PATLITE®

Wireless Data Acquisition System

User's Manual

[TYPE : WD-Z2]

Thank you for purchasing our PATLITE products. Prior to installation, be sure to read through this User's Manual for proper installation and precautionary steps. In addition, store this User's Manual for future reference when performing maintenance, repairs or inspections. When performing maintenance and repairs, etc., be sure to re-read this User's Manual. If there are any questions concerning this product, refer to the information on the last page to ask your nearest PATLITE Sales Representative.

Trademarks or Registered Trademarks

Important Notification

■ Purpose of Application and Use

This wireless acquisition data system (henceforth "Product") is for attachment to machinery with an existing Signal Pole, in which the change of state for the Signal Tower is sent via wireless to a receiver which then collects the data. Do not use this for any other purpose.

This product is not for the purpose of medical equipment, atomic energy equipment or machinery, aviation or aerospace machinery, transportation equipment or machinery, or the inclusion with the intent to control other equipment which involves human life or highly advanced reliability. If this product is used for such applications listed above which is the result of worker injury, this company is not liable.

In order to prevent any accidents with this product, do not use it for anything outside the intended use and follow the guidlines specified by this User's Manual.

■ Caution Before Use

- Be sure this product is turned off when inside an aircraft or hospital due to the radio wave emissions from this product causing possible interference within its range and the laws governing wireless systems.

- Contrary to the items of instruction depicted in this User's Manual, such as handling, disassembling, remodeling, natural disasters or such that is the result of breakdown will not be compensated.

- In addition, caution should be taken for safety measures as well as methods to prevent damage or injury, during normal operations and maintenance work, which is also not our liability.

- Our Company cannot predict all circumstances for hazards. Therefore, not every possible hazard has been able to be indicated in this manual. In order to prevent accidents other than what's indicated in this User's Manual, please be careful when performing maintenance or when operating this product.

- The copyright of the software is the property of this company.
  Do not make any modifications, copies or unauthorized use of this software in portions or as a whole without the proper written consent of this company.

- Any modifications of this product or software will affect the products performance, durability or maycause failure in operation.

- A safety and implementation directive is recommended to be put into practice for those who use this product.

- Although this product has a high level of privacy, because it transmits radio wave signals, it is possible that a third party can monitor it.

■ Regarding Laws and Regulations

This product is designed in conjunction with the laws and regulations for Radio Waves within Japan for the electrical communications industry laws to comply with the technical standards for terminal equipment acquisition (Specific radio equipment classification: 2nd Article, 1st Clause 19th item for 2.4MHz Band High Frequency Low Power Data Transmission System). Observe the following:

- Modifying of this product or changing the firmware is punishable under the Radio Law, therefore, under no circumstances shall it be tampered with.

- This company is not liable for any Illegal modifications of any kind to this product.

- By chance, if, radio frequency interference from this product occurs, then either change the frequency

being used, or stop the emission of radio waves (i.e. setup a partition) to avoid interference.

This product operates on a frequency band in the same range as medical equipment, microwave ovens and equipment for use in factory or similar industries, as well as radio stations which requires licenses, specific low power radio stations (radio stations which do not require licenses) and amateur radio stations (radio stations which do not require license).

1.   Before using this product, ensure there are no in-house radio stations presently in use, as well as specific low power radio stations or amateur radio stations in the vicinity.

2.   If by chance interference from this product affects an in-house radio station, immediately change the frequency being used, or stop radio wave emmissions and contact the following address to consult on how to prevent interference (i.e. establish a partition).

3.   Also, if from this product, trouble with interference from a low power radio station or amateur radio station occurs, contact the following address for consultation.

■ Regarding Laws and Regulations

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

- Do not use or store this product in the following places. Doing so may cause a glitch ormalfunction.
  - Poorly ventilated places
  - Near fire or a hot and humid place
  - Near equipment that generates an intense electric field or ferromagnetic field
  - A place subject to direct sunlight
  - A place subject to shock and vibration
  - Near heating devices
  - A place where a lot of dust or iron powder is generated
  - A place from which the product is likely to fall
  - A place exposed to salt air

- Pay attention to the following precautions:
  - Because of the nature of radio waves, noise or casing may make it impossible to establish communication even within the access range.
  - Do not eat, drink, or smoke near this product. Food or beverages or cigarette ashes may cause a malfunction.
  - Do not use chemicals near this product. Some chemicals may cause the product to melt or deform if they come into contact with it.

- This product has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation.
  This product generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation.
  If this product does cause harmful interference to radio or television reception, which can be determined by

turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

-- Reorient or relocate the receiving antenna.

-- Increase the separation between the equipment and receiver.

-- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

-- Consult the dealer or an experienced radio/TV technician for help.

- You are cautioned that changes or modifications not expressly approved by the party responsible for compliance could void your authority to operate the equipment.

- This product complies with FCC RF radiation exposure limits set forth for an uncontrolled environment. The antenna used for this transmitter must be installed to provide a separation distance of at least 20 cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter.

■ Concerning Disposal

For proper disposal, obey the laws of disposal in your area.

■ About This User's Manual

- In this User's Manual, changes or revisions of this product may be done without prior notice.

- The described figures in this User's Manual may vary in accordance to product applications. Also, portions of the figures in this User's Manual may be omitted to simplify explanation.

- The copyright of this User's Manual belongs to the PATLITE Corporation, Ltd. The drawings and technical information contained in this document is also the property of the PATLITE Corporation, Ltd., and cannot be copied or duplicated in any manner without proper consent.

- When transferring ownership of this product, please be sure to include this User's Manual as well asthe "Digest Version".

- If there is a need for detailed information, questions, or technical inquiry, please contact your nearest PATLITE Sales Representative.

■ Considerations for the Operating Environment

In regards to computer conditions, our company confirms the normal operation conditions have been satisfied before shipment. However, because characteristic configuration settings for the application, or addedperipherial equipment for individual computers may influence normal operation of this product, thereis no guarantee that there will be absolutely correct operation in the customer's environment.

For Safety

1. Safety Precautions

In order to prevent any damage to the user and other personnel or to assets, note the following:

1.1 Regarding Safety Symbols

◆ **The following symbol classifies and explains the level of harm inflicted when caution is disregarded while using the product.**

⚠ **Warning**	Displays the warning "Failure to follow warning may lead to death or severe injury".
⚠ **Caution**	Displays the warning "Failure to follow caution may lead from light to medium injury or maylead to property loss or injury to others".

◆ **The following symbols indicate and explains the nature of the information to be observed.**

🚫	This symbol indicates "prohibition", which should not be carried out.
❗	This symbol indicates "enforcement", which should be carried out by all means.

◆ **Along with the above description, the following indications describe important points.**

Please	Indicates something to observe before using this product. The disregard to this indication may lead to product malfunction or failure.
Note	Notice regarding supplementary information or convenient explanation is indicated.

1.2 Precautionary Items

■ **General Precautions**

⚠ Warning	
🚫 **Prohibited**	**Do not modify or disassemble the product.**
	Failure to comply may result in fire or electric shock.
	Do not use the product where condensation may form.
	Failure to comply may result in fire or electric shock.
	Do not use this product in the vicinity of pacemakers or electric medical equipment.
	Possibility of equipment being affected by electromagnetic waves may result.
	Turn the product off while in airplanes, hospitals, or other places where radio waves may affect surrounding equipment or where wireless devices are prohibited.
	Failure to comply may result in the range from equipment malfunction to FCC infringement.
	Please do not allow liquids to enter the receiver (WDR-LE-Z2) or contact with metals.
	Failure to comply may result in fire or electric shock.

⚠ Warning

Enforced	**Before product mounting and wiring, be sure to turn the power source off.** Failure to comply may result in electric shock.
	Please be sure the power source is in the voltage tolerance when using it. Failure to comply may result in fire or electric shock.
	Be sure to request the installation and wiring be performed by a professional contractor. Failure to comply may result in fire, electric shock or falling from a ladder, scaffold, etc.
	If smoke, odor, or other abnormalities are present, immediately stop supplying power to this product. Using the product under such conditions may result in fire or electric shock.

⚠ Caution

Prohibited	**Do not use or store under the following cases:** • In the location with poor ventilation or of such environment. • Near equipment which generates a strong electric field or strong magnetic field • Where its exposed to direct sunlight • The location where impact and heavy vibrations are applied • Near heating appliances • Locations where dust, iron powder, etc. are produced • Near high temperatures, such as open flames, or in a humid environment • A location in which the product may fall • A location exposed to salty or sea air • In a location exposed to where explosive or corrosive gasses are present Possibility of malfunction or failure may occur.
	Do not drink or smoke near this product. Liquid or tobacco ashes may cause failure to this product.
	Do not use chemicals nearby. Depending on the chemical, possibility of product disformation or discoloring may occur.
Enforced	**Ensure the power is at the correct polarity before insertion.** Failure to comply will result in damage to the power supply and product.

Please

• Do not install this product near the vicinity of other electrical appliances.
  Installation near Facsimiles, Computers, Televisions, Microwave Ovens or equipment using motors may causeimproper operation of this product.

• Operating under conditions indicated below where radio emission becomes narrower than the specifications maycause the product's response to slow down.

  · Steel doors or steel-enforced cement walls placed in between the transmitter and receiver.
  · Mounting surface for the transmitter or reciver made of steel.
  · Radio stations or strong radio waves in the vicinity.
  · High voltage lines or transmission lines in the vicinity.

• Please fully test in the customer's environment before installation.

Regarding Safety

- Please do not use in applications requiring high reliability and real-time characteristics.

  If faulty transmission occurs, data acquisition will not be accurate.

(Note)

- Even with proper radio reception, faulty communication may occur from surrounding noise, etc.

Regarding Safety

Before Use

2. Part Number Explanation

2.1 Individual Unit Type

■ **Transmitter**

WDT-□ -Z2

↑

Specification
6M: φ60 Signal Tower (LME Model)

5E : φ50 Signal Tower (LE Model)

■ **Receiver**

WDR-□ -Z2

↑

Specification
L :LAN/USB Connection

LE : LAN/USB Connection (Overseas Model)

Before Use

3. Product Composition

The purchased products contain the following items. Please verify that all items are included before use.

If, for any reason, any of the following items are not included, please contact the sales office where the product was purchased, or our PATLITE Sales office.

Please

- Be sure to put the User's Manual and additional accesories in a safe place.
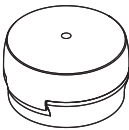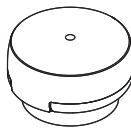
3.1 Individual Unit

■ Transmitter

WDT-6M-Z2 φ60 Signal Tower (LME Model)

Top Cover (Universal)	
	Assembled Drawing
Lens Assembly (Transmitter)	
Special Adaptor	
User's Manual Digest Version	Supplementary Operation Manual
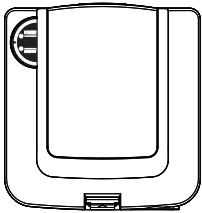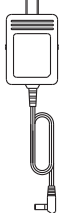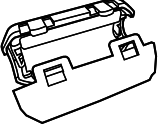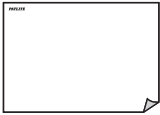
WDT-5E-Z2 φ50 Signal Tower (LE Model)

Top Cover (Universal)	
	Assembled Drawing
Lens Assembly (Transmitter)	
Special Adaptor	
User's Manual Digest Version	Supplementary Operation Manual

■ Receiver

WDR-L(E)-Z2

LAN Connection Type	AC Adaptor	Ferrite Core	User's Manual Digest Version
	*		

*only WDR-L-Z2

Before Use

Before Use

4. Wireless Network Summary

The transmitter is installed on the Signal Tower and the receiver is connected to the computer.

The change in the Signal Tower status is transmitted via wireless to the receiver.

The received data can be sent as output data from a LAN or USB serial connection to the computer.

WD-Z2 Series

Transmitter 5 Transmitter 1

Transmitter 3

Receiver

Transmitter 4 Transmitter 2

Normal Routing
Re-routing Path

Data collection and management possible.

Personal Computer

Wireless connection not made

WD Series

Transmitter 5 Transmitter 1

Transmitter 3

Receiver

Transmitter 4 Transmitter 2

Normal Routing
Re-routing Path
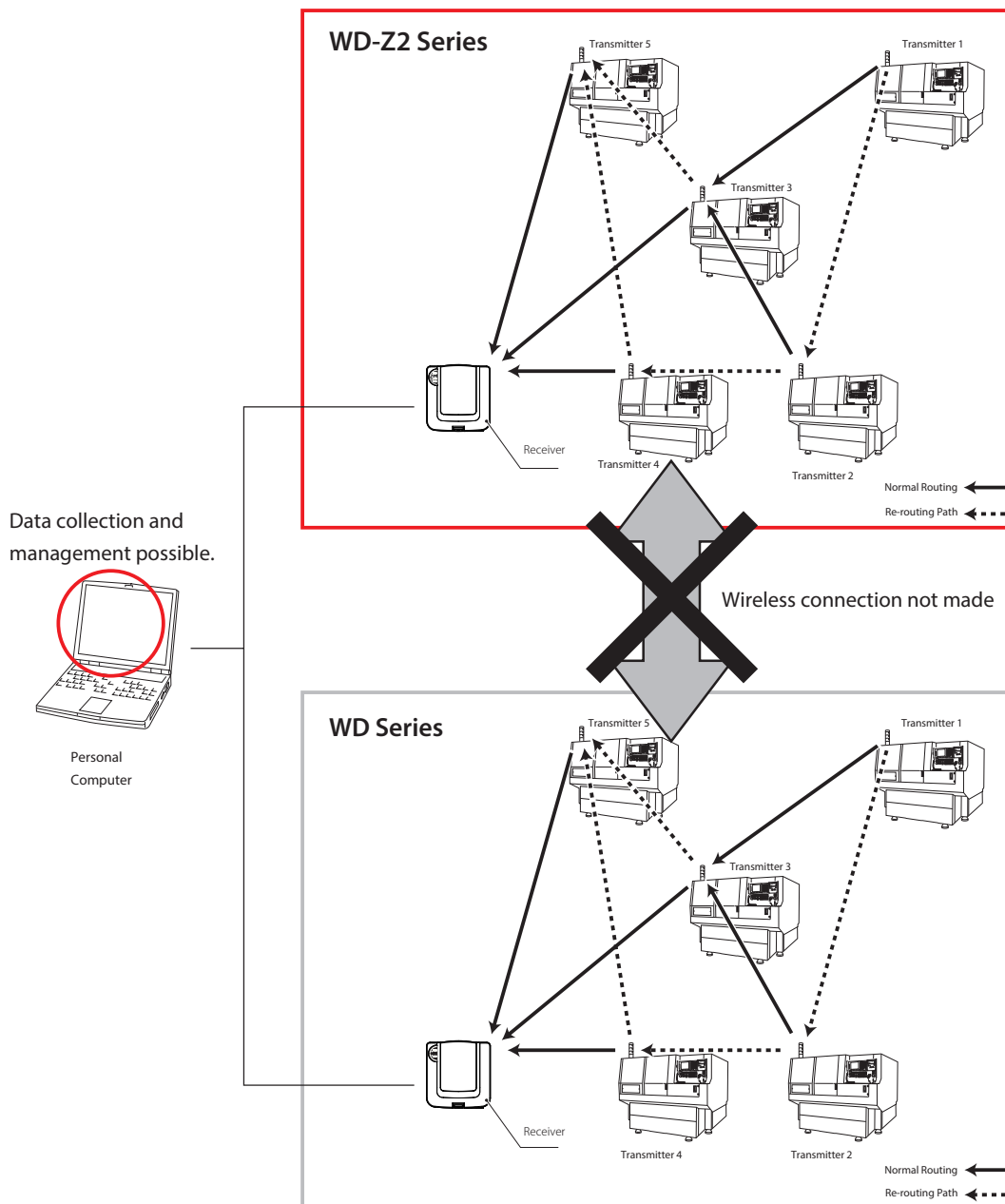
Note

The WDT-6M-Z2 and WDT-5E-Z2 transmitters can be used in unison with the WDR-LE-Z2 receiver.

Since the wireless standards between the WD Series version and WD-Z2 Series version varies, they cannot be used in unison between the two versions.

Since the protocol for the WD Series and WD-Z2 Series is compatible, data management is possible for connection to a personal computer.

Before Use

■ Wireless Multi-hopping Mesh Network

Transmitter C   Transmitter B

Transmitter D   Transmitter A   Transmitter G

Transmitter E   Transmitter F

Multi-hop network communication is flexible enough to change in response to radiocommunication circumstances.
The transmitted data mutuallyselects the best route for radio wave communication.
Even with modifications of the floor layout, datacommunication starts automatically from power-up.

Receiver

■ Relay (Hopping) Functions

This product can prevent a transmitter from acting as a relay (hopping) when multi-hopping is not needed.
Unnecessary hopping can be reduced because relay permission for each transmitter can be controlled.

Since its communication to the equipment is performed frequently, it does not want to act as a relay.

Transmitter B
Prohibit as a Relay

Transmitter E
Permit as a Relay

Obstacle

Since the equipment is far from a receiver, it will not act as a relay.

Transmitter A
Prohibit as a Relay
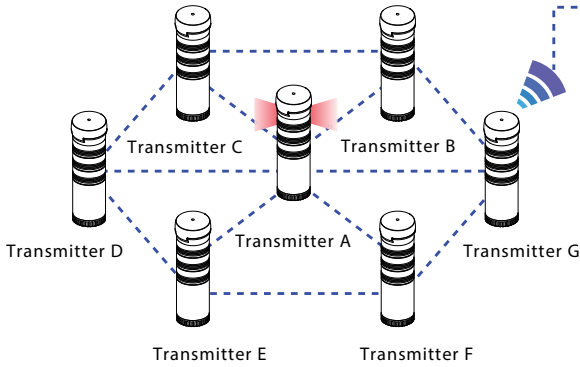
Transmitter C
Permit as a Relay

Since there is an obstacle, it does not want to act as a relay.

Transmitter D
Prohibit as a Relay

■ Routing Function

There is no need for complicated wireless or network settings, the automatic selection for a good route to carry data communication is done as soon as the power source is connected. In addition, when anobstacle impares the data transmission of the wirelesscommunication, the transmitter automatically searches for a different route to re-connect.

Transmitter A   Transmitter C   Transmitter E

Transmitter B   Transmitter D
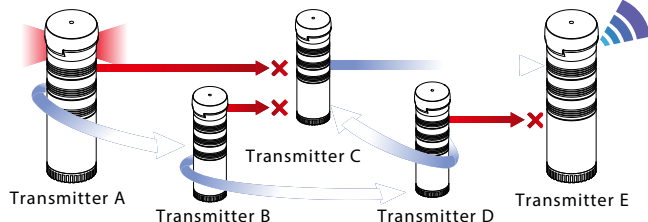
| Wireless Network - - - - | Stable Wireless Route ▷ | Unstable Wireless Route ➤ |

■ Security Communications

This product is always encrypting the data during wireless communications. The encryption method is AES-CCM (Advanced Encryption Standard-Counter with CBC-MAC) used as the code system, with a 128 bit key.

Note

- If all the transmitters are set to "prohibit as a relay", the number of
  connections with a receiver will become a maximum of 20 units.

4.2 Network Connections

The following exsplains the network connection capacity for the WD-Z2 series receiver and transmitter.

■ Maximum transmitters: 20 Units

On a ratio of receiver per transmitter, it is the maximum number of direct communications possible.

■ Maximum transmitters: 30 Units

It is the maximum number of transmitters connectable to one receiver.

* Depending on the transmitter's communication frequency and structure, a number below the maximum number may be necessary.

* The maximum number of connectable transmitters is 20 when all transmitters are set to be prohibited as relays.

■ Maximum Allowable Receiver Connections: 20 Units

It is the allowable number of receiver connections when used with the WDS Series sample application.

* If the receiver is used with the USB connection, the maximum number of receiver connections is only one unit.

■ Maximum Number of Hierarchies: 30

It is the maximum hierarchy number for connectability.
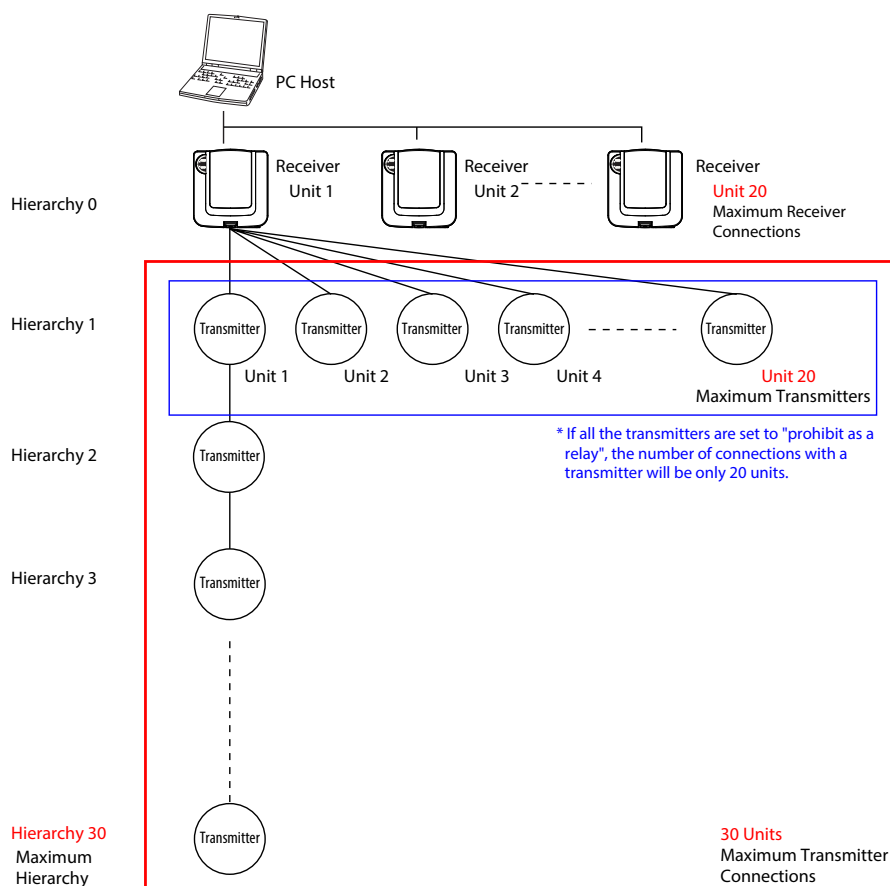
4.3 Function

■ Tiered Signal Tower Data Acquisition

1. Data from the lighted state of the Tiered Signal Tower is transmitted.

2. The data is forwarded from the transmitter to the host (computer, etc.) via the receiver.

3. With the computer application software, the data can be saved in the CSV format to be compiled.(Use the applicable software for compilation of CSV data)

■ Acquisition Data Practical Uses

< Example >

- Calculate the accumulated hours worked   => A green lamp can turn on for the total time calculated
- Calculate the rate of operation   => A ratio of hours worked can be calculated from the data
- Calculate equipment down-time   => A red light can turn on from the quantity of the data
- Calculate the length of down-time   => A red light can turn on from the calculated data
- Calculate equipment maintenance time   => A yellow light can turn on from the calculated data

4.4 Notice prior to application

Please

After obtaining this product, because some cases bring unsuitable results for a customer's use in their application, please verify the following items prior to operation.

- In order to raise the accuracy of data transmission, the receiver and transmitter will resend data between each other, but due to the characteristics of radio transmission, some data may not reach the receiver end due to packet loss, or the same data will arrive at the same receiver as duplicated data.

- This product conforms to the IEEE802.15.4 wireless-communications standard for the Zigbee 2007 directive, and therefore, the data exchange between radio modules is always performed internally.
  If the condition in which the characteristics of two or more transmitters are connected and simultaneous data transmission from two or more sets with frequent data transmission (continuation from a few to several ms in the ON/OFF state) are performed, the network layout may cause frequent delays with data, data duplication, or data packet loss due to the characteristics of wireless communication.
  In addition, depending on the network construction, communication cannot be completed due to the situation of an overload, because the overload makes it impossible to completely receive data.

- Below are two points listed to avoid the above situations from occurring at all possible.
  1. Ensure good communication quality (investigate the signal strength) in the desired environment.

  2. Verify the following if re-connection of a transmitter is frequently made, or when data overlaps, has frequent data packet loss or data duplication:
     - Data is acquired when sent from the individual transmitters to the host.
       <When the transmitter mode is made into the "response transmission mode", the Signal-Tower information can be acquired by a transmitter request command transmission.>
     - Reduce each transmitter per receiver to reduce the load and reconnect the network to reduce the communication load generated.
       Please examine which method.

- The sample application (Downloadable from our Homepage) offered by our company is a simple tool to demonstrate to the customer on how the functions of this product works. Please note the following points before operation:
  1. The sample application is not designed for prolonged continuous use. If the software is to be used for prolonged use, it is recommended that the sample application be rebooted periodically after several days, or the customer design and develop a software application before utilizing the product.

  2. The CSV data is in its original format so that it may be easy to process the status change information for the Tiered Signal Tower. If a data format other than CSV is required, it is the duty of the customer to design and develop the required application and it is authorized to utilize this product to change the format.

- Three modes are available to determine a flashing condition: Normal, medium speed, and low speed.
  When setting the "Flashing Judgement" from "Standard" to "Moderate" or "Slow", there will be a delay in the Signal Tower's condition because it takes time to determine the condition based on the delay when setting to a lower speed since the flashing has become longer (Ex.: The maximum delay of 5 seconds for the "Slow" setting).（Refer to pg. 35 "8.3 Manage Frequently-changing Status Systems"

Before Use

Before Use

5. Part Names and Dimensions

5.1 Transmitter

Before Use

■ WDT-6M-Z2

WDT-6M

Φ 65mm

36.9mm

Indicator Lamp

Φ 60mm

Signal Tower (LME)
Installation Image

Top Cover

MAC Address

Lens Assembly

Special Adaptor

■ WDT-5E-Z2

WDT-5E

Φ 65mm

38.5mm

Indicator Lamp

Φ 50mm

Signal Tower (LME)
Installation Image

Top Cover

MAC Address

Lens Assembly

Special Adaptor
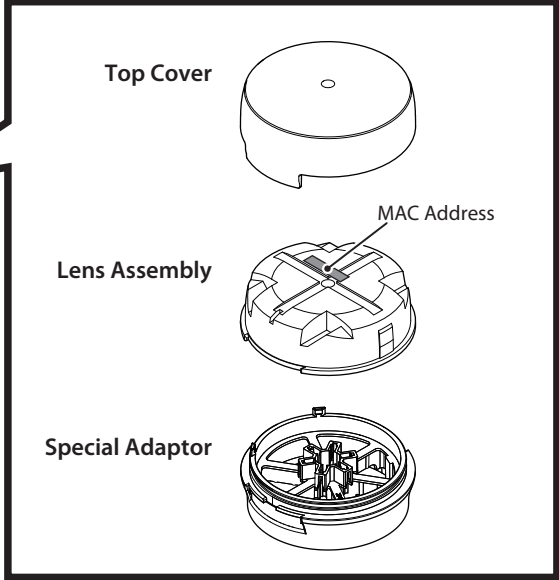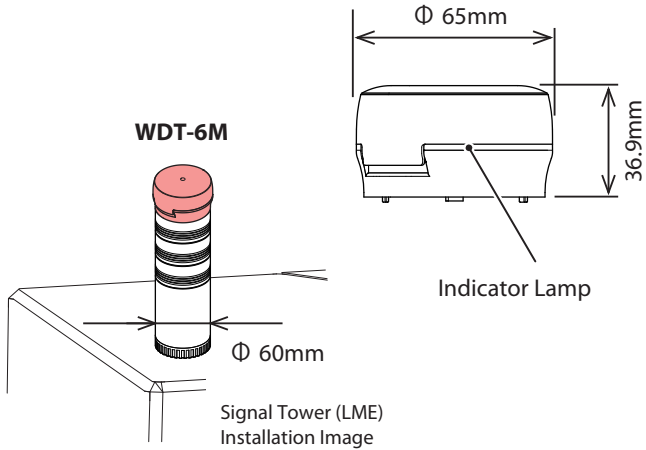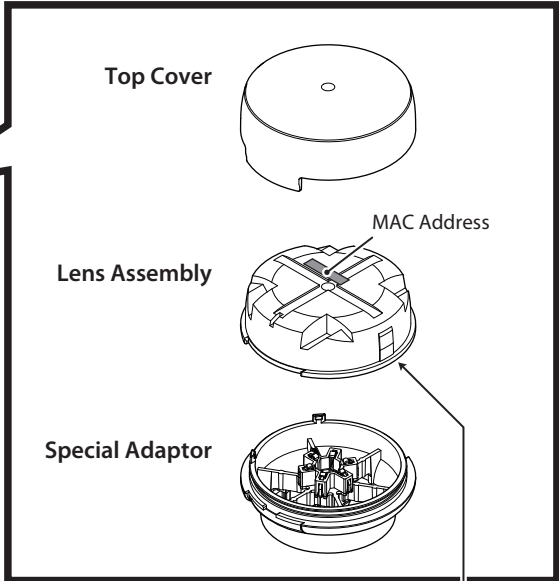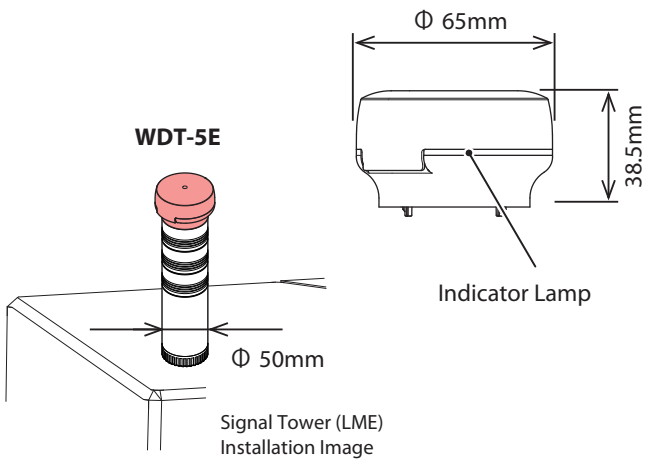
DIP Switch

For normal operation be sure all
switches are in the "OFF" position.

1 : Wireless Module Factory Setting
   (Refer to pg. 41)
2 : Not Used
3 : Not Used
4 : Not Used
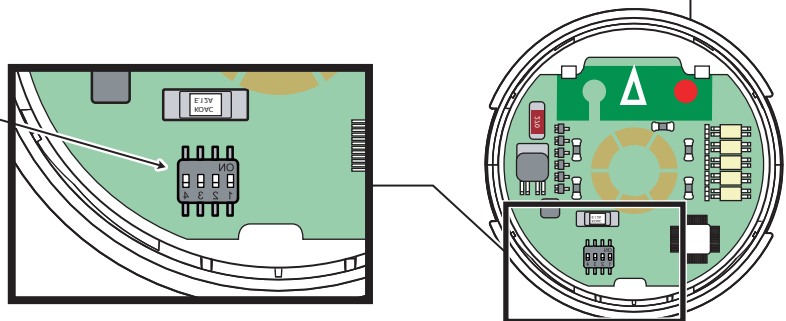
Under-side View of Lens Assembly

5.2 Receiver

■ WDR-L(E)-Z2

【WDR-L(E)-Z2 Contents】

125mm

131.8mm

Power LED（Green）

Output
LED（Red）

LAN Connector
(RJ45)
For LAN Use

USB-B Connector
(Receptacle)
For USB Use

Power Terminal
(DC24V Input)

DC Jack
For use with
Optional AC Adaptor
（For Japan Only）

Connection
Terminal

Wire Hole
（Wall Side）

Wire Hole (Bottom)

31.5mm

38.8mm

Cable Gland Mounting Hole
（Break-out）
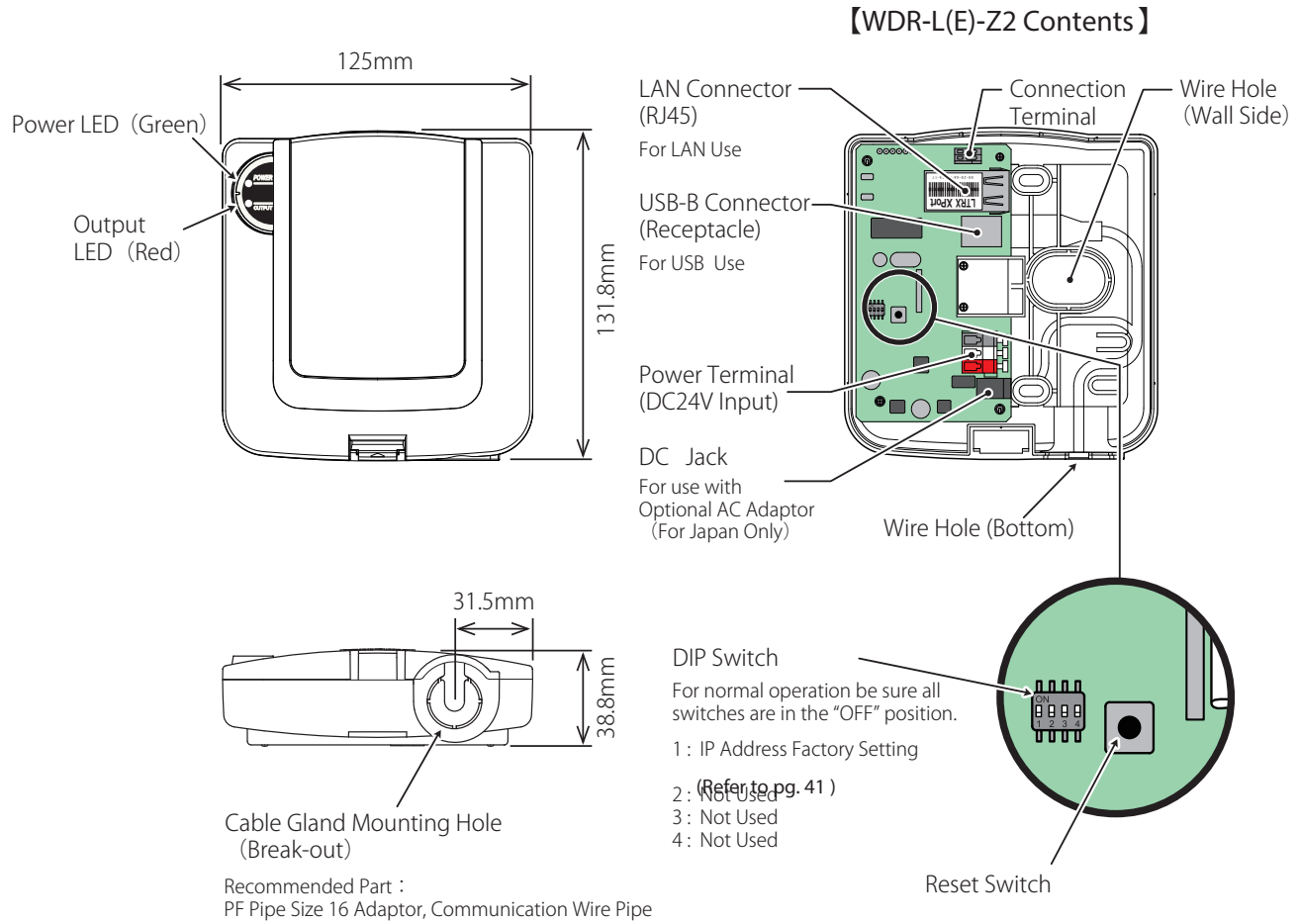
Recommended Part：
PF Pipe Size 16 Adaptor, Communication Wire Pipe

DIP Switch

For normal operation be sure all
switches are in the "OFF" position.

1 : IP Address Factory Setting

2 : Not Used （Refer to pg. 41）
3 : Not Used
4 : Not Used

Reset Switch

15

Installation

6. Installation

6.1 Important Notice for Installation

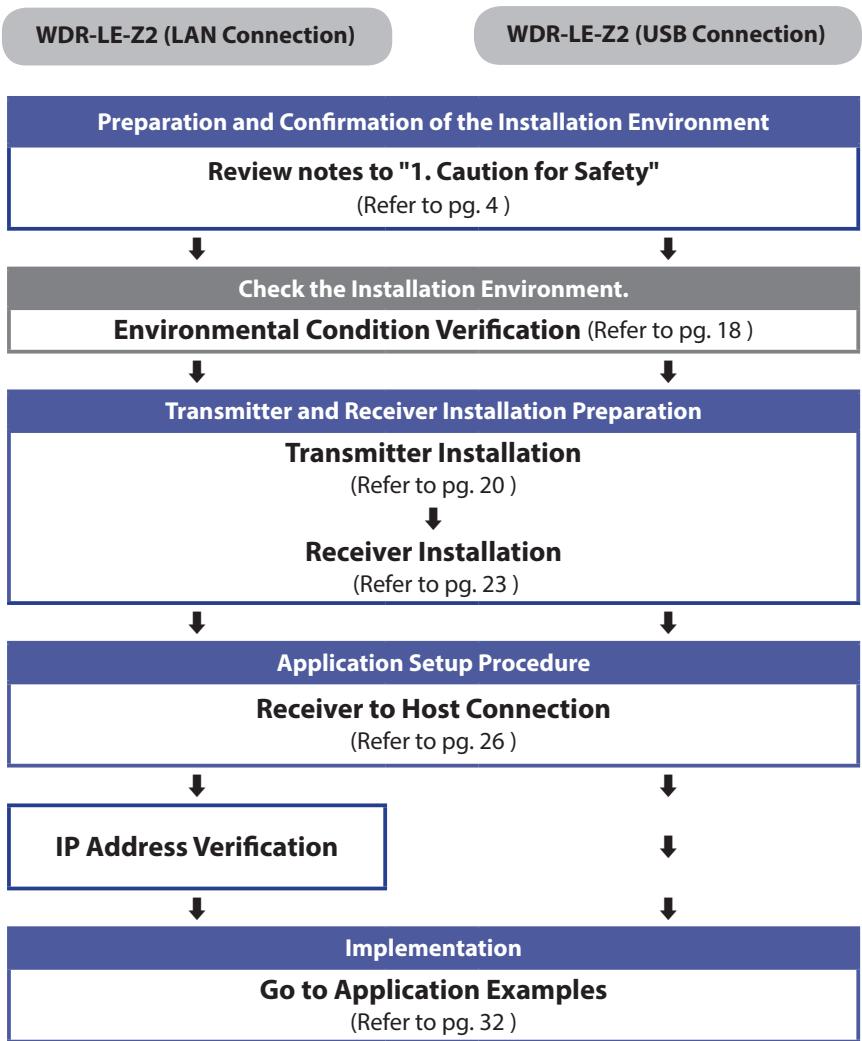| ⚠ Warning	
❗ Enforced	**Before product mounting and wiring, be sure to turn the power source off.** Failure to comply may result in electric shock.
	Be sure the wiring is correct. Possible error in wiring may cause fire or result in product failure.
	Be careful when working in a narrow or high place when installing product. Failure to comply may result in injury.
	Be sure to request the installation and wiring be performed by a professional contractor. Failure to comply may result in fire, electric shock or falling from a ladder, scaffold, etc.
	Be sure of proper footing during installation. Failure to comply may result in fire, electric shock or falling from a ladder, scaffold, etc.
	Be sure parts or tools do not fall or are dropped from high places during installation. Failure to comply may result in hitting and injuring a passer-by with falling items.

Installation / Application

6.2 Process Flow

The following is a flow chart to guide through the preparation for installation. Please follow the guidelines to this procedure.

WDR-LE-Z2 (LAN Connection)   **WDR-LE-Z2 (USB Connection)**

Preparation and Confirmation of the Installation Environment

Review notes to "1. Caution for Safety"
(Refer to pg. 4)

⬇   ⬇

Check the Installation Environment.

Environmental Condition Verification (Refer to pg. 18)

⬇   ⬇

Transmitter and Receiver Installation Preparation

Transmitter Installation
(Refer to pg. 20)
⬇
Receiver Installation
(Refer to pg. 23)

⬇   ⬇

Application Setup Procedure

Receiver to Host Connection
(Refer to pg. 26)

⬇   ⬇

IP Address Verification

⬇   ⬇

Implementation

Go to Application Examples
(Refer to pg. 32)

Installation / Application

6.3 Environmental Condition Verification

This is a product which uses wireless communications.

Confirm the environment is appropriate for wireless communication before installation.

■ Verify the following before installation:

◊ Are there other wireless products, such as wireless LAN, in the vicinity?

◊ Is there other wireless equipment besides ours being used?

◊ Are the circumstances for using electric waves for this product satisfactory?

◊ Is the fixed position of the receiver relevant? (Installation position, height, bracket, etc.)

◊ Is the power supply for receivers secured?

◊ Was confirmation that the power supply line of the Tiered Signal Tower which attaches to the transmitter been made?
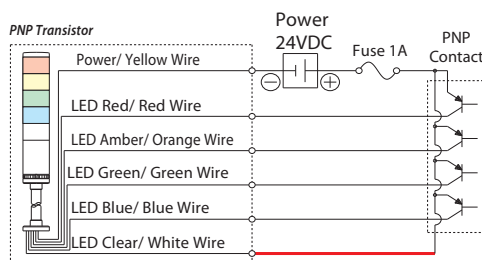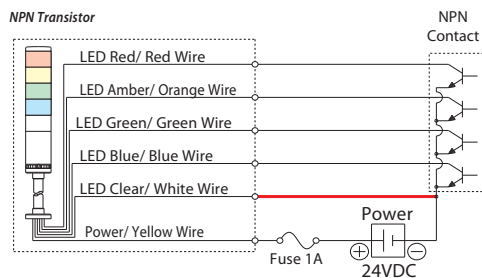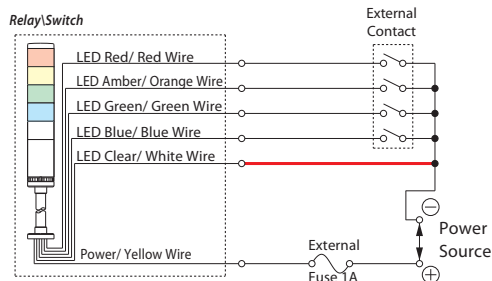
The transmitter has to have a power supply in order to operate.

As shown in the following figure, always supply power from one open signal line to be used as the power supply.

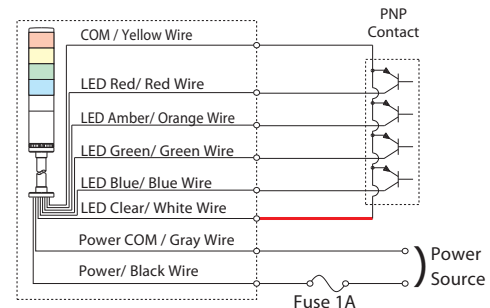(The example shows the white signal line as a supply for power)

LME/LES
■ AC/DC 24V Type

The signal line (the figure indicates the white line) is assigned as the power supply source and the power supply is the source line (Yellow) to supply power to the unit.

Relay\Switch

External Contact

LED Red/ Red Wire
LED Amber/ Orange Wire
LED Green/ Green Wire
LED Blue/ Blue Wire
LED Clear/ White Wire
Power/ Yellow Wire

External Fuse 1A

Power Source

■ AC 100/120/220/230 -240V Type

The signal line (the figure indicates the white line) is assigned as the power supply source and the power supply is the source line (Yellow) to supply power to the unit.

External Contact

LED Red/ Red Wire
LED Amber/ Orange Wire
LED Green/ Green Wire
LED Blue/ Blue Wire
LED Clear/ White Wire
Lighting/ Yellow Wire
Power COM / Gray Wire
Power/ Black Wire

External Fuse 1A

Power Source

NPN Transistor

NPN Contact

LED Red/ Red Wire
LED Amber/ Orange Wire
LED Green/ Green Wire
LED Blue/ Blue Wire
LED Clear/ White Wire
Power/ Yellow Wire

Fuse 1A

Power 24VDC

NPN Contact

LED Red/ Red Wire
LED Amber/ Orange Wire
LED Green/ Green Wire
LED Blue/ Blue Wire
LED Clear/ White Wire
Flashing COM/ Brown Wire
Power COM / Gray Wire
Power/ Black Wire

Fuse 1A

Power Source

PNP Transistor

Power 24VDC   Fuse 1A

PNP Contact

Power/ Yellow Wire
LED Red/ Red Wire
LED Amber/ Orange Wire
LED Green/ Green Wire
LED Blue/ Blue Wire
LED Clear/ White Wire

PNP Contact

COM / Yellow Wire
LED Red/ Red Wire
LED Amber/ Orange Wire
LED Green/ Green Wire
LED Blue/ Blue Wire
LED Clear/ White Wire
Power COM / Gray Wire
Power/ Black Wire
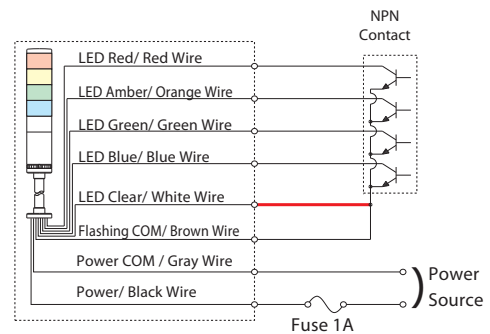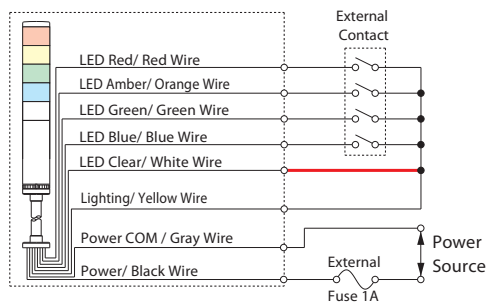
Fuse 1A

Power Source

Installation / Application

LE(L)/LES
■ AC/DC 24V Type

The signal line (the figure indicates the white line) is assigned as the power supply source and the power supply is the source line (Black) to supply power to the unit.

■ AC 100/120/220/230 -240V Type

The signal line (the figure indicates the white line) is assigned as the power supply source and the power supply is the source line (Yellow) to supply power to the unit.
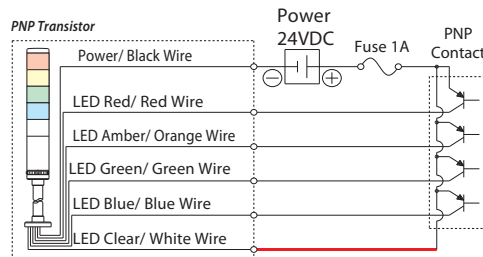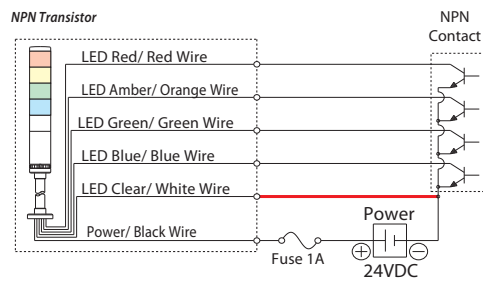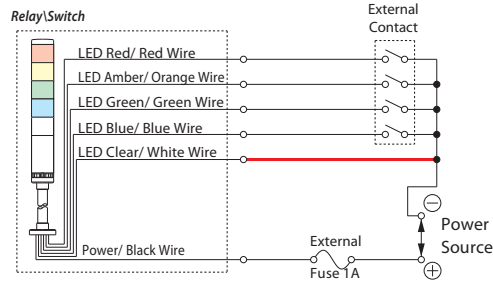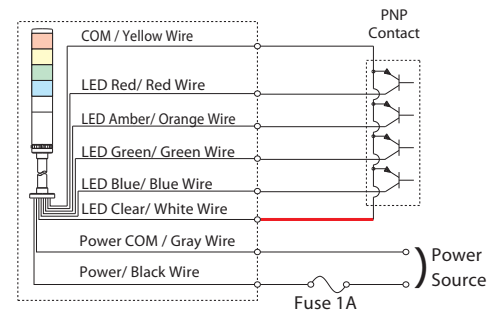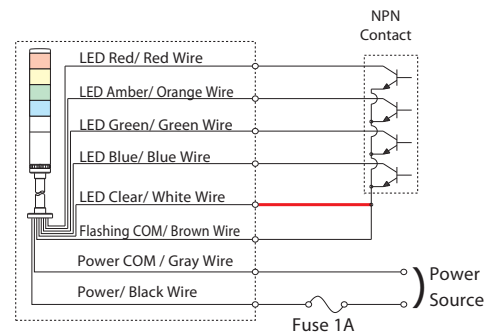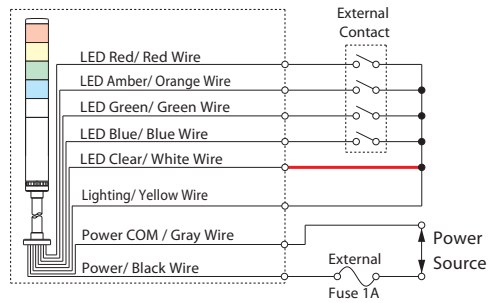
Relay\Switch

External Contact

LED Red/ Red Wire
LED Amber/ Orange Wire
LED Green/ Green Wire
LED Blue/ Blue Wire
LED Clear/ White Wire

Power/ Black Wire
External Fuse 1A
Power Source

External Contact

LED Red/ Red Wire
LED Amber/ Orange Wire
LED Green/ Green Wire
LED Blue/ Blue Wire
LED Clear/ White Wire
Lighting/ Yellow Wire
Power COM / Gray Wire
Power/ Black Wire
External Fuse 1A
Power Source

NPN Transistor

NPN Contact

LED Red/ Red Wire
LED Amber/ Orange Wire
LED Green/ Green Wire
LED Blue/ Blue Wire
LED Clear/ White Wire
Power/ Black Wire
Fuse 1A
Power 24VDC

NPN Contact

LED Red/ Red Wire
LED Amber/ Orange Wire
LED Green/ Green Wire
LED Blue/ Blue Wire
LED Clear/ White Wire
Flashing COM/ Brown Wire
Power COM / Gray Wire
Power/ Black Wire
Fuse 1A
Power Source

PNP Transistor

Power 24VDC
Fuse 1A
PNP Contact

Power/ Black Wire
LED Red/ Red Wire
LED Amber/ Orange Wire
LED Green/ Green Wire
LED Blue/ Blue Wire
LED Clear/ White Wire

PNP Contact

COM / Yellow Wire
LED Red/ Red Wire
LED Amber/ Orange Wire
LED Green/ Green Wire
LED Blue/ Blue Wire
LED Clear/ White Wire
Power COM / Gray Wire
Power/ Black Wire
Fuse 1A
Power Source

Installation / Application

Note

- Our company can offer a wireless environmental surveilance application prior to an installment. Please use it after downloading from our homepage.

- For instructions on how to use the application prior to installation, refer to a seperate manual for the WDS software.

- A setup service for this product can be provided for a fee.
  For detailed information or if there are any questions concerning this product, feel free to contact your PATLITE Sales Representative.

6.4 Transmitter Installation

| ⚠ Warning	
Enforced ❗	**Be sure of proper footing during installation.** Failure to comply may result in fire, electric shock or falling from a ladder, scaffold, etc.
	Be sure parts or tools do not fall or are dropped from high places during installation. Failure to comply may result in hitting and injuring a passer-by with falling items.
	Be careful when working in a narrow or high place when installing product. Failure to comply may result in injury.
	If oil etc. adheres to the center screw, please wipe it off before use. Failure to comply may result in product malfunction.

⚠ Caution	
Prohibited 🚫	**Do not use the special adaptor for anything other than attaching it to the Signal Tower.** Failure to comply may result in damage to the product or part.
	Do not leave the center screw untightened. Failure to comply may result in causing the LED Unit, Head Cover or Special Bracket to fall off.
	Do not apply excessive force when tightening the center screw. Failure to comply may cause screw thread damage, resulting in a loose LED Unit and product malfunction.

■ **Please verify before installation:**

- Proper tools and parts are obtained.

- Preventative measures are made to prevent any accidents if tools, etc. are dropped.

- The MAC Address of a transmitter is checked and the MAC Address and the installation place name are recorded.

```
ZB24TM-Z2701
SNXX-0A-XXXXX
XXXXXXXXXXXXXXX
```

MAC ADDRESS

Installation / Application
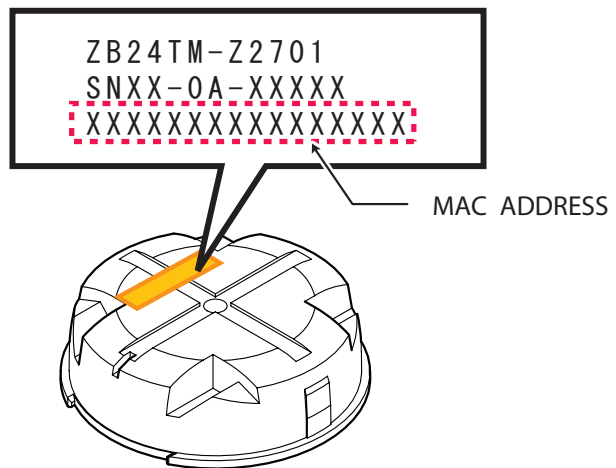
■ WDT-6M-Z2 and WDT-5E-Z2

Attach according to the figure to the right.

The figure refers to the LE series and WDT-6M.

A Special Adaptor is made for the LME Series.

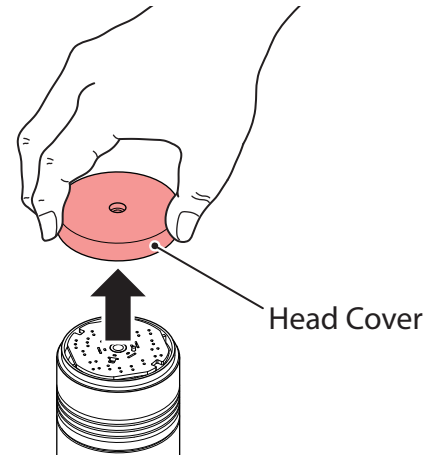**1** **Turn the power off before installation.**

2 **Unscrew the center screw then pull straight out to remove.**

Center Screw
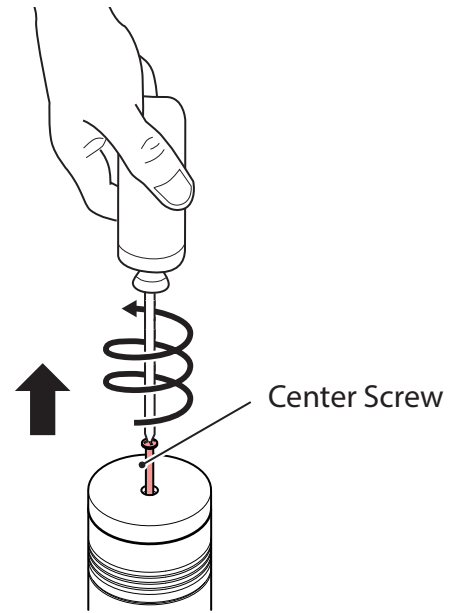
3 **Remove the Head Cover.**

Please

- After removal, store the Head Cover for future use.

Head Cover

4 **Attach the Special Adaptor to the Signal Tower.**

Referring to the figure on the right, check the place where the tabs meet and snap into place with the Special Adaptor attached.

Please

- Be sure the mounting orientation of the Bracket is correct.
- Be sure not to touch or that there is no oil, dirt or such that can inhibit connection to the metal connectors of the Adaptor.

Tab Location

Tab Hole Location
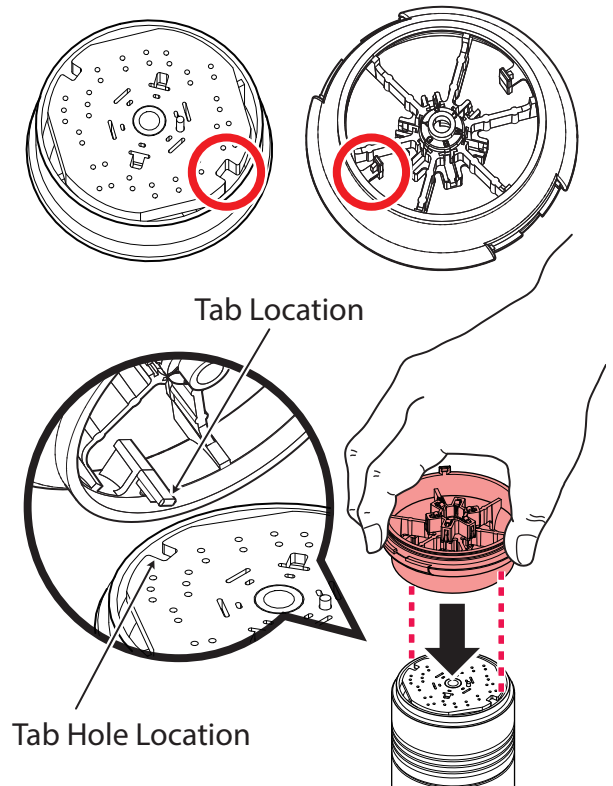
5 **Push the center screw straight through, then tighten.**
(Recommended Torque: 0.2 - 0.3N/m)

> **Please**
>
> - Do not overtighten the Center Screw. If overtightened, the possibility of internal damage may occur.
>
> - If oil etc. adheres to the center screw, please wipe it off before use. Failure to comply may result in product malfunction.
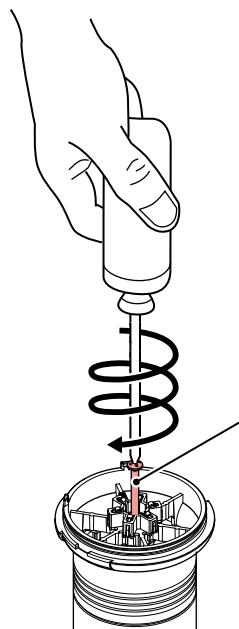
6 **Align the triangle marks (indicated on the inside of the Top Cover) with the marks on the lens and attach.**

Head Cover

Lens Assembly
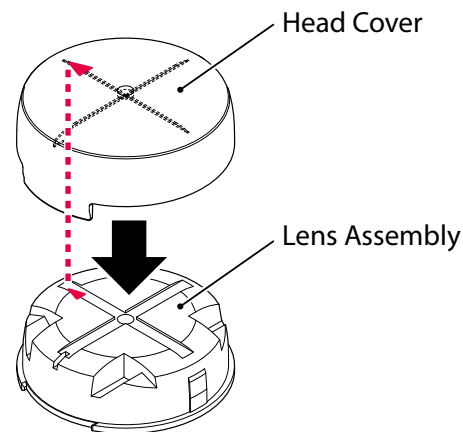
7 **From procedure 6, attach the Special Adaptor to the assembled Top Cover indicated above.**

Referring to the figure on the right, match the tab width of the Top Cover to the guide width of the Adaptor and attach.

> **Please**
>
> - Insert the cover until the tab snaps into place.

Tab Width

Guide Width

> **Please**
>
> - The white signal wire for the Signal Tower is set as the default power source for the transmitter.
>   Please use the white signal wire as the power for the Signal Tower.
>   When using a signal wire other than the white signal wire, be sure to change the power source setting.
>
> - The MAC Address is required for equipment identification. Please record the MAC address number.

Installation / Application
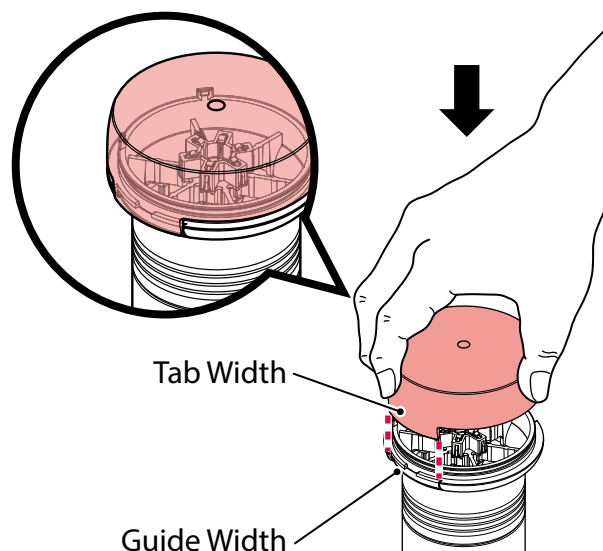
6.5 Receiver Installation

⚠ Warning	
🚫 **Prohibited**	**Do not allow the Receiver(WDR-L(E)-Z2) to be in contact with water or other liquids, nor subject it to a highly dusty or humid environment.** Failure to comply may result in fire, electrocution or product malfunction.

⚠ Caution	
❗ **Enforced**	**After breaking-out the wiring hole, be sure no burs remain.** Friction from wire rubbing against burs may result in wire disconnection.
	Be careful while breaking-out the wiring hole. Failure to comply may result in injury.
	Use the power source from either the DC Jack, or the Power Terminals, not both of them. Possible cause of failure may occur.
	Before product mounting and wiring, be sure to turn the power source off. **Be sure not to exert pressure on the receiver's PC Board during installation.** Possible cause of failure may occur.

■ **WDR-L(E)-Z2**

Refer to the following drawings for mounting and wiring.

1 **Remove the Top Cover.**

2 **Break-out the Wire Hole.**

Wire Hole (Backside)
If using the backside, remove the break-out (indicated in red) with nippers.
**Wire Hole (Bottom)**
In case the hole is too small for wiring, use nippers to remove the break-out (indicated in red) for a larger hole.

3 **When mounting the receiver, tap a hole for an M4 sized screw or for a 4mm diameter.**

Note
- The screw is not attached.
 The thickness of the receiver casing is 3mm. Select the proper screw length in consideration of the thickness.

Cover

Wire Hole (Wall)

Wire Hole (Bottom)

83.5mm

Screws

Installation / Application
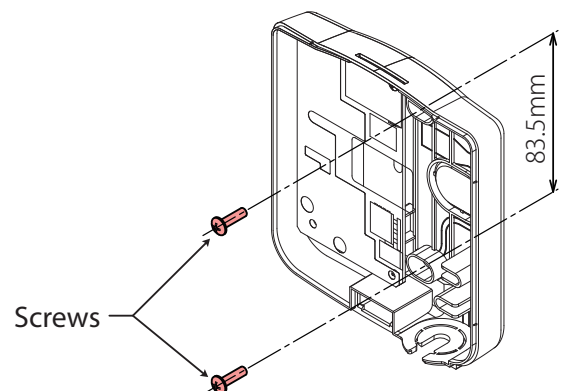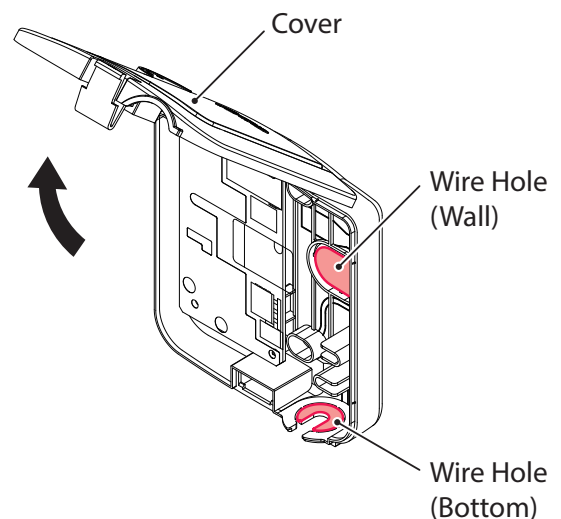
4 Connect the wiring to the receiver.

(For USB Connections)

(1) Plug the USB cable into the USB-B connector (Receptacle).

> **Note**
>
> - The USB Cable is not included.
> - Use the two guides for placing the cable.
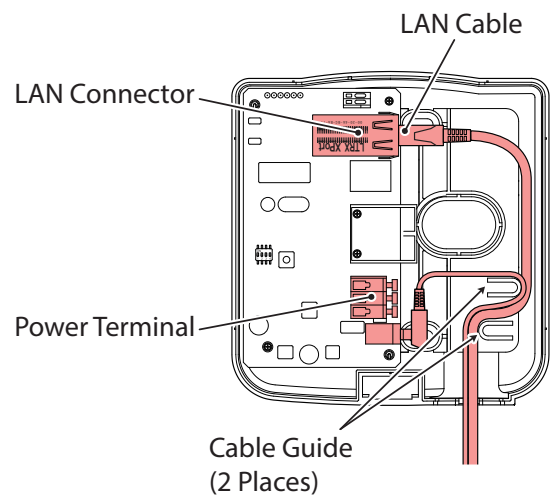> - When using the USB connection, the LAN connection cannot be used.

USB Cable

USB-B Connector
(Receptacle)

Cable Guide
(2 Places)
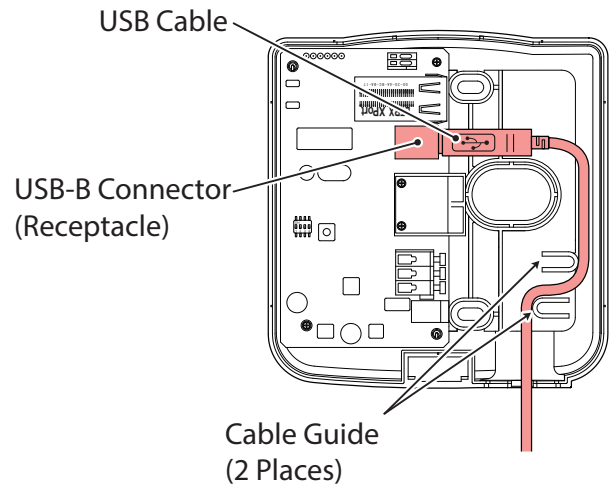
(For LAN Connections)

(1) Plug the LAN cable into the LAN connector.

(2) Connect the power.

　(Use the Power Terminal indicated in red)

> ⚠ **Caution**
>
> Before connecting the LAN cable to LAN connector,
>
> be sure to turn off the power.
>
> Possible cause of failure may occur.

> **Note**
>
> - The LAN cable is not included.
> - Use the two guides for placing the cable.

LAN Cable

LAN Connector

Power Terminal

Cable Guide
(2 Places)

Power Terminal

Black: Connect to FG

White: Connect to Negative

Red: Connect to Positive
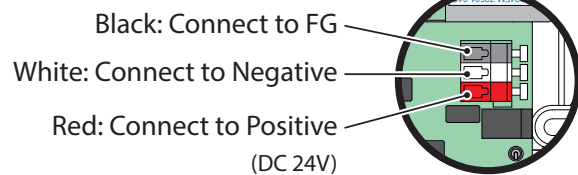
(DC 24V)

- When using the power terminals, use the ferrite core(included) as indicated in the drawing to the right.
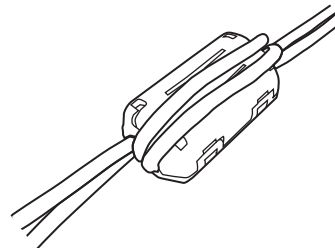
■ Contact Output Connections

Please

- When connecting, use between AWG 24 and AWG 20 wire.
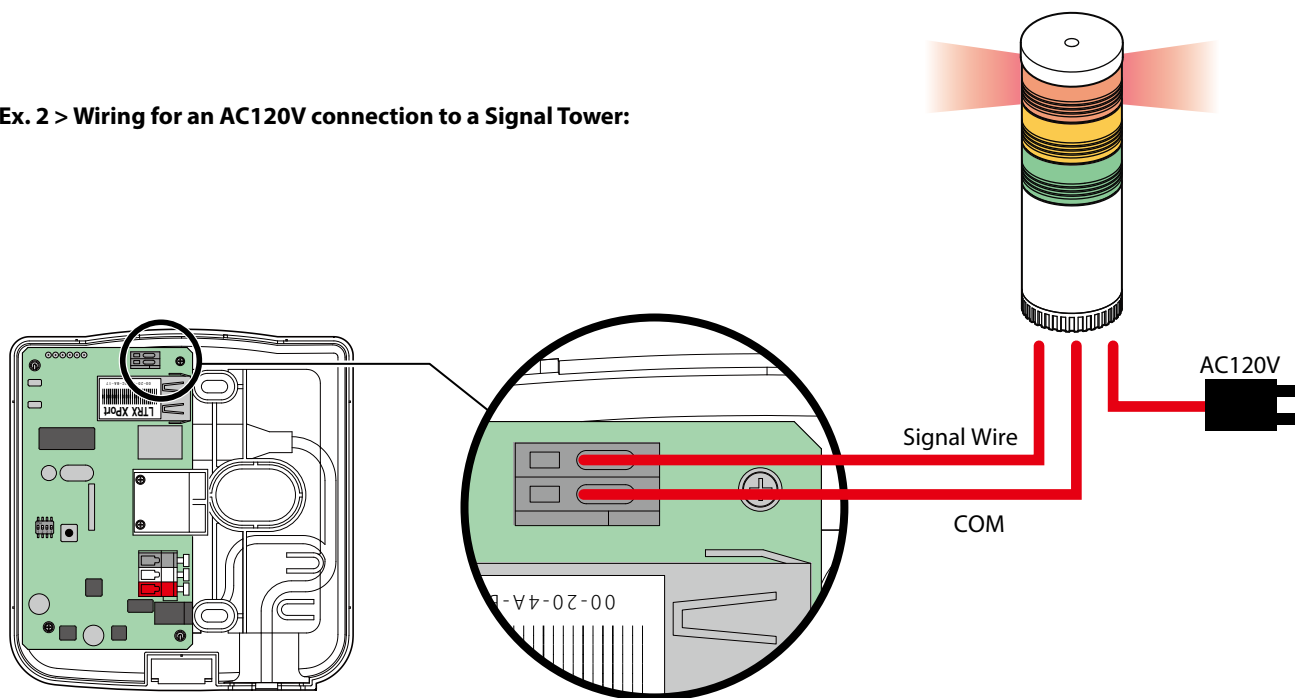
Note

- The Contact load is DC24V, at 500mA.

- When using the contact output, use the control commands for the contact control.

< Ex. 1 > Wiring for a DC24V Application:

Negative (-)   (+) Positive

Signal Wire

DC24V
Power
Supply
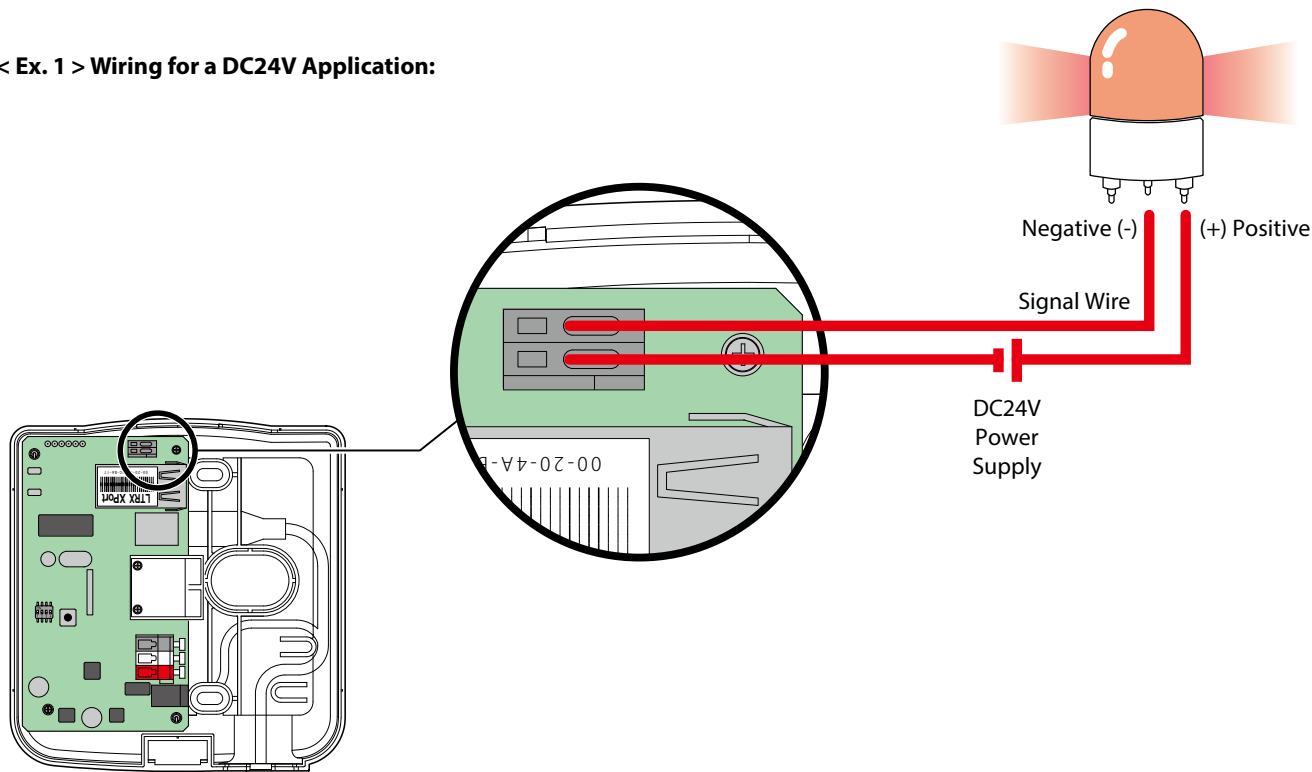
< Ex. 2 > Wiring for an AC120V connection to a Signal Tower:

AC120V

Signal Wire

COM

Installation / Application

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Application

7. How to Operate

7.1 Important Notice

⚠ Warning	
🚫 **Prohibited**	**Do not use the product where condensation may form.** Failure to comply may result in fi re or electric shock.
	Do not use this product in the vicinity of pacemakers or electric medical equipment. Possibility of equipment being affected by electromagnetic waves may result.
	Turn the product off while in airplanes, hospitals, or other places where radio waves may affect surrounding equipment or where wireless devices are prohibited. Failure to comply may result in the range from equipment malfunction to FCC infringement.
❗ **Enforced**	**If smoke, odor, or other abnormalities are present, immediately stop supplying power to this product.** Using the product under such conditions may result in fire or electric shock.

Please

- Prior to product installation, ensure the power has been disconnected.
- Please do not make a personal computer into suspend mode, a rest mode standby mode, etc. Allowing to do so will disable data communications between the computer and receiver.
- Please fully test in the customer's environment before installation.

Note

- Even with proper radio reception, faulty communication may occur from surrounding noise, etc.

7.2 Receiver to Host Connection

■ Please verify before installation:

- Check that the power supply to the receiver is applied.
- Installation of a USB driver is required to connect with a personal computer. When connecting to anything other than a computer, perform the setup in conjunction to the customer's environment.
- The driver is included with the installation of the sample application (WDS application).
  When using the USB connection, be sure to include the USB driver installation, after downloading the WDS application from our homepage.
- Our company offers a simple CSV output format which is included in the sample application for the wireless setup of the Signal-Tower status information. Please use it after downloading from our homepage.
- For instructions on how to use the application prior to installation, refer to a seperate manual for the WDS software.

■ For USB Connection (WDR-L(E)-Z2)

⚠ Warning
🚫 **Prohibited**   **Do not allow the Receiver(WDR-L(E)-Z2) to be in contact with water or other liquids, nor subject it to a highly dusty or humid environment.** Failure to comply may result in fire, electrocution or product malfunction.

⚠ Caution
🚫 **Prohibited**   **Do not use in a location where water, metal powder or oil mist is present.** Failure to comply may result from fire, electric shock to USB malfunction.

Please

- USB hub connections are not supported. Connect the WDR-U directly to the USB port of the computer.
- When using the USB connection, the LAN connection cannot be used. Therefore, do not connect the LAN cable when using the USB connection.
- Do not use USB cables longer than 3 meters. Failure to comply may result in noise generation in the cable, causing malfunction.

1 **Connect the USB to the computer port.**

(For WDR-L(E)-Z2 USB Connections)

Plug the USB cable into the computer USB port to connect to the receiver.

Note

- The USB Cable is not included.

➡ The [New Hardware] detection wizzard will start when the USB has been connected for the first time.

➡ For instructions on the driver installation, refer to the WDS application operation manual for driver installation.

Installation / Application
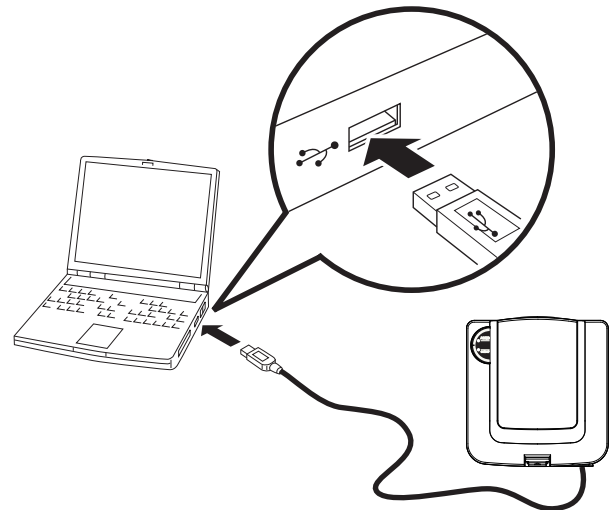
■ For LAN Connection (WDR-L(E)-Z2)

⚠ Caution
⚠ Enforced — **Ensure the power is at the correct polarity before insertion.** Failure to comply will result in damage to the power supply and product.

1 **Connect the LAN cable to the computer LAN port.**

Please

- Use a cross cable when connecting a receiver directly to a personal computer.
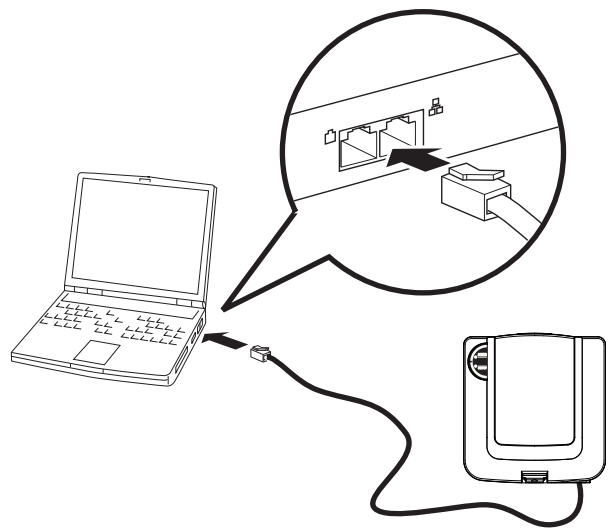
2 **Turn the power on.**

(For Power Terminal Inputs)
When connecting, the red is positive (DC24V) and the white is negative (Gnd).

Please

- Use AWG12 to AWG28 for the DC power terminal.
- Use AWG20 to AWG24 for the contact terminal.

Power Terminal

Black: Connect to FG

White: Connect to Negative

Red: Connect to Positive

(DC 24V)

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■ Caution for LAN Use

· Verify the IP Address of the computer prior to connection.
  * The default IP Address value for the receiver is set as "192.168.0.1", the subnet address is "255.255.255.0".
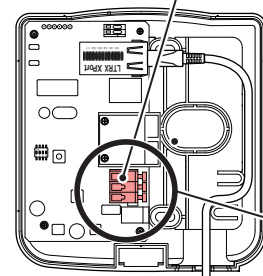
· When it is necessary to change the IP Address to the receiver when connecting to the Intranet LAN, Use the "Device Installer" to change the settings.

· When making a direct connection to the computer LAN port, a cross LAN cable should be used.

> **Note**
>
> · Refer to the LANTRONIX (R) Inc. Homepage for use of the "Device Installer".
>
> · Use the Device Installer after downloading it from our homepage, or to to the LANTRONIX (R) Homepage for updated versions.

7.3 IP Address Configuration Steps

The following describes the process in changing the IP Address, using browsers such as Internet Explore.
When using the Device Installer to change two or more receivers, refer to the WDS application operation manual.

■ Personal Computer and Receiver Connection Verification

1 **Connect the receiver to the personal computer with a LAN cable.**
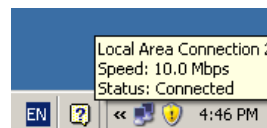
➡ When connecting a personal computer with a receiver directly, it is necessary to use a cross cable.

➡ The IP Address default value for the receiver is 192.168.0.1. Verify the IP Address of the computer prior to connection. If the personal computer's IP address cannot be found, it is impossible to set up the receiver.

➡ If the connection cannot be set up, request assistance from the system administrator to set it up correctly.

2 **After connection, enter the IP Address for "192.168.0.1"in the browser.**
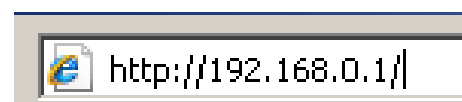
➡ The following explains the use with Internet Explorer.

➡ If the IP address to the receiver has been changed, enter the new IP address.

3 **When the Connection Confirmation Screen is Displayed, click the "O.K." button to continue.**

➡ The user and password input is unnecessary.

4 **The set up screen for the browser is displayed.**

5 On the left-hand side menu, hover the mouse cursor and click on "Network" to display the "Network setting screen".
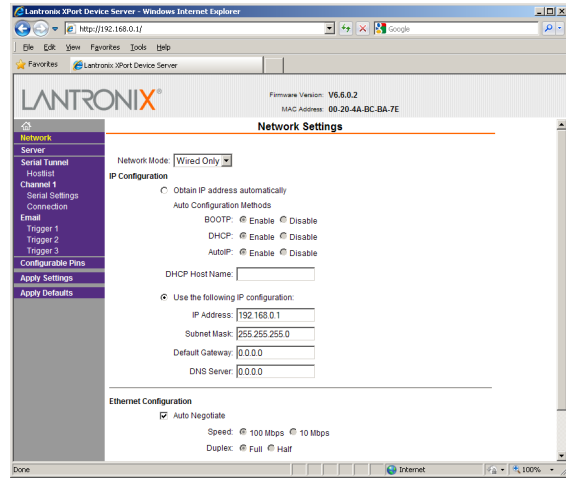
6 Select the "IP Address" item in the "IP Cofiguration", and enter the correct address value.

➡ Also enter any necessary items, such as Subnet Mask, if needed.
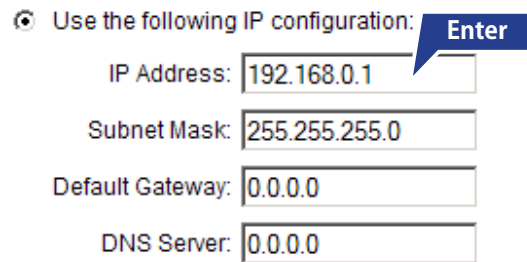
7 When the input is completed, an "O.K." button prompt will display at the bottom of the menu screen and "Done" will be displayed when the button is clicked.
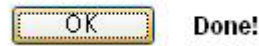
8 From the left-hand side menu, click the cursor for "Apply Settings" to activate the setup and complete the process.

➡ Since the settings will take time to activate, do not immediately turn off the power supply of the receiver until after checking the screen.

Installation / Application
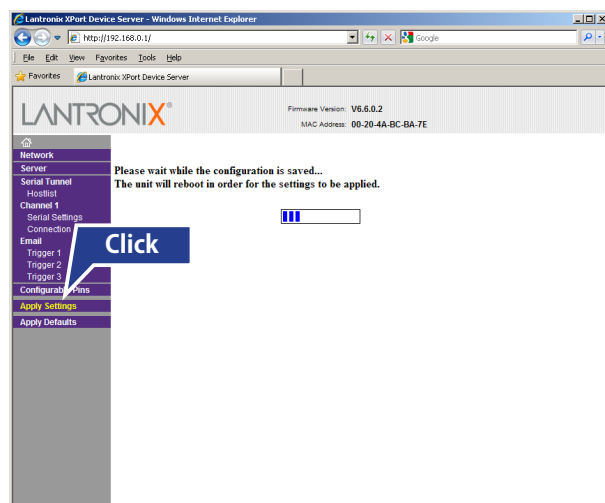
7.4 Transmission Specifications

The communication between the receiver (WDR-LE-Z2) and host (PC, etc.) is shown in the communication specifications.

■ For LAN Connection

TCP Socket Transmission (IPv4 Protocol)

[Default Value]

IP Address: 192.168.0.1

Subnet address: 255.255.255.0

Port: 10001

■ For USB Connection

Serial Communication

Bit Rate	: 38400 bps
Data Length	: 8 bit
Parity	: None
Stop Bit	: 1bit
Flow Control	: RTS/CTS (No Hard Control)

7.5 WDS Software

■ WDS Application

Our company offers WDS software application, which can be used to assist in a wireless setup, a LAN/USB setup, and a simple CSV output format for exporting Signal-Tower information. Please use it after downloading from our homepage.
For instructions on how to use each application prior to installation, refer to a seperate manual for the WDS software.

■ WDS Application Software Requirements

Ensure whether the personal computer fulfills the minimum operating conditions for the sample application prior to installation. The recommended environment is as follows:

OS	Windows XP sp2 or higher (32 bit Version),Windows Vista (32 bit Version), Windows 7 (32 or 64 bit Version),Windows 8/8.1(32 or 64 bit Version)
	operability confirmed :Windows Server 2008/2012R2(64 bit Version)
CPU	Core Duo 1.6GHz equivalence or higher
Memory	2GB or more
Hard Disk Space	100MB or more of available space
Monitor Screen	Resolution: 800 x 600 or higher, Small Font (100%)
Authorization Status	Operate the software using Administrator authorization. * If the program is used by a user without Administrator rights, access and security restrictions may prevent it from operating properly.
System Requirements	Installation of .NET Framework 4.0 (The ".NET Framework 3.5" function is used for this product)

Even with the recommended requirements indicated above, depending on the environmental condition of the computer in use, there is no guarantee it will operate properly due to some connected perephrials or applications that may not operate correctly.

■ .NET Framework Version Verification

For this application, .NET Framework 4.0. needs to be installed.

Verify the .NET Framework version is installed in the computer to be used.

(Note)

- Microsoft .NET Framework is software used to communicate between programming languages from different systems, devices, as well as for network communications.
- The WDS application is based on .NET Framework.

Installation / Application

8. Operation Guidelines

When setting up for the customer, it is necessary to match the proper quantity of transmitters and receivers according to groups, etc., and that the application software is properly set up.
The following section indicates the guidelines for these issues.

> **Note**

- A setup service for this product can be provided for a fee.
  For detailed information or if there are any questions concerning this product, feel free to contact your PATLITE Sales Representative.

8.1 Command List

When creating an application, etc., for a customer, use the proper command controls for Socket Communication for USB serial or LAN communications.
Command functions are listed for software support, but for additional details, please contact our PATLITE Sales Representatives.

> **Note**

- Refer to the WDS operation manual to ensure proper setup and usage for the required application.

> **Please**

- When sending command executions, do not turn off the power source. Also, do not remove the unit. Failure to comply will result in malfunction.

- Some commands are shared between the WD Series and the WD-Z2 Series, but if there are some applications where both Series are mixed, there are some commands which can be used only for the WD-Z2.

8.2 Two or more Receivers

If an application requires two or more receivers for the system, a problem is that radio wave interference will be received and it cannot operate normally between receiver, causing missing data to frequently occur. In order to improve such a situation, the following steps can be used.
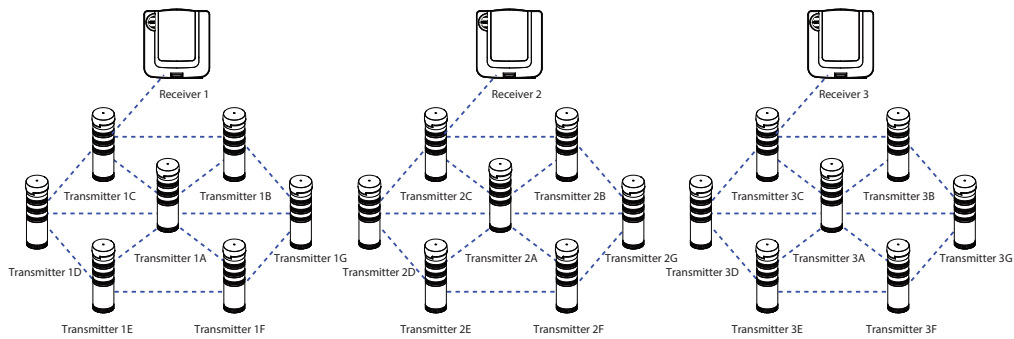
■ Grouping All Receivers

Interference between receivers is prevented by dividing into groups for every receiver and setting the radio channel of each group so as not to overlap.

As an example with a system of three groups using three receivers: In the three receivers, Group 1 would be set between Receiver 1 and its transmitters; the second system would be Group 2 with Receiver 2; and the third system would be Group 3 with Receiver 3.
Also shown in the figure is the set values for ExtendedPanID and frequency channels which do not overlap for each group.
• Radio wave interference can be prevented by not overlapping any frequency channels.
• By not overlapping the ExtendedPanID, it will prevent any communication load from wrongly participating in another group or with the wrong transmitter.
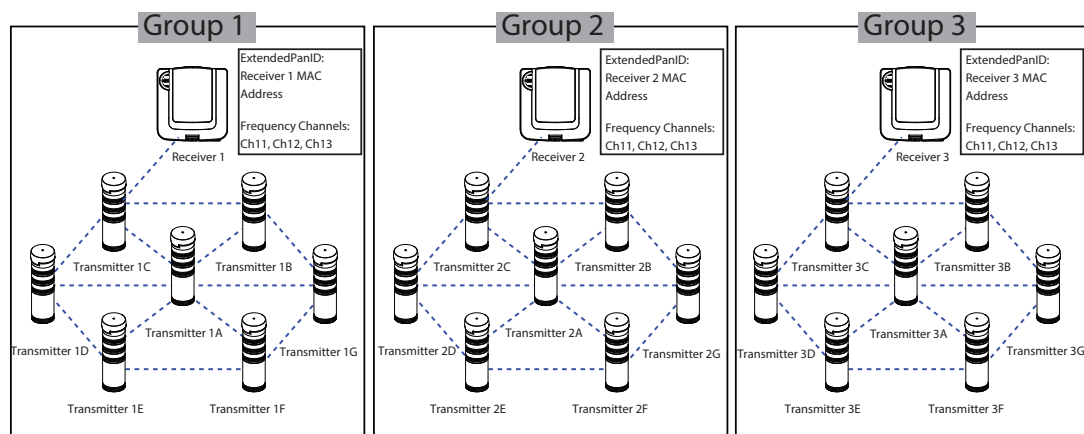
> **Note**
>
> • Since a MAC Address for the receiver is set up by default, the ExtendedPanID for the transmitter has to be set.

■ Arrange Reciever distances as much as possible

Each receiver cannot be placed too close together, so to reduce radio wave interference and communication load, place them far apart.

To reduce communication load, set up the layout so the transmitters are in a closer vicinity with the whole group.

- If two or more recievers use the same frequency channel, influence due to radio wave interference may increase, resulting in an unstable network.
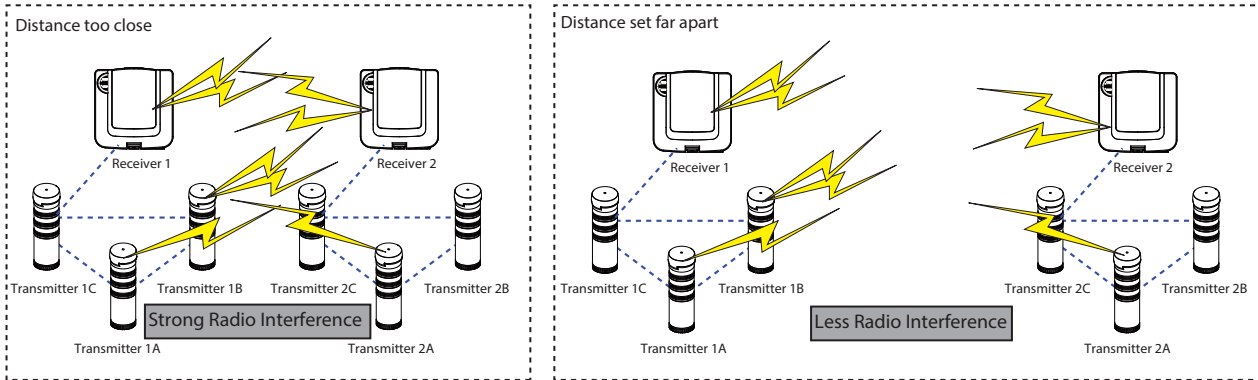
■ Improve the transmitter's location

If transmitters are used in a large quantity, missing data may occur more frequently because of the communication load to a specific transmitter may be used often as a communication relay because of its location in the arrangement.

By reducing the load to a transmitter, adjust the position and/or the number of transmitters used as relay points.
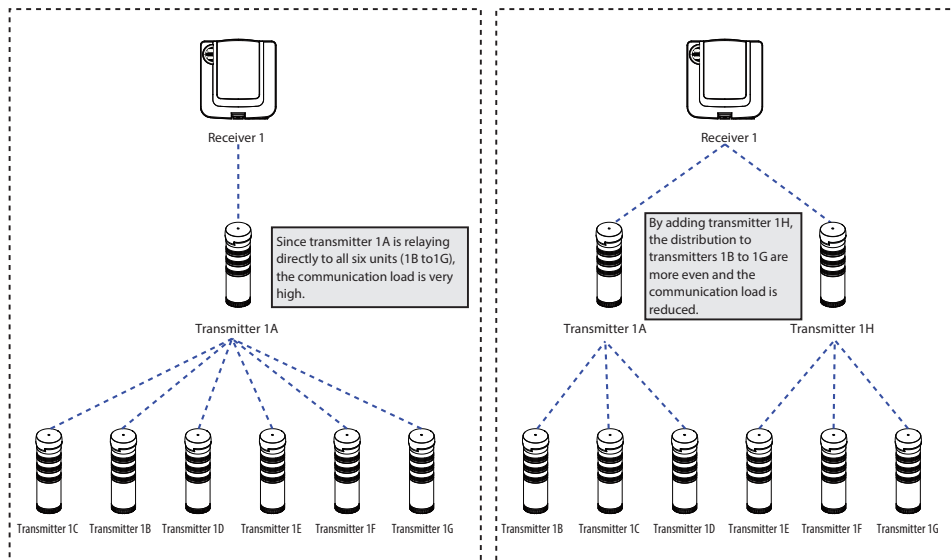
8.3 Managing many Transmitters

Systems which incorporates a large number of transmitters in which the Signal-Tower status changes frequently can result in the data communication load to become high and cause data to be missing or cause frequent transmitter participation/drop-outs.

In order to improve such a situation, the following steps can be used.
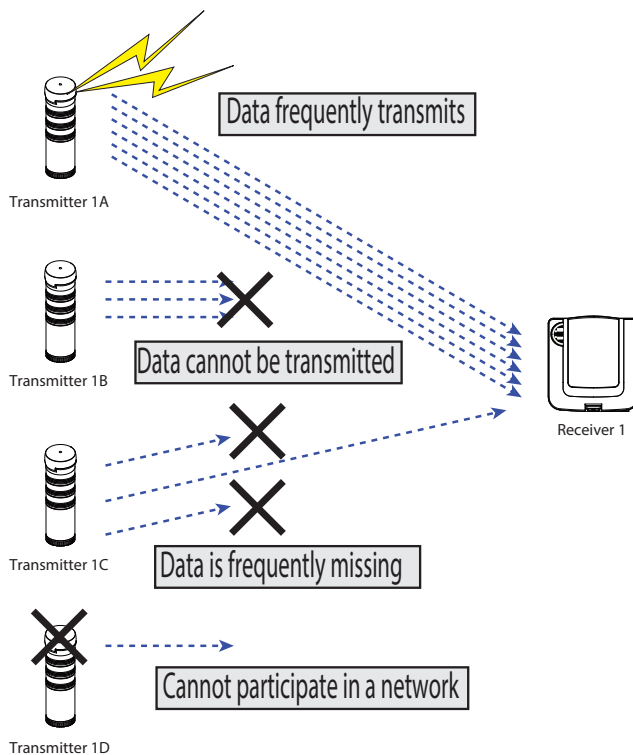
■ **Shift data transmission timing for each transmitter**

The wireless communication foundation is at a one-to-one ratio, so if there is a transmitter which is sending a radio output, other transmitters cannot send a radio output. This foundation also applies for data relay.

Therefore, by shifting the transmission timing in a group, missing data and communication hindrance can be reduced because the data transmission from the transmitter in each group shifts each transmission timing.

• Standard Data Transmission Timing

[Conditions]

Very sufficient radio wave environment.

20 transmitter units are connected to one receiver.

[Reference Value]

From the time one transmitter transmits data until it receives acknowledgement is about 0.6 seconds.

It is therefore recommended that the data transmission timing is shifted 1 second or more per unit as a standard value.

■ Periodically Acquire Signal-Tower Data from Host

The method consists of using packet data management from the host side to request data, rather than using individual data transmission for each transmitter.
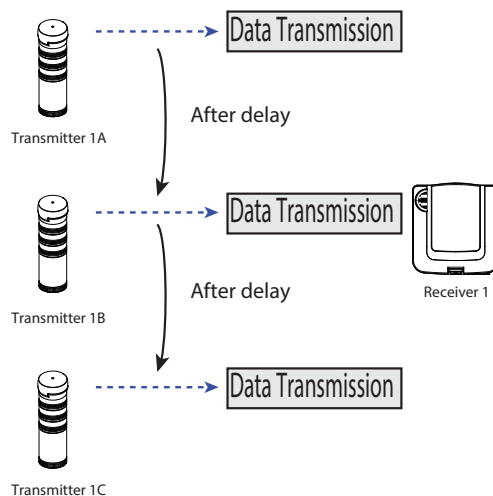
Missing data and/or communication hindrance can be reduced because the data transmission and reception to the transmitters is sent as a group.

Refer to the method in the following figure prior to design.
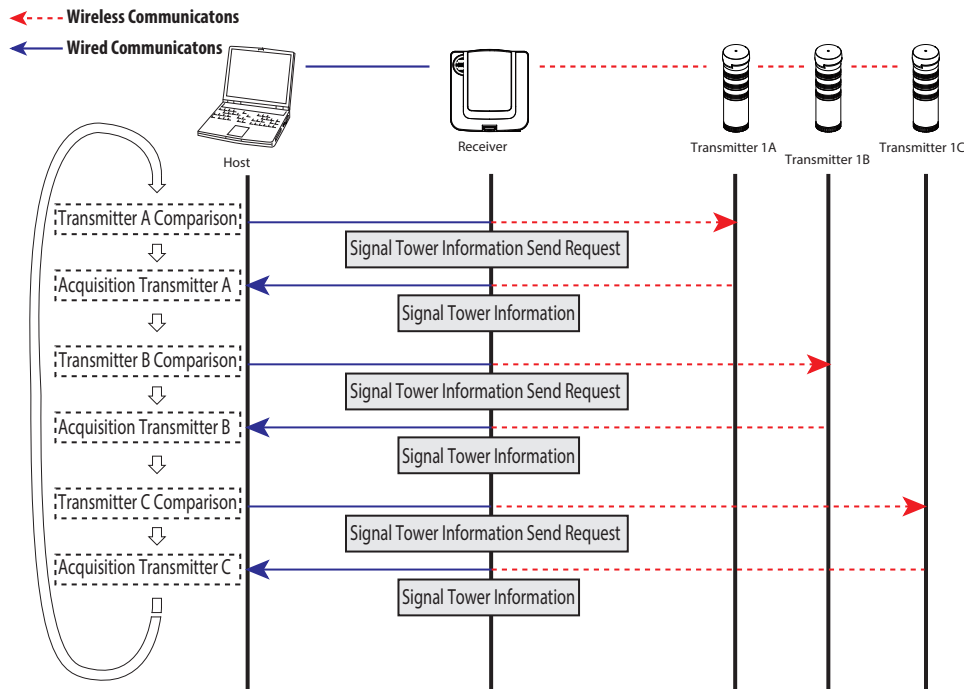
Please

- The transmission mode for each transmitter has to be changed into "response transmission mode".
- To acquire Signal-Tower information from each transmitter, the "Request to Send Signal-Tower Information" has to be made.
- Since data is periodically acquired regardless of changing transmitters, a Signal Tower change may occur based on the access number.

[**Conditions**]

Very sufficient radio wave environment.

20 transmitter units are connected to one receiver.

[**Reference Value**]

The estimated time it takes where data is acquired for a quantity of 20 transmitters is about 6 to 12 seconds.

* It is a value in which most data acquisitions and timeouts do not occur.

■ Increase time lag for transmitters doing data transmission

When data output is almost simultaneous between two or more transmitter units, implementing a carrier sensor would cause a maximum of three transmitters to send and recieve data transmissions.

If the operation is implemented continuously, redundant data transmission resending may occur based on missing data.

By doing continuous transmissions to an extent with a certain time gap, missing data and retransmissions of data can be reduced.

[Reference Value]

In a system using 4 or 5 transmitters sending data transmissions almost simultaneously, it is recommended to leave about a 10 second gap.
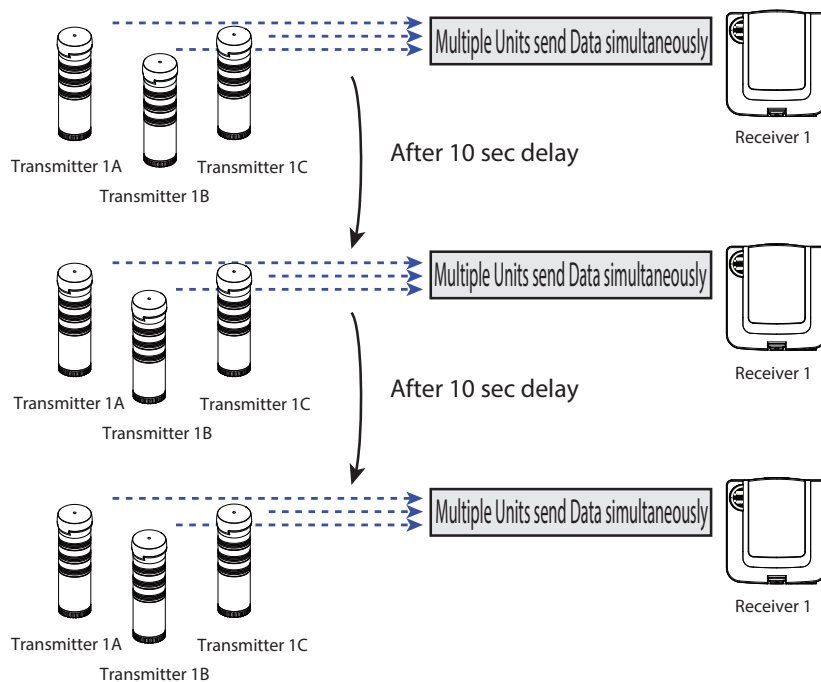
Other

9.　Specifications

9.1 Transmitter

■ General Specifications

Item	Specifications	
Model Name	WDT-6M-Z2	WDT-5E-Z2
Corresponding Signal Tower	LME Series	LE Series
Rated Voltage	DC24V (Non-polar)	
Operating Voltage Range	DC21.6V - DC26.4V	
Current Consumption	20mA ±10mA	
Operating Temperature Range	-10 to 60°C	
Relative Humidity	RH 85% or less (No Condensation)	
Storage Temperature Range	-20 to 70°C (No Freezing)	
Mounting Direction (Indoor Only)	Upright Only	
Protection Rating	Conforms to installed Signal Tower	
Mass	52g±5g	

■ Function

- Wireless network configuration is automatically set.

    * As long as one of any signal wires is used as the power supply for the transmitter.

- An indicator displays the radio reception strength (Three Colors):

    Strong: Green (Radio Strength ≥ -84dBm)

    Good: Orange (-87dBm < Radio Strength < -84dBm)

    Poor: Red (Radio Strength ≤ -87dBm)

- Data is sent when the condition of the Signal Tower changes.

- Data is sent for the Signal Tower color condition (Flashing/On/Off).

- Flashing and On/Off Parameters:

    On: The status in which the signal is turned on for a duration greater than a specified amount in seconds.

    Off: The status in which the signal is turned off for a duration greater than a specified amount in seconds.

    Flashing: the status change is created within seconds (ss) when repeated two or more times.

(In any case, any change below a 0.1 second duration is disregarded.)

* "ss" is a variable for seconds when referring to the flashing modes.

   (1) Standard Flashing (Flashing) : ss:0.7

   (2) Flashing moderate speed: ss:1.5

   (3) Flashing slow speed: ss:2.5

   (4) No flashing: Flashing is immediately determined, based on lights in the "ON" or "OFF" condition.

   * The judgment for flashing can be set for "Active" or "Deactive" for each wireless unit (Standard Flashing is set at the time of factory shipments).

ON

ON Status　Off Status

Judge・・・・・Flashing

OFF

sec.　　sec.
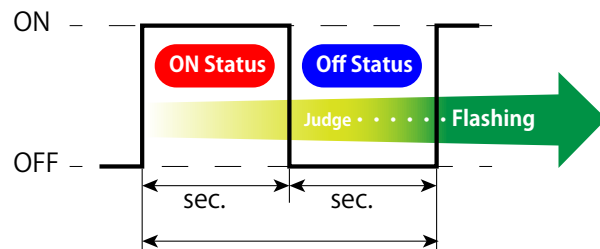
ON ＋ OFF for one cycle=Flashing
(ON "ss" + OFF "ss")

■ Initial Transmitter Mode Setup

Item	Default Value
Operating Mode	Standard Mode (All DIP Switches turned OFF)
Transmitter Mode	Change the Transmitter Mode
Flashing Status	Flashing "ON": Standard(~Firmware 2.02)
	Flashing moderate speed(Firmware 2.03~)
Specified Power Source Line	White
Wireless Setup: ExtendedPanID	Can connect with arbitrary receivers (0x0000000000000000)
Wireless Setup: Frequency Channel	Can connect with channels 11-6 (All Channels)
Wireless Setup: Relay Setup	Permit as a Relay

■ Table of Compatable Signal Tower Models

Transmitter Type	Model Name		Compatibility (Yes/No)	Voltage
WDT-5E	LES- [ ] [ ] [ ] A (W)	- [ ] 02	Yes (Conditional)	24V AC/DC
	LE- [ ] [ ] [ ] (FB) P/W	- [ ] 01	No	12V AC/DC
		- [ ] 02	Yes	24V AC/DC
	LE- [ ] [ ] [ ] (FB) P/W	- [ ] 10	Yes	100V AC
		- [ ] 20	Yes	220V AC
	LEL- [ ] [ ] [ ] (FB) P/W	- [ ] 01	No	12V AC/DC
		- [ ] 02	Yes	24V AC/DC
WDT-6M	LMS- [ ] [ ] [ ] (K/L)	- [ ] 02	Yes	24V AC/DC
	LME- [ ] [ ] [ ] (FB) (W)	- [ ] 02	Yes	24V AC/DC
	(-S, -Q Models Included)	- [ ] 12	Yes	120V AC
		- [ ] 23	Yes	230-240V AC
	LME- [ ] [ ] [ ] (FB) (W)	- [ ] 10	Yes	100V AC
	(-S, -Q Models Included)	- [ ] 20	Yes	220V AC
	LME- [ ] [ ] [ ] (FB) (L)	- [ ] 02	Yes	24V AC/DC
		- [ ] 12	Yes	120V AC
		- [ ] 23	Yes	230-240V AC
	LME- [ ] [ ] [ ] (FB) (L)	- [ ] 10	Yes	100V AC
		- [ ] 20	Yes	220V AC
	LME- [ ] [ ] [ ] FBK	- [ ] 02	Yes	24V AC/DC

- Conditions for LES Compatability: To ensure proper power supply wiring to transmitter.

Note

- This product cannot be attached to Legacy LE Series ending in production from January of 1999.

9.2 Receiver

■ General Specifications

Item	Specifications
Model Name	WDR-L(E)-Z2
Rated Voltage	DC24V (AC Adaptor Included *)
Operating Voltage Range	DC21.6V - DC26.4V
Current Consumption	65mA ±15mA
AC Adaptor Rating *	AC100V
AC Adaptor Voltage Tolerance *	AC90V - AC110V
Operating Temperature Range	-10 - 60°C 0 - 40°C (When AC Adaptor is used)
Relative Humidity	No more than 85% RH (No condensation)
Storage Temperature Range	-20 - 70°C -10 - 70°C (When AC Adaptor is used) (No Freezing)
Mounting Direction (Indoor Only)	Upright (Wall Mount) or Sideways (Level Surface Mounting) for Indoors Only
Protection Rating	IP20
Mass	170g ±10g

* The AC Adaptor included is exclusively for the use with this machine in Japan.
ent upon the environment, installed location and number of communications.

■ Function

Item		Specifications
Model Name		WDR-LE-Z2
Transmission Specifications	ETHER NET	10BASE-T/100BASE-TX (Full/Half Duplex)
	USB	USB1.1/USB2.0 (Supports Full-speed) * Not supported for USB Hub connections
Output Specification		Non-voltage Contact: 1 Output (DC24V 500mA) Connection

9.3 Wireless Specification

Item	Specifications
Wireless Communication Standard	IEEE 802.15.4
Wireless Communication Frequency	2405MHz - 2480MHz (16 Channels)
Wireless Transmission Method	Direct Spread (DS-SS[1]) System
Wireless Transmission Standard	ZigBee2007 Conformity ZigbeePRO Stack Loading (Unique Profile Implementation)
Wireless Transmission Speed	Maximum Theoretical Speed of 250k-bps[2]
Wireless Transmission Output	Maximum 3 mW (From Antenna Source)
Radio Frequency Range[3]	Direct Sight of about 60m (Reference Value)
Number of Relays	Maximum 30 Relays
Radio Law Compliant Areas	Japan, The United States of America, Europe, China[5], Indonesia[5], Taiwan[5], Thailand [4,5], Philippines[5], Vietnam[5], Mexico[5]

[1] : DS-SS = Direct Sequence-Spread Spectrum

[2] : The radio transmission is dependent upon the environment and installed location.

[3] : The radio transmission is depend

[4] : This telecommunication equipment conforms to technical standard NTC TS 1012-2551

[5] : Excluding WDR-L-Z2

Other

9.4 Setup Initialization

If the wireless setup where the IP address of the WDR-LE-Z2 is not clear anymore, or the WDT-Z2 set up is not clear anymore, the default value can be reset.

Please

- During the initialization process, do not turn off the power supply. Also, do not remove the unit.
  Failure to comply will result in malfunction.

< WDR-LE-Z2 >

The following is the procedure to return the network value back to its default value.

1   **Turn the power off.**

2   **Turn "DIP Switch1" to the "ON" position.**

3   **Turn the power back on.**

➡ The Power LED (green) lights up.

4   **The Output LED (Red) should turn on. (about 60 seconds)**

5   **After the Output LED (Red) has turned on, turn the power off, again.**

6   **Return "DIP Switch1" back to the "OFF" position.**

Note

- The following is the network default setting:

Item	Default Value
IP Address	192.168.0.1
Subnet Mask	255.255.255.0
Default Gateway	0.0.0.0
DNS Server	0.0.0.0
Local Port	10001

Other

< WDT-Z2 >

The following procedure will set the values of the wireless module back to its factory default settings.

> **Please**
>
> - During the initialization process, do not turn off the power supply. Also, do not remove the unit.
>   Failure to comply will result in malfunction.

1 **Turn the power off.**

2 **Turn the power off.**

3 **Turn the power back on.**

4 **Wait for for the Status LED to flicker between green and red. (about 1 second)**

5 **After the Status LED has stopped flickering between green and red, turn the power off.**

6 **Return "DIP Switch1" back to the "OFF" position.**

> **Note**
>
> - The following is the wireless setting default values:

No.	Name	Functions
❶	ExtendedPanID (0x0210)	0x0000000000000000
❷	Frequency Channel (0x0211)	0x07FFF800 (ALL Channels)
❸	Relay Setup (0x0304)	With DIP Switch 4OFF: 0xFF (Permitted as a Relay)
		With DIP Switch 4 ON: 0x00 (Prohibited as a Relay)
❹	Transmitter Mode	Transmitter Mode : 0x0000 (Change the Transmitter Mode)
		Flashing Status : 0x05 (Standard [~Firmware 2.02])
		0x10 (Flashing moderate speed [Firmware 2.03~])
		Specified Power Source Line : 0x05 (White)

Other

Other

10. Troubleshooting

Refer to the table below before requesting repair. If the product does not work after referring to the table below, please contact your nearest PATLITE Sales Representative to request repair.

10.1 Transmitter Issues (WDT-Z2)

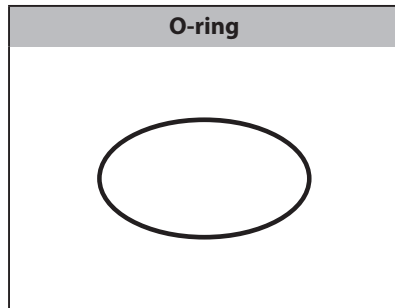| Problem	Where to Check	What to do
Tiered Signal Tower is not Operating.	Is the transmitter attached correctly?	Check whether it is attached correctly. (Refer to pg. 20 "6.4 Transmitter Installation")
Transmitter does not operate		
Indicator lamp does not come on	Is the power supply to the transmitter applied?	If the product still does not work after referring to the troubleshooting tips, please contact your nearest PATLITE Sales Representative to request repair.
The indicator lamp seems to go on and off.	When the receiver is connected properly to the network, the gradation will light. If it seems that the lighting is gradually going on and of in intervals, it is normal operation.	Although there is no problem with operation, the lighting color is indicating the radio reception intensity. Since the weak status of the electric wave is indicated with a red LED color, it is recommended to change the Signal Tower location where a green or orange color is displayed.
The indicator lamp is red	Is the power supply for the receiver on?	Because it is a wireless product, the network may be unable to connect if an obstacle is present or the distance is beyond its range. Install in a place where sufficient radio reception is present, or install a relay transmitter to help stablize the radio reception.
	Is the wireless setup (PanID, frequency channel) to the transmitter and receiver in agreement?	
	Is there a problem in the installation distance between the transmitter and receiver?	
	Are there any large obstacles, such as a metal plate, between the transmitter and receiver?	
The indicator lamp is blinking in red.	It is possible that there is a hardware problem in the receiver.	If this condition occurs, immediately disconnect the power and contact your nearest PATLITE Sales Representative to request repair.
The indicator lamp is blinking in green.	It is possible that the receiver is collecting unknown data, or a certain problem may be occurring.	If this condition still occurs, immediately disconnect the power and contact your nearest PATLITE Sales Representative to request repair.
Signal Tower status change information output does not occur.	Verify whether DIP switch 2 is turned on.	Turn OFF DIP Switch 2 and use it in Standard Mode.
	Is it in transmission mode or response transmission mode?	For response transmission mode, information is acquirable only by the Request-to-Send command of Signal-Tower information. When there is a status change, try to periodically implement a Request-to-Send command in transmission mode.

Other

10.2 Receiver Issues (WDR-Z2)

Problem	Where to Check	What to do
Power LED does not light up.	Is the power supply connected correctly?	When utilizing the DC jack, connect with the AC/DC adaptor included (Japan Only).
		Verify the power supply polarity (+, -) of the Terminal Buss and re-apply power again.
		Please do not use a USB hub etc., which uses a power supply from the USB cable. Faulty operation may occur due to the lack of electric current.
Power LED is blinking.	There may be a problem in the hardware.	If this condition occurs, immediately disconnect the power and contact your nearest PATLITE Sales Representative to request repair.
There is no contact output.	Is the wiring correct?	Please wire correctly and confirm proper operation.
	Is the command correct?	Retransmit the correct command.
There is no communication made with the host, although there is a USB connection made.	Was the COM port selected for the correct port?	Selecting the correct COM port and connect.
	Is the WDR-LE-Z2 recognized correctly?	Refer to pg. 29 "7.3 IP Address Configuration Steps" on how to install the USB drivers and confirm the proper COM port is selected.
	Is it connected to a USB Hub?	Our company has verified that the application cannot function from a hub. Connect directly to a USB port.
There is no communication made with the host, although there is a LAN connection made.	Is the IP address and port correct?	The factory default is set up as: 192.168.0.1:10001. If the IP was changed by the customer, reselect the proper IP and connect.
		If the changed IP address is unknown, initialize to the default settings and reconfigure if necessary. (Refer to pg. 41 "9.3 Setup Initialization")

Other

Other

11. Replacement Parts

Replacement parts for maintenance are indicated below:

O-ring