

INSTRUCTION MANUAL

MRS-10B

Digital Telemeter

Setting Software

Thank you for purchasing KYOWA's product MRS-10B Setting Software.
Read this Instruction Manual carefully in order to make full use of the high performance capabilities of the product.
Do not use the product in methods other than described in this Manual.

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The contents of the Instruction Manual are subjected to change without prior notice.

We assume no responsibility whatever for any damage resulting from the use of this product.

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NOTATIONS USED IN THE INSTRUCTION MANUAL

Certain notations are used as necessary to attract your attention to information that requires special care when handling the product, and to information provided for reference purposes.

Examples of Notations

NOTE

Essential precautions required when handling the product.

MEMO

Reference items required when handling the product.

IMPORTANT PRECAUTIONS WHEN USING MRS-10B

- When any of the following states are enabled on your computer, this software may not function properly:
 - Screensaver is scheduled to be activated.
 - Energy-saving features such as system standby are activated.
 - Software applications such as anti-virus programs are scheduled to be activated.
 - Computer is receiving access from the network
or the computer is accessing the network.
- About window font size
 - Select the font size Normal (small).
 - Windows 7
 - Right-click the desktop, and then click “Personalize” from the pop-up menu.
 - In [Display] window, select “Smaller - 100% (default)” and then click Apply.
 - Windows 8 and 8.1
 - Right-click the desktop, and then click “Personalize” from the pop-up menu.
 - In [Display] window, select “Smaller” and then click Apply.
 - Windows 10
 - Right-click the desktop, and then click [Display settings] from the pop-up menu.
 - Move the slider on "Change the size of text apps and other items" to 100% (Recommended).

The instruction manual in other available languages can be found at

https://www.kyowa-ei.com/eng/product/category/acquisition/s_mrs-100_series/index.html

1.OUTLINE OF PRODUCT

MRS-10B (hereinafter referred to as the Setting Software) is software designed to configure and operate the MRS-114A, MRS-111A(-E), MRS-111B (hereinafter referred to as the Receiver), MRS-104A-S and the MRS-101A-S/SE/V, MRS-101B-S/V/T (hereinafter referred to as the transmitter.)

This manual describes ways for setting and operating the Setting Software.

In the following pages, Windows 10 is used to explain the procedure.

NOTE

The MRS-10B can be used with the Transmitter and Receiver Firmware Ver. below.

Some combinations cannot be used depending on the Transmitter and Receiver Firmware Ver.

○: usable ×: not usable

		MRS-114A		MRS-111A(-E)		MRS-111B
		Ver.3.00	Ver.3.01 or later	Ver.2.00	Ver.2.00 or later	Ver.3.01 or later
MRS-104A-S	Ver.3.00	○	○	×	×	×
MRS-101A-S/SE	Ver.1.00	○	○	○	○	○
	Ver.2.00 or later	○	○	○	○	○
MRS-101A-V	Ver.3.00 or later	○	○	○	○	○
MRS-101B-T	Ver.3.00 or later	×	○ *1	×	○*1	○*1
MRS-101B-S	Ver.3.01 or later	×	○ *2	×	○*2	○*2
MRS-101B-V	Ver.3.01 or later	×	○ *2	×	○*2	○*2

*1 MRS-10B software Ver.1.00 is not supported

*2 MRS-10B software Ver.1.00 or earlier is not supported

MEMO

The MRS-10B software Ver. is displayed on the Title bar.

MEMO

The Transmitter and Receiver Firmware Ver. can be confirmed from MRS-10B.

Each Firmware Ver. of the Receiver or Transmitter can be confirmed by clicking the Receiver Information button in the information for the Receiver or by clicking the Transmitter Information button under the [Transmitter settings] tab for the Transmitter, respectively.

MEMO

Do not use other software when using the MRS-10B.

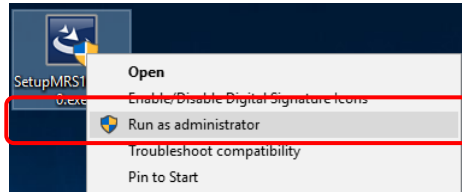
2. SETUP

2-1. INSTALLATION

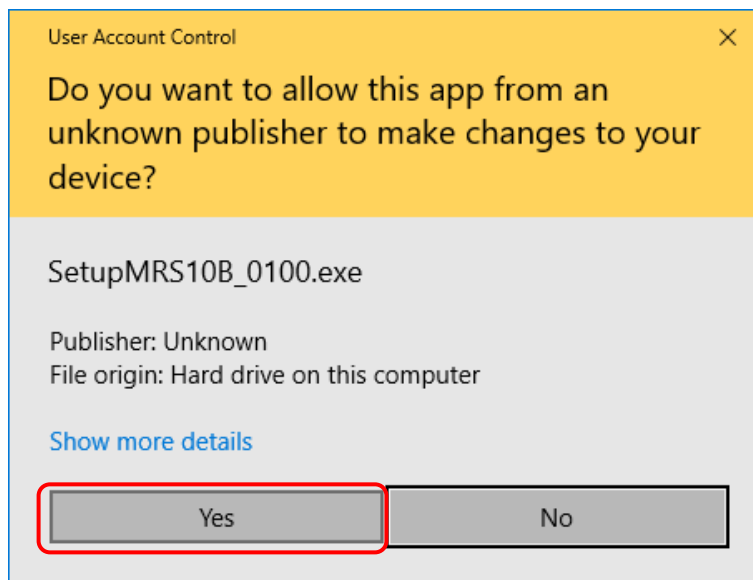
Install the Setting Software.

When installing updates, follow “2-2. Uninstall” to remove the old version before installing the update.

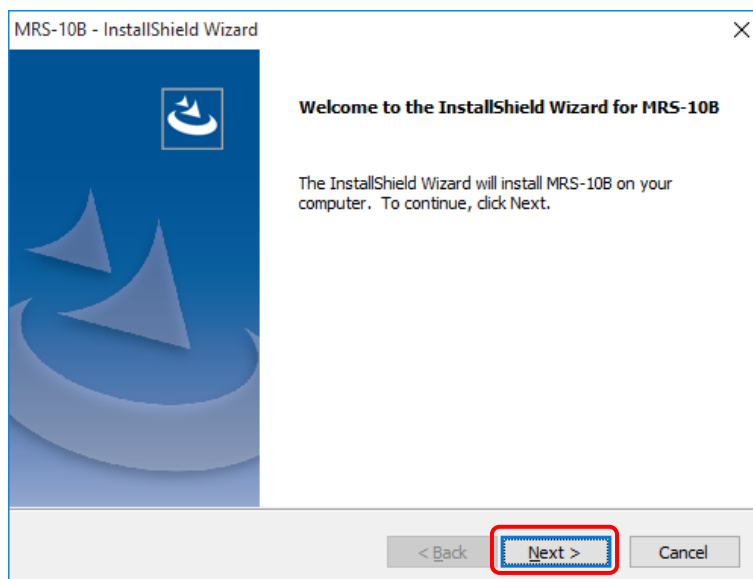
(1) Select SetupMRS-10B_****.exe in the CD-ROM included, “right-click”, and then select “Run as administrator”.



(2) When the User Account Control pop-up is displayed, click to continue.

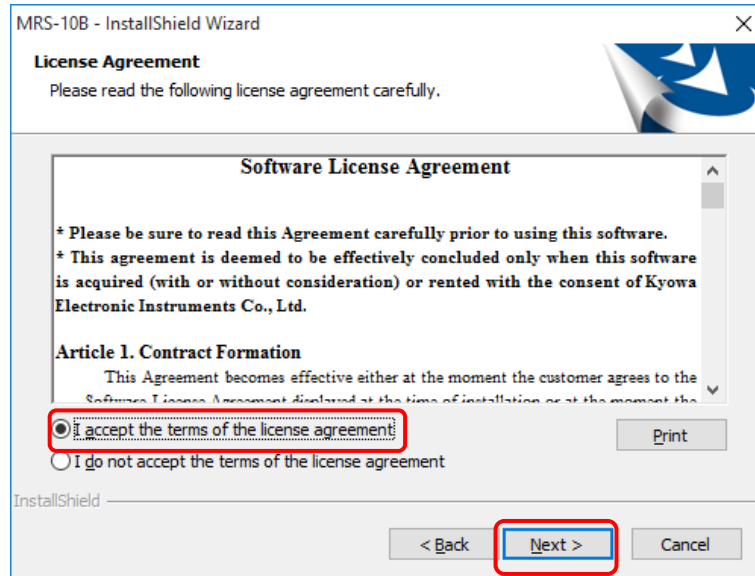


(3) Click .



- (4) License Agreement is displayed. Read and verify what it says.

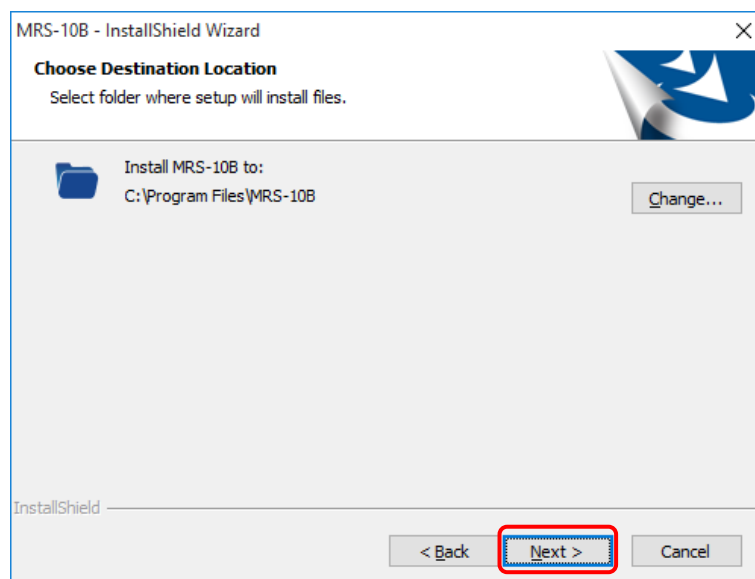
To agree with the conditions, select "I accept the terms of the license agreement", and then click **Next>**.
If you select "I do not accept the terms of the license agreement", you cannot proceed.



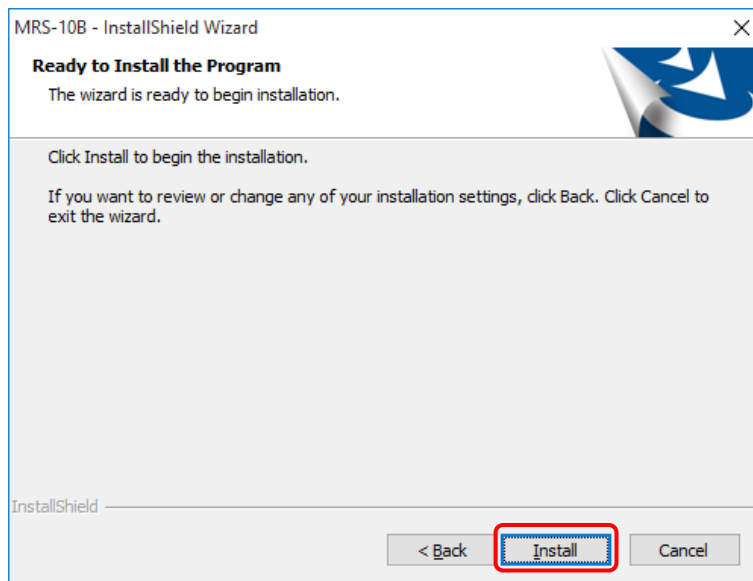
- (5) Specify the installation directory.

When you verify the installation directory, click **Next >**.

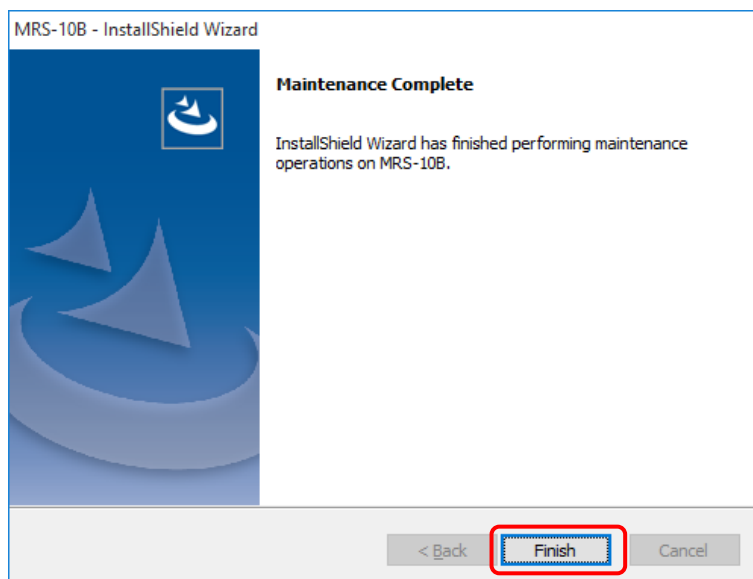
To select another folder, click **Change...** and specify the desired installation directory.



When the installation preparation finishes, the following window is displayed, so click **Install**.



If this application has already been installed, "Maintenance Complete" is displayed. If the details are correct, click **Finish**.



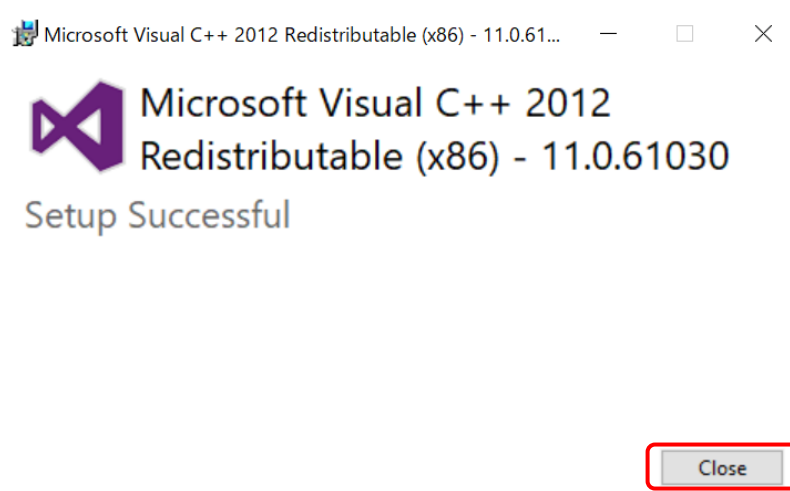
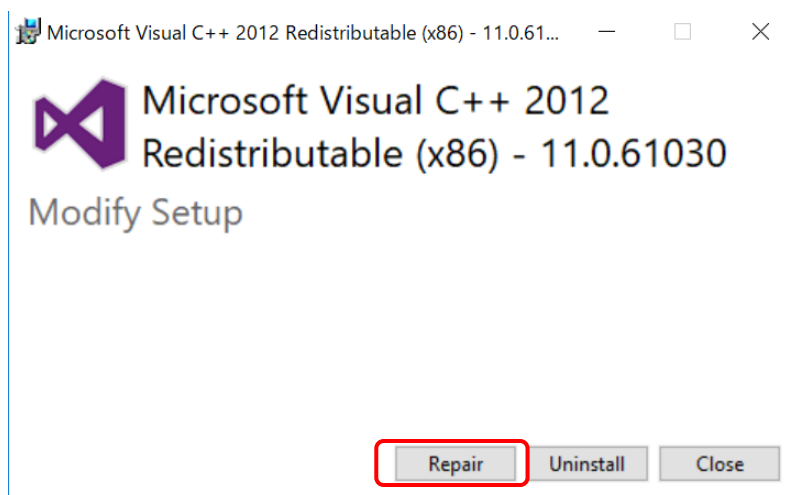
(6) Install the runtime components.

Install the runtime components necessary to execute this application.

Read the License Agreement and check "I agree to the license terms and conditions" in the License Agreement checkbox, and then click **Install**.

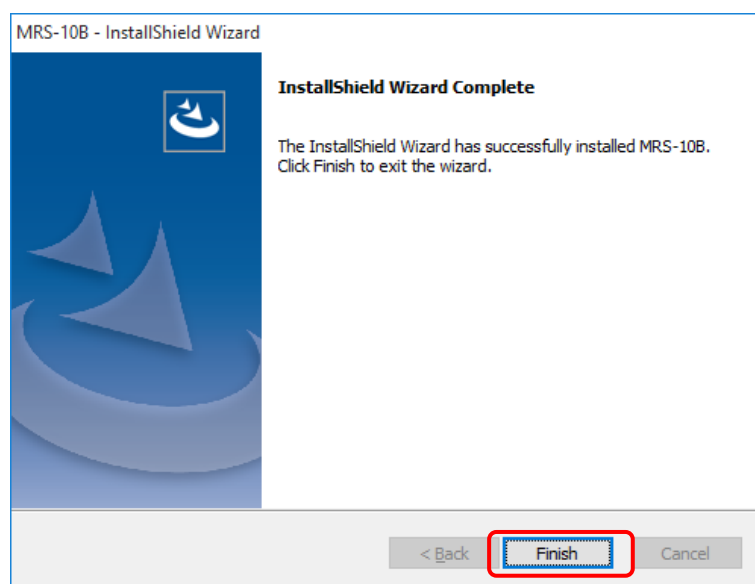


If it is not necessary to install the runtime components, click **Repair**, and then click **Close** after the installation finishes.



(7) The installation has finished.

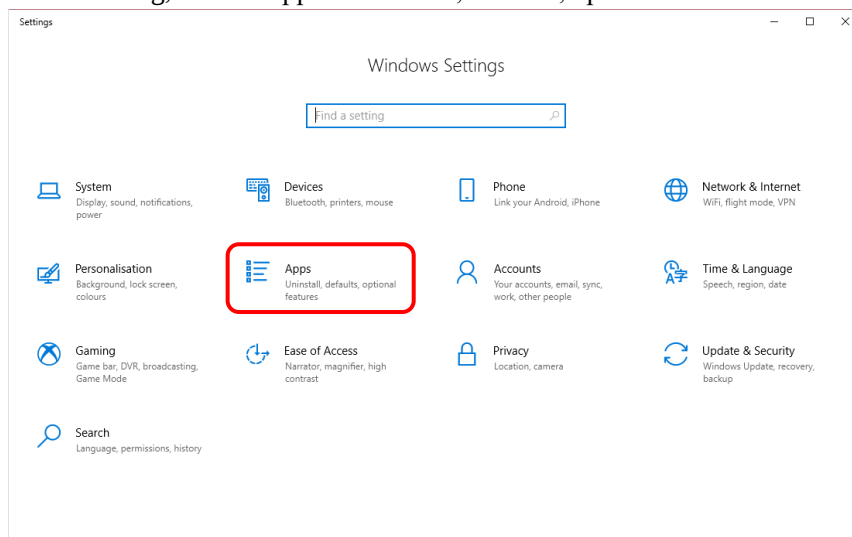
To finish the MRS-10B installation successfully, click **Finish**.



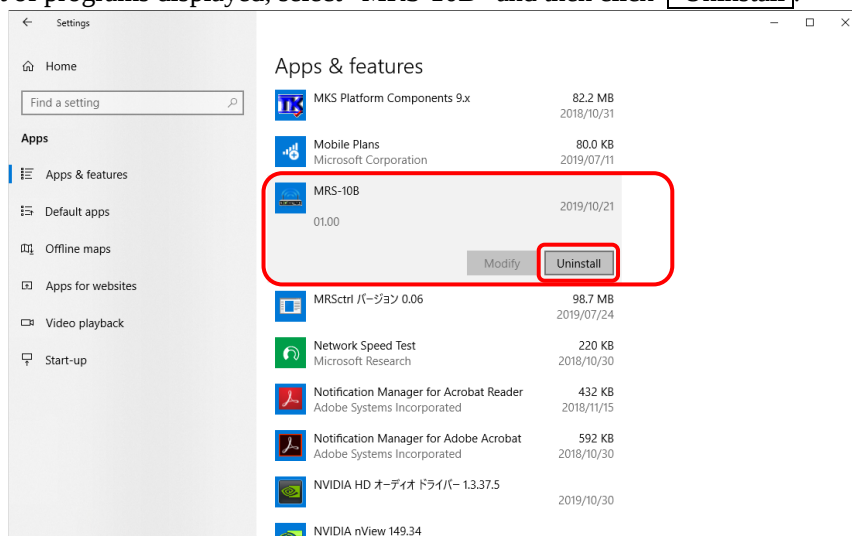
2-2. UNINSTALLATION

When you perform an uninstallation, the Setting Software functions are uninstalled.

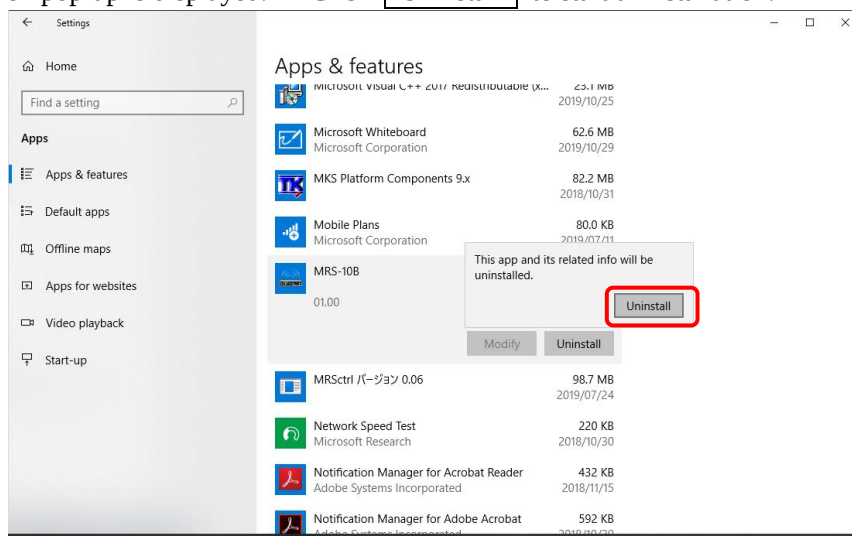
- (1) From the Windows Setting, select “Apps” “Uninstall, defaults, optional features”.



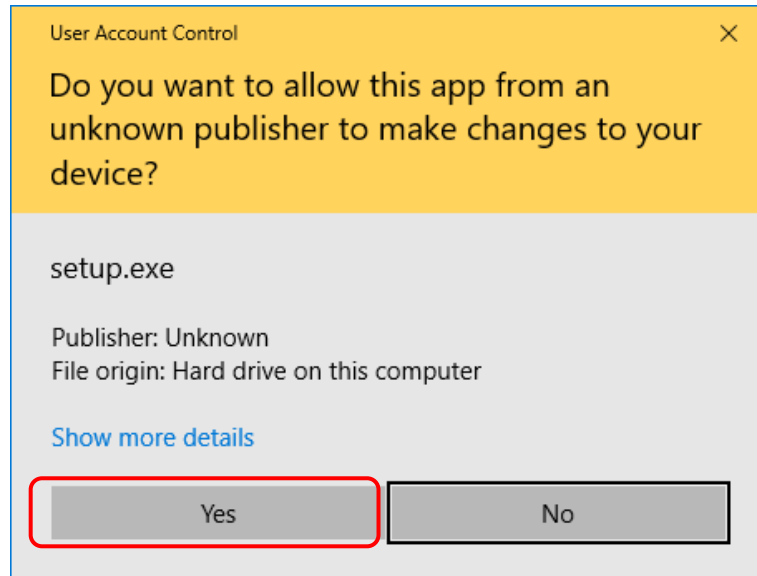
- (2) From the list of programs displayed, select “MRS-10B” and then click **Uninstall**.



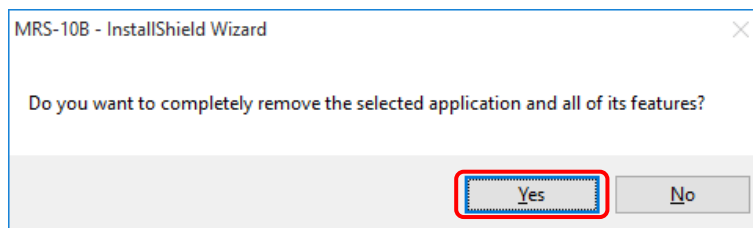
- (3) A confirmation pop-up is displayed. Click **Uninstall** to start uninstallation.



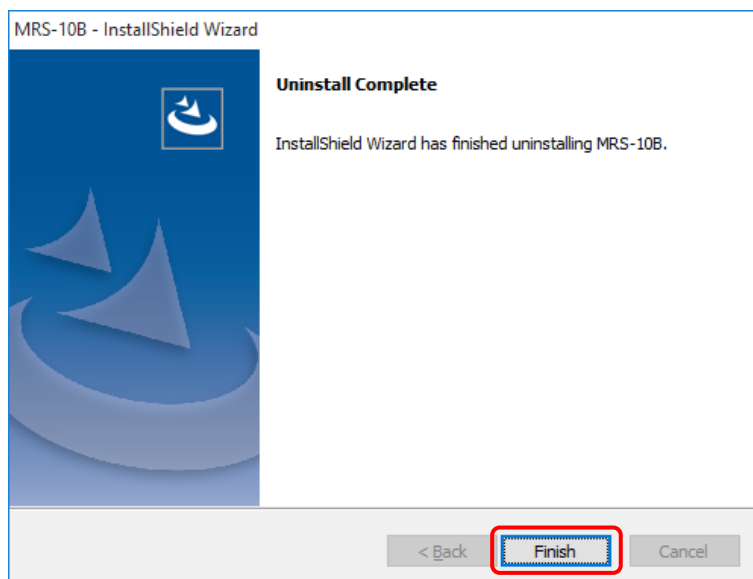
- (4) The following window is displayed during the uninstallation.
Click **Yes** and complete the operation.



- The following window is displayed during the uninstallation.
Click **Yes** and complete the operation.

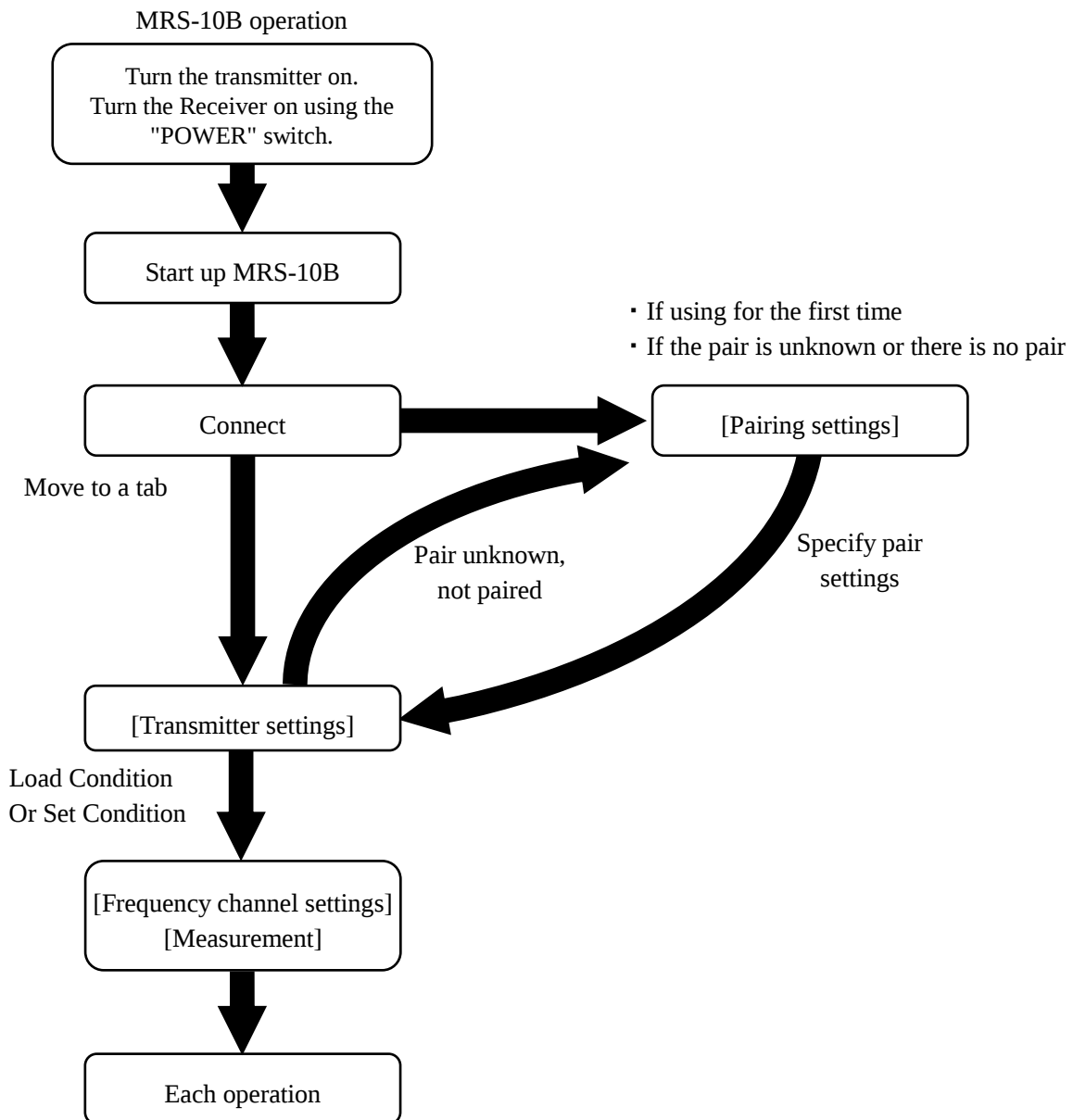


- (5) Once the uninstallation is complete, the following window is displayed
Click **Finish** and complete the operation.



3. OPERATIONS

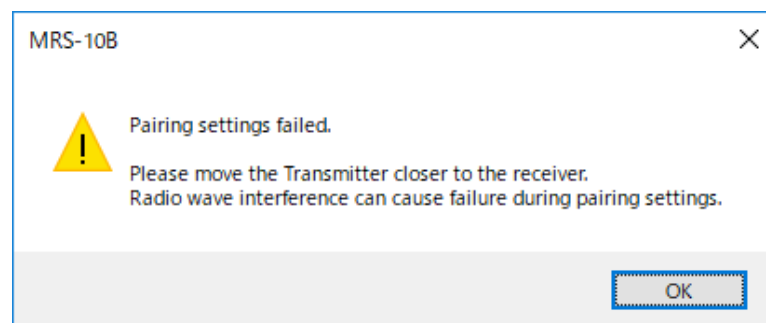
3-1. Operation flow



* It is necessary to specify the [Pairing settings] for the Transmitter and Receiver.

NOTE

If using the software for the first time, the pair is unknown, or pairing has not been performed, the popup window below is displayed upon attempting to move to a different tab, preventing you from doing so.



Click , and then specify the [Pairing settings].

3-2. Startup procedure

After turning on the transmitter, turn on the Receiver.

NOTE

This device uses the 2.4GHz frequency band, which is the same as a wireless LAN, Bluetooth, and microwave ovens.

Devices using a wireless LAN may create radio interference that could cause communication errors on this device.

Ensure such devices are not located close by while this device is in operation.

Also, any wireless LAN and Bluetooth features on the computer being used may generate radio interference. When using a computer to operate this device, ensure that the built-in wireless LAN and Bluetooth features of the computer are turned off.

MEMO

The Transmitter mode after turning on the power differs depending on the Transmitter Firmware Ver.

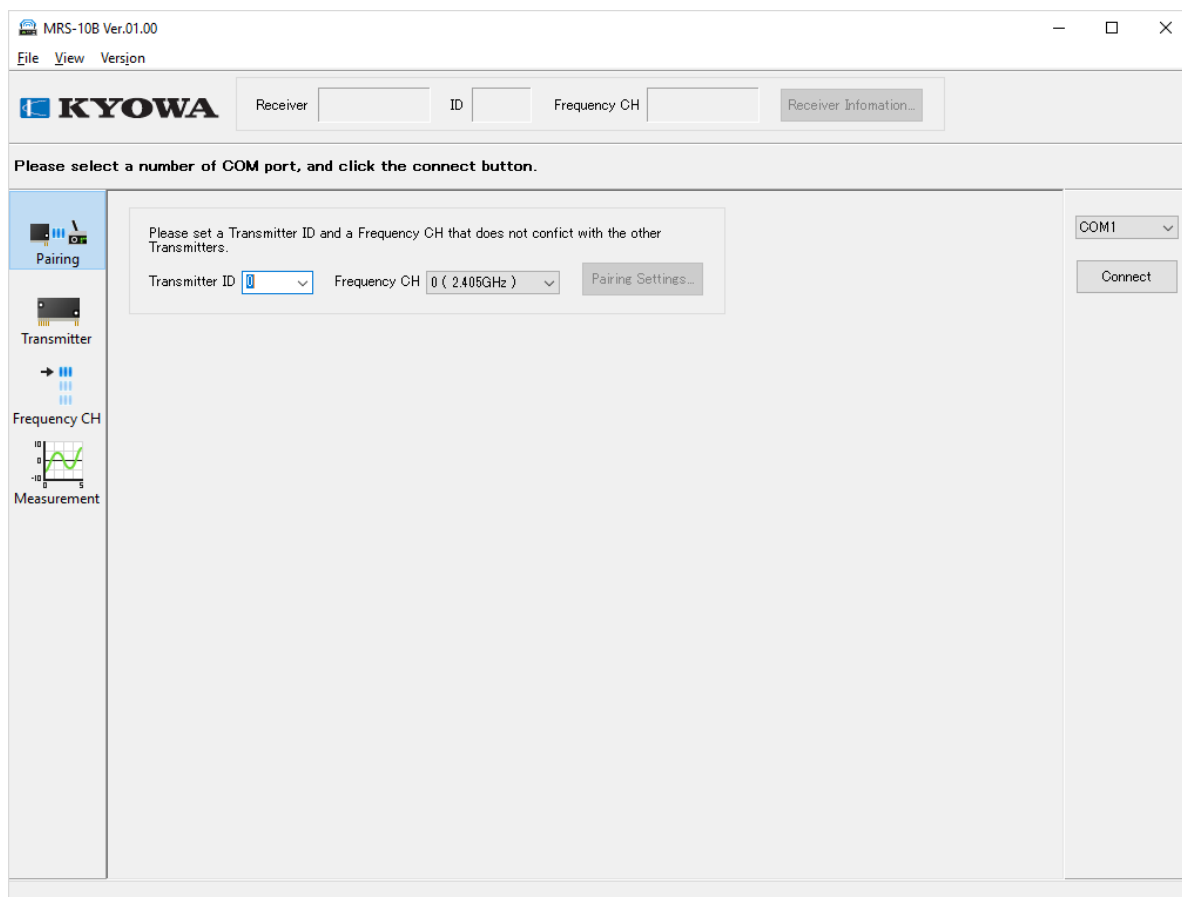
- For Firmware Ver.2.00 or later, it is the Measuring Mode.
- For Firmware Ver.1.00, it is the Command Mode.

3-3. Start

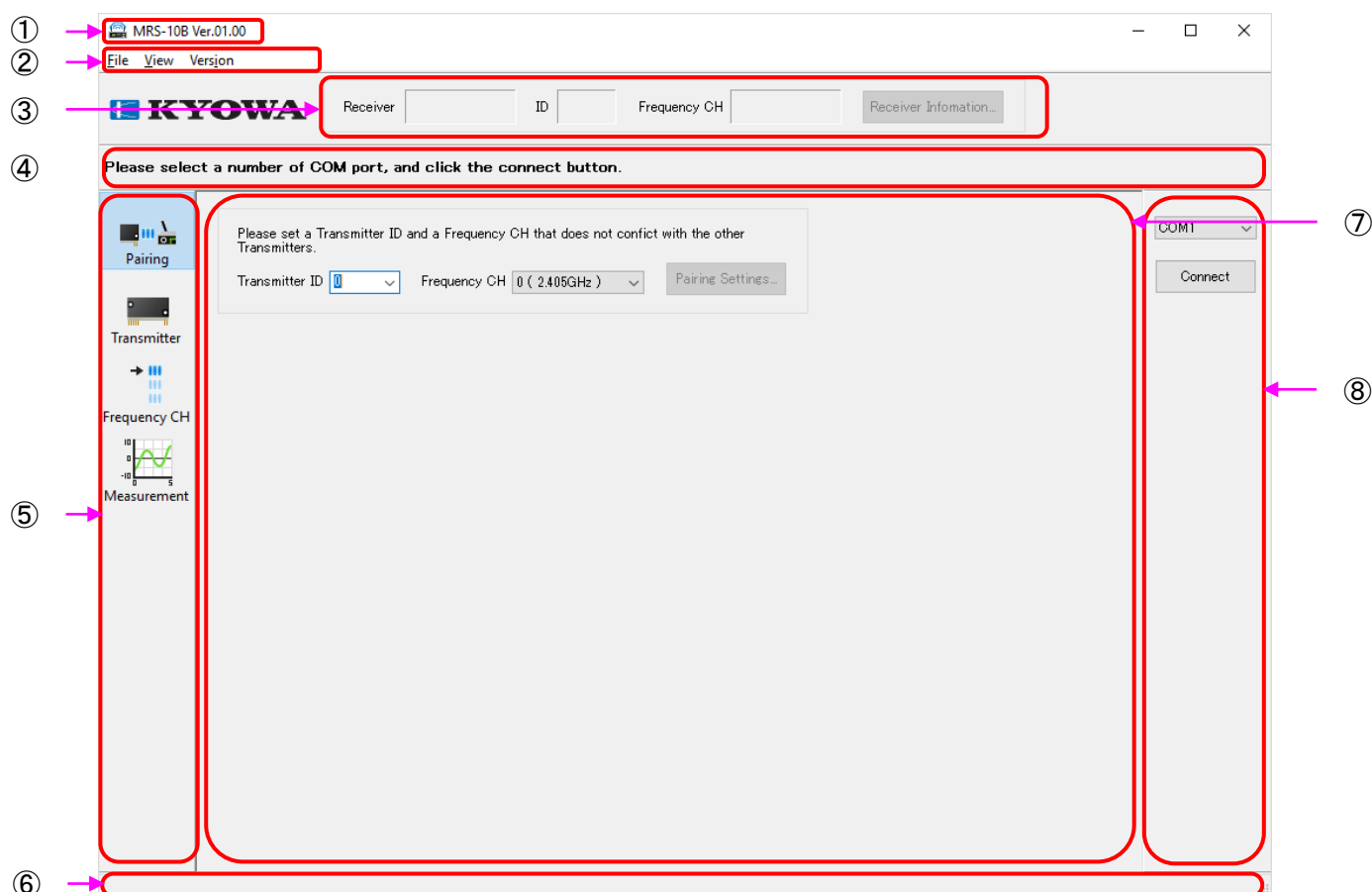
Connect the Receiver to a USB port of a computer on which the Setting Software has been installed, and then, on the Windows 10 desktop, click the Windows logo Start button at the lower left of the screen or press the Windows key , and then click the setting software icon in the Start menu.



After a while, the following window is displayed.



3-4. Window configuration



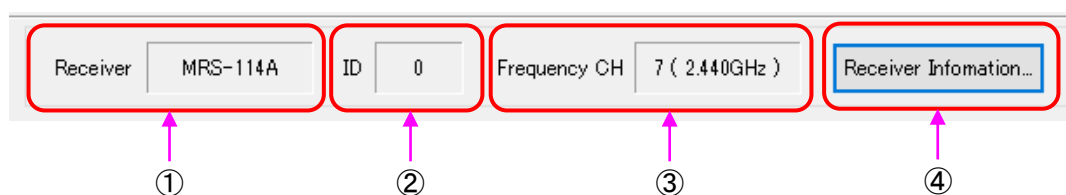
- | | |
|----------------------------|--|
| ① Title bar | Displays the name and Ver. of the application. |
| ② Menu bar | Operate the File menu, perform main-window display operations, or display the Ver. of the application. |
| ③ Receiver information bar | Displays information about the connected Receiver. |
| ④ Hint bar | Shows hints to support user operations as well as the operating status. |
| ⑤ Tool bar | Make various setting and measurement (Pairing, transmitter settings, Frequency CH settings, Measurement) selections. |
| ⑥ Status bar | Displays menu operations. |
| ⑦ Tab display | Displays tab details. |
| ⑧ Connection bar | Displays a list of computer COM ports and is used to connect or disconnect the Receiver from the selected COM port. |

MEMO

- Displaying or hiding the tool bar or status bar
The tool bar or status bar can be hidden.
In the [View] menu on the menu bar, check the tool bar or status bar to display the bar, or uncheck the bar to hide it.

3-4-1. Receiver information bar

Displays information about the connected Receiver.



① Receiver model

Displays the connected Receiver model.

② ID

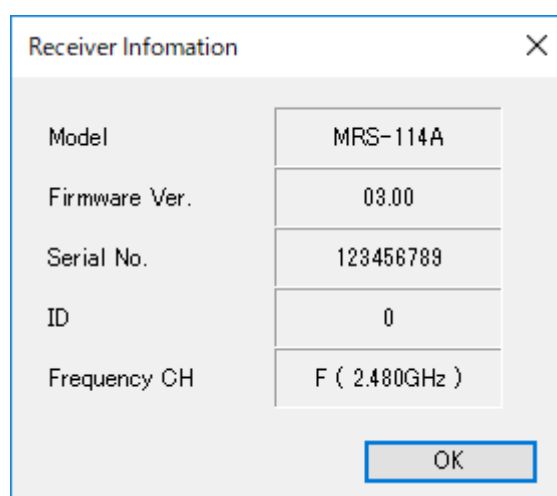
Displays the ID set for the connected Receiver.

③ Frequency CH

Displays the Frequency CH set for the connected Receiver.

④ Receiver information

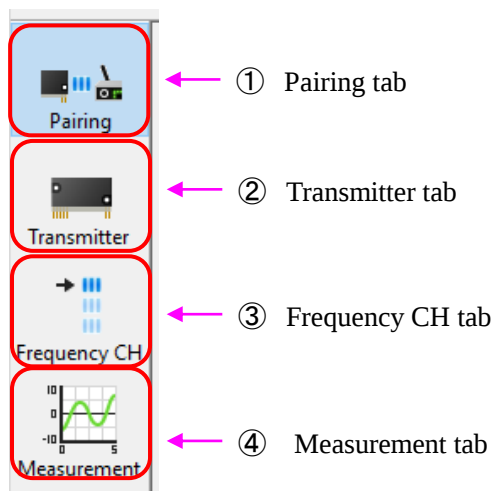
The model, firmware Ver. serial No., ID, and Frequency CH of the connected Receiver are displayed in the pop-up below.



3-4-2. Tool bar

The tool bar displays the Pairing tab, transmitter tab, Frequency CH tab, and Measurement tab.

When a tab is selected, the main-window tab display switches to the details of the selected tab.



① Pairing tab

Used to specify pair settings.

② Transmitter tab

Display the settings and setting details of the paired Transmitter.

③ Frequency CH tab

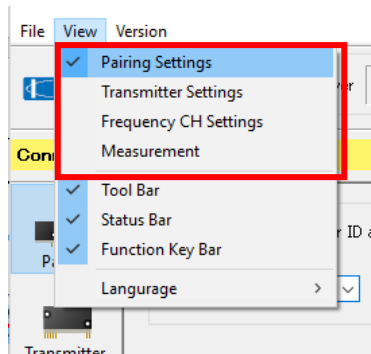
Used to confirm the communication status between the Receiver and Transmitter and to change the Frequency CH.

④ Measurement tab

Used to execute the following operations from a computer: balance settings (MRS-104A-S, MRS-101A-S/SE), balance adjustment (MRS101A-V), sensor connection checks, measurement starting, and measurement stopping.

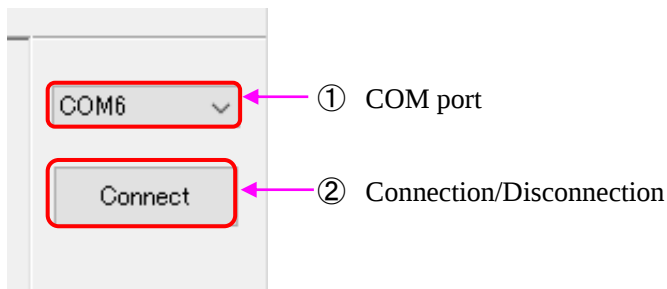
MEMO

The main-window tab display can be switched to the selected tab details from the menu bar.
The tab display switches to the item that has a check mark in the menu bar "View" menu.



3-4-3.Connection bar

Displays a list of computer COM ports and is used to connect or disconnect the Receiver from the selected COM port.



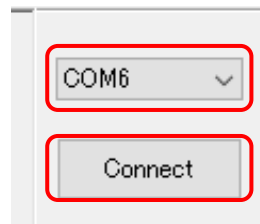
Displays a list of computer COM ports.

Used to connect or disconnect the Receiver from the selected COM port.

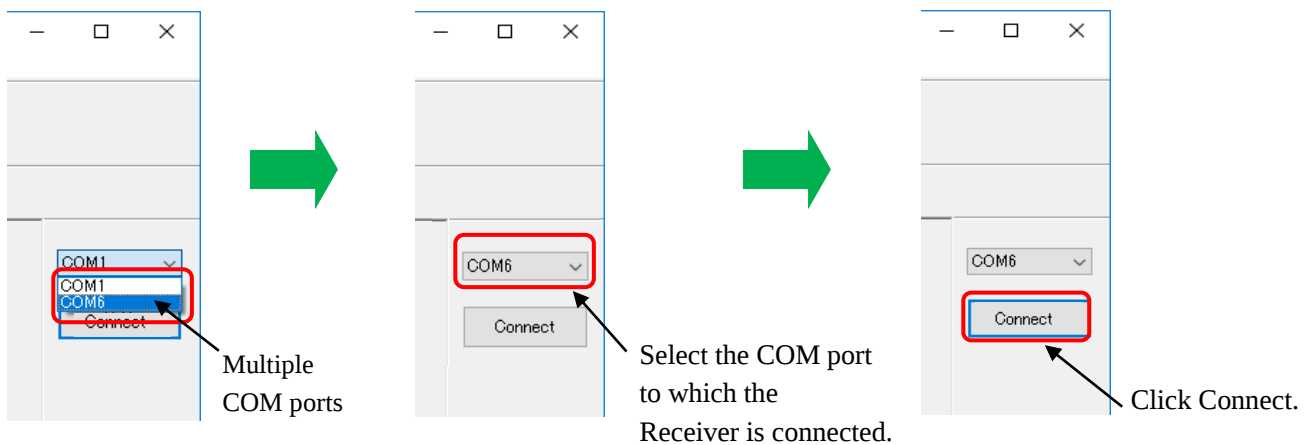
Before turning the Receiver's power off, click Disconnect.

3-5.Receiver connection

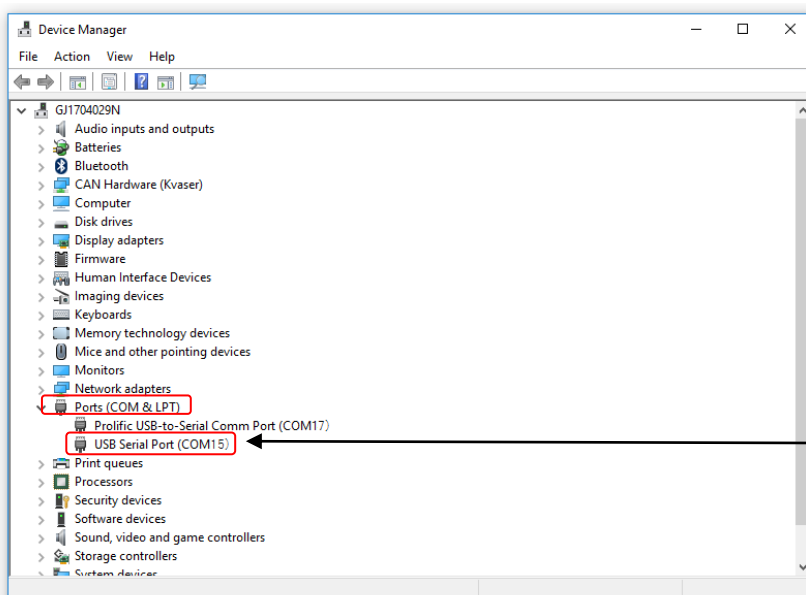
- (1) When the Receiver is connected via USB to a computer on which the Setting Software has been installed, the COM port to which the Receiver is connected is displayed on the connection bar.
Select the COM port to which the Receiver is connected, and then click **Connect**.



- When multiple COM ports are detected
Normally, the COM port to which the Receiver is connected is displayed, but multiple COM ports are displayed in some cases.
In such cases, select the COM port to which the Receiver is connected, and then click **Connect**.



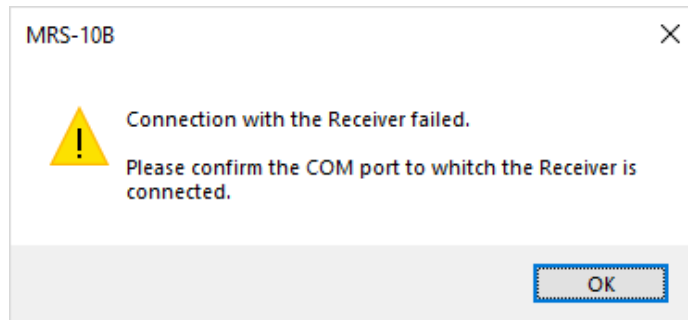
From the Device Manager, open “Ports (COM & LPT)”, and then confirm the connected port.



The port the Receiver is connected to is displayed as "USB Serial Port".

MEMO

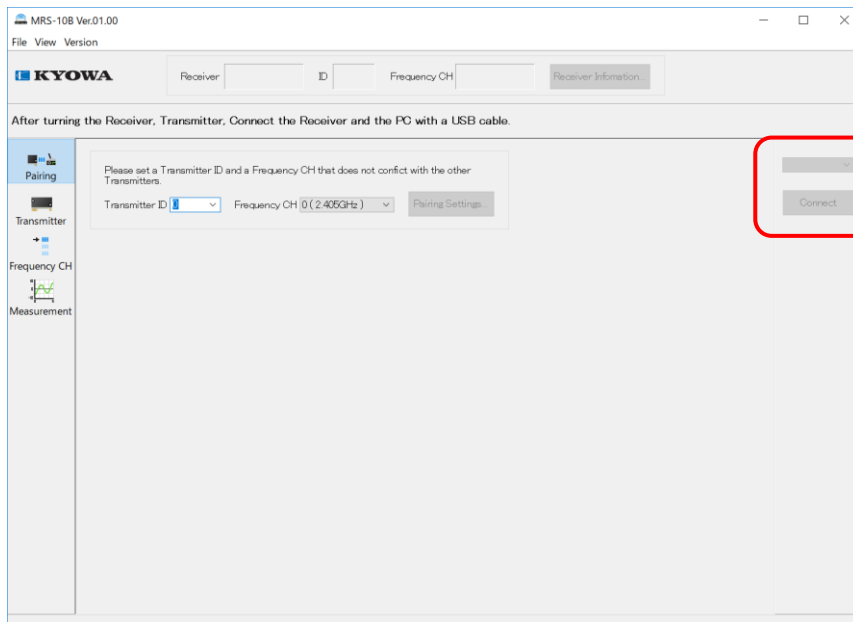
If the connection with the Receiver fails, the following pop-up is displayed.



In this case, click **OK**, and then turn the Receiver on again.

After turning the Receiver on again, select the COM port to which the Receiver is connected, and then click **Connect**.

- If the COM port field and Connect button are blank



The COM port and Connect button are blank.

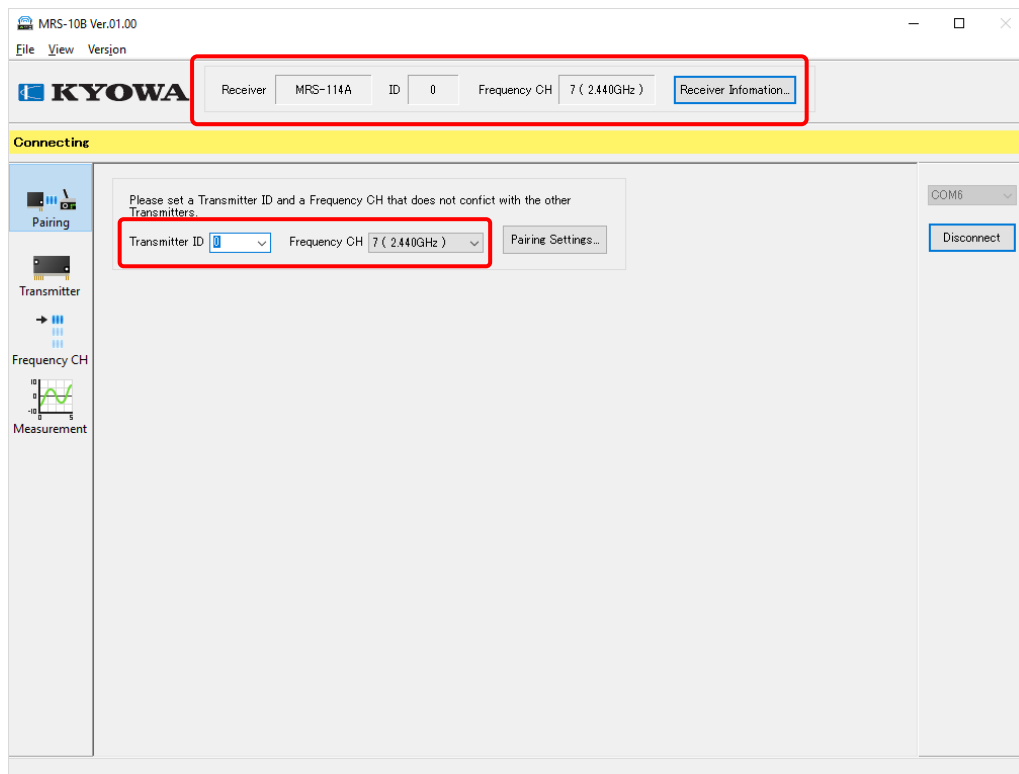
This could be due to the following reasons:

- Receiver power is not turned on.
- The USB cable connection is faulty.
- USB driver is not installed.

In case a), turn on the Receiver, search for COM ports, and display the COM port to which the Receiver is connected.

If there are no problems with the Receiver power or USB cable connection, install the USB driver as described in “4. The installation of USB device driver”.

- (2) When the computer and Receiver are successfully connected, the Receiver information of the connected Receiver is displayed on the “Receiver Information Bar”. In addition, the Receiver ID and Frequency CH are applied to the Pairing display transmitter ID and Frequency CH. After connection, the operation can be performed.



When the Receiver information is not displayed, the computer and Receiver are not connected. Check the Receiver power and perform the connect procedure again.

MEMO

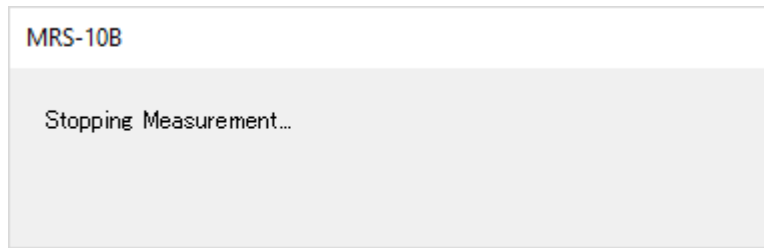
Even in the Measuring Mode, establishing a connection switches the system from the Measuring Mode to the Command Mode, and operations from the Setting Software become possible.

NOTE

If the Transmitter is in the Measuring Mode, clicking **Connect** sends a command from the Receiver to the Transmitter to switch to the Command Mode.

NOTE

If the Transmitter is turned on after starting up the Setting Software, the following pop-up might be displayed.



In this case, the Transmitter will switch to the command mode after a while, and the Setting Software can then be used to perform operations.

NOTE

If the Receiver is connected to the computer, the panel switches cannot be used.
Once the Receiver is connected, use the Setting Software to operate the device.

When you click **Disconnect** to disconnect the computer and Receiver, the switches on the main Receiver body are activated.

3-6. [Pairing settings]

To use this device, the Frequency CH of the transmitter and Receiver must be identical, and the transmitter ID and transmitter information (including transmitter type, Range and Bridge resistance) to identify the transmitter must be registered in the Receiver.

For this purpose, the Pairing setting must be performed to match the specified transmitter ID and Frequency CH before the transmitter information (including transmitter type, Range and Bridge resistance) already registered in the transmitter can be registered to the Receiver.

NOTE

When using this device for the first time, the Pairing settings must be performed.

When changing the Transmitter and Receiver pair, the Pairing settings must be performed.

If the [Pairing settings] are not specified, measurement errors will occur, and normal communication will not be possible.

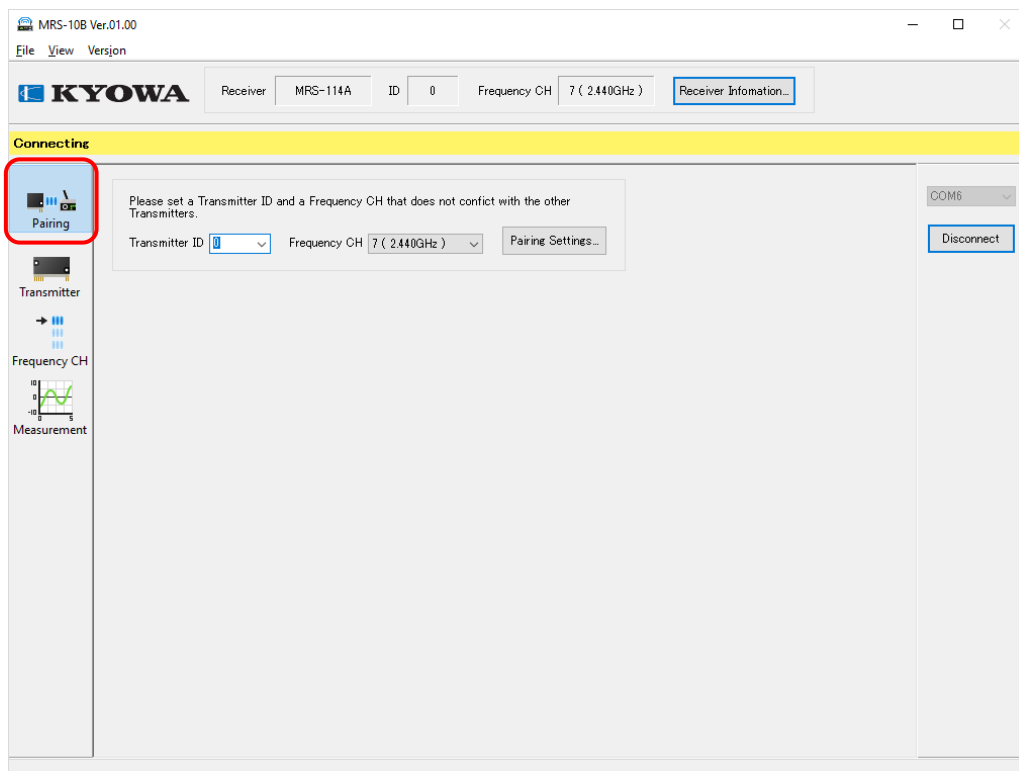
- (1) To execute the Pairing settings, place the transmitter and Receiver within a 50cm range.

NOTE

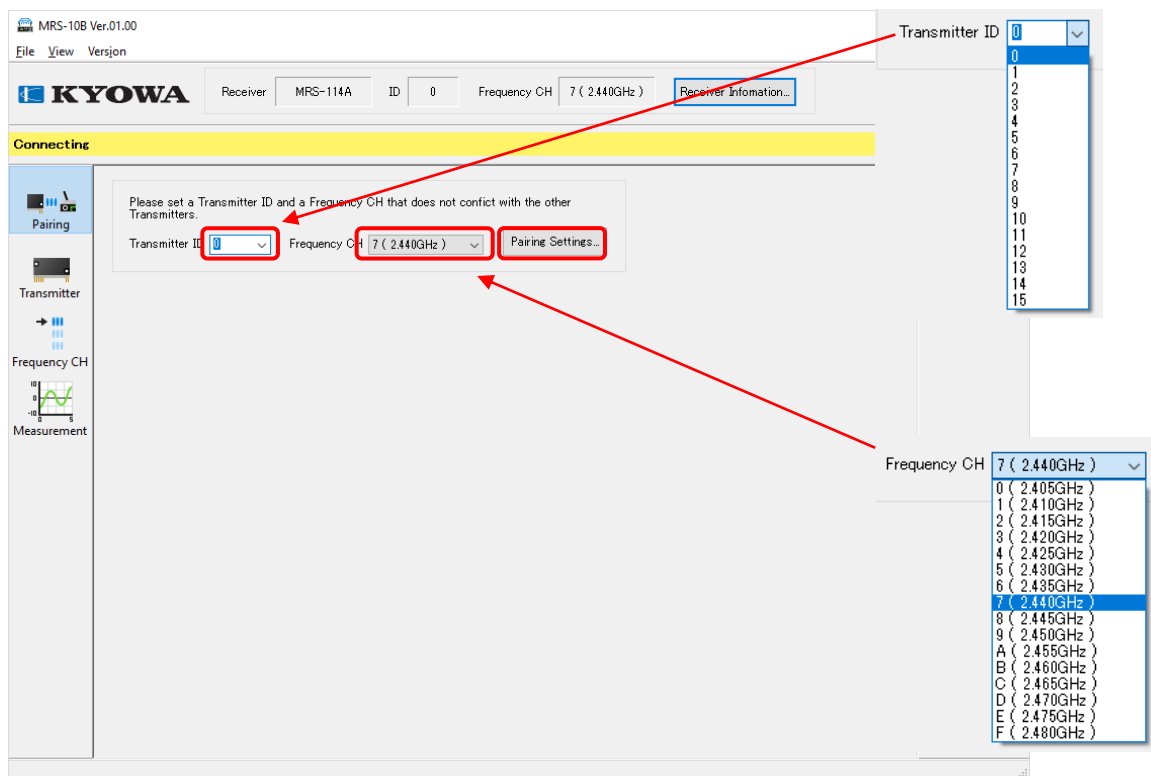
When a Transmitter other than the target Transmitter exists, the Pairing settings may fail or the other Transmitter not intended to be paired may be paired to the Receiver.

When performing the Pairing settings, only turn on the power of the target Transmitter.

- (2) Click the **Pairing** tab on the tool bar.



- (3) Set the transmitter ID and the Frequency CH to be used for the communication.
Select each value from the pull-down menu, and then click **Pairing Settings**.

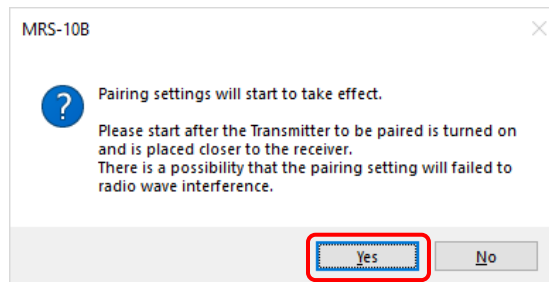


For the transmitter ID, 47 choices between 0 and 46 are available. (0 to 15 can be selected from the pull-down menu, and 16 to 46 can be selected via direct input.) For the Frequency CH, 16 choices between 0 and F are available.

NOTE

When using multiple transmitter-receiver pairs, ensure the Transmitter ID and Frequency CH are not the same as the ones used by other pairs.
When overlapping, normal communication cannot be established.

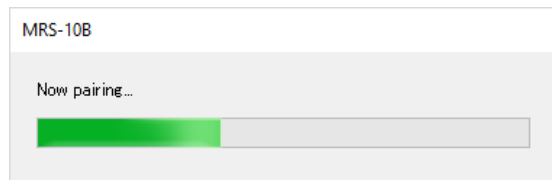
- (4) When the transmitter ID and Frequency CH are different from other transmitter-receiver pairs, click **Yes**.



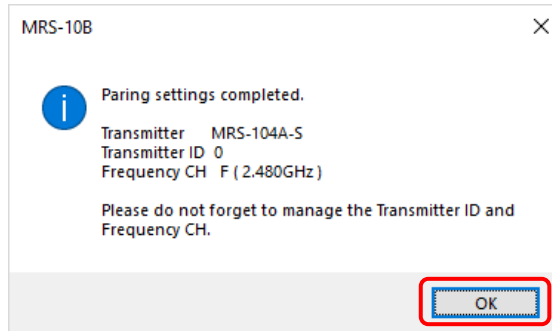
NOTE

If using the MRS-111A(-E), MRS-111B, it is not possible to specify a pair with the MRS-104A-S.
To specify a pair with the MRS-104A-S, use the MRS-114A.

- (5) The following window is displayed while performing the Pairing settings.

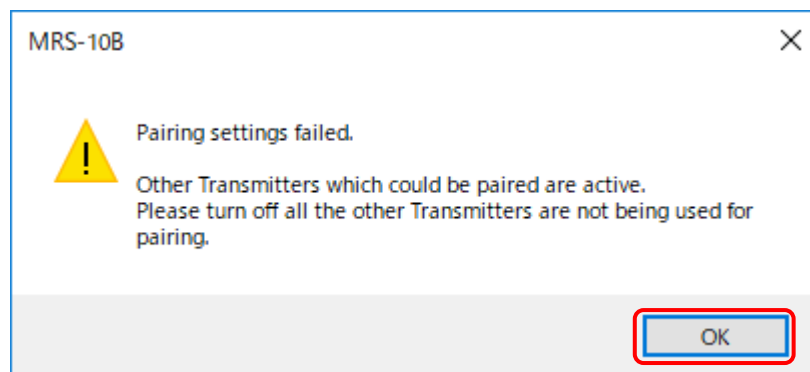


- (6) When the Pairing settings are complete, the configured ID and Frequency CH are displayed. Check the settings again and click **OK**.



MEMO

When multiple Transmitters are present, the following window is displayed. Make sure Transmitters other than the Transmitter targeted in the Pairing settings are not present. Turn off the power of other Transmitters, click **OK**, and then perform the Pairing settings again.



MEMO

The Transmitter ID and Frequency CH settings are saved to nonvolatile memory in the Transmitter and Receiver. Settings are saved even after power down.

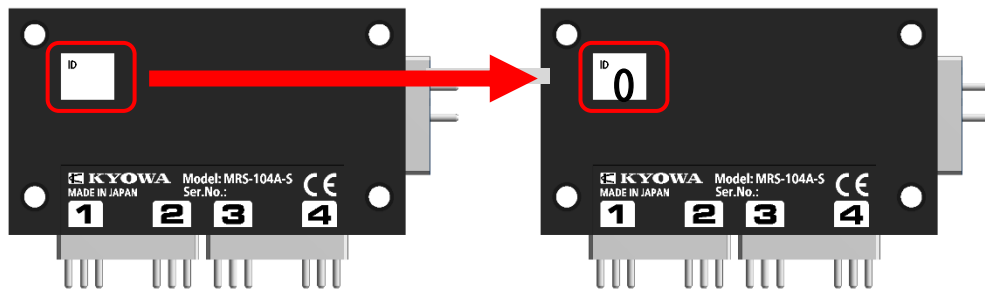
MEMO

The Transmitter ID and Frequency CH are important information to establish communication. Manage the Transmitter ID and Frequency CH carefully.

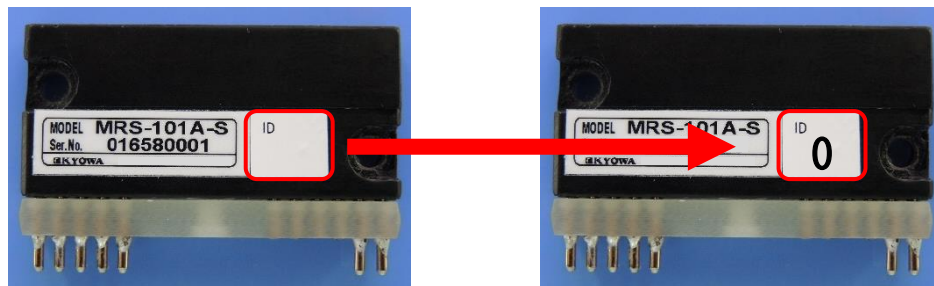
A label is attached to the Transmitter where the ID can be written down. Write down the set ID using a permanent marker.

A spare label is included in the Transmitter.

- If using MRS-104A-S (4ch strain transmitter)

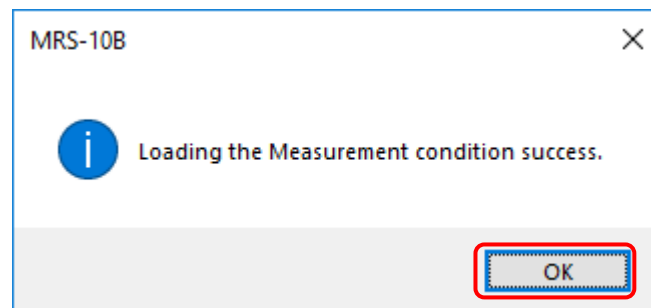
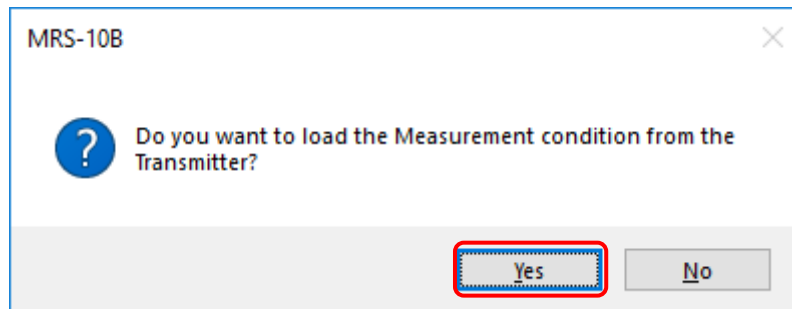


- If using MRS-101A-S/SE/V (1ch-Strain Transmitter, 1ch-Strain Transmitter (external antenna) or 1ch-Voltage Transmitter)

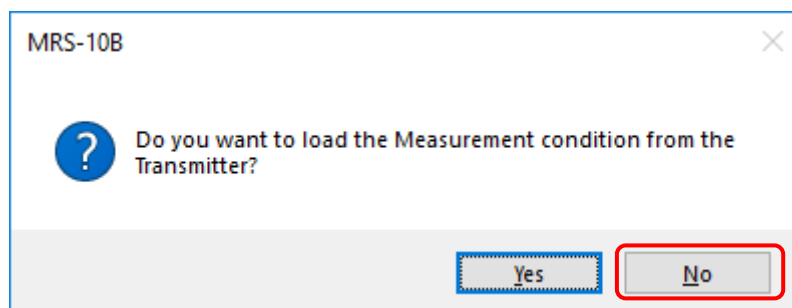


- (7) After pairing is complete, the current transmitter information can be loaded to the Setting Software. When the transmitter information is loaded to the Setting Software, the paired transmitter information is applied to the transmitter setting display of the Setting Software. Load this information in accordance with use of the setting condition file.

- If not using the condition file: Click **Yes**, and then click **OK**.
The measurement condition is successfully loaded and applied to the transmitter setting window.



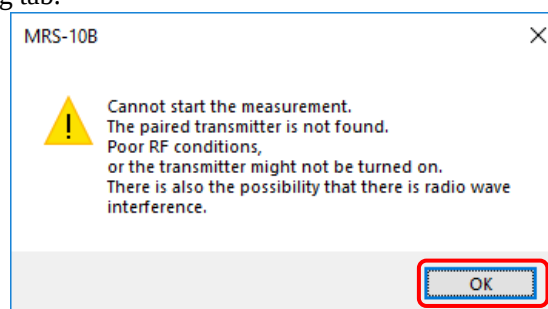
- If using the condition file: Click **No**.



MEMO

When the following window is displayed, Transmitters with unmatched Transmitter information (the Transmitter without Pairing settings) are powered on.

Either click **OK** to return to the Transmitter with Pairing settings or set up pairing with the current Transmitter from the Pairing tab.



3-7. [Transmitter settings]

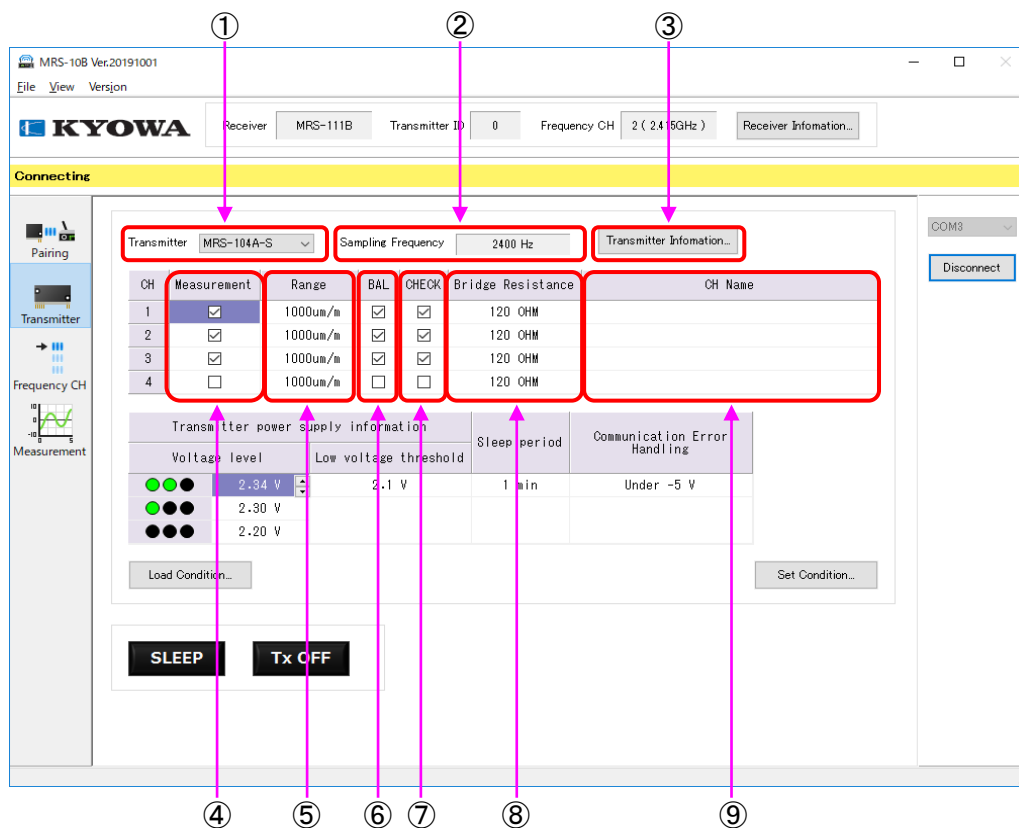
Click the **Transmitter** tab on the tool bar.

This is where settings of the paired transmitter are configured and displayed.

The window differs depending on the transmitter type specified for pairing.

3-7-1. Transmitter setting

- If using the MRS-104A-S (4ch-Strain Transmitter), MRS-101A-S (1ch-Strain Transmitter), MRS-101A-SE (1ch-Strain Transmitter (EXT Antenna)) or MRS-101B-S (1ch-Strain Transmitter)



- ① Transmitter selection

Select the transmitter for which pairing has been specified from the pull-down menu.

MEMO

If using the MRS-101A-SE, select the MRS-101A-S.

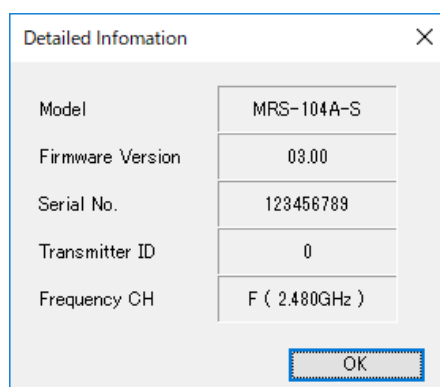
- ② Sampling frequency

Displays the transmitter sampling frequency.

In the case of the MRS-104A-S (4ch-Strain Transmitter), this is automatically determined based on the transmitter measurement channel condition.

- ③ Transmitter information button

Click **Transmitter Information** to display information about the paired transmitter.



④ Measurement channel selection:

Set the number of measurement channels.

The sampling frequency is automatically updated according to the specified number of measurement channels.

* If the MRS-101A-S (1ch-Strain Transmitter), MRS-101A-SE (1ch-Strain Transmitter (EXT Antenna)) or MRS-101B-S (1ch-Strain Transmitter) is selected, only CH1 is displayed, and CH2 to CH4 are hidden.

● 4 Measurement channels

Transmitter: MRS-104A-S Sampling Frequency: 1920 Hz

CH	Measurement	Range	BAL	CHECK	Bridge Resistance
1	☒	2500um/m	☒	☒	120 OHM
2	☒	2500um/m	☒	☒	120 OHM
3	☒	1000um/m	☒	☒	120 OHM
4	☒	1000um/m	☒	☒	120 OHM

● 3 Measurement channels

Transmitter: MRS-104A-S Sampling Frequency: 2400 Hz

CH	Measurement	Range	BAL	CHECK	Bridge Resistance
1	☒	2500um/m	☒	☒	120 OHM
2	☒	2500um/m	☒	☒	120 OHM
3	☒	1000um/m	☒	☒	120 OHM
4	☐	1000um/m	☐	☐	120 OHM

● 2 Measurement channels

Transmitter: MRS-104A-S Sampling Frequency: 3200 Hz

CH	Measurement	Range	BAL	CHECK	Bridge Resistance
1	☒	2500um/m	☒	☒	120 OHM
2	☒	2500um/m	☒	☒	120 OHM
3	☐	1000um/m	☐	☐	120 OHM
4	☐	1000um/m	☐	☐	120 OHM

● 1 Measurement channel

Transmitter: MRS-104A-S Sampling Frequency: 4800 Hz

CH	Measurement	Range	BAL	CHECK	Bridge Resistance
1	☒	2500um/m	☒	☒	120 OHM
2	☐	2500um/m	☐	☐	120 OHM
3	☐	1000um/m	☐	☐	120 OHM
4	☐	1000um/m	☐	☐	120 OHM

⑤ Range:

Use the pull-down menu to set the measurement range to 25,000, 10,000, 5,000, 2,500, or $1,000 \times 10^{-6}$ strain.

⑥ Balance:

Set the measurement channels for which to perform balance adjustment. Balance adjustment is only executed for measurement channels with checked boxes (☒)

It is not displayed when the connected receiver is Ver.1.00.

⑦ Check:

Executes a sensor connection check. The sensor check is only executed for measurement channels with checked boxes (☒)

It is not displayed when the connected receiver is Ver.1.00.

⑧ Bridge resistance:

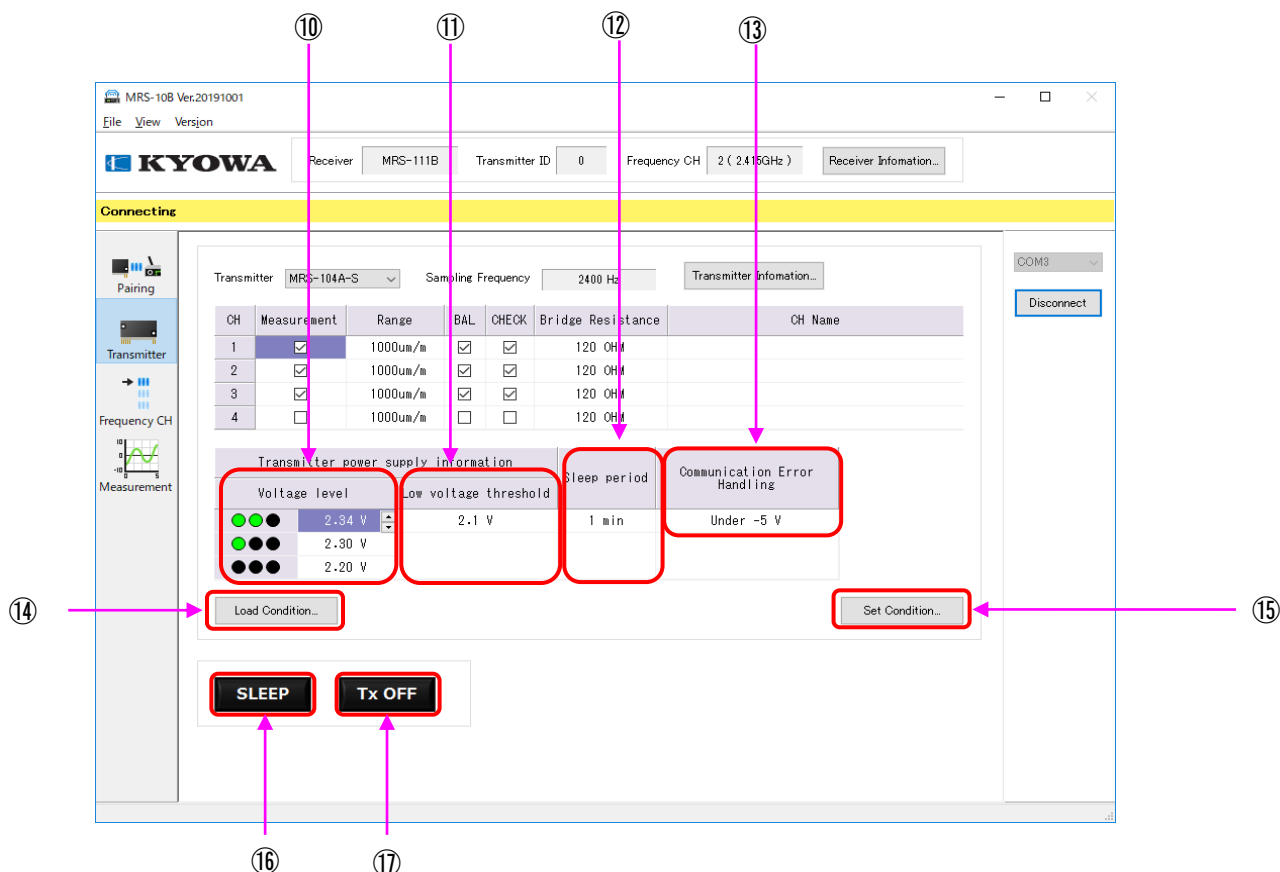
Enter the Bridge resistance to be used.

Enter within the range of 115 and 1005Ω.

⑨ CH Name:

Enter the channel name.

The entered name is displayed in the legend on the Measurement-tab monitor display.



⑩ Transmitter power supply information:

Set the lighting voltage of the transmitter power supply voltage monitoring LEDs.

The voltage level can be set in units of 0.01V over 3 stages.

Set as follows: Discharge cutoff voltage < ●●● < ●●● < ●●●

In the onscreen display example, the number of lit green LEDs are reduced from 3 to 2 when the voltage drops below approx 2.35V.

⑪ Low voltage threshold (V):

Set the voltage that will stop the transmitter.

The transmitter will stop when the battery voltage drops below the set voltage.

The transmitter may fail to start up depending on the setting here.

Read the **[note]** before making adjustments.

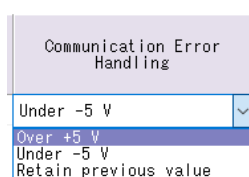
⑫ Sleep period settings:

The sleep period can be set between 0 and 1,440 minutes (24 hours) in one minute increments.

When set to 0 minutes, the sleep function is disabled.

⑬ Communication Error Handling:

From the pull-down menu, the data error processing method can be selected from among three options when a communication error occurs.



Over +5V:

To identify the error, more than +5V is applied forcibly to the analog output of the Receiver.

Under -5V:

To identify the error, less than -5V is applied forcibly to the analog output of the Receiver.

Retain previous value:

Retains measurement data value immediately prior to the occurrence of the error and applies it to the analog output of the Receiver.

- ⑭ Load Condition: Load the paired transmitter information. The loaded information is applied to the transmitter display.
- ⑮ Configuration button: Change setting values.
When changes are made to items, click the Set Condition button.
Settings are applied to the transmitter.
- ⑯ SLEEP: Put the transmitter to sleep.
Refer to 3-7-2. SLEEP MEMO for transmitter operation when the preset SLEEP time for the transmitter has elapsed.
- ⑰ Tx OFF: Executes Tx OFF on the transmitter.
When you click Tx OFF, the transmitter power is turned off.
Once executed, the transmitter will not resume operation until the transmitter is restarted manually.

NOTE

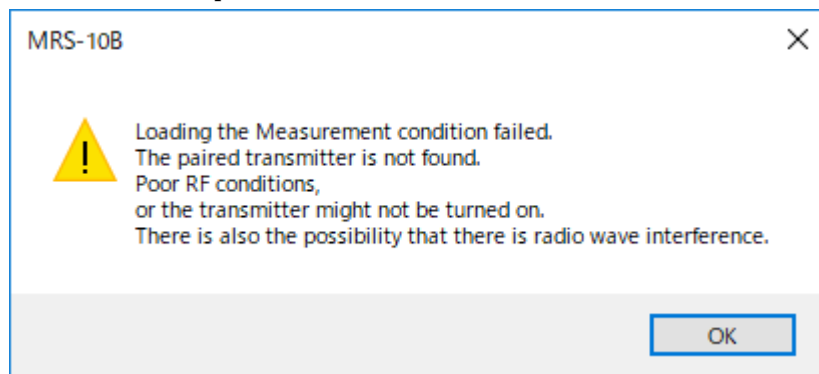
When setting the low voltage threshold, check the battery voltage, and pay attention to the setting.

- After performing a battery replacement, the Transmitter will not be able to start up if the Low voltage threshold is set lower than the voltage of the replacement battery.
Caution should be taken regarding the low voltage threshold value especially when replacing lithium-ion batteries with batteries that operate at a lower output voltage, such as 2twonickel-hydrogen chargeable batteries in series.
- While it is possible to set the Low voltage threshold higher than the voltage of batteries currently in use, doing so will force the Low voltage threshold to be exceeded as soon the setting is applied.
This will result in the Transmitter not being able to start up.

If the Transmitter is unable to start up, first input a voltage higher than the low voltage threshold (must be below 4.4V) to the Transmitter, and then reset the low voltage threshold to the correct value.

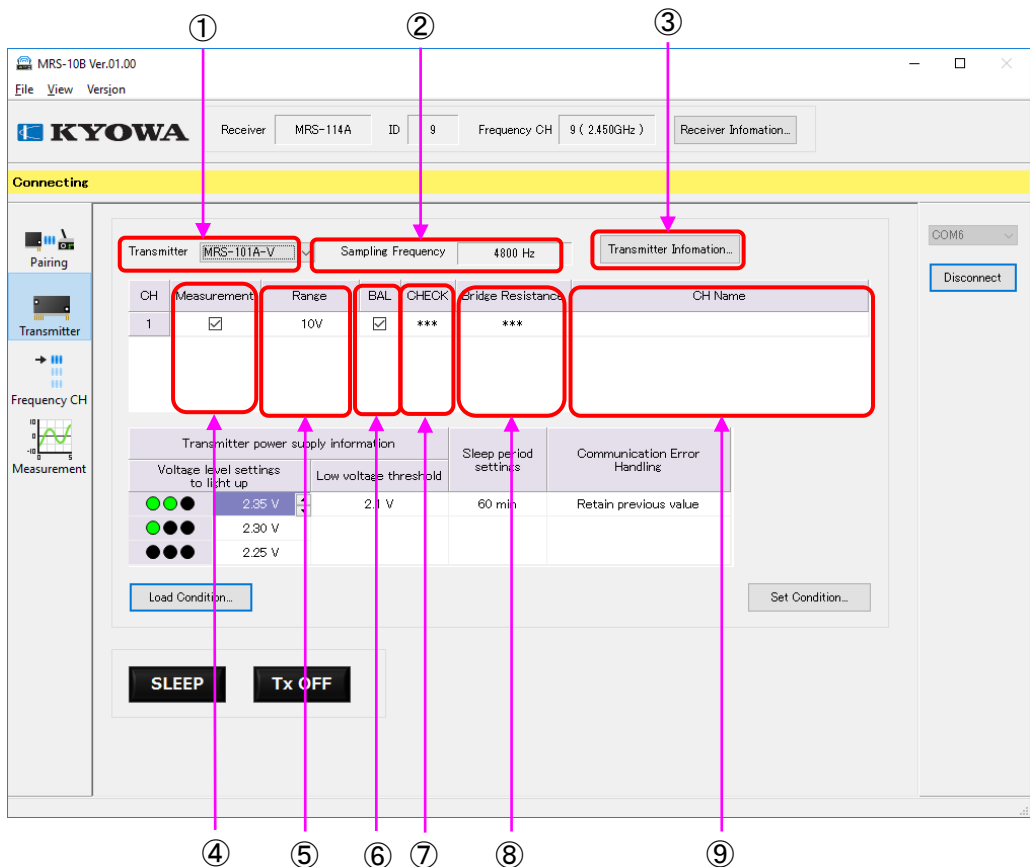
MEMO

When the power of the paired Transmitter is off, the following error-message pop-up window is displayed to indicate that "There was no response from the Transmitter".



If this happens, click OK, and check the Transmitter status.
After confirmation, set up pairing from the Pairing tab again.

- If using the MRS-101A-V (1ch-Voltage Transmitter), MRS-101B-V (1ch-Voltage Transmitter) or MRS-101B-T (1ch-Thermocouple Transmitter)



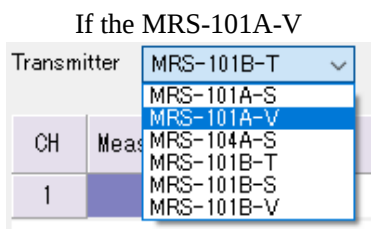
① transmitter selection

Select the transmitter for which pairing has been specified from the pull-down menu.

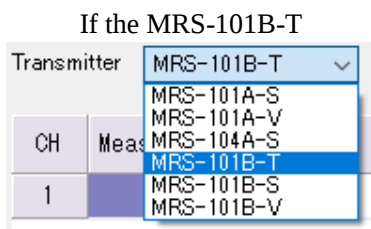
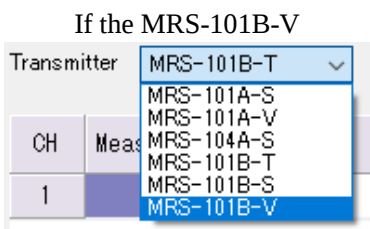
In the case of the MRS-101A-V (1ch-Voltage Transmitter), select the MRS-101A-V.

In the case of the MRS-101B-V (1ch-Voltage Transmitter), select the MRS-101B-V.

In the case of the MRS-101B-T (1ch-Thermocouple Transmitter), select the MRS-101B-T.



② Sampling frequency



Displays the transmitter sampling frequency.

When MRS-101A-V (1ch-Voltage Transmitter) or MRS-101B-V (1ch-Voltage Transmitter) is selected as the transmitter, the frequency is fixed at 4800 Hz.

When MRS-101B-T (1ch-Thermocouple Transmitter) is selected as the transmitter, the frequency is fixed at 50 Hz.

③ Transmitter information button

Click **Transmitter Information** to display information about the paired transmitter.

Transmitter Information	
Model	MRS-101A-V
Firmware Ver.	02.00
Serial No.	123456789
Transmitter ID	0
Frequency CH	F (2.480GHz)
OK	

④ Measurement channel selection:

Set the number of measurement channels.
If the MRS-101A-V, MRS-101B-V or MRS-101B-T is selected in the transmitter settings, only CH1 is displayed, and CH2 to CH4 are hidden.

⑤ Range:

Use the pull-down menu to set the measurement range.

Transmitter model name	Measuring Range
MRS-101A-V MRS-101B-V	5V, 10V
MRS-101B-T	K100°C, K500°C, K1300°C T100°C, T400°C N100°C, N500°C, N1300°C J100°C, J500°C, J1200°C

⑥ BAL

Set the measurement channels for which to perform balance adjustment.

Balance adjustment is only executed for measurement channels with checked boxes (☑).

Not displayed if the connected transmitter is the MRS-101A-V, MRS-101B-V or MRS-101B-T.

⑦ CHECK

Set the measurement channels for which to perform sensor checks.

If using the MRS-101A-V or MRS-101B-V (1ch-Voltage Transmitter), there is no sensor check function.

⑧ Bridge Resistance

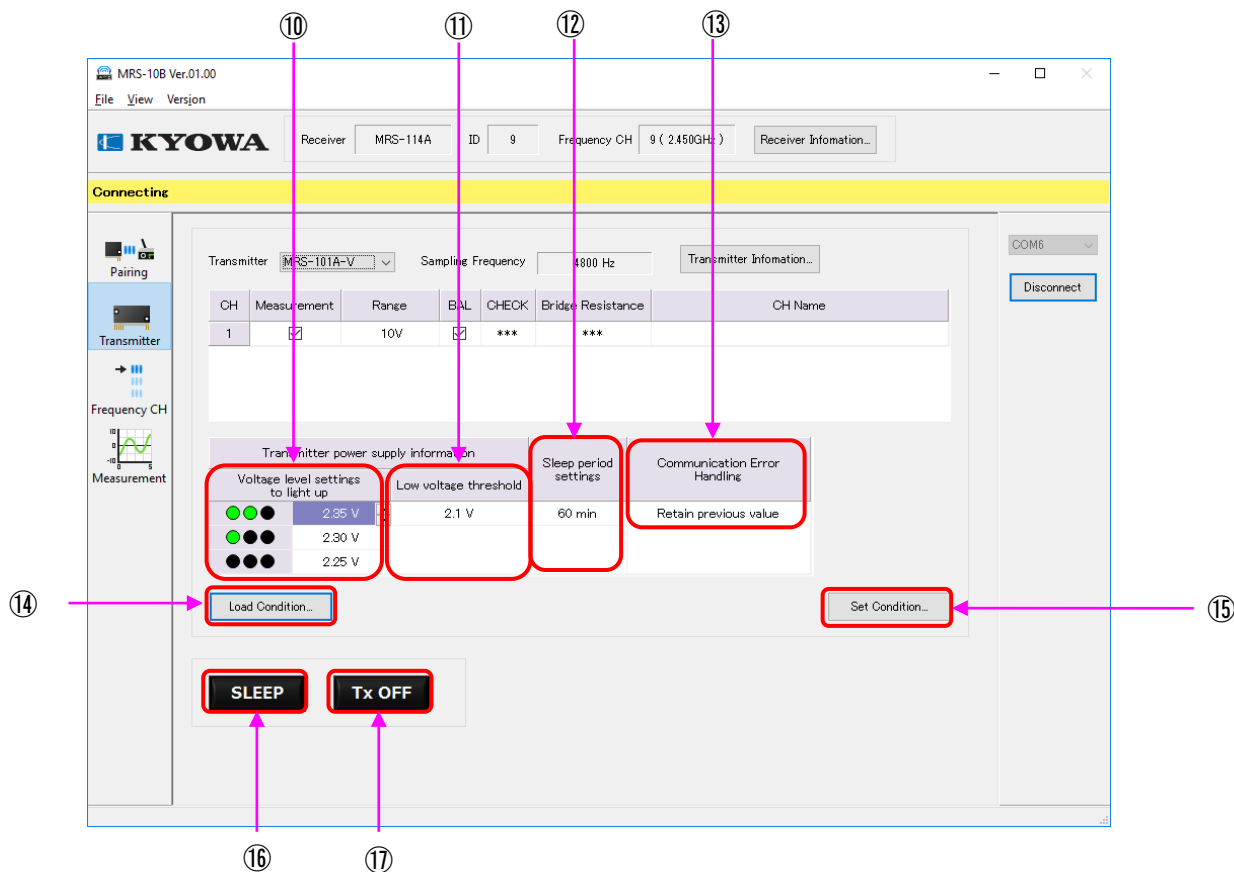
Enter the bridge resistance to use.

If the MRS-101A-V, MRS-101B-V or MRS-101B-T is selected in the transmitter settings, * is displayed, and entry is not possible.**

⑨ Channel Name

Enter the channel name.

The entered channel name is displayed in the legend on the Measurement-tab monitor display.



⑩ Transmitter power supply information:

Set the lighting voltage of the transmitter power supply voltage monitoring LEDs.
The voltage level can be set in units of 0.01V over 3 stages.
Set as follows: Discharge cutoff voltage <●●●<●●●<●●●
In the onscreen display example, the number of lit green LEDs are reduced from 3 to 2 when the voltage drops below approx 2.35V.

⑪ Low voltage threshold (V):

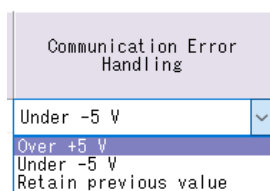
Set the voltage that will stop the transmitter.
The transmitter will stop when the battery voltage drops below the set voltage.
The transmitter may fail to start up depending on the setting here.
Read the note before making adjustments.

⑫ Sleep period settings:

The sleep period can be set between 0 and 1,440 minutes (24 hours) in one minute increments.
When set to 0 minutes, the sleep function is disabled.

⑬ Communication Error Handling:

From the pull-down menu, the data error processing method can be selected from among three options when a communication error occurs.



Over +5V:

To identify the error, more than +5V is applied forcibly to the analog output of the Receiver.

Under -5V:

To identify the error, less than -5V is applied forcibly to the analog output of the Receiver.

Retain previous value:

Retains measurement data value immediately prior to the occurrence of the error and applies it to the analog output of the Receiver.

- ⑭ Load Condition Load the paired transmitter information. The loaded information is applied to the transmitter display.
- ⑮ Configuration button: Change setting values.
When changes are made to items, click the Set Condition button.
Settings are applied to the transmitter.
- ⑯ SLEEP Put the transmitter to sleep.
Refer to 3-7-2. SLEEP MEMO for transmitter operation when the preset SLEEP time for the transmitter has elapsed..
- ⑰ Tx OFF Executes Tx OFF on the transmitter.
When you click Tx OFF, the transmitter power is turned off.
Once executed, the transmitter will not resume operation until the transmitter is restarted manually.

NOTE

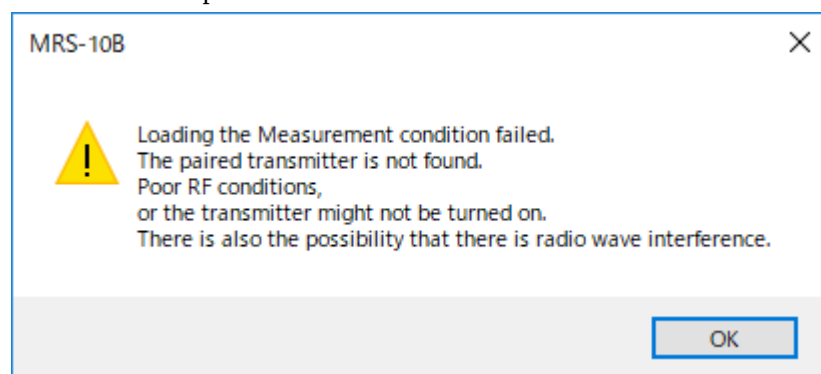
When setting the low voltage threshold, check the battery voltage, and pay attention to the setting.

- After performing a battery replacement, the Transmitter will not be able to start up if the Low voltage threshold is set lower than the voltage of the replacement battery.
Caution should be taken regarding the low voltage threshold value especially when replacing lithium-ion batteries with batteries that operate at a lower output voltage, such as 2twonickel-hydrogen chargeable batteries in series.
- While it is possible to set the Low voltage threshold higher than the voltage of batteries currently in use, doing so will force the Low voltage threshold to be exceeded as soon the setting is applied.
This will result in the Transmitter not being able to start up.

If the Transmitter is unable to start up, first input a voltage higher than the low voltage threshold (must be below 4.4V) to the Transmitter, and then reset the low voltage threshold to the correct value.

MEMO

When the power of the paired Transmitter is off, the following error-message pop-up window is displayed to indicate that "There was no response from the Transmitter".



If this happens, click OK, check the Transmitter status.
After confirmation, set up pairing from the Pairing tab again.

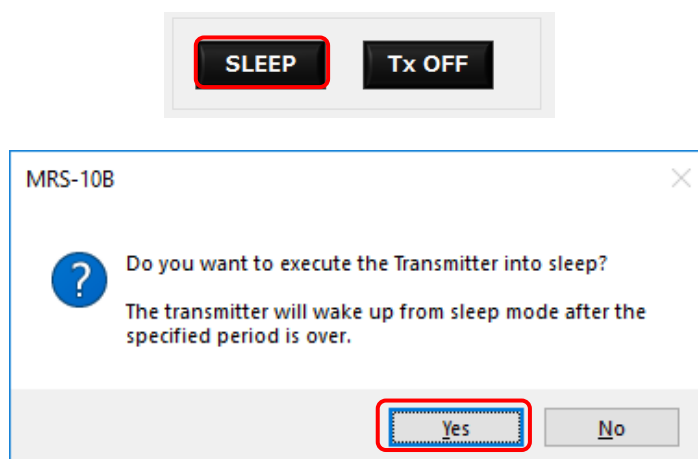
3-7-2.SLEEP

The transmitter will be put into sleep for the set period of time. This saves unnecessary battery consumption.

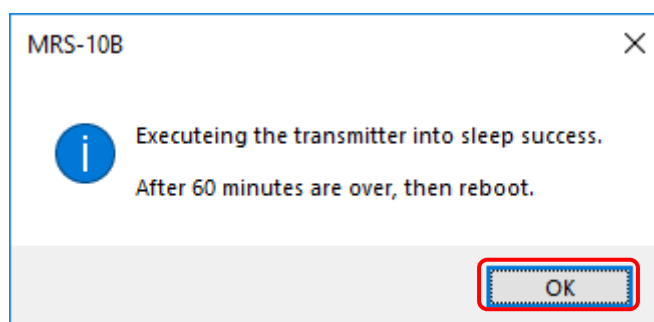
The transmitter cannot be operated while it is in sleep.

Once the set period of time elapses, the transmitter automatically resumes operation, and can then be operated from the Receiver.

- (1) Click **SLEEP**, and then click **Yes**.



- (2) When the transmitter is successfully put to sleep, the pop-up below is displayed, so click **OK**.
The transmitter will be put into sleep for the set period of time. This saves unnecessary battery consumption.



MEMO

When the Transmitter is turned on again or the Sleep period elapses, the Transmitter's status upon resuming operation differs depending on its Firmware Ver. as follows:

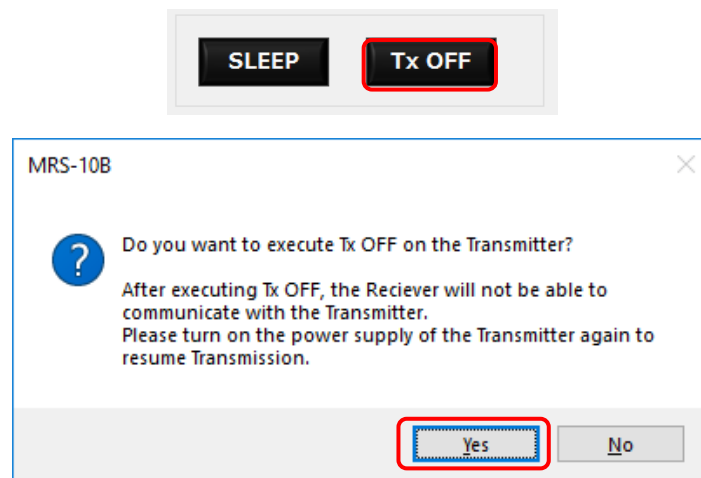
- For Firmware Ver.2.00 or later, operation is resumed in the Measuring Mode.
- For Firmware Ver.1.00, operation is resumed in the Command Mode.

3-5-3.Tx OFF

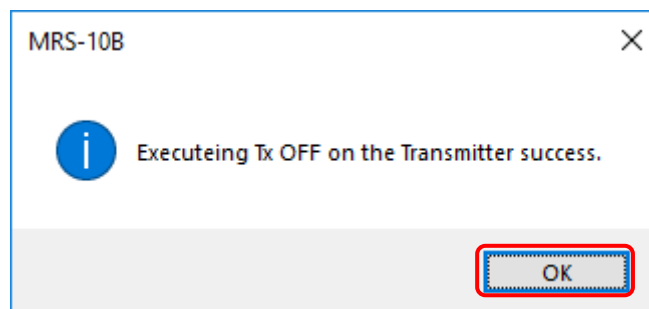
When you click **Tx OFF**, the transmitter power is turned off.

Once executed, the transmitter will not resume operation until the transmitter is restarted manually.

- (1) Click **Tx OFF**, and then click **Yes**.



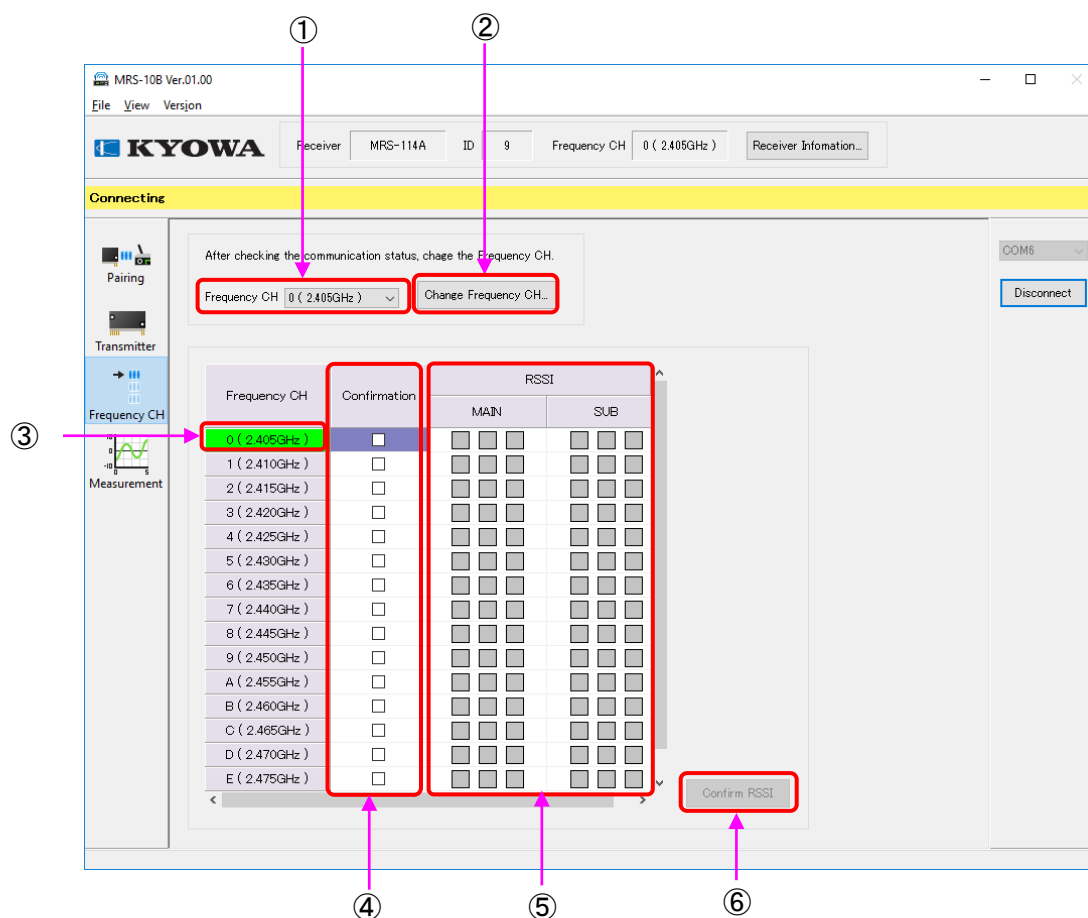
- (2) When the transmitter is successfully put to sleep, the pop-up below is displayed, so click **OK**.



3-8. [Frequency channel settings]

Click the Frequency CH tab on the tool bar.

This is where you can check the communication status between the Receiver and transmitter, and change the Frequency CH.



- ① Frequency CH selection
- ② Change Frequency CH button

- ③ Frequency CH:

- ④ RSSI CH Confirmation

- ⑤ Confirm RSSI button

- ⑥ RSSI

Select the Frequency CH to change to.

Apply changes to the Frequency CH.

The Frequency CH is changed to the selected Frequency CH.

The current Frequency CH is lit green.

Tick the CH ☒ to apply the Confirm RSSI.

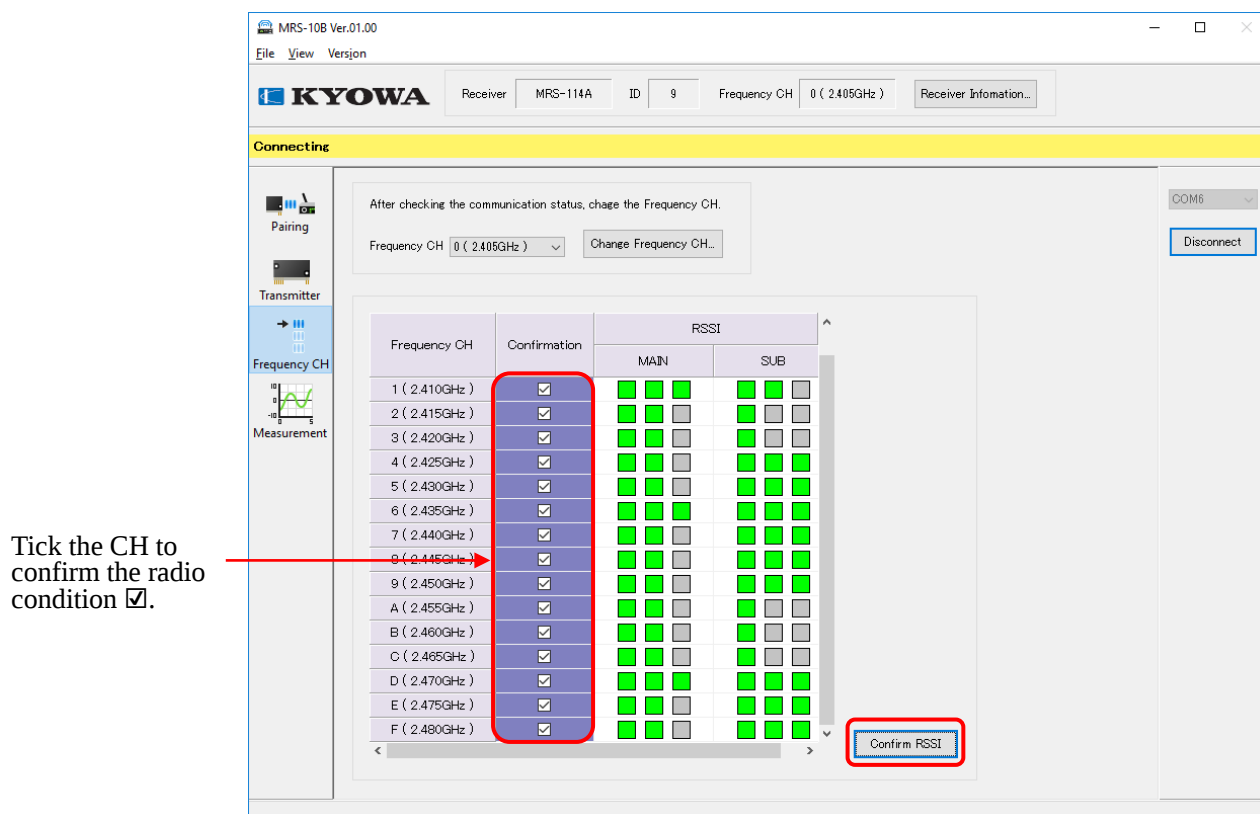
When **Confirm RSSI** is clicked, the radio-wave condition of the Frequency CH indicated by a checked box (☒) is confirmed.

Displays results of Confirm RSSI of the MAIN ANTENNA and SUB ANTENNA.

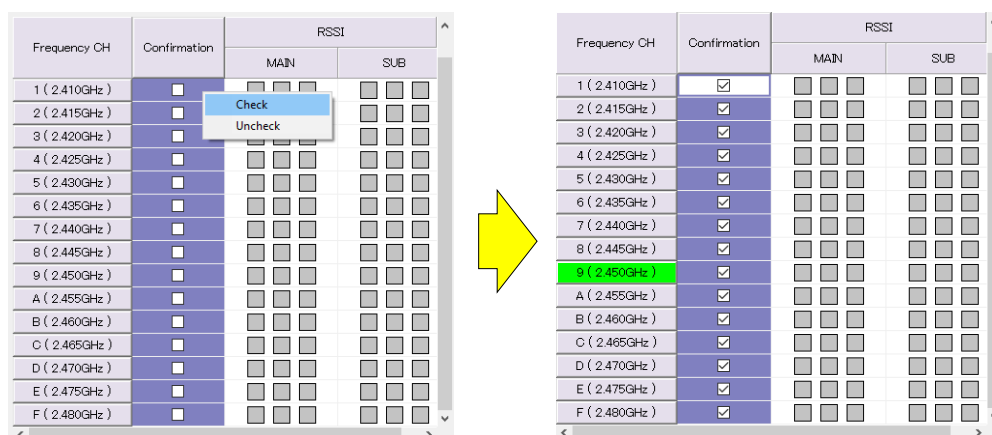
3-8-1. Confirm RSSI

When the Frequency CH to confirm the radio condition is ticked ☒ and **Confirm RSSI** is clicked, the communication test is automatically performed on the ticked Frequency CH between the paired transmitter and Receiver.

The result is displayed as the radio wave status.



When all the channels are selected, they can all be checked or unchecked by right clicking.



The radio wave status is displayed in 4 stages.

- Excellent
- ■ □ Good
- □ □ Weak
- □ □ Fail (Low communication level and potential radio interference of wireless LAN.)

NOTE

Performing Confirm RSSI may introduce radio interference to other transmitter-receiver pairs in the same space.

First exclude the Frequency CH used by other transmitter-receiver pairs before performing Confirm RSSI.

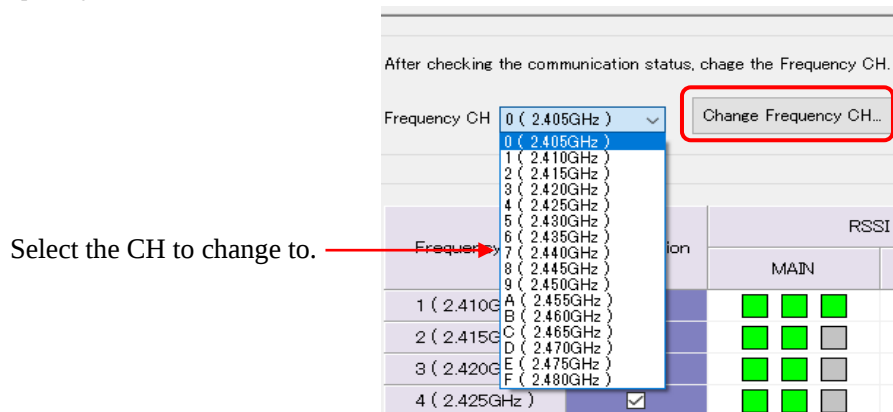
MEMO

Use the Confirm RSSI when selecting the installation location and Frequency CH to be used.

Since it displays radio wave status for the MAIN ANTENNA and SUB ANTENNA individually, it could be used for selecting the installation location of antennas connected via the Receiver extension cable.

3-8-2. Change Frequency CH

Select the Frequency CH to change to from the pull-down menu, and then click **Change Frequency CH** to change the Frequency CH.



NOTE

When the Frequency CH is changed to another Frequency CH used by other transmitter-receiver pair in the same space, it may cause radio interference and communication errors.

First exclude Frequency channels used by other transmitter-receiver pairs before performing Change Frequency CH.

MEMO

Depending on factors including the surrounding environment, there may be Frequency CH with weaker radio wave signal strength compared to other Frequency CH.

We recommend you perform a Confirm RSSI operation before doing a Change Frequency CH in order to check the status of the target Frequency CH.

3-9. [Measurement]

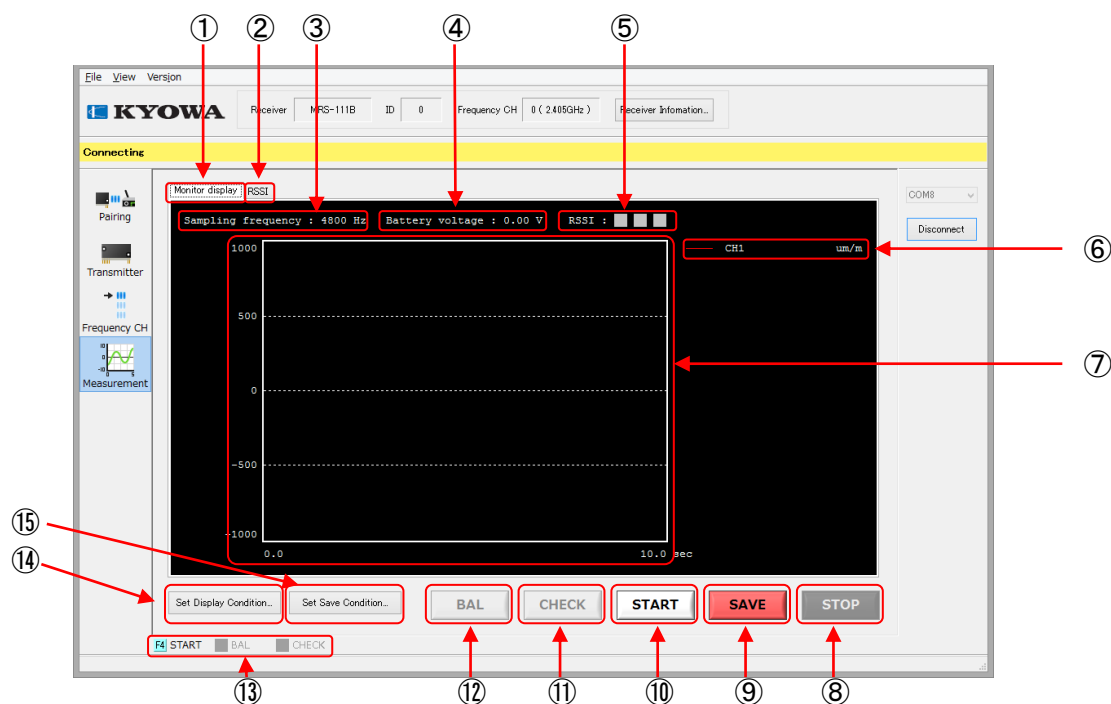
Click the Measurement tab on the tool bar.

The balance adjustment, Sensor connection check, etc. can be executed from the computer.

When the measurement-start operation is performed, RSSI, and transmitter battery voltage can be monitored in addition to the measured value.

The window differs depending on the transmitter type specified for pairing.

- If using the MRS-104A-S (4ch-Strain Transmitter), MRS-101A-S (1ch-Strain Transmitter) or MRS-101A-SE (1ch-Strain Transmitter (EXT Antenna))



- ① Monitor display Tab: Displays the monitor display.
- ② RSSI Tab: Display the RSSI in full-screen mode.
- ③ Sampling Frequency: Displays the current sampling frequency.
- ④ Battery Voltage: Displays the voltage of the transmitter battery.
- ⑤ RSSI: Displays the RSSI of the MAIN ANTENNA. When a reception error occurs at the MAIN ANTENNA, the RSSI of the SUB ANTENNA is displayed.
The display responds to the indicator display of the Receiver.
- ⑥ Value Display: Displays the strain value sent from the transmitter

Transmitter model name	Value Display
MRS-104A-S MRS-101A-S MRS-101A-SE MRS-101B-S	CH1 CH2 CH3 CH4 μS μS μS μS
MRS-101A-V MRS-101B-V	CH1 V
MRS-101B-T	CH1 $^{\circ}\text{C}$

- ⑦ Monitor Display Monitor data sent from the Transmitter in a simplified format.
- ⑧ STOP Button: Stops measurement.

STOP

 → Go to the command mode.
- ⑨ SAVE Button: Starts simple data memo function.
- ⑩ START Button: Starts measurement.

START

 → Go to the measurement mode.
- ⑪ Check Button: Executes sensor connection check.
If using the MRS-101A-V (1ch-Voltage Transmitter), this function is not available.
- ⑫ Balance Button: Executes zero adjustment of the transmitter.
- ⑬ Function Key Bar: Displays the set function keys.
- ⑭ Set Display Condition: Set the graph line color, vertical axis, horizontal axis, background color, etc.
- ⑮ Set Save Condition: Set the save condition of simple data memo function.

MEMO

When transition to the command mode (stop measurement) does not start immediately after clicking

STOP

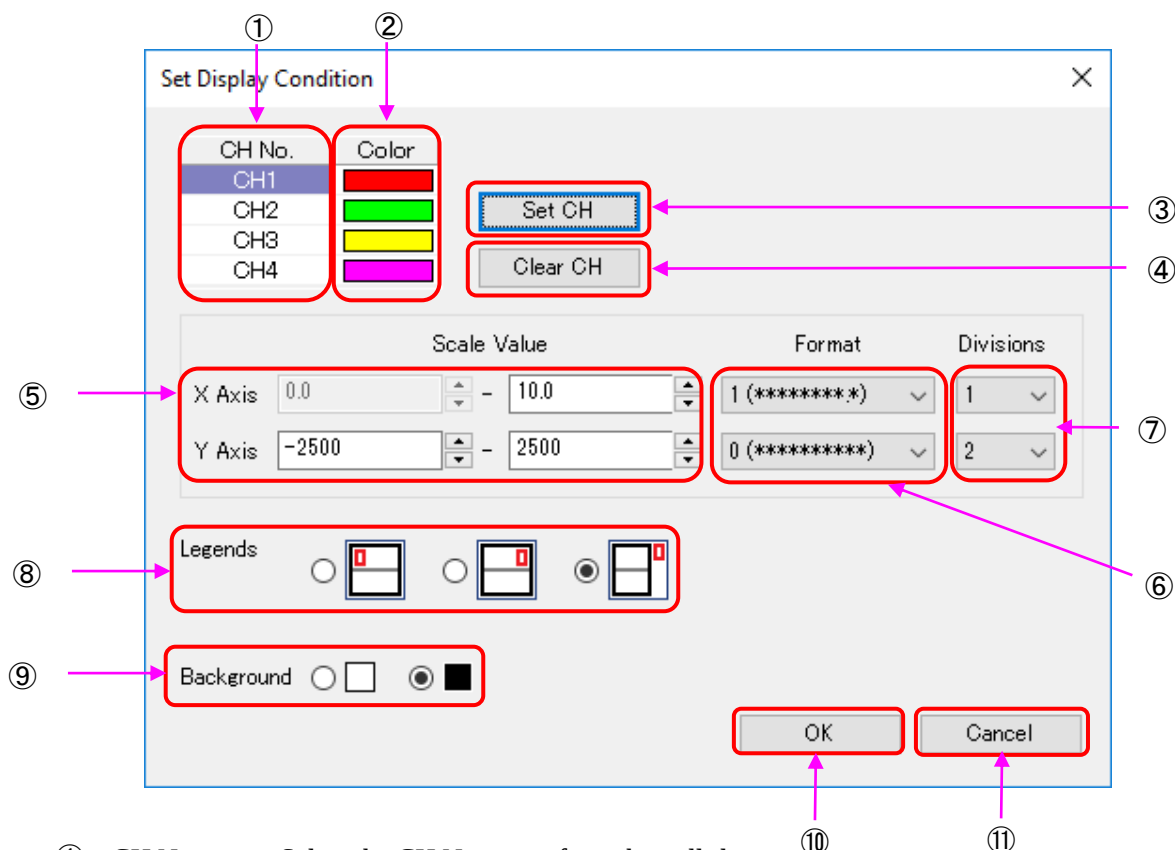
The measurement may not stop after clicking “STOP” once, depending on the timing. This may include a situation in which the timing for the Transmitter to send packet data and the timing for the Receiver to send the STOP command have coincided.

In such a case, wait a moment before clicking

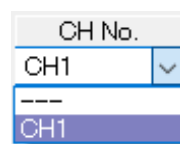
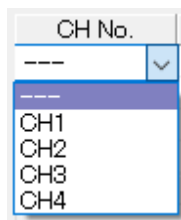
STOP

 again. Repeat the process until the measurement stops.

- Set Display Condition



- ① CH No.: Select the CH No. to set from the pull-down menu.
 For the MRS-104A-S, a maximum of four channels can be set.
 For the MRS-101A-S/SE/V and MRS-101B-S/V/T only one channel can be set.
 If the MRS-104A-S If the MRS-101A-S/SE/V, MRS-101B-S/V/T



- ② Color: The line color for each channel can be changed by clicking it.
- ③ Set CH: CH1 to CH4 can be set at the same time by clicking **Set CH**.
- ④ Clear CH: CH1 to CH4 can be cleared at the same time by clicking **Clear CH**.
- ⑤ X axis/Y axis scale: The scale of the X axis and Y axis for monitor display can be set here.
 MRS-104A-S: maximum display time of 26 seconds.
 MRS-101A-S/SE/V: maximum display time of 10.4 seconds.
 MRS-101B-S/V: maximum display time of 10.4 seconds.
 MRS-101B-T: maximum display time of 1000 seconds.
 Numbers can be directly entered or set by using the
- ⑥ Format: Set the number of digits displayed after the decimal point for the X axis and Y axis from the pull-down menu.
 Any setting in the range from 0 digits (an integer) to 5 digits after the decimal point can be specified.
- ⑦ Divisions: Set the number of divisions for the X axis and Y axis from the pull-down menu.
 Any number of divisions from 1 to 12 can be specified for each axis.
- ⑧ Legends: Set the legend display position.
- ⑨ Background: Change the graph background color.
 The color can be changed to white or black.
- ⑩ Setting button: When **OK** is clicked, the graph is changed according to the various settings above.
- ⑪ Cancel button: When **Cancel** is clicked, the various specified settings are canceled.

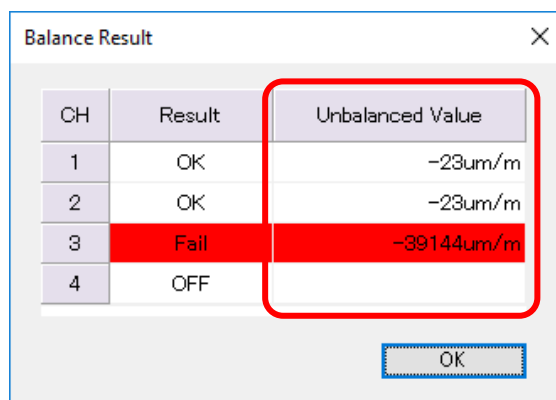
3-9-1. Balance

(If using the MRS-101B-T (1ch-Thermocouple Transmitter), this function is not available.)

By clicking , zero adjustment of the transmitter can be performed.

- If using the MRS-104A-S (4ch-Strain Transmitter), MRS-101A-S (1ch-Strain Transmitter), MRS-101A-SE (1ch-Strain Transmitter (EXT Antenna)) or MRS-101A-S (1ch-Strain Transmitter)

After performing a balance adjustment, the balance adjustment result is displayed. The value shown in the red circle indicates a value close to the unbalanced value.

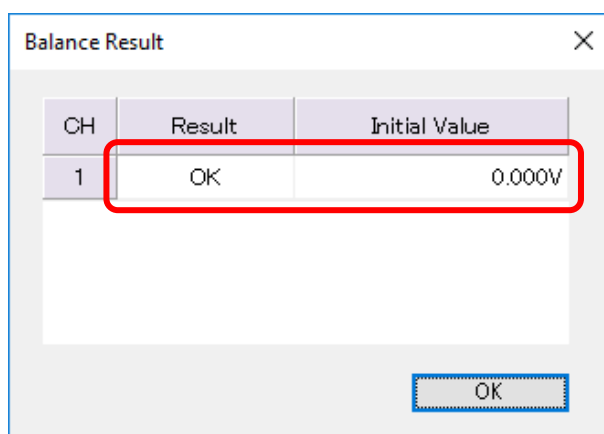


A screenshot of a 'Balance Result' dialog box. It contains a table with three columns: 'CH', 'Result', and 'Unbalanced Value'. There are four rows. The first two rows show 'OK' results with unbalanced values of -23um/m. The third row is highlighted in red, showing a 'Fail' result and an unbalanced value of -39144um/m. The fourth row shows an 'OFF' result. A red circle highlights the 'Unbalanced Value' column. An 'OK' button is at the bottom right.

CH	Result	Unbalanced Value
1	OK	-23um/m
2	OK	-23um/m
3	Fail	-39144um/m
4	OFF	

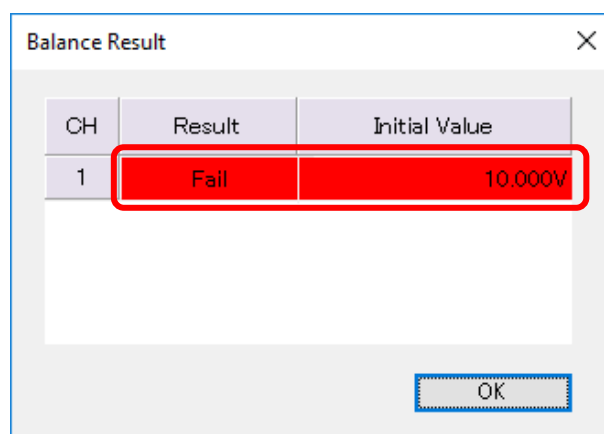
- If using the MRS-101A-V (1ch-Voltage Transmitter) or MRS-101B-V (1ch-Voltage Transmitter)

After performing a balance adjustment, the balance adjustment result is displayed. The value shown in the red circle indicates a value close to the initial value.



A screenshot of a 'Balance Result' dialog box for a voltage transmitter. It contains a table with three columns: 'CH', 'Result', and 'Initial Value'. There is one row showing a successful balance adjustment with 'OK' result and '0.000V' initial value. A red circle highlights the 'Initial Value' column. An 'OK' button is at the bottom right.

CH	Result	Initial Value
1	OK	0.000V



A screenshot of a 'Balance Result' dialog box for a voltage transmitter. It contains a table with three columns: 'CH', 'Result', and 'Initial Value'. There is one row showing a failed balance adjustment with 'Fail' result and '10.000V' initial value. The entire row is highlighted in red. A red circle highlights the 'Initial Value' column. An 'OK' button is at the bottom right.

CH	Result	Initial Value
1	Fail	10.000V

Click to close the result view.

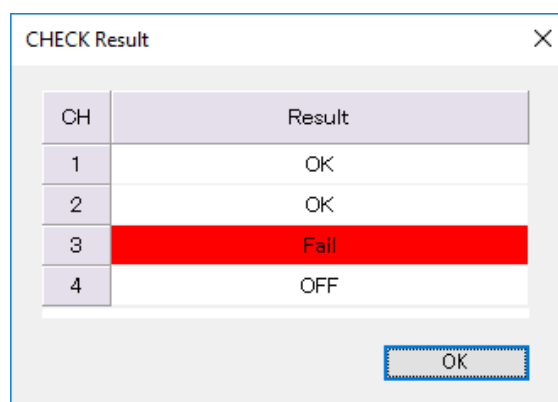
If a failure occurs, click again to re-execute the balancing.

3-9-2. Check

(If using the MRS-101A-V (1ch-Voltage Transmitter) or MRS-101B-V (1ch-Voltage Transmitter), this function is not available.)

Click to run a sensor connection check.

If the result shows “Fail”, a bridge circuit connection error or wire disconnection may be occurring.



Click to close the result view.

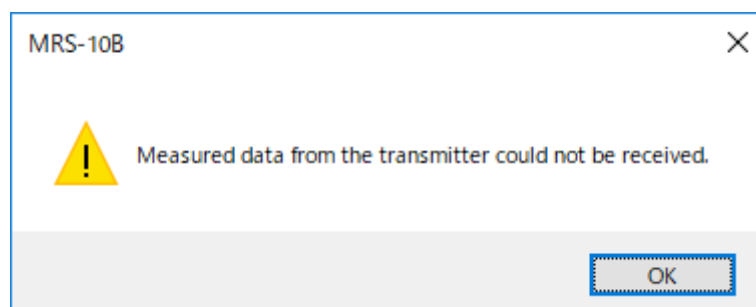
If a failure occurs, click again to re-execute the check.

NOTE

If using the MRS-104A-S, MRS-101A-S/SE or MRS-101B-S, When the bridge resistance value in use and the bridge resistance value set in the [Transmitter settings] are not matched closely, the sensor check result will fail.

MEMO

When the communication status deteriorates and data from the Receiver is interrupted for a certain period of time, the following window is displayed and operation stops.

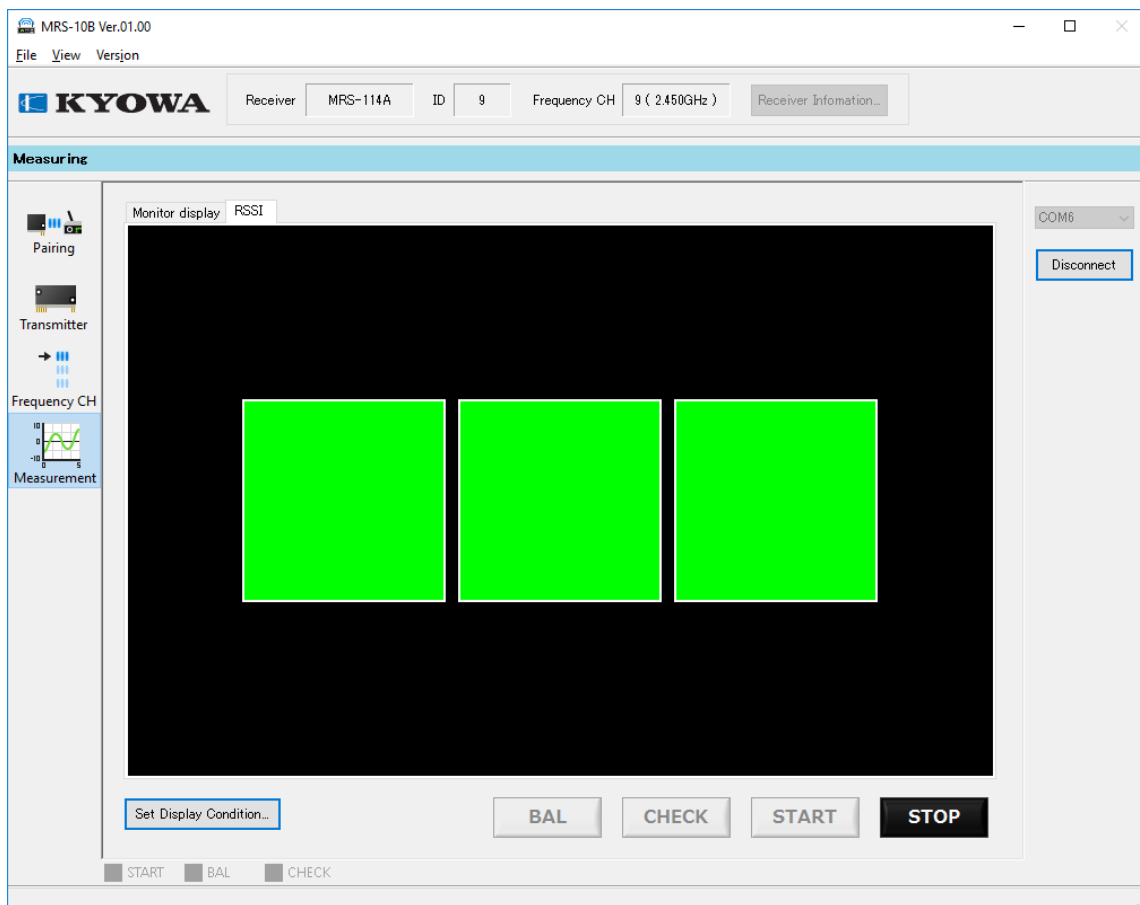


Once communication returns and the measurement data from the Receiver can be received, operation automatically resumes.

3-9-3. RSSI

When the "RSSI" tab is clicked, the radio wave strength switches to full-screen display.

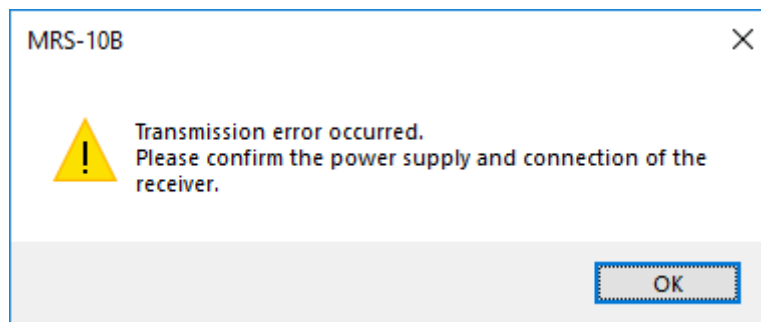
When the transmitter is installed, it is easier to confirm the radio-wave condition from a remote location.



3-10. EXIT

When turning off the Receiver power, first click **Disconnect** to release the computer and Receiver connection before proceeding.

When turning off the Receiver power before clicking Disconnect, the following window is displayed.



3-11. Condition files

3-11-1. Saving a condition file

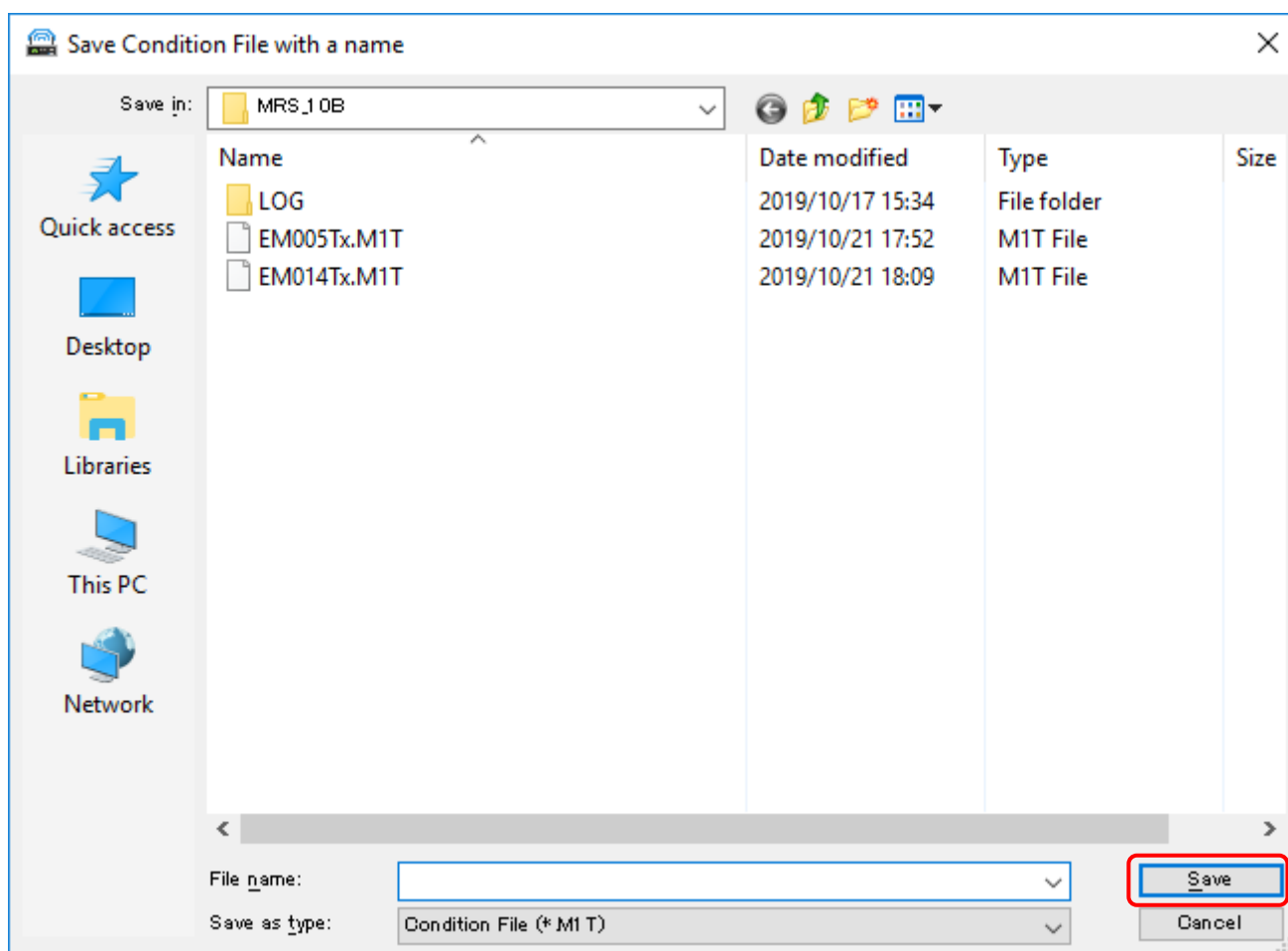
The current conditions can be saved as a condition file (extension: M1T).

The next time measurement is performed with the same conditions, the condition file can be loaded to set all the conditions at once.

The saved conditions include measurement conditions (the transmitter model, measurement channel settings, etc.) as well as graph and numerical display conditions.

■Operating method

- (1) If the Receiver is connected, click **Disconnect**, and then disconnect the Receiver from the computer and turn off the power.
- (2) Select "File" followed by "Save Condition File with a name" from the menu bar to open the "Save Condition File with a name" window.
- (3) In the "Save Condition File with a name" window, select the folder to save to, enter the file name, and then click the Save button.



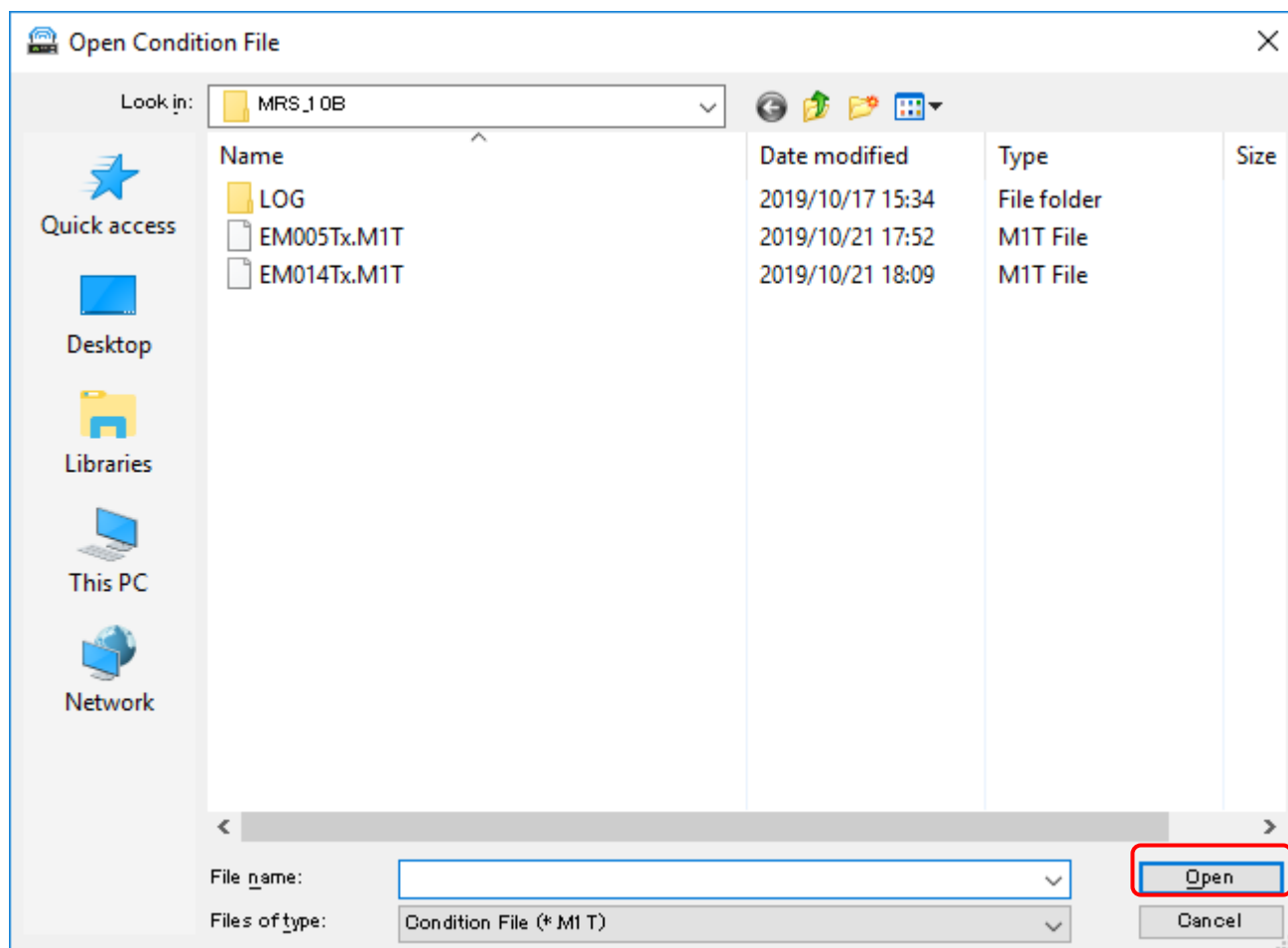
3-11-2. Loading a condition file

Any previously saved condition file (extension: M1T) can be loaded.

When a condition file (extension: M1T) is loaded, the saved settings are applied to the tab details.

■Operating method

- (1) If the Receiver is connected, click **Disconnect**, and then disconnect the Receiver from the computer and turn off the power.
- (2) Select "File" followed by "Open Condition File" from the menu bar to open the "Open Condition File" window.
- (3) In the "Open Condition File" window, select the folder and file name, and then click the Open button.



3-12. Simple data memo function

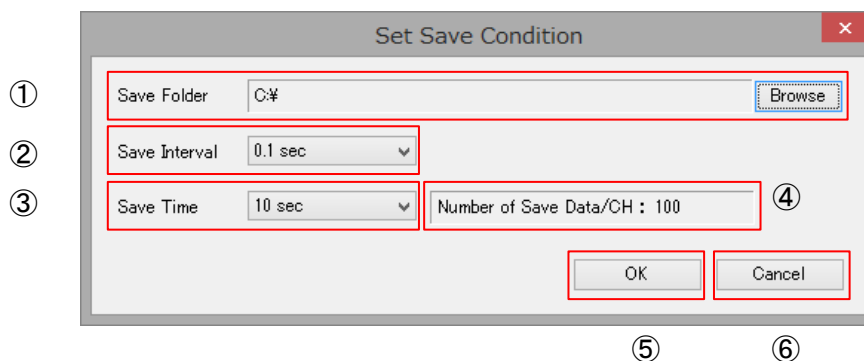
The simple data memo function is a function to save the measurement data of the transmitter in csv format for the purpose of checking the operation before the test. The CSV file name is the file name at the time when the simple data memo was started.

Example:

If it starts the simple data memo at 07:00:00 on 2020/01/01, the CSV file name will be “20200101070000.csv”.

3-12-1. Set save condition

Set the csv file to save. Make the settings from the **Set Save Conditions** on the measurement screen.



- ① Save Folder
- ② Save Interval

Display the save destination folder. change the destination folder by clicking Browse.
Select the data save interval you want to set from the pull-down menu.
The Save Interval are shown in the table below.

Transmitter model name	Save Interval
MRS-101A-S/SE/V, MRS-104A-S MRS-101B-S/V	All data, 0.01sec, 0.1sec, 1sec
MRS-101B-T	All data, 0.1sec, 1sec

Example1:

If the sampling frequency is 4800 Hz, it saves the data as shown in the table below.

Interval	Saved data
All data	1st data, 2nd data, 3rd data...
0.01sec	1st data, 49th data, 97th data...
0.1sec	1st data, 481st data, 961st data...
1sec	1st data, 4801st data, 9601st data...

Example2:

If the sampling frequency is 1920 Hz, it saves the data as shown in the table below.

Interval	Saved data
All data	1st data, 2nd data, 3rd data...
0.01sec*	1st data, 20th data, 39th data...
0.1sec	1st data, 193rd data, 358th data...
1sec	1st data, 1921st data, 3841st data...

* Since the data is saved every 19 data, the save time is shorter than the actual save time.

③ Save Time

Select the data save time.

The data save time are shown in the table below.

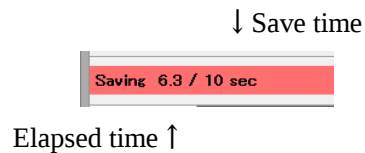
Save Interval	Data save time
All data	1sec, 5sec, 10sec, 30sec, 60sec
0.01sec, 0.1sec, 1sec	1sec, 5sec, 10sec, 30sec, 60sec, 300sec, 600sec, 1800sec, 3600sec

- ④ Save setting display The number of saved data for each channel is displayed according to the save interval and save time.
- ⑤ Setting button Set the setting.
- ⑥ Cancel button Cancel the setting.

3-12-2. Simple data memo

You can execute a simple data memo by clicking **SAVE**.

During execution, the following is displayed on the hint bar.



When the save time has elapsed, the hint bar is displayed as shown below.



MEMO

- If you execute a simple data memo in command mode, the measurement mode is set and the simple data memo is executed.
- In the measurement mode, the simple data memo is executed in that mode.
- If the save time elapses or is interrupted by the **stop**, the operation continues in measurement mode.

3-12-3. Save data format

The data saved in the CSV file is as follows.

- Reciever info. Using the Reciever model name, Reciever's Firmware ver. and Sirial No.
- Transmitter info. Using the Transmitter model name , Transmitter's Firmware ver. and Sirial No.
- Transmitter ID Setting the Transmitter ID.
- Frequency CH Setting the Frequency CH.
- Test date Date and time when the simple data memo was executed.
- Sampling Frequency Setting the Sampling Frequency.
- Save Interval Setting save the interval.
- CH name Setting the Channel Name.
- Measuring Range Setting the Measuring Range.
- Bridge resistance Setting the Bridge resistance (Only MRS-101A-S/SE, MRS-104A-S and MRS-101B-S)
- Unit Unit of measuring data (It depends on the transmitter)
- Save Data The data Saved by simple memo fancement.

The number of digits after the decimal point is as follows.

Transmitter model name	Number of digits after the decimal point
MRS-101A-S/SE, MRS-104A-S MRS-101B-S	0
MRS-101A-V MRS-101B-V	3
MRS-101B-T	1

MEMO

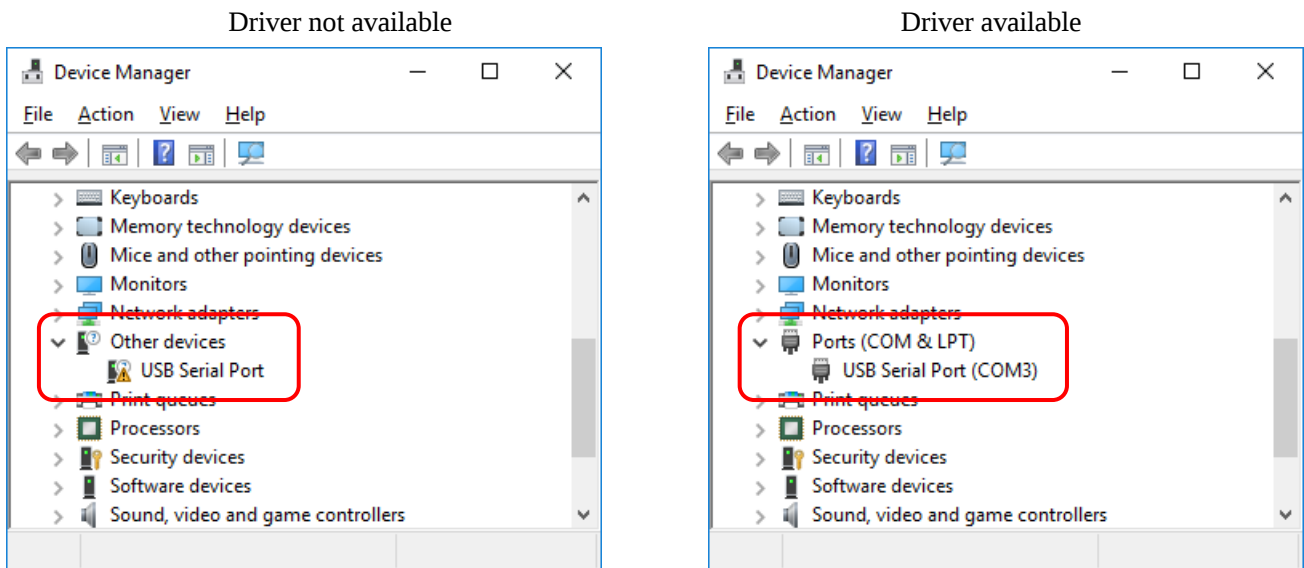
If you execute simple data memo fancement with sampling frequency: 4800Hz, number of measurement channels: 1, storage interval: all data, storage time: 60sec, the CSV file will be approximately 4,600K bytes.

Data Example:

```
Receiver,MRS-111B,3.00,987654321
Transmitter,MRS-101B-T,3.00,123456789
Transmitter ID,0
Frequency CH,0 ( 2.405GHz )
Test Date,2020/01/01,00:00:00
Sampling Frequency(Hz),50
Save Interval,All data
CH Name,
Range, K100degC
Bridge Resistance,***
Unit, degC
Time,CH1
0.0000,26.5
0.0200,26.5
0.0400,26.5
```

4. The installation of USB device driver

Once the Receiver is connected to the computer, open Device Manager to check the USB driver.

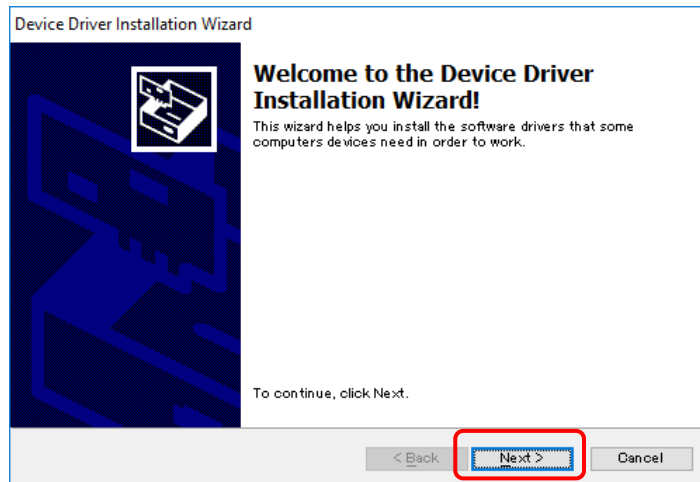


If the USB driver is not available, a driver installation is required.
Follow the procedure below to install the USB driver:

- (1) Select CDM21224_Setup.exe in the included CD-ROM, “Right click”, and then select “Run as administrator”.
- (2) When the User Account Control pop-up is displayed, click to continue.
- (3) Click .

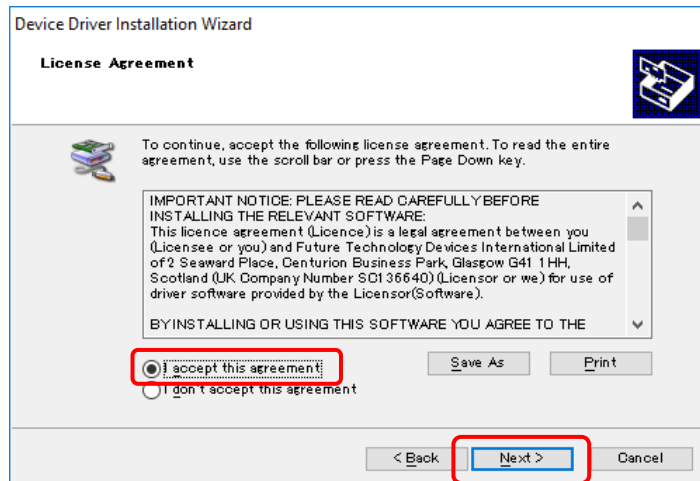


- (4) Click **Next>**.



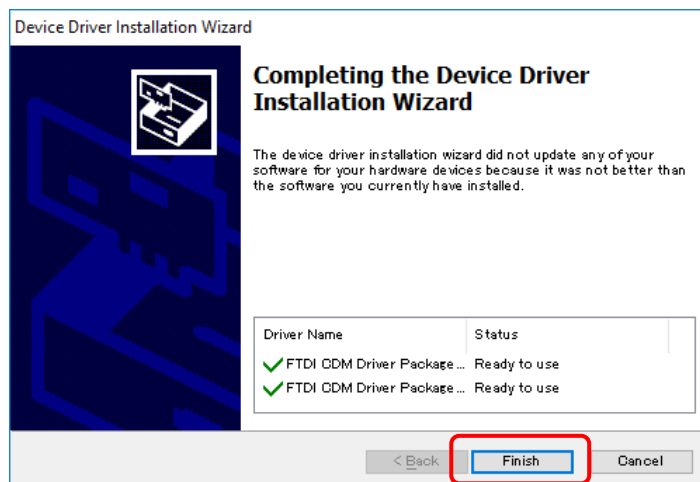
- (5) License Agreement is displayed.

Select "I accept the agreement" to agree to the license agreement and click **Next>** to start the installation. If you select "I do not accept the agreement", you cannot proceed.



- (6) Installation is complete.

Click **Finish** to close the installation.



MEMO

Even if the USB driver is not installed on the computer, the required driver will be searched for on the network and installed automatically when the computer first connects to the Receiver.

If the computer is not connected to the network or the driver cannot be found, a USB driver installation should be performed.

5.SPECIFICATIONS

This software lets you control Receivers from a computer and perform transmitter setup and measurements. A computer and the Receiver must be connected via USB.

■Compatible Receivers

MRS-114A
MRS-111A(-E)
MRS-111B

■Software Functions

Setting Functions	Set the Measuring Range. Set the LEDs lighting level for monitoring transmitter supply voltage. Set the Minimum voltage for operating transmitter. Set frequency channel. Set the sleep time of transmitter (Max 10days). Set data processing at the time of radio communication error.
Operation Functions	Execute balance adjustment. Check sensor connection. Display graph.
Inspection Function	Radio condition inspection.

Simple data memo fanction

Outline: Function for checking operation before test

Save format	: csv
Save interval	: MRS-101A-S, MRS-101A-SE, MRS-101A-V, MRS-104A-S, MRS-101B-S, MRS-101B-V All data, 0.01 sec, 0.1sec, 1sec MRS-101B-T All data, 0.1sec, 1sec
Save time	: Save interval All data 1, 5, 10, 30, 60sec Save interval 0.01 sec, 0.1sec, 1sec 1, 5, 10, 30, 60, 300, 600, 1800, 3600sec

■Operating Environment

OS	Windows 7, Windows 8/8.1, Windows 10 Japanese/English, 32/64 bit support
CPU	Intel Core2Duo,2GHz or advanced
Memory	4GB or more
Interface	USB2.0 (can also be operated in a USB3.0 port)
Display	1024*768 dots or more.

* There is no data acquisition function by this software.



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