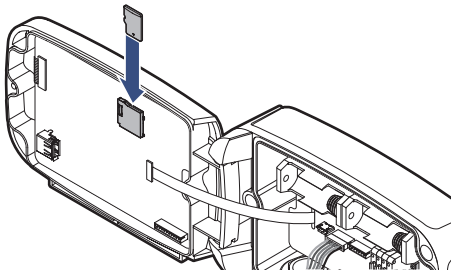
`ATVMAC xxxx0000xxxx`	Enter the address that will be used as the virtual MAC address.
`ATCLF`	The virtual MAC address is replaced by the original address.
`ATNODNS 1`	DNS settings are ignored.
`ATNODNS 0`	DNS settings become valid again.
`ATLOG 1`	Event logs are saved on the memory card.
`ATLOG 0`	No event logs are created.
`ATNOWIF 1`	The Wi-Fi feature is enabled.
`ATNOWIF 0`	The Wi-Fi feature is disabled.

Memory Card Usage Configuration

Memory cards facilitate the configuration of multiple Data Loggers at once.

1. Back up the setup data on a memory card in the configured Data Logger.

a) Insert a micro SD card into the Data Logger.



b) On the **DISPLAY/OTHERS** page, tap **Copy to SD Card** > **Copy Now**.

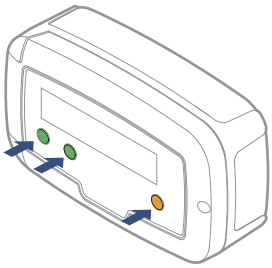
c) Remove the SD card.

2. Copy the setup data from the SD card to another Data Logger.

a) Insert the SD card into the Data Logger.

b) Use the Ⓟ button to turn the Data Logger off.

c) Press both the Ⓢ and Ⓦ buttons simultaneously and hold the Ⓟ button to turn the Data Logger on.



If `NEW CONFIG FILE IS LOADED` appears, the setup data has been copied successfully.

⚠ Use an SD card (up to 16 GB) formatted with the FAT32 file system. Other file systems are not supported.

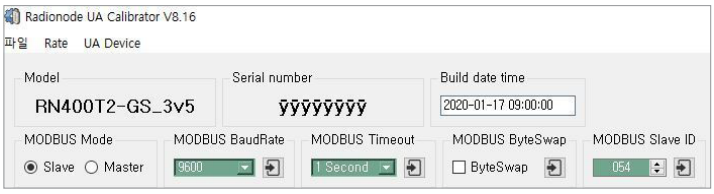
Checking Communication With Radionode365 Server

From the Data Logger, select `6.CHECK SYSTEM` to ensure that data are successfully updated when adding I/O channels in Radionode. Measurements are displayed every 3 seconds and sent to the Radionode365 server. On the web page, verify that the displayed values match the ones shown. Press the Ⓟ button to finish.

RS-485 Modbus Communication

The UA Calibarator program is required to change settings of Modbus RTU communication. Download and install UA Calibarator from the Radionode web site at **`www.radionode365.com`**.

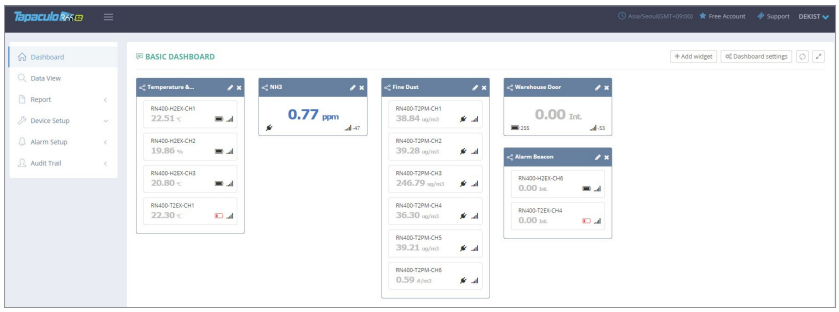
1. From the Data Logger, select `3.USB CALIBRATION`.
2. Connect the Data Logger to your computer using a USB cable.
3. Run UA Calibrator on your computer. When the Data Logger is successfully recognized, the following will appear on the monitor:



4. Change Modbus settings accordingly.
5. Press the Ⓟ button to finish.

Radionode 365

Radionode365 is a cloud-based sensor monitoring web application operated by DEKIST, a radionode manufacturer. We offer data storage for all sensor-measured data, and provide various features such as emergency alarms, reports, and real-time status based on stored data.



This chapter outlines how to add new devices and channels to Radionode365. For more information on Radionode365, see the information provided on the web page below:

`https://help.radionode365.com/article-categories/tp365-manual`

Key features of Radionode365 include:

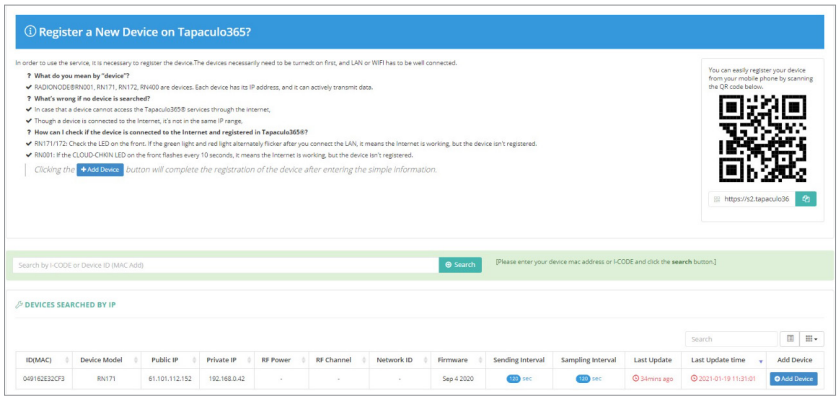
- Measurement data displayed in real-time;
- View measurement data records via charts;
- Create and email periodic reports;
- Alarms notifications sent via e-mail, text, or voice message in the event of an alarm.

Create a user account at the address below to access Radionode365.

`https://s2.Radionode365.com/html/memberjoin.html`

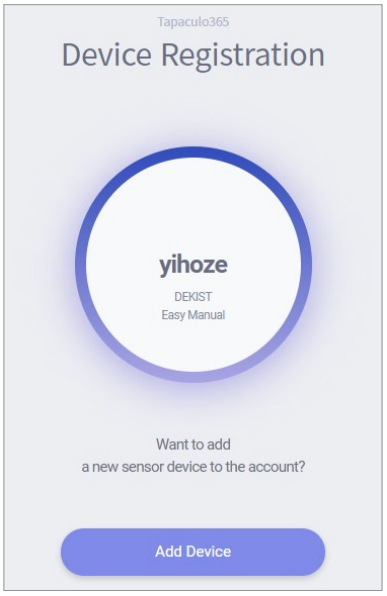
Adding Devices from Your Smartphone

At the **New Device** page, you will find a unique QR code for your account. The QR code allows you to easily add devices and channels to your smartphone.



Scan the QR code with your smartphone. Alternatively, copy the link address from the QR code image and send it to your smartphone.

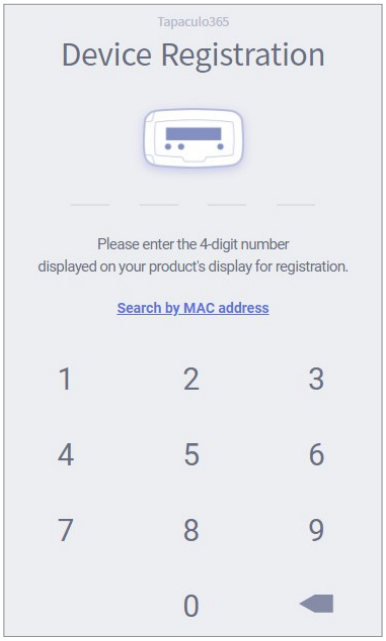
1. Your smartphone's default web browser will open with your user information. Tap **Add Device**.



When the RN400 Series Data Logger first connects to Radionode365, its identification code (i-code) is displayed as follows:

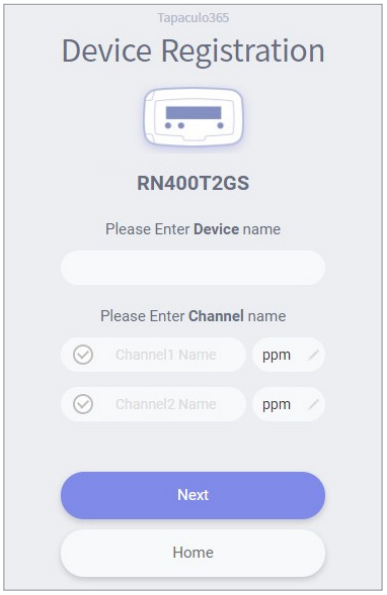
```
Enter iCode on TP365
iCode: 2024
```

2. Enter the i-code on the device display. If you do not see an i-code on the display, tap **Search by MAC address** and enter your MAC address.



3. If the i-code or MAC address is correct, the device information will appear as below. Tap **Next**.

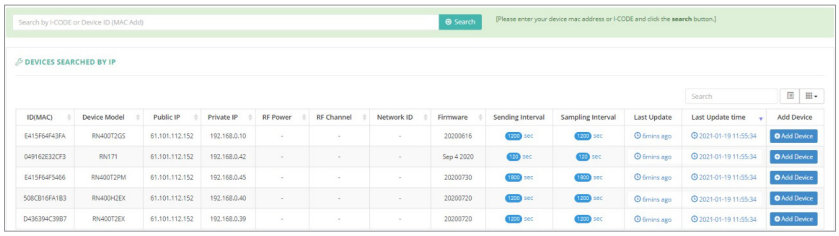
4. Enter your device name, check the box of the channel that will be used, then enter the channel name and unit that will be used. Tap **Next** to finish.



Adding Devices from Your Computer

Adding Devices

The **New Device** page will appear if there is no added device on login. To add a device that was added later, click **Device Setup** > **New Device**.

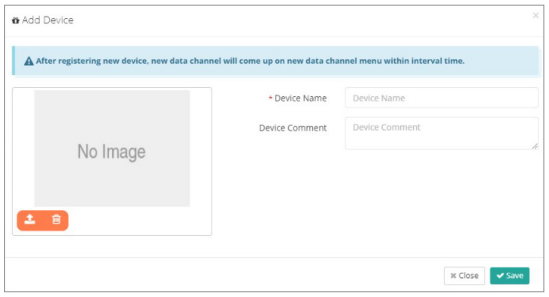


Devices found in the same IP band are listed here. If you do not see your device in the list, you can add it using its i-code. When RN400 Series first connects to Radionode365, its i-code is displayed as follows:

```
Enter iCode on TP365
iCode: 2024
```

Enter the i-code above the device list and click **Search**. Devices can also be searched via MAC address instead of their i-code. The device will be then be added to the list.

To add your device, click the **Add Device** button in the last column.

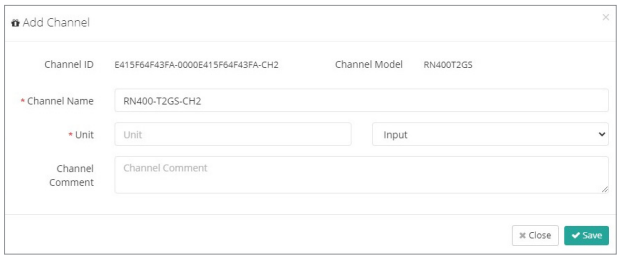


Enter your device name in the window that appears, upload a picture of the installed device, then click **Save**.

Adding Channels

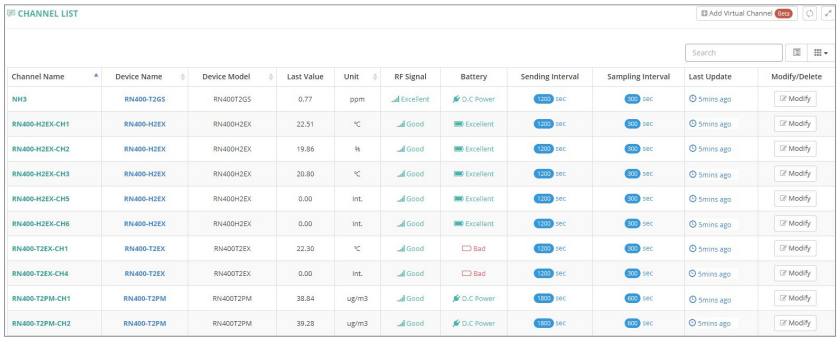
Once your device has been added, click **Device Setup** > **New Data Channel**. All added device channels will be listed.

This list also includes channels not associated with external sensors or other devices. Adding a channel essentially means selecting a channel to monitor. To add a channel, click the **Add Channel** button in the last column.



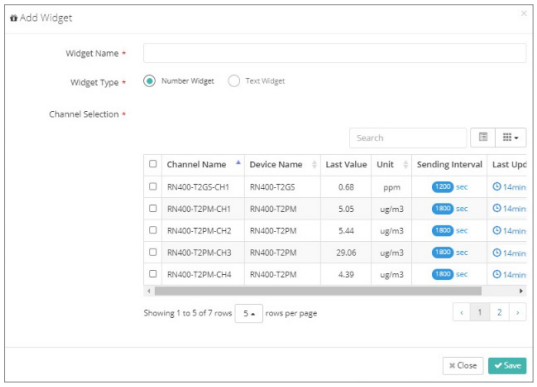
Enter the channel name in the window, select/enter a unit to use, then click **Save**.

To view the list of added channels, click **Device Setup** > **Channel List**.



Adding Widgets

A widget contains one or several channels. You can add a widget to the dashboard by clicking **Dashboard**, then **Add widget**.



Enter the widget name in the window, select channels, then click **Save**.

Maintenance

Cleaning

Use a dry cloth to clean the Data Logger. Do not use solvents or abrasives. Not only do these substances damage the surface of the Data Logger, but they may also affect sensor performance.

Batteries

Replace the battery when the battery status on the Radionode365 web page is **Bad**, or if it appears as follows:

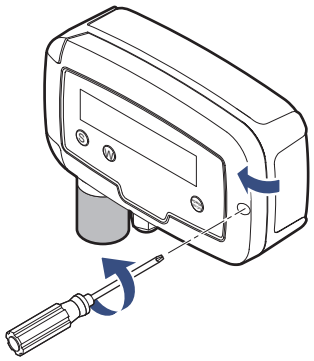
```
WARNING!  !S:menu
Low Battery!
```

When the measurement interval and transfer interval are set to the lowest frequency, the battery is expected to last up to 1 year without external power.

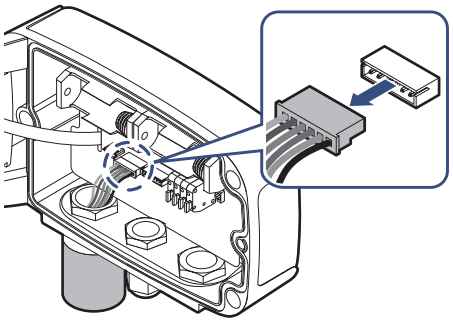
Sensor Replacement

RG10 sensor has a one year lifespan. Replace RG10 sensor yearly.

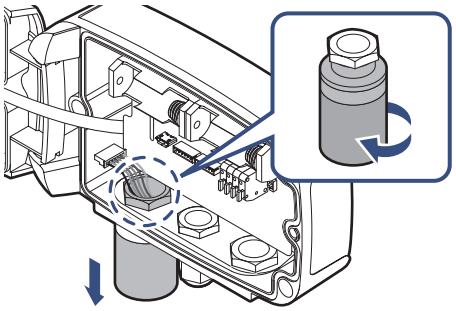
1. Loosen the screw on the right side of the front panel and open the front panel.



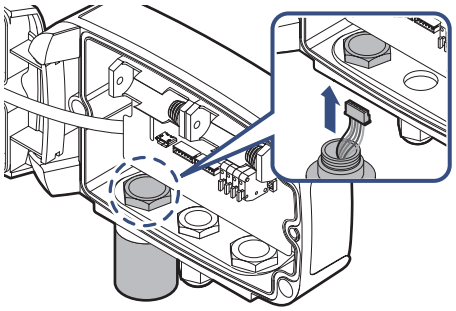
2. Disconnect the sensor cable from the substrate connector.



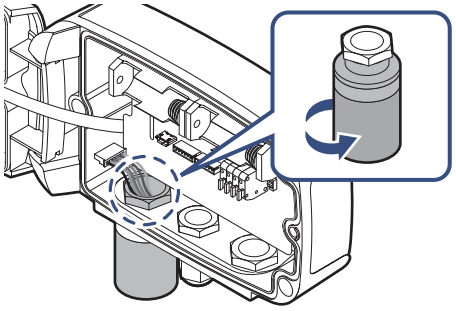
3. Loosen the sensor, disconnect it from the nut, and remove the sensor.



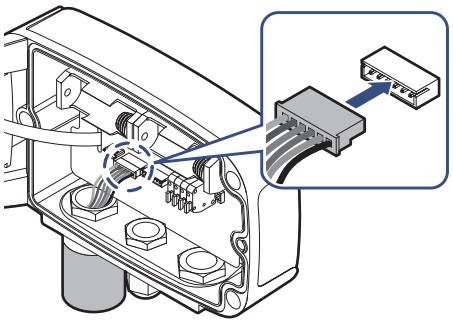
4. Route the sensor cable through the new sensor slot and nut.



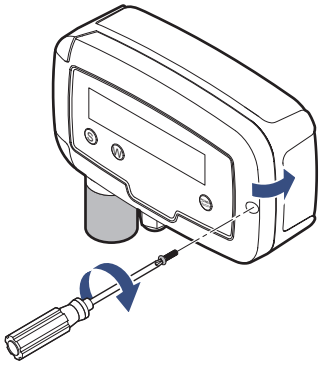
5. Insert the sensor into the nut and tighten.



6. Connect the sensor cable to the connector.



7. Cover the front panel and tighten the screws.



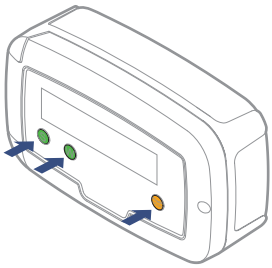
Firmware Update

The Data Logger can be updated with new firmware to correct errors or enhance features. Latest firmware is distributed optionally depending on your circumstances.

1. Copy the firmware file to a micro SD card to the following path and insert it into Data Logger. The file name is the same as the model number.

```
/img/t2gs.bin
```

2. Insert a micro SD card into the Data Logger.
3. Use the Ⓟ button to turn the Data Logger off.
4. Press both the Ⓢ and Ⓦ buttons simultaneously and hold the Ⓟ button to turn the Data Logger on.



If `NEW IMAGE FILE IS LOADED` appears, the firmware will be updated successfully.

> ⚠ Use an SD card (up to 16 GB) formatted with the FAT32 file system. Other file systems are not supported.

Customer Service Information

Manufacturer Contact Information

DEKIST Co., Ltd. provides repair service and replacement parts for RADIONODE products. To request customer service, contact us via one of the following methods.

- Tel: +(82) 1566-4359
- Fax: (+82) 31-8039-4400
- E-mail: master@dekist.com

Warranty

Repairs are provided free of charge for product failure under normal operating conditions within one year of the product installation date.

Limit of Liability

Warranty repairs are not provided in the event of:

- Failure caused by unapproved installation methods;
- Failure caused by user negligence;
- Failure caused after alteration, disassembly, or repair of the product by a person unauthorized by DEKIST;
- Failure caused by corrosion, falling, submersion, or other improper storage methods;
- Failure caused by natural disaster or other unforeseen circumstances, such as storms, floods, earthquakes, lightning, or abnormal voltage;
- Service requested for actions that the user can take, such as replacing consumables;
- Alteration of the software through decompilation or the like

Certifications

FCC Class A Digital Device

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 when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Changes or modifications not expressly approved by the manufacturer responsible for compliance could void the user's authority to operate the equipment.

KC

This equipment has passed conformity testing for use in work environments, and is likely to cause interference when used in a household environment.

HTTP Radionode Protocol V2

Radionode users can build their own servers that receive measurement data from radionode devices, such as the RN400 Series data loggers or RN17x Series data transmitters, instead of the Radionode365. This chapter describes the POST-method HTTP request format used by radionode devices for customer server developers.

Customer servers must process the following two requests:

- The radionode device requests transmission of device information from the server at the start of operation and every six hours thereafter. This request is called check-in.
- The device requests transmission of measurement data from the server at the set time. This request is called data-in.

Check-in

Check-in requests are in the following format:

```
POST / HTTP/1.1
Host: 192.168.10.1/checkin
Content-Type: application/x-www-form-urlencoded
Content-Length: 589

mac=0000xxxx0000&
ver=20201031&
model=RN171&
ip=192.168.100.11&
splrate=60&
interval=300&
tags=xxx|xxx|xxx
```

In `192.168.10.1/checkin`, `checkin` is the server program name that processes check-in requests, which can be either `checkin.php`, `checkin.asp` or `checkin.js`.

- `mac`: Mac address of the device
- `ver`: Firmware version
- `model`: Model No.
- `ip`: IP address
- `splrate`: Measurement interval
- `interval`: Data transfer interval
- `tags`: CH info

  This parameter is separated by vertical lines (|) and indicates the nature of each channel.

  ```
  tags=TEMP|RH|NTC_TEMP|NULL|NULL|NULL
  ```

  In this example, there are a total of six channels with Channel 1 indicating temperature, Channel 2 indicating RH, and Channel 3 indicating the temperature measured by NTC external temperature sensor. The remaining channels are not associated sensors or devices.

The server must reply to a check-in request in the following XML format:

```
<xml>
<root>
<ack>ok</ack>
<timestamp>1501912142</timestamp>
<offset-ch1>0.6</offset-ch1>
<offset-ch2>1.3</offset-ch2>
<sample-mode>3</sample-mode>
</root>
</xml>
```

The first two of the five tags are mandatory, whereas the remaining three tags are options, subject to change according to the server's reply.

- `ack`: Processing outcome (`ok` or `error`)
- `timestamp`: Current time of the server in UNIX timestamp format
- `offset-ch1`: Calibration Value of Channel 1
- `offset-ch2`: Calibration Value of Channel 2
- `sample-mode`: Measurement and Transfer Intervals.

  If this tag's value is "3," the measurement interval changes to 5 minutes and the transfer interval to 20 minutes. See the following table:

	1	2	3	4	5	6	7	8	9	10	11	12	13
Measurement interval	1 m	1 m	5 m	5 m	10 m	10 m	10 m	10 m	20 m	30 m	10 s	10 s	10 s
Transfer Interval	10 m	5 m	20 m	10 m	10 m	30 m	20 m	60 m	40 m	60 m	10 s	30 s	60 s

`sample-mode` Note that when setting a tag to a value greater than 10, setting measurement and transfer intervals in seconds may cause rapid battery depletion.

Data-in

Data-in requests are in the following format:

```
POST / HTTP/1.1
Host: 192.168.10.1/datain
Content-Type: application/x-www-form-urlencoded
Content-Length: 589

mac=0000xxxx0000&
sig=40&
bat=255&
volt=1|3.12&
SMODEL=RN400H2EX&
C000=1505912142|23.22|12.44|122.11|123&
P000=1505911542|23.19|12.40|121.96|123&
P001=1505910942|23.18|12.52|122.04|123&
```

- `mac`: Mac address of the device
- `sig`: Strength of wireless signal
- `bat`: Battery status.

  The value ranges from 0 to 255. The battery must be replaced when the value is "5" or less. "-1" is displayed when DC power is connected.
- `volt`: Battery type and current voltage.

  "0" indicates two 1.5 V batteries are inserted and "1", one 3.6 V.
- `SMODEL`: Model number of the device
- `Cxxx`: Current measurement of each channel.

  This parameter is separated by vertical lines (|) and indicates the values of the timestamp and each channel.

  ```
  C000=Timestamp|Ch. 1|Ch. 2|Ch. 3|Ch. 4
  ```
- `Pxxx`: Past channel measurements

The server must reply to a data-in request with a process outcome in the following format:

```
<xml>
<root>
<ack>ok</ack>
</root>
</xml>
```

Order List

Data Logger

Type	Model No.	Compatible External Sensors
Temp, RH	RN400-H2PS	PR-P1-3, PR-P1-15, PR-K1-3, PR-K1-15
Temp, RH, Door	RN400-H2EX	PR-P1-3, PR-P1-15, PR-K1-3, PR-K1-15 AP-D1, AP-W1
Temp	RN400-T2PS	PR-N1-20, PR-N1-150, RG20
Temp, Door	RN400-T2EX	PR-P1-3, PR-P1-15, PR-K1-3, PR-K1-15 PR-T1-3, PR-T1-15, AP-D1, AP-W1
Temp	RN400-T2TS	PR-K1-3, PR-K1-15 PR-T1-3, PR-T1-15
4-20mA	RN400-T2CS	
Gas	RN400-T2GS	RG10-NH3, RG10-H2S
PM2.5 Particulate matter	RN400-T2PM	

Accessories

Temp Sensor

Type	Model No.	Cable
PT100	PR-P1-3	3 m
-200~200°C	PR-P1-15	15 m
Type K Thermocouple (TC-K)	PR-K1-3	3 m
-50~200°C	PR-K1-15	15 m
Type T Thermocouple (TC-T)	PR-T1-3	3 m
-200~200°C	PR-T1-15	15 m
NTC	PR-N1-20	20 cm
-100~200°C	PR-N1-150	150 cm
Temp & RH	RG20	

Gas Sensor

Type	Model No.	Cable
Ammonia	RG10-NH3	
Hydrogen Sulfide	RG10-H2S	

Misc.

Type	Model No.	Cable
Door Contact	AP-D1	1 m
Alarm Beacon	AP-W1	25 cm
DC Adapter (EMC Core sold separately)	AP-P1	3 m

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