HERUTU

Simple Contact Wireless Transfer Unit

# WCP-LR16U

INSTRUCTION MANUAL V1.00

Please use this operation manual correctly on reading well.

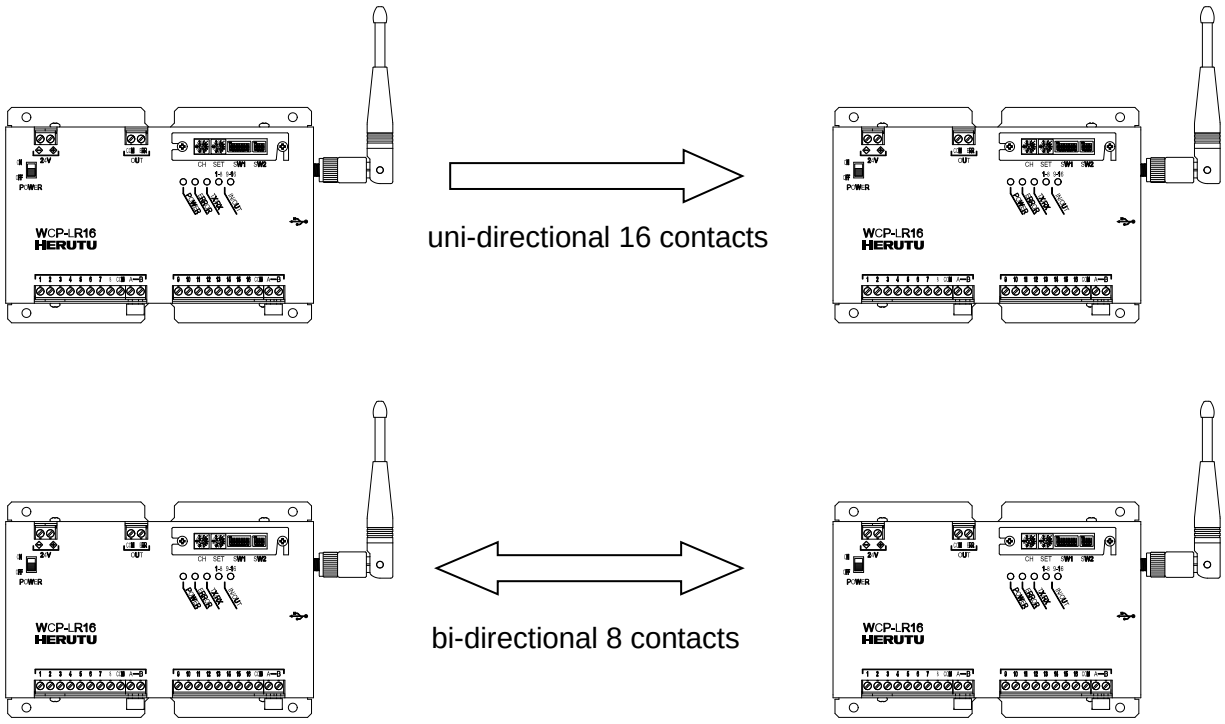
Please keep it carefully to be able to read immediately, when required.

# Table of Contents

# 1. Outline

WCP-LR16U is a simple contact wireless transfer unit using the 920 MHz band wireless communication. The device wirelessly transfers contact signals from external devices. Use of the device enables wireless transfer of up to 16 contacts between manufacturing facilities and industrial equipment that are located far from each other. Wireless communication with 920 MHz band LoRa modulation achieves reliable communication.

The device is configured to be used in pairs(1:1).




<Features>

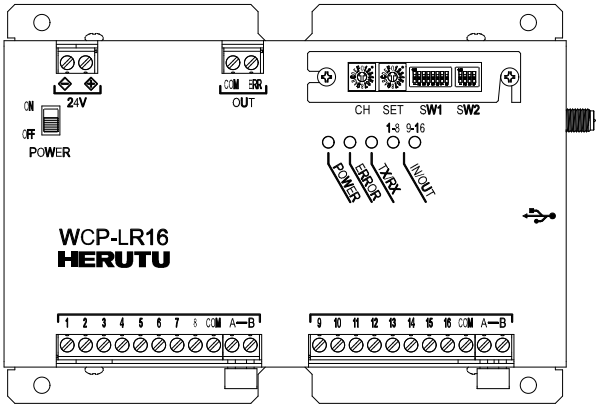
- ◆The configuration is 1:1.
- ◆With 920 MHz band LoRa modulation, highly reliable bi-directional communication is achieved.
- ◆Operation settings can be easily performed with the configuration switches.
- ◆Selectable from 15 wireless channels.
- ◆The communication mode can be selected from “Standard mode” and “Long- range mode”.
- ◆The transfer method of contacts can be selected from “uni-directional 16 contacts” and “bi-directional 8 contacts”.
- ◆You can check the wireless communication status and terminal input/output status with the LED for Monitoring.
- ◆When using the terminals in the input setting, you can switch between “Voltage contact input” and “Non-voltage contact input”.
- ◆You can determine the installation location using “Communication environment checking function” that displays the communication environment between the paired units in 5 levels.
- ◆When a wireless communication error occurs, you will be notified by lighting of the LED for Error Indication and an error output.
- ◆The power supply is DC24V±10%.

  The device can be used with AC100-240V by using the optional AC adapter.

◆In Standard mode, “communication distance of approx. 300m(328yd) indoors / approx.1,000m (1,094 yd) in line of sight”, and in Long-range mode, the communication distance can be extended to “communication distance of approx. 2,000m (2.187 yd) in line of sight”. (※depending on usage conditions)
As demo units are available, it is recommended to perform a communication test, etc. in advance.

# 2. Body and Accessories

## 2-1. WCP-LR16U




WCP-LR16U body ×1

Dipole antenna ×1
(MEGWX-467XRSBX-920)

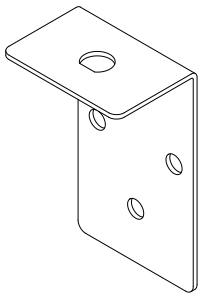
Insertion bridge ×2

**※Shipped mounted on "A-B" terminal**

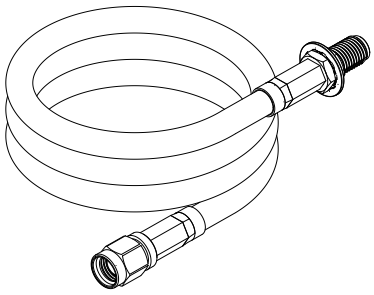
## 2-2. Options

・Antenna mounting kit（cable 3m） SMAR3-3D2V

The kit is a set of a bracket and coaxial cable. The supplied dipole antenna can be installed away from the main unit.

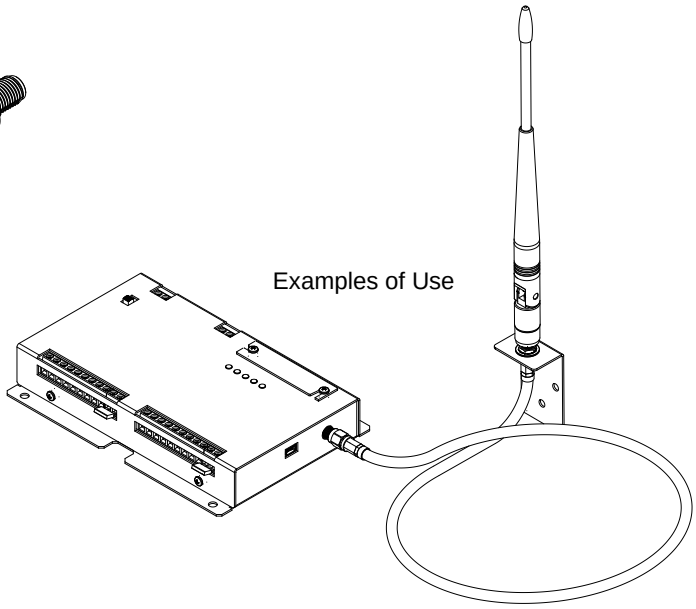


Bracket

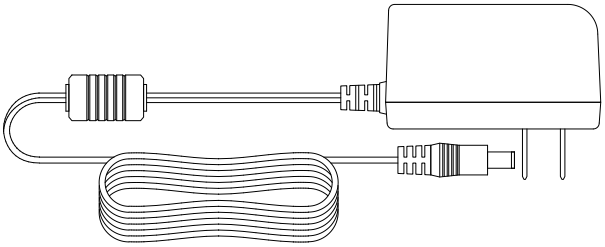


Coaxial cable
3.0m

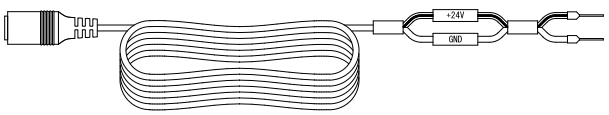
Examples of Use



・AC Adapter ADB24050-F （With connection cable）



Cable 1.5m




Connection cable 1.8m

# 3. Safety Precautions (Be Sure to Read This)

This section describes the matters to be observed in order to prevent harm to the users and other persons and damages to the property.

■ The following marks and displays classify and describe the extent of harm and damage caused by failing to observe the display content and using this product wrongly.

| ⚠ Caution | This display column shows "a failure to do observe it could result in only the personal injury or property damage". |
|---|---|

■Handling this product

●This product is the wireless communication equipment made of precision parts. Do not disassemble or modify it. Or the accident or fault may occur.

■Use and storage environment

●DO NOT USE OR STORE the product in the following places to prevent defects, malfunction, deterioration, fire, and electric shock:

・Do not use and store it in places exposed to direct sunlight,

・Do not use and store it in places where liquids, foreign substances, corrosive gases or combustible gases can enter the product,

・Do not use and store it in places with high humidity or where there is abundant oil smoke, dust, sand, etc. ,

・Do not use it in an unstable place such as a wobbling table or an inclined plane,

・Do not use it in a place with vibration.

| ⚠ Warning | This display column shows "a failure to do observe it could result in death or serious personal injury". |
|---|---|

■Handling this product

●Do not use this product for application that requires the extremely high reliability affecting the human life.

●Do not use this product in the area which the radio wave reaches or not.

■Handling the AC adapter

Be sure to observe the followings in order to prevent the accidents such as heat generation, damage, or ignition of AC adapter.

| |
|---|
| ●Do not place the AC adapter close to fire or insert them into fire. Or they may be burst and ignited, resulting in the accident. |
| ●Use the AC adapter and main body only at the specified power supply voltage in order to prevent burst and ignition accidents. |
| ●Do not use main body at the location where they easily get wet. Or the accidents including heat generation, ignition, or electric shock and faults may occur. |
| ●Do not touch main body, power cord, and power supply terminal base with wet hands. Or the accident such as an electric shock may occur. |
| ●Do not damage the power cord of the AC adapter. Short-circuit or heat generation may cause fire or electric shock. |
| ●Do not use the power supply terminal base with dusts attached. Short-circuit or heat generation may cause fire or electric shock. |
| ●Do not give a strong shock to the AC adapter.<br>Or the accident or fault may occur. |
| ●If you find a deformation in the AC adapter, do not use it.<br>Or the accident or fault may occur. |
| ●Do not charge the main body at the location where the flammable gas is generated.<br>Or the ignition accident may occur. |
| ●Never disassemble main body. Or the accident or fault may occur. |

■If a problem occurs during use

Remove the power plug from the outlet because it may cause fire and electric shock. Request the dealer or our company to repair it.

| |
|---|
| ●When smoke comes or there is a strange smell, immediately stop usage and remove the power plug from the outlet because it may cause fire and electric shock. Request the dealer or our company to repair it. |
| ●Do not use this product when its AC adapter cable or the power switch of the main unit is damaged.<br>Using the cord damaged continuously may cause fire or electric shock. |

## ■Notes on the Radio Law

○Disassembly or modification of the device having an approva l is prohibited by the law.

○Do not use this product for the ap plication that may cause harm to human body or damage to other devices and equipment. Do not use this product near the devices th at may malfunction due to radio waves emitted from this product.

○This product is available only in the U.S.A and Cananda. It is not available in other countries or regions.
The wireless module “HRF-SG01-US” incorporated in the unit obtains FCC (Federal Communications Commission), CRF47 Telecommunication, Part15.212 certification of Modular Transmitter, and Part15 subpart C Module certification of “International Radiators”, based on the above.
In addition, the wireless module “HRF-SG01-US” is approved for use in Canada according to Industry Cananda (IC) radio standard specification (RSS) RSS-210 and RSS-Gen.

■FCC/IC Warning

Information about FCC Standard.

FCC CAUTION

Change or modifications not expressly approved by the party responsible for compliance could void the user’s authority to operate the equipment.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interface, and (2) This device must accept any interface received, including interface that may cause undesired operation:

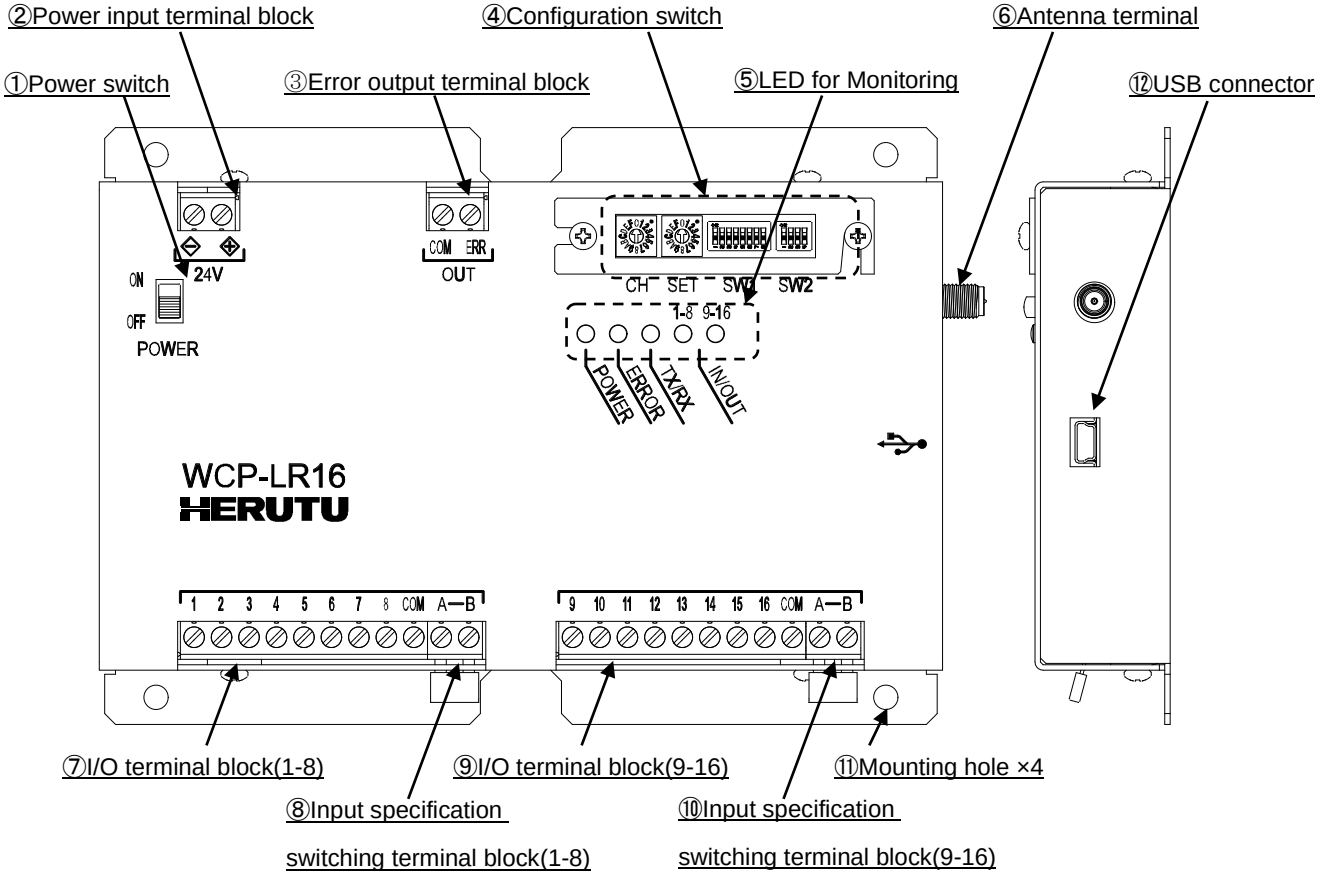
Information about FCC Standard and IC standard.

This device complies with Part 15 of FCC Rules and Industry Canada licence-exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

Le présent appareil est conforme aux la partie 15des règles de la FCC et CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes : (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

# 4. Names and functions of each part

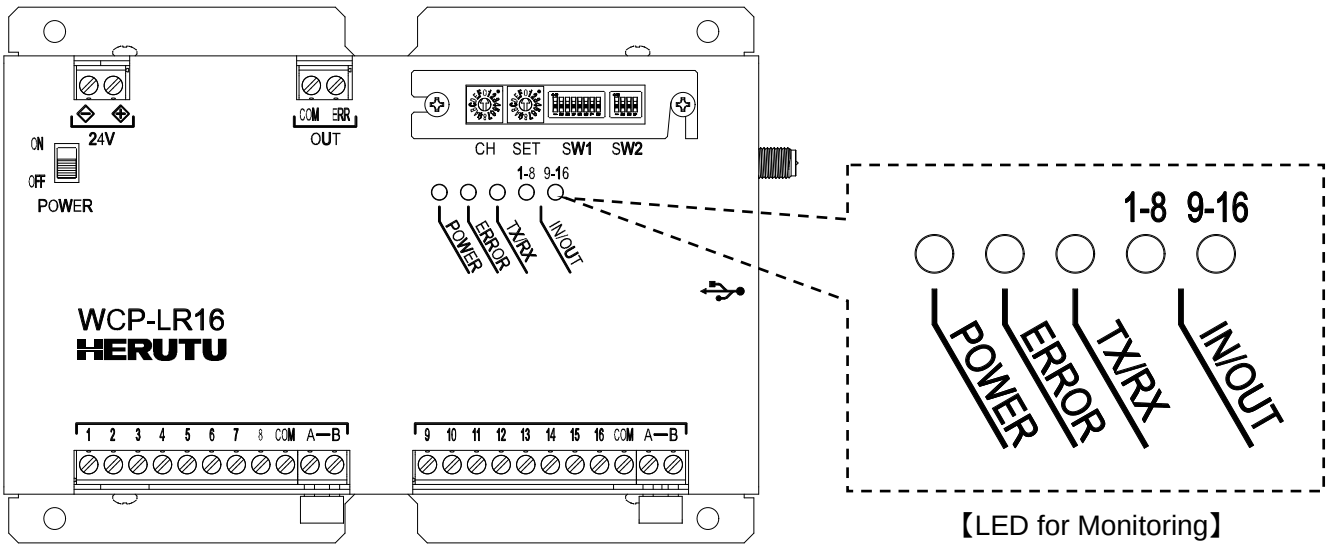
## 4-1. Names of each part




| No. | Name | Description |
|---|---|---|
| ① | Power switch | Turns the power supply of the main unit ON/OFF. |
| ② | Power input terminal block | Inputs operating power supply (DC24V±10%). |
| ③ | Error output terminal block | Outputs signals to external devices when a communicator error occurs. |
| ④ | Configuration switch | Used to configure the wireless communication channels, set No. and various operation settings. |
| ⑤ | LED for Monitoring | Displays the status of the power supply, communication error, wireless transmission /reception, and contact input/output. |
| ⑥ | Antenna terminal | Connect the supplied antenna or the coaxial cable in the optional antenna mounting kit. Its shape is an SMA reverse connector. |
| ⑦ | I/O terminal block(1-8) | A terminal block for contact input/output of the terminals 1–8. |
| ⑧ | Input specification switching terminal block(1-8) | A terminal block for switching the contact input specifications of the terminals 1–8 (Voltage / Non-voltage). |
| ⑨ | I/O terminal block(9-16) | A terminal block for contact input/output of the terminals 9–16. |
| ⑩ | Input specification switching terminal block(9-16) | A terminal block for switching the contact input specifications of the terminals 9–16 (Voltage / Non-voltage). |
| ⑪ | Mounting hole | A mounting hole used to fix the main unit. (4-Φ4.5) |
| ⑫ | USB connector | It is a USB connector for maintenance. Customers must not connect this connector. |

## 4-2. About LED for monitoring

The device has an LED for Monitoring that indicates the operation status. The indication of each LED for Monitoring is listed in the table below.




【LED for Monitoring】

| LED | Name | Description |
|---|---|---|
| POWER | LED for power indication | Lights up in green when the power is turned ON. |
| ERROR | LED for Communication Error Indication | Lights up in red when a wireless communication error with the paired unit occurs. This LED is synchronized with the error output. |
| TX/RX | LED for Wireless Communication Monitoring | Indicates the wireless communication status. Lights up in red during transmission and lights up in green during reception. |
| IN/OUT 1-8 | LED for Monitoring I / O 1-8 | Indicates the input/output status of the I/O terminals 1–8.<br>Setting the input terminals:<br>Lights up in green during input of the terminals 1–8.<br>Setting the output terminals:<br>Lights up in red during output of the terminals 1–8. |
| IN/OUT 9-16 | LED for Monitoring I / O 9-16 | Indicates the input/output status of the I/O terminals 9–16.<br>Setting the input terminals:<br>Lights up in green during input of the terminals 9–16.<br>Setting the output terminals:<br>Lights up in red during output of the terminals 9–16. |

# 5. How to use

## 5-1. Use procedure

The procedure until start of using the device is described below.

**【1】Set the wireless channels.**

Set the same channel for each pair.

For the setting method, refer to “6-1-1. Communication channel settings”.

⇩

**【2】Set the set number.**

Set the same set number for each pair.

For the setting method, refer to “6-1-2 Set number settings”.

⇩

**【3】Set the I/O terminals to be used.**

Set the I/O terminals1–8 / 9–16 to “Input terminal” or “Output terminal”.

For the setting method, refer to “6-1-3. Terminal input/output settings”.

⇩

**【4】Set the input judgment time.**

Set the time to judge that the input signal of “input terminal” is valid.

For the functions and setting method, refer to “6-1-5. Setting the input judgment time”.

⇩

**【5】Set the periodic transmission time.**

Set the transmission intervals for periodic transmissions.

For the functions and setting method, refer to “6-1-4. Setting the periodic transmission time”.

⇩

**【6】Set the communication mode.**

Select the communication mode from “Standard mode” and “Long- range mode”.

Set the communication mode based on the communication distance and response time for signal control.

For the functions and setting method, refer to “6-1-6. Setting the communication mode”.

⇩

**【7】Connect the power input terminal block.**

Supply stable power with less fluctuations.

For the connecting method to the terminal block, refer to “7-3-1. Power input terminal block”.

⇩

**【8】Check the communication status at the installation location with the Communication environment checking function.**

For the functions, refer to “7-4. Communication environment checking function”, and for the setting method, refer to “7-2. Installation site”.

And for the setting method, refer to “6-1-7. Startup of the Communication environment checking function”,

*For precautions on installation location, refer to “7-2. Installation location”.

⇩

**【9】Installation of the device.**

For fixing/installation of the device, refer to “7-1. Installation”.

⇩

**【10】Connection to I/O terminal block.**

Connect the signal line(cable) to the I/O terminal block and error output terminal block.

For connection to the terminal block or for the connection cable, refer to “7-3-3. I/O terminal block” and “7-3-4. Connection cable”.

⇩

**【11】Confirmation of I/O contact transfer.**

Check the operation after installation and connection are completed.

⇩

start of use

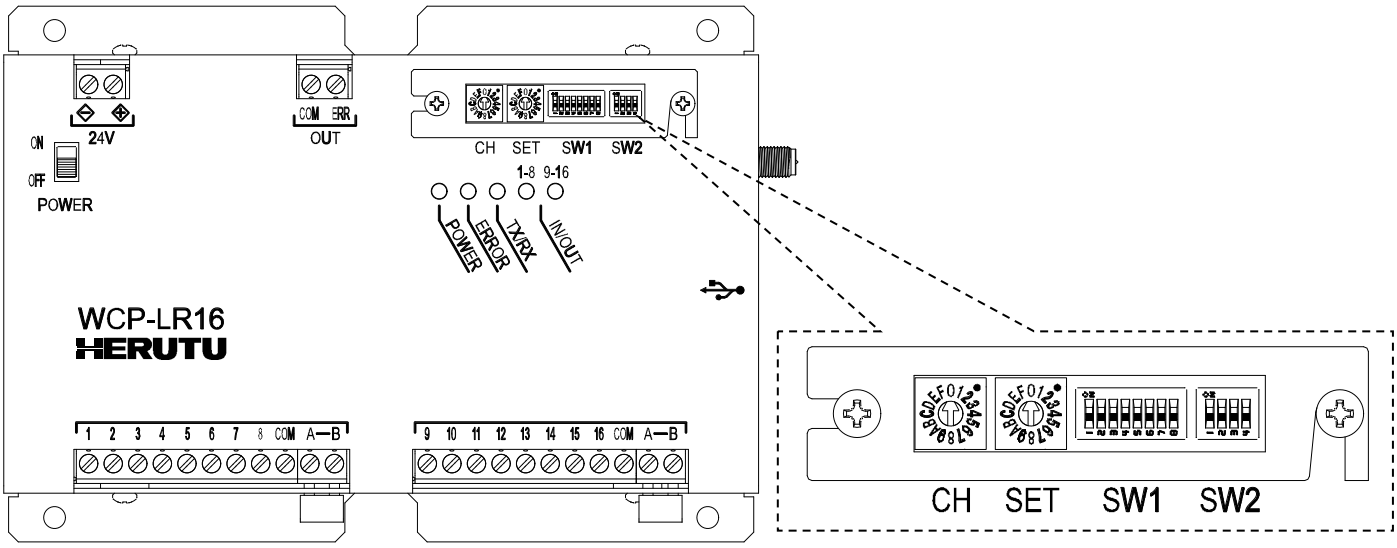
# 6. Functions and settings

## 6-1. Configuration switch

Set the operation of the device with the configuration switches.

The configuration switches are protected by the switch cover. When operating the switch, loosen the screws and remove the cover.

Also, turn OFF the power of the main unit before operating the configuration switches.




【Configuration switch】

| Display | Switch | Name | Description |
|---|---|---|---|
| CH | — | Channel setting | Set the communication channel to be used. |
| SET | — | SET number setting | Set the set number of the device. |
| SW1 | 1 | I/O 1-8 terminal setting | Set the terminals 1–8 to input terminal or output terminal. |
| | 2 | I/O 9-16 terminal setting | Set the terminals 9–16 to input terminal or output terminal. |
| | 3 | Periodic transmission time setting | Set the time to perform periodic communication checks. |
| | 4 | Input judgment time setting | Set the input judgment time for contact input.<br>This setting is valid for input terminals only. |
| | 5 | Communication mode setting | Set wireless communication to Standard mode or Long-range mode. |
| | 6 | Communication environment checking function activated | Turn ON the switch when using the Communication environment checking function. Contact transfer is not performed when this function is used. |
| | 7-8 | unused | Leave the switch in factory default (OFF) when using the device. |
| SW2 | 1-4 | unused | Leave the switch in factory default (OFF) when using the device. |

***At the time of shipment, the “CH” and” SET” switches are set to “0”, and the “SW1” and” SW2” switches are all set to “OFF”.**

### 6-1-1. Communication channel settings

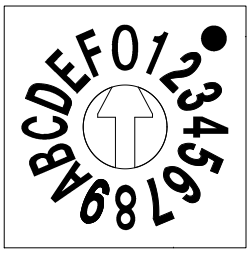
Set the communication channels by “Channnel configuration switch”.

The communication channel can be set from 15 channels of 1 to F. The “0” setting will be set to the channel 1.

The pair to be used needs to be set to the same channel.

When using multiple pairs in the same area, set each pair to a different communication channel.

Note on selecting a channel,refer to also “9-2. Selecting communication channel“.




**CH**

| SW | Channel | Frequency (MHz) |
|---|---|---|
| 0(*)/1 | 1 | 905.0 MHz |
| 2 | 2 | 906.6 MHz |
| 3 | 3 | 908.2 MHz |
| 4 | 4 | 909.8 MHz |
| 5 | 5 | 911.4 MHz |
| 6 | 6 | 913.0 MHz |
| 7 | 7 | 914.6 MHz |
| 8 | 8 | 916.2 MHz |
| 9 | 9 | 917.8 MHz |
| A | 10 | 919.4 MHz |
| B | 11 | 921.0 MHz |
| C | 12 | 922.6 MHz |
| D | 13 | 924.2 MHz |
| E | 14 | 925.8 MHz |
| F | 15 | 927.4 MHz |

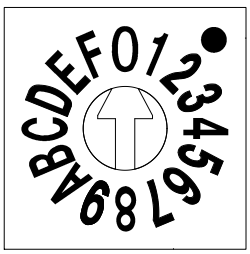
**(*):Factory default setting**

### 6-1-2. Set number settings

The set number identifies the device to be paired.

Set the set number with “SET No. configuration switch”. The set number can be set from 16 types of 0 to F, and the switches “0” to “F” correspond to the set numbers. The pair to be used need to be set to the same set number.

When using multiple pairs in the same area, set each pair to a different set number.




**SET**

| SW | Set No. |
|---|---|
| 0(*) | 0 |
| 1 | 1 |
| 2 | 2 |
| 3 | 3 |
| 4 | 4 |
| 5 | 5 |
| 6 | 6 |
| 7 | 7 |

| SW | Set No. |
|---|---|
| 8 | 8 |
| 9 | 9 |
| A | A |
| B | B |
| C | C |
| D | D |
| E | E |
| F | F |

**(*):Factory default setting**

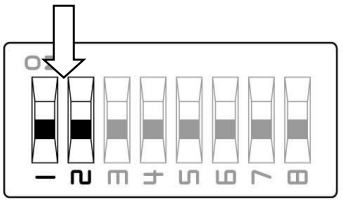
### 6-1-3. Terminal input/output settings

The I/O terminals 1–8 and 9–16 can be set to input or output terminals with “I/O configuration switch”.

I/O settings of the terminals are performed in units of 8 on the terminals 1–8/9–16.

Since contact control of the device is performed on the terminals with the same number, the I/O setting of the paired terminals should be set to “Input setting” and “Output setting”.

I/O configuration switch

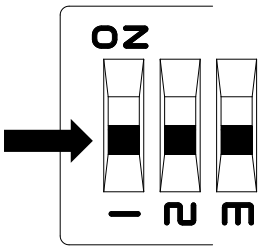


**SW1**

| SW1-1 | OFF(*) | ON |
|---|---|---|
| I/O 1-8 terminal setting | Output setting | Input setting |

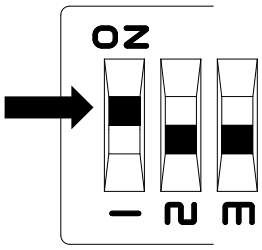
| SW1-2 | OFF(*) | ON |
|---|---|---|
| I/O 9-16 terminal setting | Output setting | Input setting |

**(*):Factory default setting**



Switch OFF

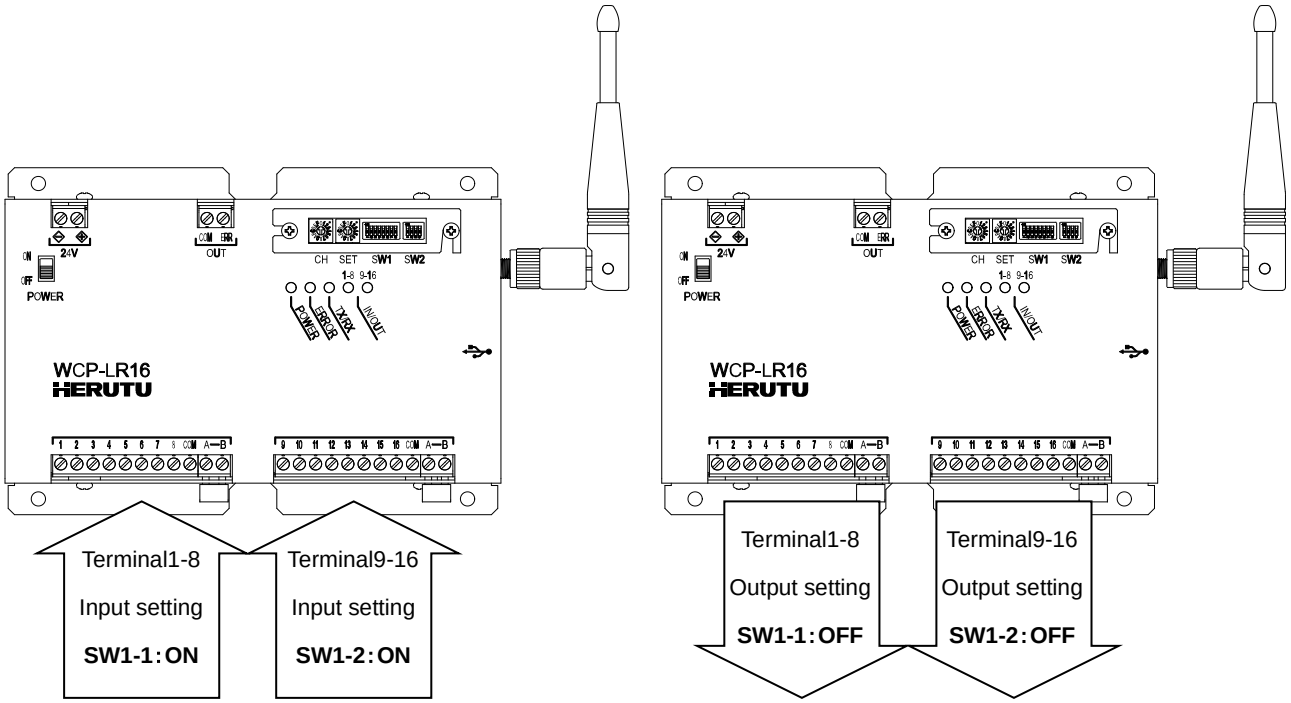
Slide the switch down



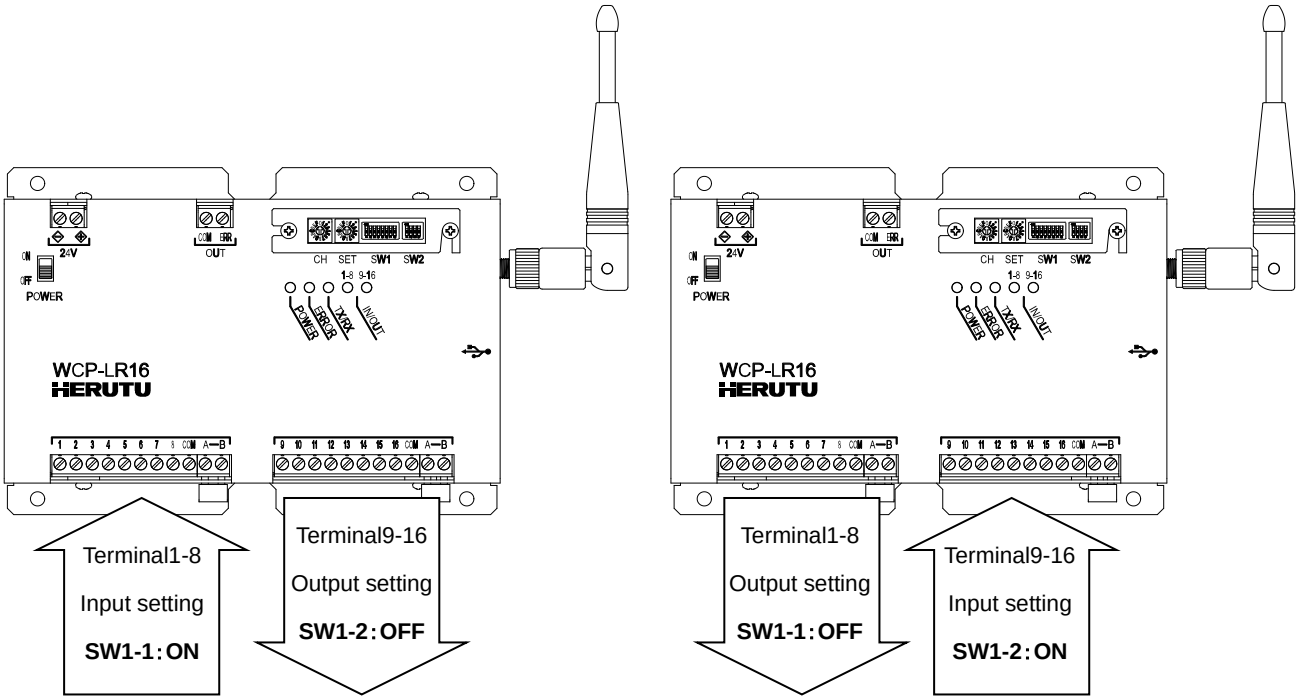
Switch ON

Slide the switch up

**■Setting method for using uni-directional 16 contacts**



■**Setting method for using bi-directional 8 contacts**



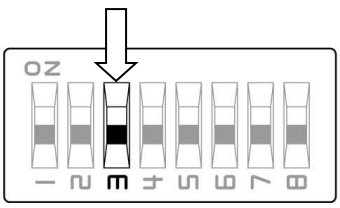

Set the I/O setting of the paired terminals to “Input setting” and “Output setting”.
If the setting is incorrect, the device does not work properly.

### 6-1-4. Setting the periodic transmission time

The wireless communication of the device is an event type that communicates when the input state into the input terminals is changed.

If there is no change in the input state, communication is not performed. A function to periodically check the communication between the paired devices is a periodic transmission. The intervals of periodic transmission can be set with “Periodic transmission time configuration switch”. If there is no change in the input state into the input terminals for the set time, periodic transmission is performed. To detect communication errors quickly, select “10 seconds”.

Periodic transmission time configuration switch



**SW1**

| SW1-3 | OFF(*) | ON |
|---|---|---|
| Periodic transmission time | 60 seconds | 10 seconds |

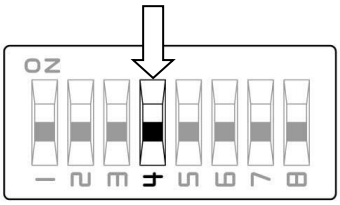
**(*):Factory default setting**

### 6-1-5. Setting the input judgment time

Input judgment time is a time to judge that the input signal into the input terminal is valid.

The input judgment time can be set to “10msec” or “100msec” with “Input judgment time configuration switch”. The input signals shorter than the set time are invalid. Set the input judgment time according to the time width of the signal to be inputted.

Input judgment time configuration switch

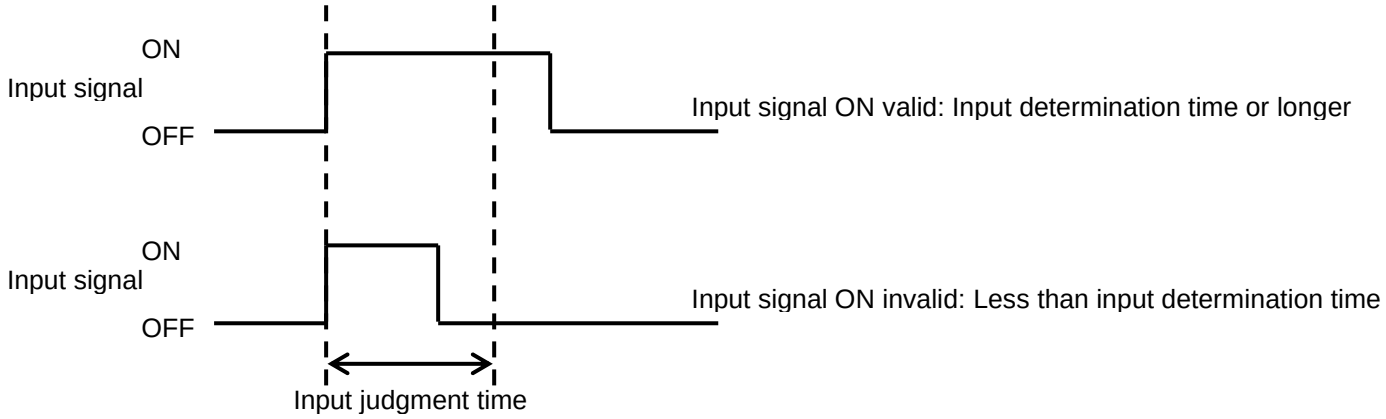



**SW1**

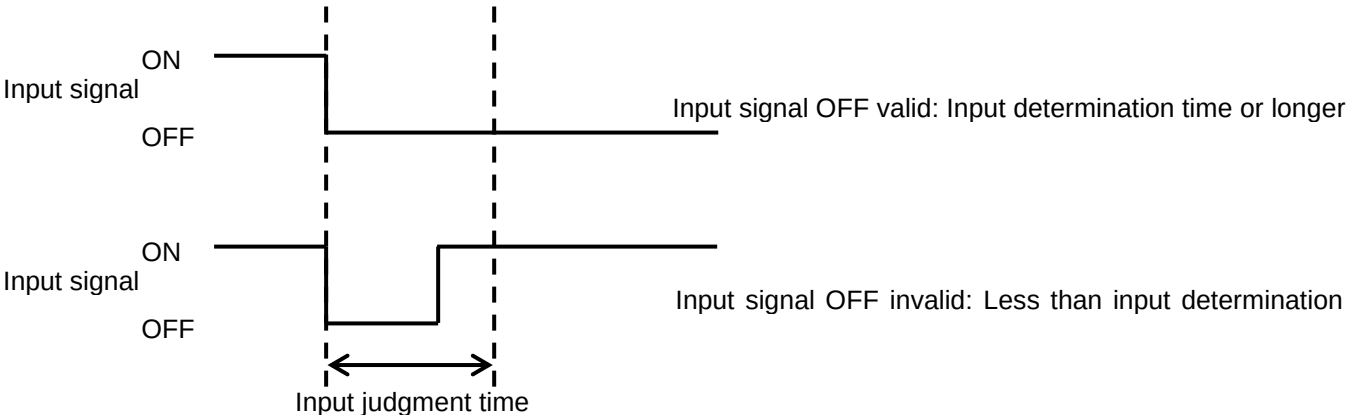
| SW1-4 | OFF(*) | ON |
|---|---|---|
| Input judgment time | 10msec | 100msec |

**(*):Factory default setting**

**■Valid judgment operations of input signal ON**



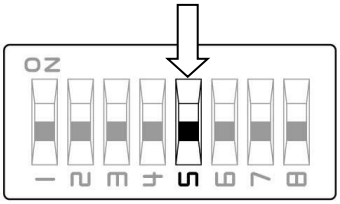

**■Valid judgment operations of input signal OFF**



### 6-1-6. Setting the communication mode

The communication mode can be set to “Standard mode” or “Long- range mode” with “Communication mode configuration switch”. The communication distance and response time vary depending on the communication mode. Set the communication mode according to the environment to be used and the signal to be controlled. The paired devices need to be set to the same communication mode.

Communication mode configuration switch




**SW1**

| SW1-5 | OFF(*) | ON |
|---|---|---|
| Communication mode | Long- range mode | Standard mode |

**(*)：Factory default setting**

Response time refers to the time it takes when a signal is inputted into the input terminal until a signal is outputted from the output terminal of the paired unit.

Communication distance and response time vary depending on the usage conditions, but refer to the following values as a guide.

| Communication mode | Standard mode | Long- range mode |
|---|---|---|
| Communication distance | approximately 300m indoors / 1,000m in line of sight | approximately 300m indoors / 2,000m in line of sight |
| Response time | 250msec | 1000msec |

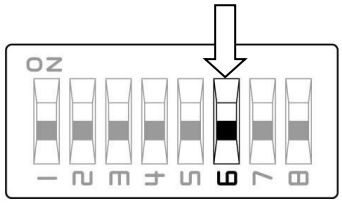
### 6-1-7. Startup of the Communication environment checking function

"Communication environment checking function" is a function to check the status of the wireless communication environment with the paired device. It can be used as a guide to determine the installation location. Before using this function, the required settings between the pairs must be completed.

Turn ON the power with "Communication environment checking function start switch" turned ON, and the communication environment checking function will start up.

The communication environment check results are indicated by three LEDs, "TX/RX", "IN/OUT1-8", and "IN/OUT9–16". This function operates until the power is turned OFF. For details of the communication checking function, refer to "7-4. Communication environment checking function".

Communication environment checking function start switch




**SW1**

| SW1-6 | OFF(*) | ON |
|---|---|---|
| Communication environment checking function | No start up (Normal operation) | Start up |

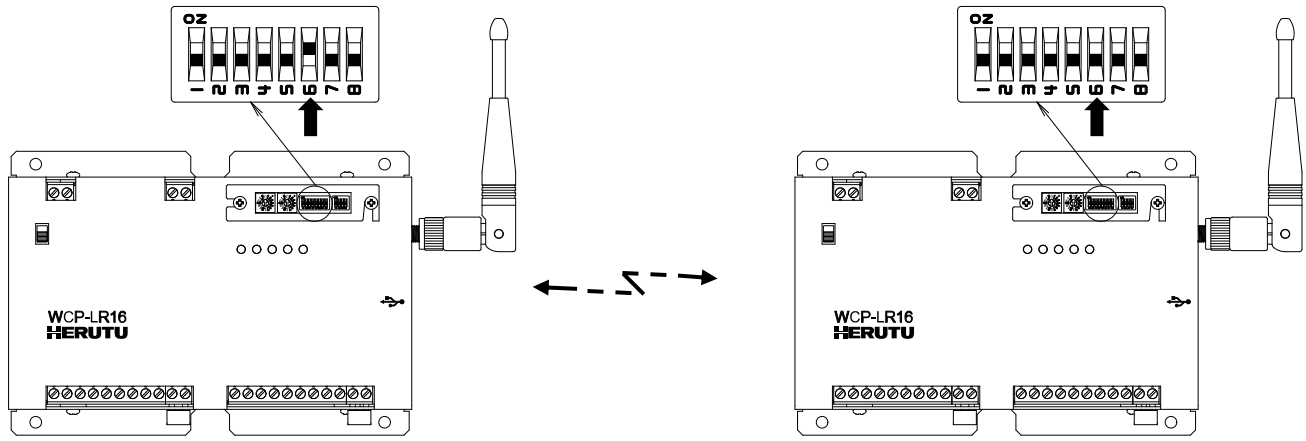
**(*):Factory default setting**

#### ■Setting method when using the Communication environment checking function

When using this function, start the device to be checked with the Communication environment checking function turned ON, and start the paired device in normal operation. The results are displayed only on the device side that is operating with the Communication environment checking function.

**【SW1-6=ON】**:communication environment checking function start up

**【SW1-6=OFF】**:Normal operation



# 7. Installation and connection

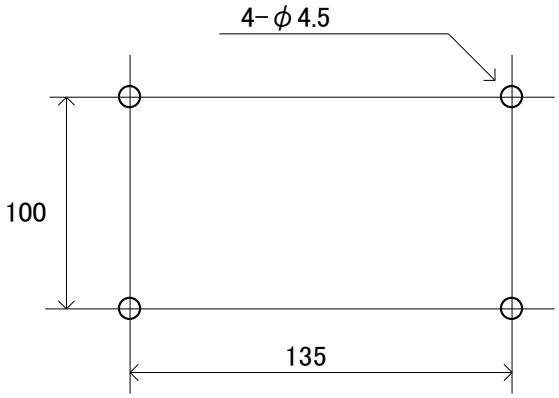
## 7-1. Installation

Fix /install the device securely using the mounting holes.

The case of the device is electrically connected to GND in the internal circuit. Depending on how the case is mounted, it may be affected by noise from other devices. In such a case, install the case so that the device and mounting location are isolated.

**■Mounting method and dimensions**

The dimensions of the mounting holes are shown in the figure below. Fix the device by using the screws corresponding to the hole diameter below.

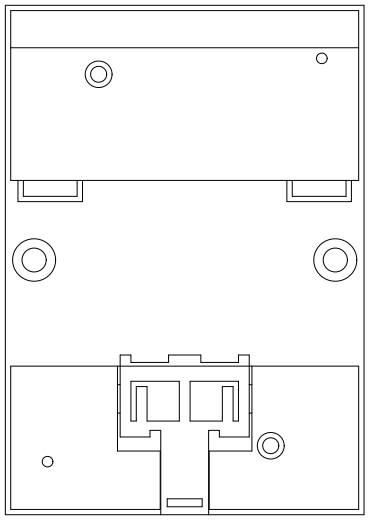



**■Mounting on the DIN rail**

Omron's DIN rail mounting base "Y92F-90" can be attached to the device.

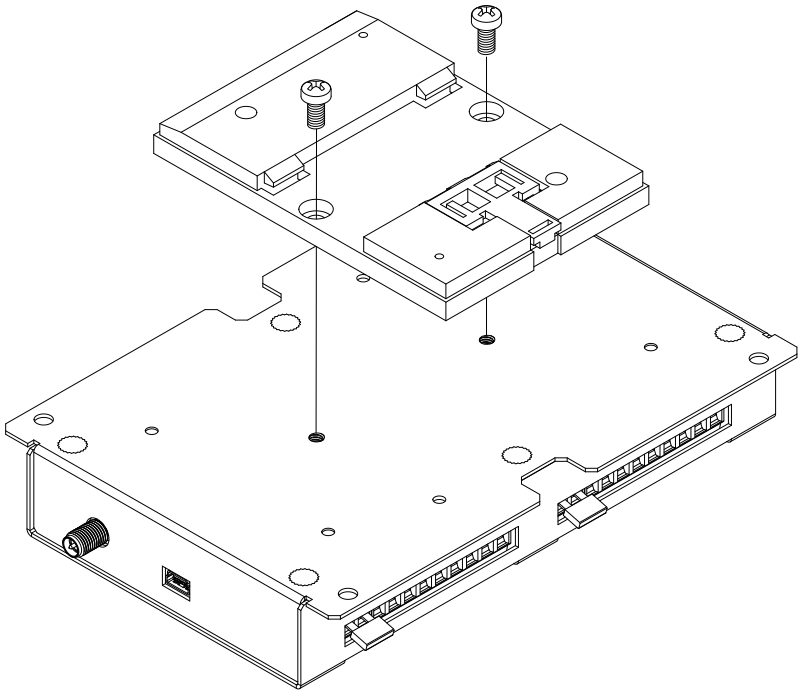
Use it to mount the device on the DIN rail. Use the two M4 screws supplied with "Y92F-90" to fix it.

***"Y92F-90" is not available at HERUTU. Please prepare it separately.**



Omron's DIN rail mounting base

【Y92F-90】



## 7-2. Installation location

Please note the following for the installation location.

①Do not install the transmitter in the following locations.

- ・Locations exposed to direct sunlight.
- ・Locations with high humidity.
- ・Near a television or radio.
- ・Near objects that generate strong noise, such as motors and inverters.
- ・Locations where strong magnetic field is generated.
- ・Locations surrounded by steel frames or metal walls.
- ・Near the wireless devices that use the same frequency as the wireless frequency used by the unit.
- ・Near the devices that can malfunction due to radio waves from the unit.

②Install the unit as high as possible.

③Install the antenna as vertically as possible and avoid it from being parallel with a metal plate or wire. Also, keep it away from a metal plate or wire as much as possible.

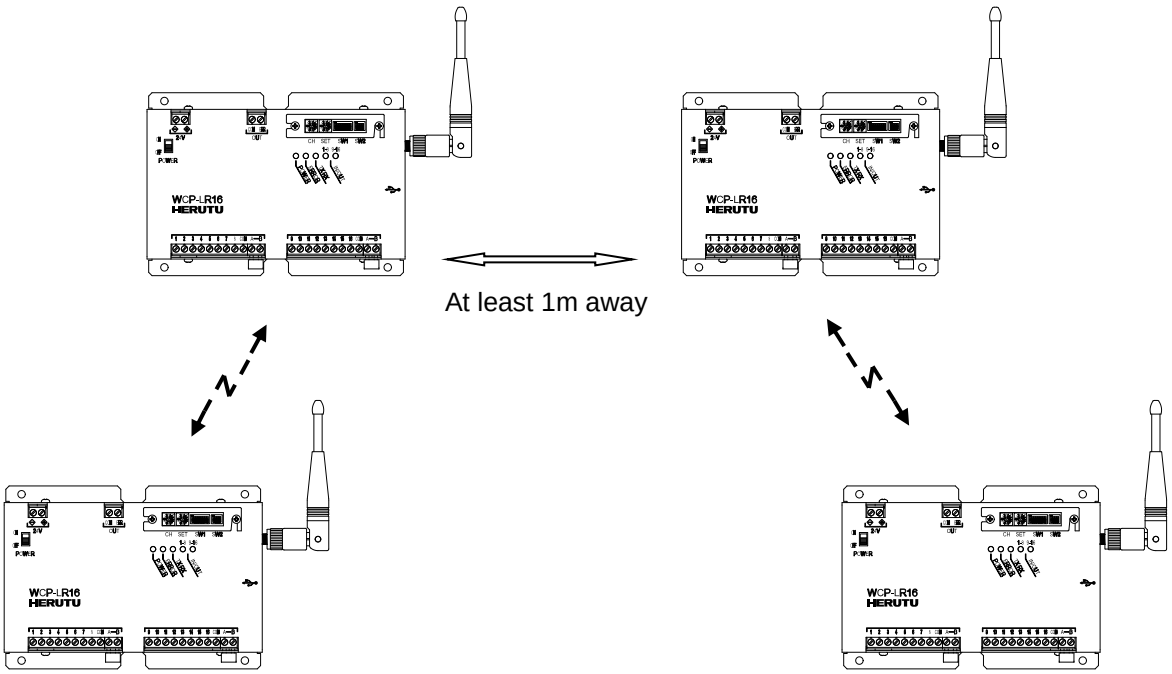
④Install as far away from noise sources as possible.

⑤Communication performance varies greatly depending on the installation environment. Please confirm that communication is possible before installation.

⑥It is not dust/splash proof. Depending on the installation environment, take measures, such as integrating it into the case.

### ■Installation spacing

Install the unit 1m or more away from each unit. If they are installed close to each other, they may affect each other's communication. So, install them as far apart as possible.



## 7-3. Connection to the terminal block

### 7-3-1. Power input terminal block

Supply stable power with less variations（DC24V）to the power input terminal block.

| **Operating supply voltage　DC24V±10%（21.6V～26.4V）** |
|---|

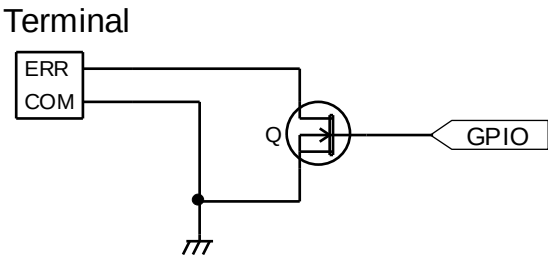
*When operating the unit with an AC power supply, use an optional AC adapter “ADB24050-F”.

### 7-3-2. Error output terminal block

When a communication error occurs, the error output terminal block is synchronized with the LED for Communication Error Indication and generates an open drain output.

| | |
|---|---|
| **Rated load voltage** | **50V** |
| **Maximum load current** | **0.5A** |

【Output circuits】



### 7-3-3. I/O terminals

The terminals1–8 and 9–16 of the input terminal block can be set to input or output terminals in units of 8 points.

For the setting method of the I/O terminals, refer to “6-1-3. I/O terminal settings”.

#### ■Setting the input terminals

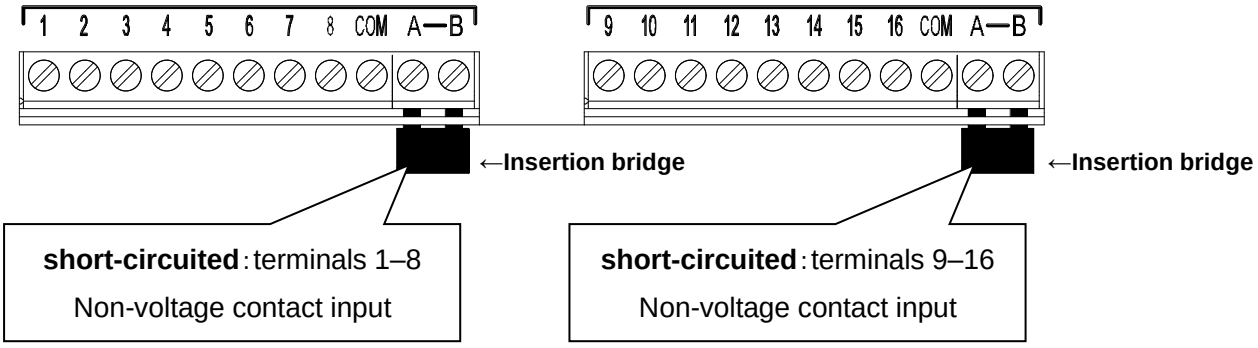
When setting the input terminals, the input specification(voltage/non-voltage) can be switched.

It can be switched by short circuiting/ not short circuiting “A-B” terminals of each I/O terminal.

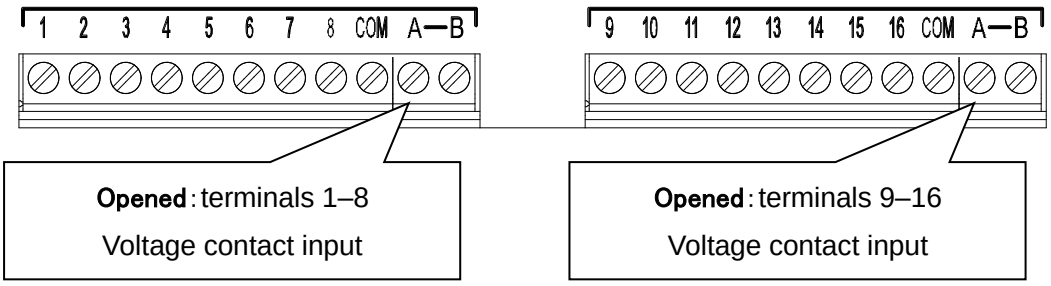
When short circuited, the input specification becomes Non-voltage contact input”, and when opened, it becomes “Voltage contact input”.

***At the time of shipment, as the terminals are short-circuited by insertion bridge, the input specification is non-voltage contact input.**

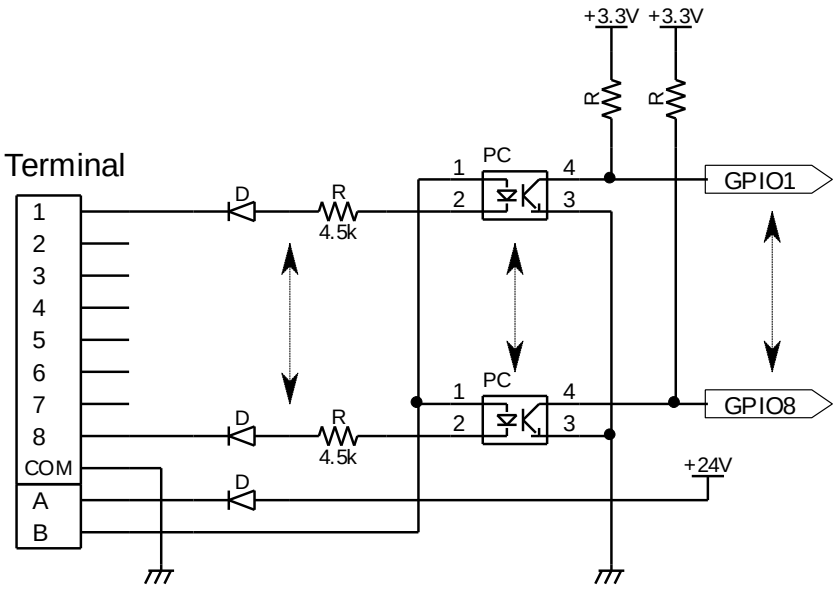
**Non-voltage contact input specifications**




**Voltage contact input specifications**



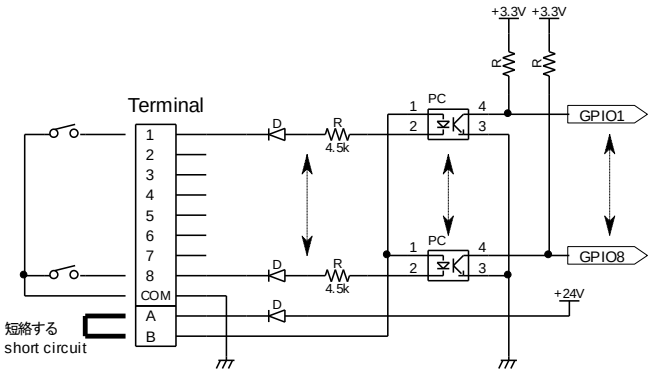
【Input circuits】



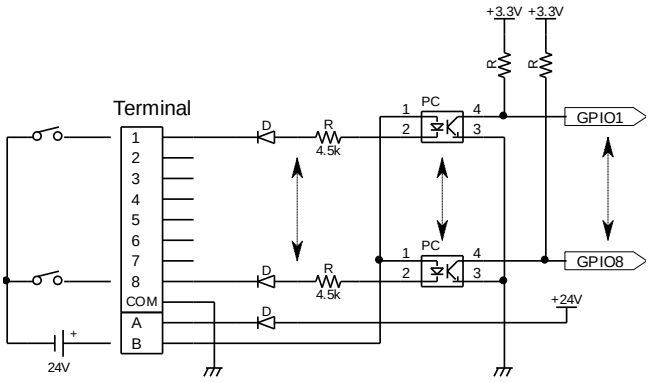

| | | |
|---|---|---|
| **Voltage contact input** | **Input voltage / Internal resistor** | **DC24V / 4.5kΩ** |
| **Non-voltage contact input** | **Output voltage / Current** | **DC24V / 5mA** |

【Connection example】

Non-voltage contact input




Voltage contact input

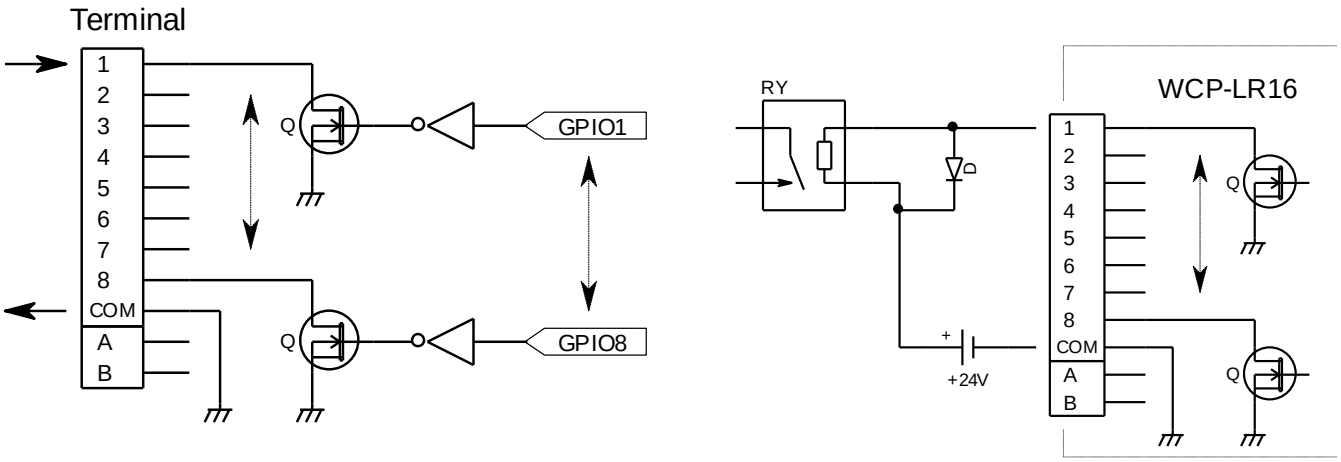


■**Setting the output terminals**

When the output terminal is set, it is an open drain output.

| | |
|---|---|
| **Rated load voltage** | **45V** |
| **Maximum load current** | **0.1A** |

【Output circuits】




Use of voltage/current exceeding the rated values may damage the unit as well as other connected units. Connect an appropriate drive circuit, such as a relay, depending on the units or devices to be connected. Especially, when controlling inductive loads, such as lamps and relay, take appropriate measures on the load side. The right figure shows a connection example for controlling the relay. A diode is connected to the device to protect it from surge voltage that generates in the relay coil.

### 7-3-4. Connection cable

For the cable to be connected to the terminal block, follow the specifications below.

・Wire connection range 0.14mm$^2$～1.5mm$^2$(Common to solid/ stranded wire)
AWG26～AWG16

・Strip-off length 6.0mm(Preliminary soldering at the tip of wire is not allowed)

The tightening torque of the terminal block screw is 0.5Nm-0.6Nm. Tighten the screw with a flat-blade screwdriver.
When checking continuity with the head of the terminal block screw, check it with the screw tightened.

The case of the unit is electrically connected to the GND（COM）of the internal circuit.
When connecting the cable, be careful to prevent the conductor part from contacting the case.

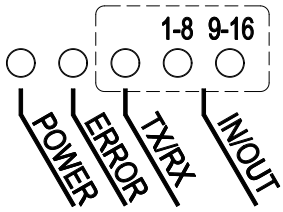
Use ferrule terminals (rod shaped terminal) to prevent the wire from fraying.

## 7-4. Communication environment checking function

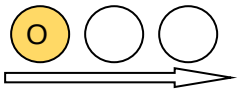
When determining the installation locations, use the “Communication environment checking function” for checking the status of wireless communication environment with the paired device.
Before using the function, you need to perform “Channel setting”, “SET number setting” and “Communication mode setting”. For the setting method, refer to “6-1. Configuration switch”.

Place each device to be paired in your desired location temporarily, and start the device to be checked with the Communication environment checking function, and **start the other device in normal operation**. For the starting method of the function, refer to “6-1-7 Startup of the Communication environment checking function”.

The communication environment check results are displayed in 5 color-coded steps by 3 LEDs of “TX/RX”, “IN/OUT1–8”, and “IN/OUT9–16”.




For about 10 seconds after startup, an orange-color scroll display is performed.




After about 10 seconds, the communication environment check results are displayed. The result display is updated. The result is displayed from the communication content of the last about 30 seconds. Check the result after about 30 seconds at each location where the communication environment is checked.
To perform stable communication, it is recommended to install the device where the check result is “excellent” or “good”. Perform communication environment check in the environment and condition as close to the actual operation as possible.

| Communication environment check result | LED Display |
|---|---|
| Excellent | G G G |
| Good | G G O |
| Fair | G O O |
| Poor | O O O |
| Very Poor | R R R |

G :Green
O :Orange
R :Red

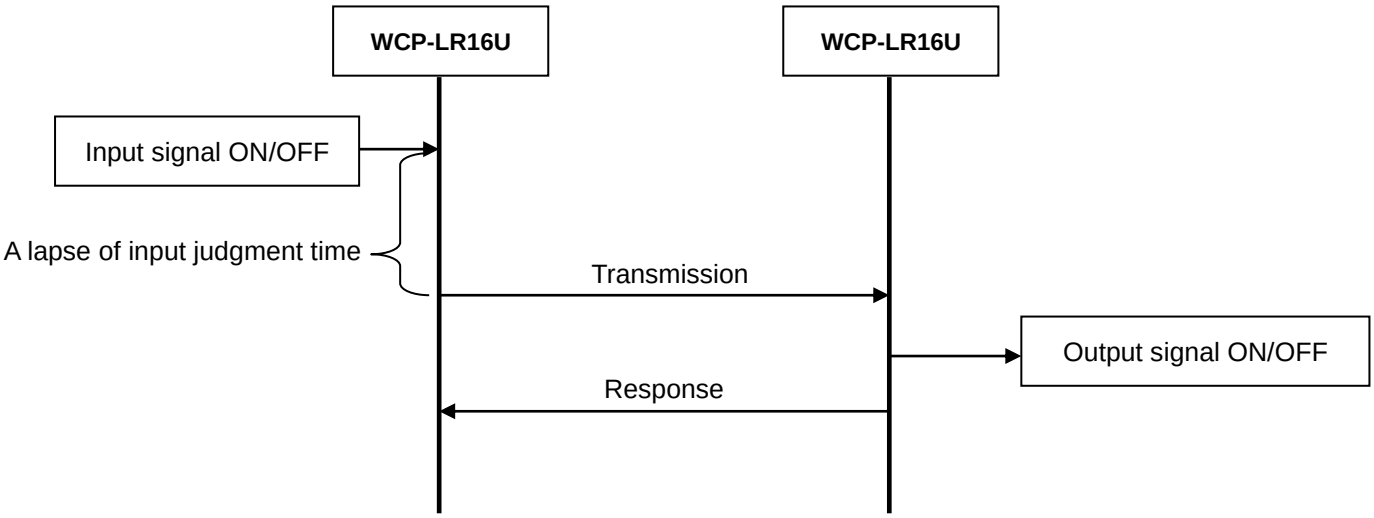
# 8. Communication

## 8-1. Communication type

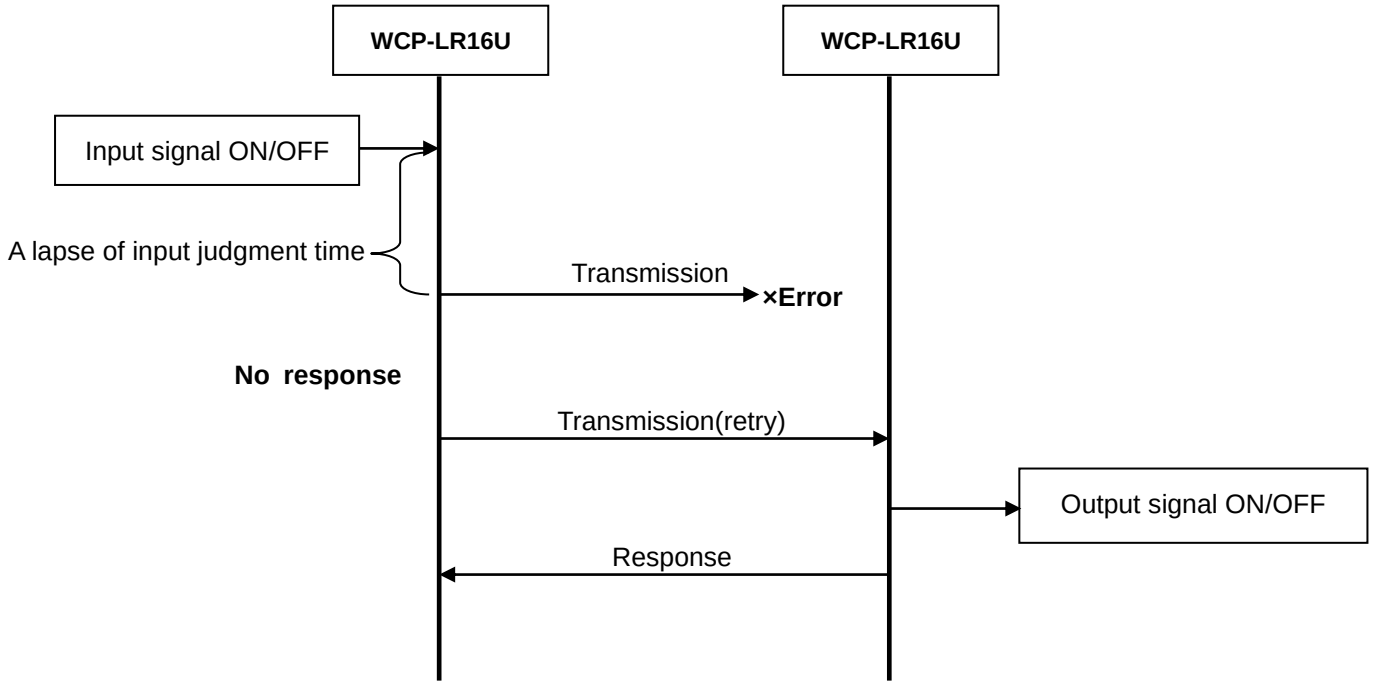
Wireless communication of the device is an event type that communicates when the status of the input signal into the input terminal changes. Normally, no radio wave is emitted, which reduces interference in wireless communication. Also, wireless communication is bi-directional regardless of its usage. After transmitting the contact data, it checks a response from the paired unit. When a response from the paired unit cannot be received, the device performs retry communication to securely transfer the contact data.

In addition, secure communication between paired units is achieved by confirming that the channel and set number match. Set the communication channel and set No. with “Channel configuration switch” and “Set No. configuration switch”. For the setting method, refer to “6-1-1. Communication channel settings” and “6-1-2 Set number settings”.

**■Normal communication（event type）**




**■Retry communication**



## 8-2. communication error output

If there is no response from the paired unit during communication or periodic transmission due to a change in the input signal, the device performs retry communication. However, if no response is received even after certain times of retry communication, a communication error output is performed.

The communication error output is performed by lighting of the LED for Communication Error Indication and producing an external output from the error output terminal block.

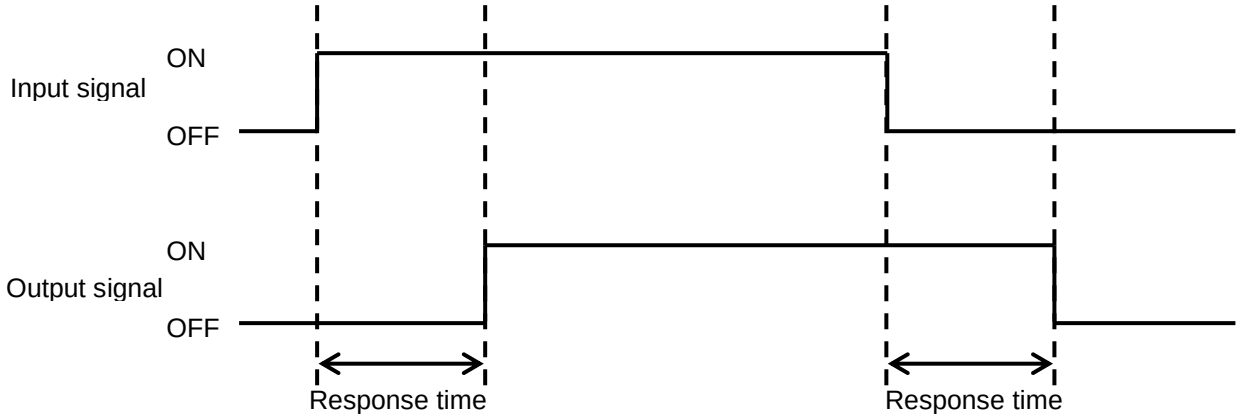
The communication error output will be reset when communication is normally established.

For error output terminal block, refer to “7-3-2. Error output terminal block”.

# 9. Notes for use

## 9-1. Response time

Response time refers to the time it takes when a signal is inputted into the input terminal until a signal is outputted from the output terminal of the paired unit.

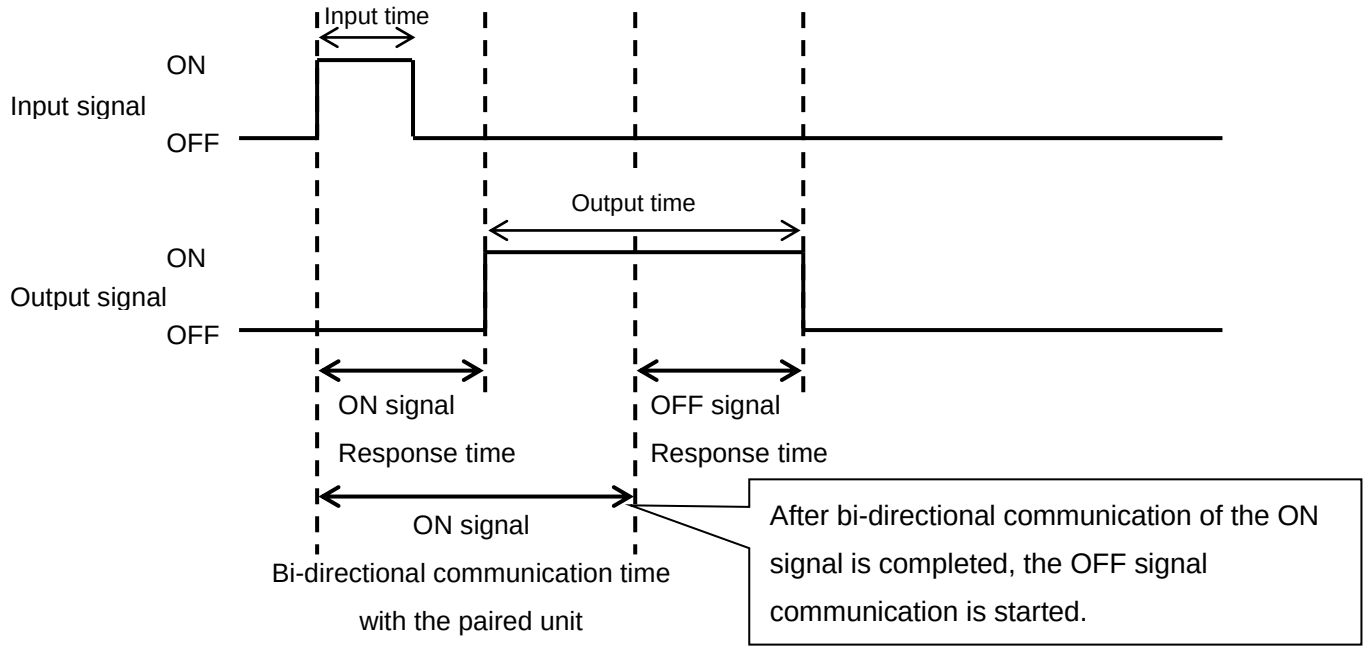



Response time varies depending on the settings of the communication mode and input judgment time.
The time shown below is response time when the input judgment time is set to “10msec”, and wireless communication can be established without retry communication.
When the input judgment time is set to “100msec”, the response time will be +90msec.

| Communication mode | Standard mode | Long-range Mode |
|---|---|---|
| Response Time | 250msec | 1000msec |

**■If the input time is short**

Note that for a short input signal, the signal output time from the paired unit is longer than the input time.



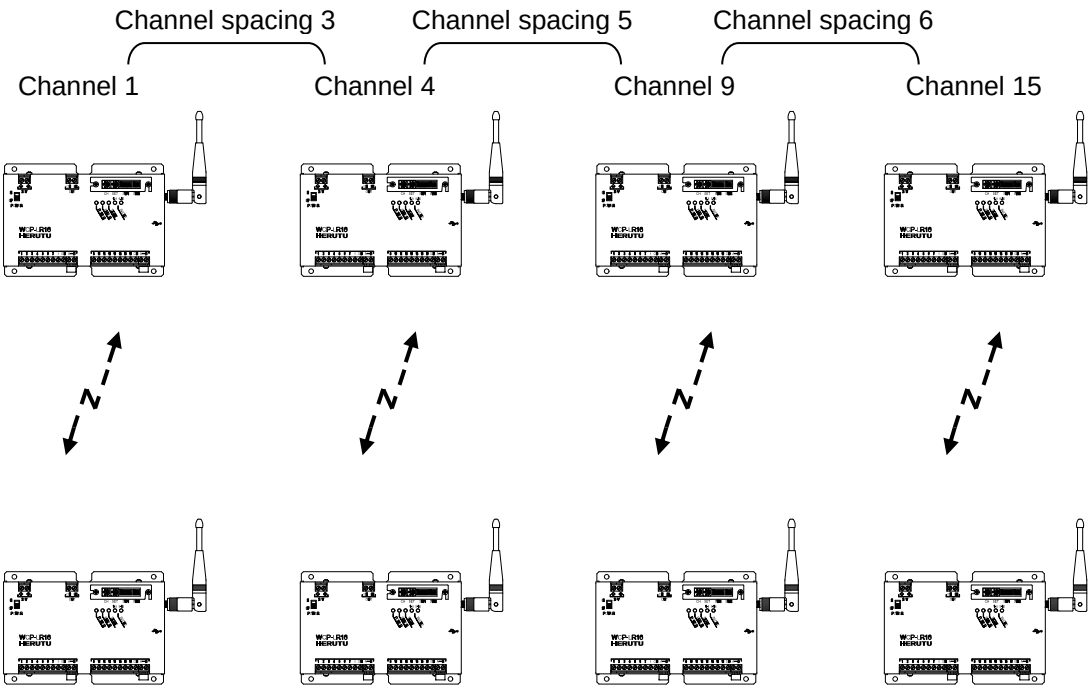
## 9-2. Selecting communication channel

When using multiple pairs in the same area, set each pair to a different communication channel.

Since the wireless communication of the device is an event type, 15 channels can be used in the same area.

**【Example：Using 4 pairs in the same area】**

The channels should be spaced as far apart as possible. Preventing the spacing between the channels from being equal can reduce impact on communication of other pairs when communicating at the same time.



# 10. Specification

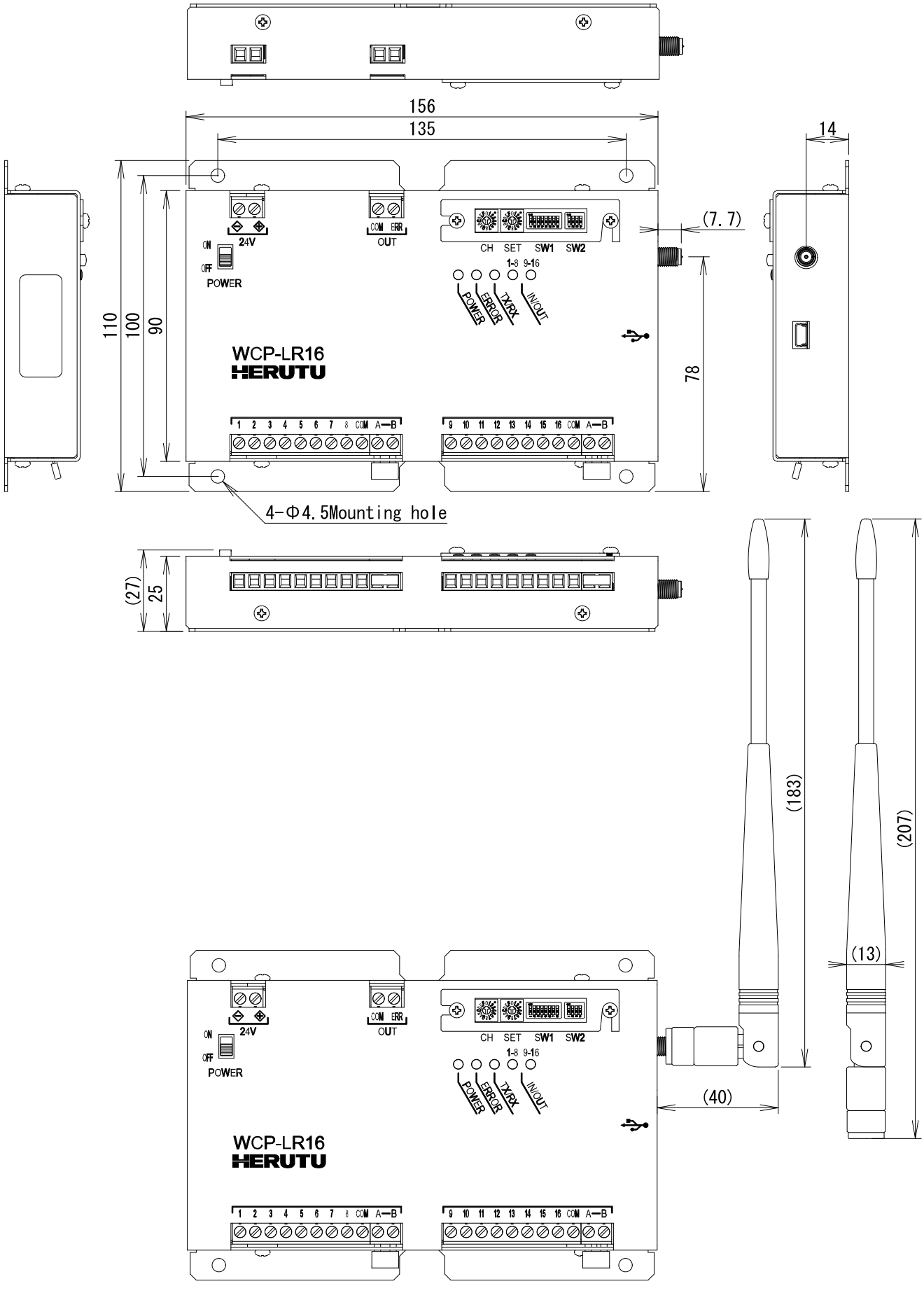
**Radio part**

| Item | Specification |
|---|---|
| Standard | FCC15.247、FCC15.212 |
| Frequency Band | 905.0MHz～927.4MHz |
| Modulation Band | LoRa Modulation |
| Radio format | F1D |
| Communication Method | Simplex |
| Number of Channels | 15 (1.6MHzStep) |
| Deviation | SF9/SF12 |
| Antenna Power | Max +14dBm |

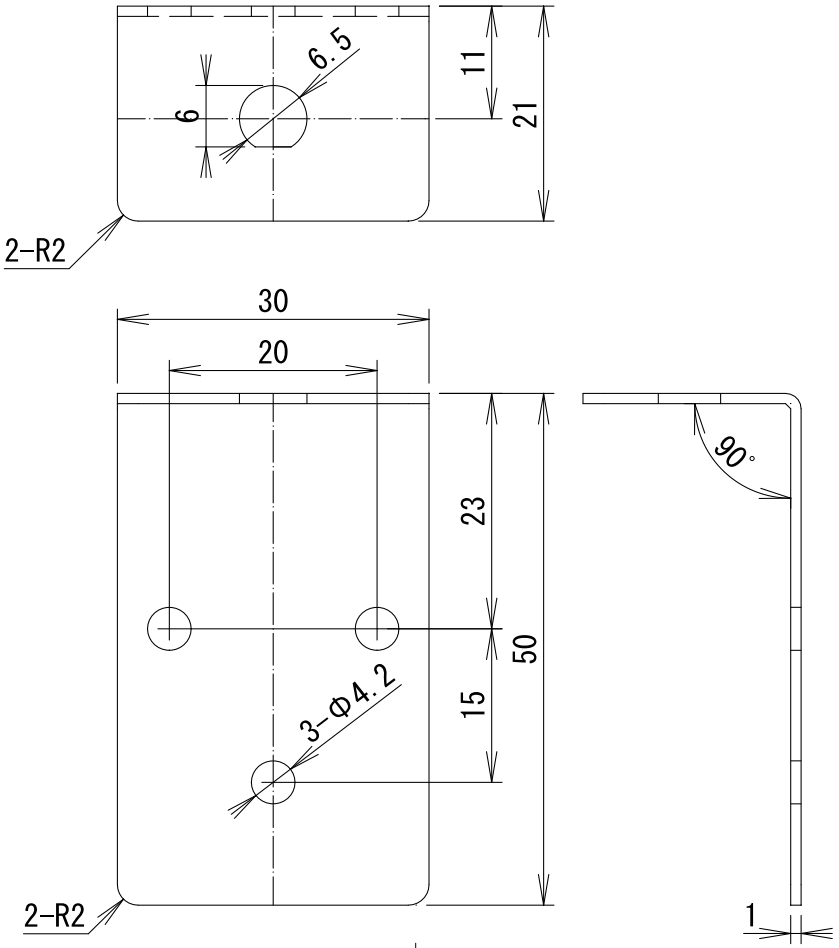
**Device Specification**

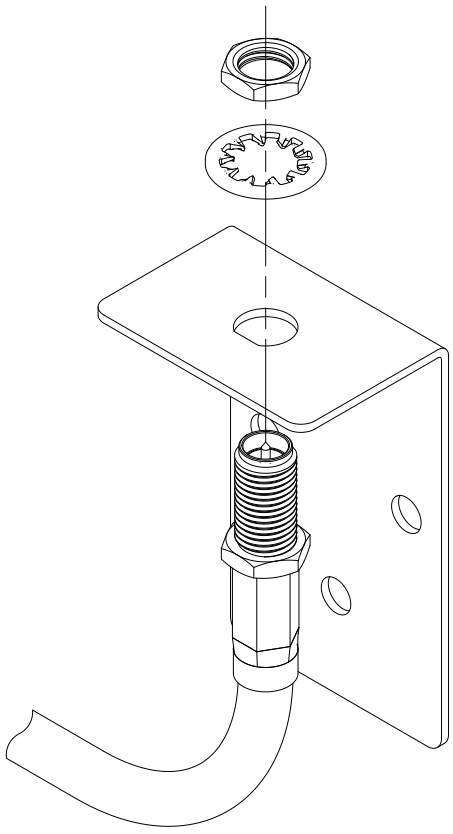
| Item | Specification |
|---|---|
| Model | WCP-LR16U |
| Input/Output | 16 I/O terminal blocks (16 inputs / 16 outputs / 8 inputs and 8 outputs Configurable)<br>Output:Open drain output(Rated load voltage 45V / Maximum load current 0.1A)<br>2 terminal blocks for switching between voltage and no-voltage contact input |
| Output | 1 open drain output (ERR)<br>(Rated load voltage 50V / Maximum load current 0.5A) |
| Switch | 2 Switches (16-Position Rotary) (CH/SET)<br>1 Switches (8- Position DIP) (SW1)<br>1 Switches (4- Position DIP) (SW2) |
| Display | 1 Green LED for power indication<br>1 Red LED for Communication Error Indication<br>1 Red / Green LED for Wireless Communication Monitoring<br>1 Red / Green LED for Monitoring I / O 1-8<br>1 Red / Green LED for Monitoring I / O 9-16 |
| Power Source | DC24V±10%（21.6V～26.4V） |
| Current Consumption | 120 mA or less (at DC 24 V input) |
| Operating Environment | Temperature: -10 to 60°C, Humidity: Up to 85% (non-condensing) |
| External Dimensions | 156 x 25 x 110 mm (6.1 x 1.0 x 4.3") (excluding protrusions) |
| Weight | Approximately 440 g (15.5 oz) (including antenna) |
| Antenna | Dipole antenna (MEGWX-467XRSBX-920) |

# 11. Dimensions Drawing



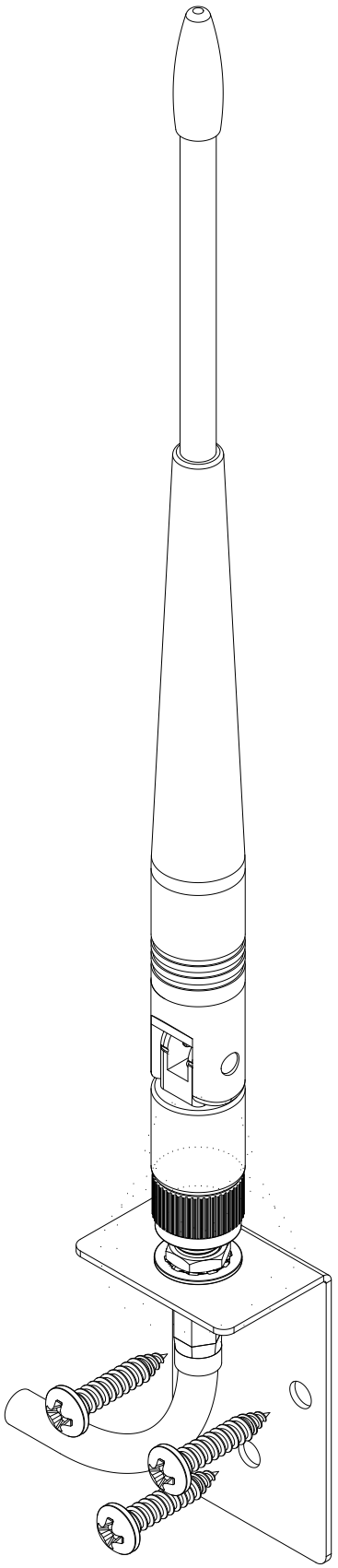
■Antenna Mounting Kit (cable 3m)



Installing a cable

(Nuts and washers are included with the connector.）



Assembly/Installation example

(Screws are not included.）

# 12. Troubleshooting

| Phenomenon | Cause and remedy |
|---|---|
| The LED for Power Indication（POWER） does not light up. | Power is not supplied.<br>→Check whether operating power voltage is supplied. |
| | The power input terminal block is connected incorrectly.<br>→Refer to “6-3-1. Power input terminal block”. |
| | The power switch is not turned ON.<br>→Turn ON the power switch. |
| Wireless communication cannot be performed.<br>The LED for Wireless Communication Monitoring（TX/RX）lights up only in red and a communication error occurs. | The communication channels are not matched between the pairs.<br>→The communication channels between the pairs need to be matched. Refer to “6-1-1. Communication channel settings”. |
| | The set numbers are not matched between the pairs.<br>→The set numbers between the pairs need to be matched. Refer to “6-1-2 Set number settings”. |
| | The communication modes are not matched between the pairs.<br>→The communication modes between the pairs need to be matched. refer to “6-1-6. Setting the communication mode”. |
| | The installation positions of the pair are too far from each other.<br>→Check the communication status with the Communication environment checking function. Refer to “7-4. Communication environment checking function”. |
| | Communication cannot be established due to external factors.<br>→It may be affected by the same radio waves or noise as the communication channel. Take measures against the source or change the communication channel to be used. |
| Wireless communication cannot be performed.<br>The LED for Wireless Communication Monitoring（TX/RX）does not light up in red even after inputting a signal. | The I/O terminals are not set to input setting.<br>→Check the settings of the I/O terminals. Refer to “6-1-3. Terminal input/output settings”. |
| | The input specifications(voltage/non-voltage) and connection are not matched.<br>→Check the signal connection to the input terminals. Refer to “7-3-3. I/O terminals”. |
| | The input signal is too short.<br>→If the input time of the input signal is shorter than the input judgment time, the input signal is not judged to be valid. Refer to “6-1-5. Setting the input judgment time”. |

| | |
|---|---|
| The LED for I/O Monitoring does not light up in green even after inputting a signal. | The I/O terminals are not set to input setting.<br>→Check the settings of the I/O terminals.<br>Refer to “6-1-3. Terminal input/output settings”. |
| The LED for Power Indication（POWER） blinks. | An initialization error at startup occurred.<br>→Repair is required. Please contact our sales department. |
| The LED for Communication Error Indication (ERROR) blinks. | An initialization error at startup occurred.<br>→Repair is required. Please contact our sales department. |

# 13. After service and Warranty

If something is wrong. If you should find anything wrong with the machine when using it under normal conditions, check the warranty and repair regulations and contact the outlet store through which you purchased the product or our Sales Office. The latest warranty and repair regulations can be found on our website.

The user is prohibited by law from disassembling or making modification to the unit or otherwise may be subject to punishment.

〔Warranty Regulation〕

This regulation (hereinafter referred to as the "Regulation") is for post-shipment warranty provided by HERUTU ELECTRONICS CORPORATION (hereinafter referred to as the "Company") so that you can use the Company's product you have purchased with confidence. The Regulation does not apply to special order products (custom products). In addition, purchased products shall be subject to the relevant manufacturer's warranty regulations, and the Regulation shall not apply.

Please note that in the event that the product you purchased comes with an instruction manual that describes the Company's old repair regulation, the latest Regulation will still apply.

1. Warranty period

Unless otherwise specified, the warranty period shall be "up to thirteen months from the date of shipment of the product by the Company". During the warranty period, the Company will replace the product with a new one or repair it free of charge in accordance with the provisions of the Regulation.

In addition, if a failure occurs during the warranty period due to the Company's responsibility and the product with the failure (hereinafter referred to as the "Product") is replaced with a new one or repaired free of charge, the warranty period of the Product will be “thirteen months from the date of initial shipment of the Product, or six months from the date of shipment of the Product that has been replaced or repaired, whichever comes later”.

The warranty period for paid repairs shall be in accordance with the provisions of the Company's repair regulation.

2. Warranty scope

If a failure occurs during the warranty period due to the Company's responsibility, the Company will replace the product with a new one or repair it free of charge.

Even within the warranty period, the warranty does not apply in the following cases:

A) In the event of failure or damage caused by improper handling by the customer, such as dropping or impact during transportation or movement by the customer
B) In case of failure due to disassembly or modification of the main unit by the customer
C) In case of natural disasters such as fires, earthquakes, floods, and in case of failure or damage due to abnormal voltage
D) In case of failure caused by failure of equipment other than the Company's designated equipment connected to the Product
E) In case of failure of the Product's accessories (AC adapter, antenna, connection cable, etc.)
F) If damage is caused by the failure of consumables or limited-life parts included in the Product:

1. Consumables: Batteries (rechargeable, batteries, dry batteries, button batteries, etc.), recording media

(SD cards, etc.)

2. Limited-life parts: Various switches (limit switches, push button switches, etc.) and various sensors
3. Other items that are worn out or have a service life due to use

If consumables or limited-life parts fail, we will replace or repair the parts for a fee.

G) In case of failure caused by handling contrary to the usage and precautions described in the instruction manual of the Product

H) If repaired, adjusted, or improved by elsewhere other than the Company

I) If the Company is unable to reproduce the failure

3. About repair of the Product

Please note that repairing the Product requires equipment such as measuring instruments and tools, so the Company will handle it as a pick-up repair service at the Company.

4. About the shipping cost for replacement or repair of the Product

Shipping charges for sending the Product to the Company or a distributor, as well as shipping charges for sending the Product that has been replaced or repaired by the Company or the distributor to the customer, will be borne by the Company or the distributor.

5. Disclaimer

The Company is not responsible for any direct or indirect damages or monetary loss caused by failure of the Product or its use.

6. Additional notes

Please note in advance that the information of the Product described on the Company's website and in the catalogs, instruction manuals, technical materials, and other materials provided by the Company are subject to change without notice to customers.

〔Repair Regulation〕

This regulation (hereinafter referred to as the "Regulation") shall be applied to paid repair service (hereinafter referred to as the "Service") provided by HERUTU ELECTRONICS CORPORATION (hereinafter referred to as the "Company"). The Regulation does not apply to special order products (custom products). In addition, purchased products shall be subject to relevant manufacturer's repair regulations, and the Regulation shall not apply.

Please note that in the event that the product you purchased comes with an instruction manual that describes the Company's old repair regulation, the latest Regulation will still apply.

1. Subject of the Regulation

The Service is provided for the Company's products that are "beyond the scope of the warranty specified in the warranty regulation" and "from the sales start date to the end date of the repair period (seven years from the production end date)". However, please note that the end date of the repair implementation period may be earlier depending on the availability and procurement status of repair parts.

2. Establishment of contract

The contract shall be established when the customer approves the quotation presented by the Company and issues an order form before the end of the repair implementation period.

3. Purpose of the Service

The Company will provide the Service for the purpose of repairing the function and performance of the Company's product used by the customer if it fails beyond the scope of the warranty specified in the warranty regulation. Please note that the Service requires equipment such as measuring instruments and tools, so the Company will handle it as a pick-up repair service at the Company.

4. Usage fee for the Service

The usage fee for the Service shall be the total of the following fees:

A) Repair service fee

The repair service fee is the total amount of technical fees, parts costs, other expenses incurred, and applicable taxes associated with repairing the Company's product (hereinafter referred to as the "Product for repair") that the customer wishes to repair.

B) Shipping fee (including the cost of packaging boxes)

The Company kindly asks that customers bear the shipping costs for sending the Product for repair to the Company and for returning it from the Company. However, in the event that the Product for repair is sent by payment on delivery by the customer, the shipping cost will be included in the Service charge.

5. Warranty period and scope of the Product for repair

The warranty period for the Product for repair is "up to six months from the date of repair completion". However, please note that failures other than the repaired parts (repaired places or replaced parts) are not covered by the warranty of the Product for repair. In addition, if a failure occurs due to the Company's responsibility within the warranty period, the Company will again repair the product free of charge.

6. Handling of repair parts

A) In order to provide the Service stably for a long time and to promote environmental protection, etc., the Company may use recycled parts or alternative parts at the time of repair at its discretion.

B) The Company may, at its own discretion, collect the removed parts for the purpose of recycling or analysis at the time of parts replacement through the regulation of the Service. Please note that the collected parts are the property of the Company and will be recycled, used or discarded at its discretion.

7. Estimate for the Service

The estimate for the Service is basically free of charge. However, if the Company is unable to reproduce the failure, it will not be able to carry out repairs and will not provide an estimate. If a technical investigation is required to reproduce the failure, the Company will estimate the cost of reproducing the failure.

8. Return of unrepaired product

If the Company does not estimate the cost of the Service due to reasons such as being unable to reproduce the failure, it will return the Product for repair to the customer.

In addition, if the customer does not place an order within three months from the date of creation of the quotation, or if the customer does not accept the quotation and the customer expresses an intention not to carry out the repair, the Company will assume that the customer has canceled the request for the Service, and the Company will return the Product for repair to the customer without carrying out the repair.

In addition, if a shipping fee is incurred for returning the product, it will be borne by the customer.

9. Handling of personal information

The Company will properly handle personal information such as names and addresses being provided in accordance with the privacy policy posted on the Company's website.

10. Compensation for damages

A) The responsibility of the Company for providing the Service shall be limited to the matters and contents specified in the repair regulation, and shall not include any damages incurred by the customer due to special circumstances (including loss of profits of the customer and damages based on claims for compensation made by third parties against the customer) and damages caused by the customer being unable to use the product due to a failure or defect of the Product for repair. However, this does not apply if the damage was caused by the Company's willful misconduct or gross negligence.

B) Even if the Company is liable to the customer for damages in connection with the regulation of the Service, the Company's liability shall not exceed the amount equivalent to the value of the Product for repair, except in cases of willful misconduct or gross negligence on the part of the Company. The value of the Product for repair shall be calculated based on the residual value after depreciation or the price of products with equivalent performance sold in the market at the time of damage.

11. Additional notes

A) The Company cannot restore stickers, LCD protective sheets, and coloring applied to the outer casing parts that you have attached yourself. In addition, if advertisement stickers were affixed at the time of sale, they cannot be newly prepared as repair parts when replacing the outer casing parts. After replacing the outer casing parts, the advertisement stickers will be returned without being affixed.

B) Please note in advance that the information of the Product on the Company's website and in the catalogs, instruction manuals, technical materials, and other materials provided by the Company are subject to change without notice to customers.

HERUTU

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