

PATLITE®

Wireless Data Acquisition System

Transmitter

TYPE WDT-4LR-Z2

TYPE WDT-5LR-Z2

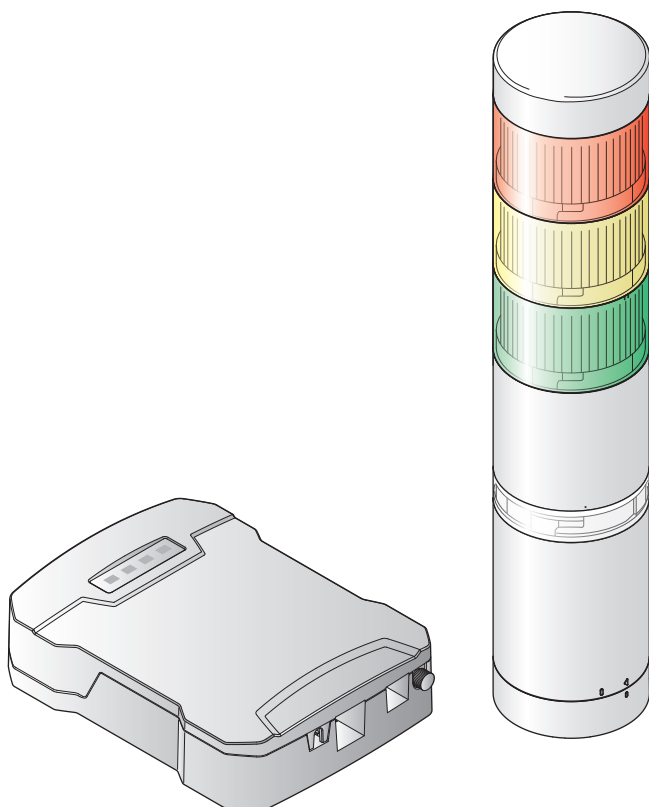
TYPE WDT-6LR-Z2

WD-PRO Receiver

TYPE WDR-L-Z2-PRO(-L)

TYPE WDR-LE-Z2-PRO(-L)

Instruction Manual [Web Version]



Notice to Customer

Thank for your purchasing our PATLITE products.

- The WDT-4LR-Z2, WDT-5LR-Z2 and WDT-6LR-Z2 transmitters are used exclusively with LR4/LR5/LR6 signal towers.
- Before using the WDR-L-Z2-PRO or WDR-LE-Z2-PRO, update to the latest version of the firmware. You can download the latest version of the firmware from the customer registration page.
- When using the system operation software WDS-WIN01, use version 1.04 or later.
- Request the installation and wiring be performed by a professional contractor if construction work is involved.
- Prior to installation, read this manual thoroughly before using this product to ensure correct use.
- In addition, please store this manual for future reference when performing maintenance, repairs or inspections. If there are any questions concerning this product, refer to the contact information at the end of this document and contact your nearest PATLITE Sales Representative.
- This manual describes functions supported in version 1.03 of the WDR-L-Z2-PRO and WDR-LE-Z2-PRO. Depending on the version you are using, some functions may not be available or the screen layout may differ from that shown in this manual.
- For the WDT-6LR-Z2-PRO and WDB-D80S-PRO, refer to "WDB-D80S-PRO/WDT-6LR-Z2-PRO Instruction Manual."
- For the WDT-5E-Z2 and WDT-6M-Z2, refer to "Instruction Manual [TYPE: WD-Z2]."

To the Contractor

- Prior to installation, read this manual thoroughly to ensure it is installed correctly.
- Return this manual to the customer.

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1. Before you begin




1.1. About Safety Symbols

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

- The degree of harm and damage that will occur when misuse is made by ignoring the contents of the icons indicated is explained below.

| | |
|--|--|
|  WARNING | This symbol indicates, "Failure to follow the instructions may lead to death or serious injury." |
|  CAUTION | This symbol indicates, "Failure to follow the instructions may lead to injury or property damage." |

- The following symbols classify and describe the content of associated messages.

| | |
|--|--|
|  Prohibited | This symbol identifies "Prohibited" operations that should never be carried out. |
|  Mandatory | This symbol identifies "Mandatory" instructions that should always be carried out. |
|  | This symbol identifies general "Caution" related information. |

1.2. Safety Precautions

WARNING



Prohibited

- This product is intended to be installed onto a compatible PATLITE signal tower for the purpose of wireless data transmission. Do not use this product for any other purpose.
- Please do not use a heart pace pay car and other medical-application electrical machinery and apparatus nearby. Do not use cardiac pacemakers or other medical electrical equipment nearby. Radio waves may have an adverse affect on medical electrical equipment.
- Do not use or install the receiver in locations where liquids such as water is present, oil will splatter, or locations that are humid or dusty. Failure to follow these instructions could result in fire, electric shock or product failure.
- To prevent accidents or injuries, use this product only for its intended purpose, and be sure to follow the guidelines outlined in this User's Manual.
- This product is not intended for use in applications where life is at risk, such as medical equipment, atomic energy equipment and machinery, aviation and aerospace, transportation, and control of other equipment. If this system is used for these applications, we cannot be held responsible in the event of injury, death, or property damage.
- Do not modify or disassemble this product. Failure to follow these instructions could result in fire or electric shock.
- Do not use this product when there is condensation. Failure to follow these instructions could result in fire or electric shock.
- Do not allow liquids to enter the receiver, and do not allow it to have contact with metallic objects. Failure to follow these instructions could result in fire or electric shock.



Mandatory

- Request the installation and wiring to be accompanied by a professional contractor. If installation is done improperly, it may result in fire, electric shock, falling, or malfunction.
- Before installing and wiring this product, be sure that it is disconnected from the power source. Failure to comply may result in fire, electrocution or product malfunction
- Always use a power supply within the operating voltage range. Failure to follow this instruction could result in fire or product failure.
- Turn this product off while in airplanes, hospitals, or other places where radio waves may interfere with surrounding equipment or where wireless devices are prohibited.
- PATLITE can not predict all circumstances of hazards while using this product. Therefore, not all safety hazards are listed in this manual. In order to prevent accidents that may not be mentioned in this manual, please be sure to follow the provided guidelines while performing maintenance or operating this product.
- If you notice smoke, odor, or other abnormalities while this product is in operation, immediately stop supplying power to this product. Continuing to use this product under such conditions may result in fire or electric shock.
- Take the following precautions to prevent electric shock, short-circuit, or damage.
- Disconnect the power before wiring, repairs, or replacing a fuse.
 - Use this product only while in its proper state. (If the body or a unit is damaged, replace it.)



CAUTION



Prohibited

- Do not install this product near other electrical appliances. If you install this product near a facsimile, personal computer, television, microwave oven, or equipment using a motor, this product may not operate properly.
- Do not operate this product with the O-ring removed. Waterproof performance will drop and may damage the product. (Transmitter only).
- Do not use this product in applications that require a high-degree of reliability or real-time performance. If there are communication problems, this product cannot retrieve accurate data.
- Do not use this product near fire, in hot or humid environments, or where corrosive or flammable gas is present. Failure to follow this instruction could result in product malfunction.
- Do not use or store this product in the following locations. Failure to follow this instruction could result in product malfunction or failure.
 - Environments with poor breathability and ventilation.
 - Near equipment that generates strong electrical or magnetic fields
 - Places exposed to direct sunlight.
 - Locations subject to shock and vibration.
 - Near heating appliances.
 - Environments where dust or iron powder is present.
 - Locations from where the product may fall off.
 - Locations exposed to salty sea air.



Mandatory

- Operate this product only after thorough testing in the customer environment.
- If you need to secure this product against unauthorized access from external devices over the Internet or internal infrastructure network, the customer must take measures to prevent the unauthorized access.
- Pay close attention to the polarity of the power supply before connection. Connecting the power supply incorrectly could result in product failure.
- Use a soft cloth, etc., dampened with water to wipe the product. Do not use cleaners containing thinner benzene gasoline, oil, Chemicals, etc., to wipe with. It may result in discoloration and deterioration.
- In order to maintain this product's IP rating, be sure to attach each unit and head cover onto the signal tower properly. will drop and may damage the product.
- When removing covers or packing from equipment with the transmitter attached, be careful not to snag the product. Failure to follow this instruction could result in product failure.



CAUTION



- Although this product has a high level of security, there is the potential for third-parties to intercept communications as this product uses radio waves.
- When using this product, pay close attention to the following:
 - Due to the nature of radio waves, communication can be disabled even over insignificant distances as a result of noise or other environmental factors.
 - Do not use this product near chemicals. This product could melt or become deformed if exposed to chemicals.
 - To prevent static shock, make sure your body is discharged of static electricity. (You can discharge static electricity by touching grounded metal objects.)
 - Perform daily inspections.
 - As a precaution, use this product in conjunction with other equipment to handle potential problems.
- Operation under the following conditions could cause the wireless communication distance to become shorter than specified, and increase reaction times:
 - Metal obstructions, such as steel doors or reinforced concrete, are between the transmitter and receiver.
 - Transmitter or receiver is mounted on a metal surface.
 - Powerful radio waves are nearby, such as those emitted by broadcasting stations.
 - Power lines or other high-voltage lines are nearby.
- About the Operating Environment
 - We tested the product with out of the box computers in a normal operating environment. However, depending on your operating environment, which includes the computer main unit, peripheral devices and applications in use, there may be cases where this product will not run properly.
- The software copyrights are held by our company. Do not use this software in other products, or duplicate or modify a portion or all the software without prior written permission.
- Disposing this product
 - When disposing of this product, follow the rules and regulations on how to handle recyclable materials as outlined in your community.
- About this manual
 - The contents of this manual are subject to change without notice.
 - Images in this manual are for illustration purposes only, and may appear different from the actual product. Additionally, for ease of explanation, the illustration may hide a portion of the product.
 - This manual is copyrighted. No part of the manual, including drawings or technical information, can be copied or duplicated in any manner, without prior consent.
 - When transferring ownership of this product, include the instruction manual (digest version).
 - If you have any questions or need further information, contact your nearest PATLITE sales representative.

- We cannot warrant against breakdowns caused by disassembling this product, natural disasters, or handling of this product that is contrary to any warnings or precautions contained herein. Avoid using this product in ways other than those described in this manual.
- We cannot be held responsible for damages and injuries caused by failing to pay attention, or failing to follow precautions, during operation and maintenance.

1.3. About laws and regulations in each country

For Customers in U.S.A

• WDT-4LR-Z2/WDT-5LR-Z2/WDT-6LR-Z2

● FCC notation requirement

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 interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

◆ FCC CAUTION

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

This equipment 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 equipment 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 equipment 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.

PATLITE(U.S.A)Corporation
20130 S. Western Ave. Torrance, CA90501, U.S.A
www.patlite.com

• WDR-L(E)-Z2-PRO(-L)

● FCC notation requirement

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 interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

◆ FCC CAUTION

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

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. The equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

(Responsible party in U.S.A.) PATLITE U.S.A. Corporation, R20130 S. Western Ave. Torrance, CA90501, U.S.A.
www.patlite.com

For Customers in Europe

• WDT-4LR-Z2/WDT-5LR-Z2/WDT-6LR-Z2



■ EU Declaration of Conformity

We PATLITE Corporation, 4-1-3, Kyutaromachi, Chuo-ku, Osaka-shi, Osaka 541-0056 JAPAN declare under our sole responsibility that the product described below is in compliance the following directives.

- Product Name: Wireless Data Acquisition System
- Company Logo: **PATLITE**
- Communication Frequency: 2405 to 2480 MHz (16 channels)
- Transmission Output: Maximum 3 mW or less (at the antenna feed point)
- Directive: Electromagnetic Compatibility Directive(EMC): 2014/30/EU
RoHS Directive: 2011/65/EU
Radio Equipment Directive: 2014/53/EU
Low Voltage Directive (LVD): 2014/35/EU

Visit our homepage at www.patlite.com/ce/wd_07539.html to download "EU Declaration of Conformity".

• WDR-L(E)-Z2-PRO(-L)



● EU Declaration of Conformity

This product conforms to EN standards and shows the CE Marking. This product has been tested and found to comply with the limits for a Class A device, pursuant to EMC DIRECTIVE. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This product must not be used in residential areas.

We PATLITE Corporation, 4-1-3, Kyutaromachi, Chuo-ku, Osaka-shi, Osaka 541-0056 JAPAN declare under our sole responsibility that the product described below is in compliance the following directives.

- Product Name: Wireless Data Acquisition System WD PRO Receiver
- Company Logo: **PATLITE**
- Communication Frequency: 2405 to 2480 MHz (16 channels)
- Transmission Output: Maximum 3 mW or less (at the antenna feed point)
- Directive: Electromagnetic Compatibility Directive(EMC): 2014/30/EU
RoHS Directive: 2011/65/EU
Radio Equipment Directive: 2014/53/EU
Low Voltage Directive (LVD): 2014/35/EU

Visit our homepage at www.patlite.com/ce/wd_07539.html to download "EU Declaration of Conformity".

For Customers in Thailand

• WDT-4LR-Z2/WDT-5LR-Z2/WDT-6LR-Z2/WDR-LE-Z2-PRO(-L)

This telecommunication equipment conforms to the technical standards or requirements of NBTC



For Customers in Canada

• WDT-4LR-Z2/WDT-5LR-Z2/WDT-6LR-Z2/WDR-LE-Z2-PRO(-L)

Canada, Innovation, Science and Economic Development Canada (ISED) Notices

This device contains licence-exempt transmitter(s)/receiver(s) that comply with Innovation, Science and Economic Development Canada's licence-exempt RSS(s). Operation is subject to the following two conditions:

- (1) This device may not cause interference.
- (2) This device must accept any interference, including interference that may cause undesired operation of the device.

Radio Frequency (RF) Exposure Information

The radiated output power of the Wireless Device is below the Innovation, Science and Economic Development Canada (ISED) radio frequency exposure limits. The Wireless Device should be used in such a manner such that the potential for human contact during normal operation is minimized.

This device has also been evaluated and shown compliant with the ISED RF Exposure limits under mobile exposure conditions. (antennas are greater than 20cm from a person's body).

Avis du Canada, Innovation, Sciences et Développement économique Canada (ISED)

L'émetteur/récepteur exempt de licence contenu dans le présent appareil est conforme aux CNR d'Innovation, Sciences et Développement économique 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;
- (2) L'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

Informations concernant l'exposition aux fréquences radio (RF)

La puissance de sortie rayonnée du dispositif sans fil est inférieure aux limites d'exposition aux radiofréquences d'Innovation, Sciences et Développement économique Canada (ISED). Le dispositif sans fil doit être utilisé de manière à minimiser le potentiel de contact humain pendant le fonctionnement normal.

Cet appareil a également été évalué et montré conforme aux limites d'exposition RF ISED dans des conditions d'exposition mobiles. (Les antennes sont à plus de 20 cm du corps d'une personne).

For Customers in Taiwan

• WDT-4LR-Z2/WDT-5LR-Z2/WDT-6LR-Z2/WDR-LE-Z2-PRO(-L)

◆第十二條 經型式認證合格之低功率射頻電機，非經許可，公司、商號或使用者均不得擅自變更頻率、加大功率或變更原設計之特性及功能。

◆第十四條 低功率射頻電機之使用不得影響飛航安全及干擾合法通信；經發現有干擾現象時，應立即停用，並改善至無干擾時方得繼續使用。

前項合法通信，指依電信法規定作業之無線電通信。低功率射頻電機須忍受合法通信或工業、科學及醫療用電波輻射性電機設備之干擾。

For Customers in Mexico

• WDT-4LR-Z2/WDT-5LR-Z2/WDT-6LR-Z2/WDR-LE-Z2-PRO(-L)



La operación de este equipo está sujeta a las siguientes dos condiciones:

(1) es posible que este equipo o dispositivo no cause interferencia perjudicial y

(2) este equipo o dispositivo debe aceptar cualquier interferencia, incluyendo la que pueda causar su operación no deseada.

For Customers in Singapore

• WDT-4LR-Z2/WDT-5LR-Z2/WDT-6LR-Z2/WDR-LE-Z2-PRO(-L)

Complies with
IMDA Standards
DA106138

1.4. Trademarks

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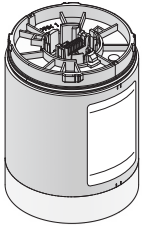
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2. Contents

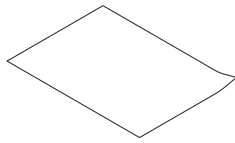
2.1. About the Contents

2.1.1. WDT-4LR-Z2/WDT-5LR-Z2/WDT-6LR-Z2

Main Unit: 1

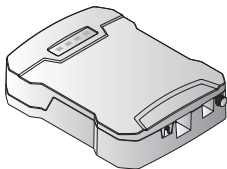


User's Manual: 1

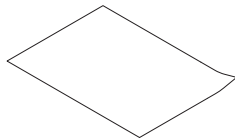


2.1.2. WDR-L-Z2-PRO(-L)/WDR-LE-Z2-PRO(-L)

Main Unit: 1



Instruction Manual: 1

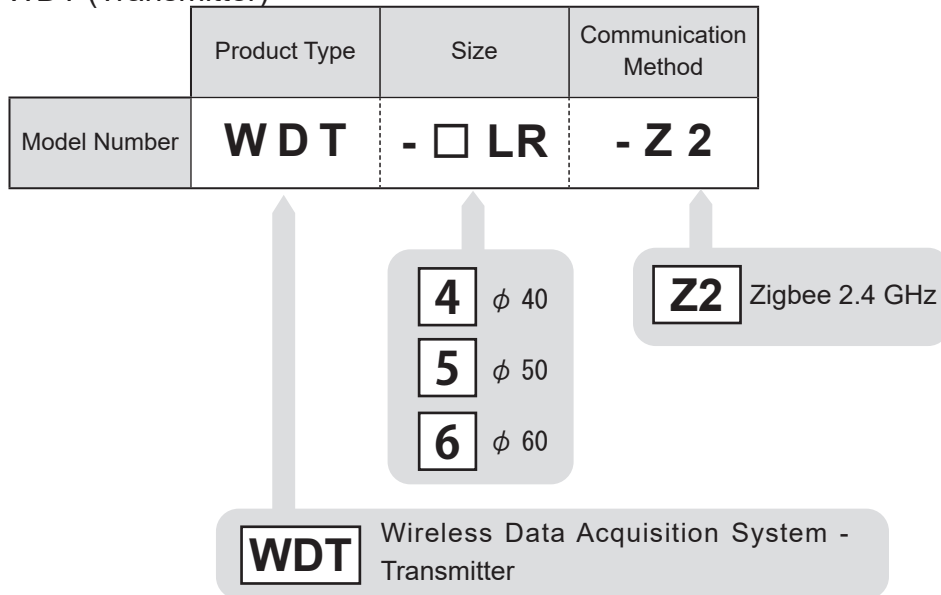


| Accessory | | |
|------------------------------------|---------------------------|--|
| <p>Cable fixing plate</p> <p>1</p> | <p>Cable tie</p> <p>1</p> | <p>AC Adaptor (WDR-L-Z2-PRO(-L) only)</p> <p>1</p> |

3. Models

3.1. About Models

3.1.1. WDT (Transmitter)

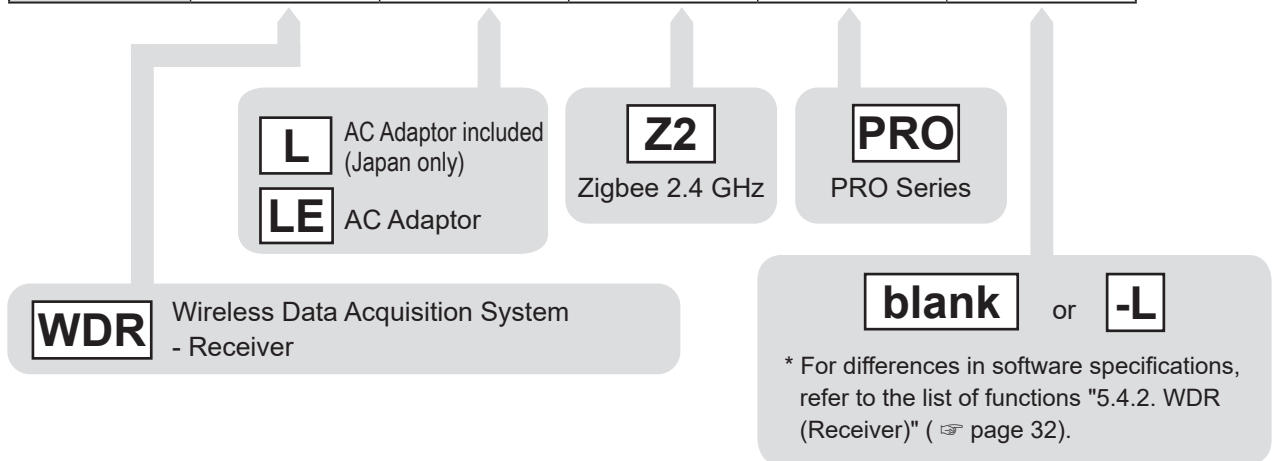


The types of LR Signal Towers applicable to each WDT (transmitter) are as follows.

| WDT (transmitter) | LR Signal Tower | | |
|-------------------|-----------------|------|----------------|
| Model | Model | Size | Rated Voltage |
| WDT-4LR-Z2 | LR4- □ -02 | φ 40 | 24 VDC |
| | LR4- □ -M02 | | 100 to 240 VAC |
| WDT-5LR-Z2 | LR5- □ -01 | φ 50 | 12 VDC |
| | LR5- □ -02 | | 24 VDC |
| WDT-6LR-Z2 | LR6- □ -02 | φ 60 | 24 VDC |
| | LR6- □ -M2 | | 100 to 240 VAC |

3.1.2. WDR (Receiver)

| | Product Type | Specifications | Communication Method | Model | Software specifications |
|--------------|--------------|----------------|----------------------|-------------|-------------------------|
| Model Number | WDR | - □ | - Z 2 | -PRO | □ |

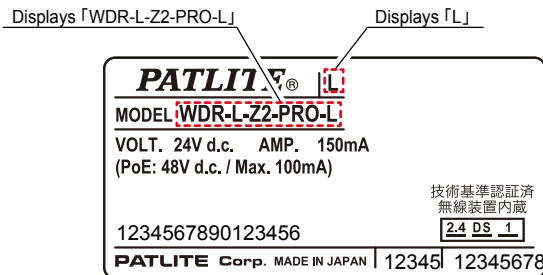


By checking the nameplate affixed to the product, you can identify products due to their differences in software specifications.

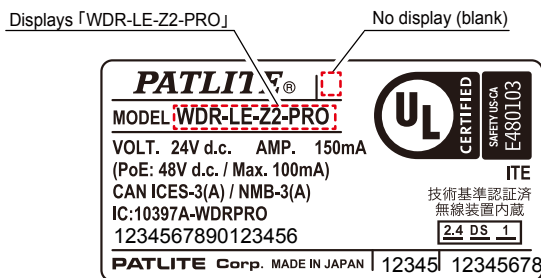
WDR-L-Z2-PRO (When software specification is **Blank**)



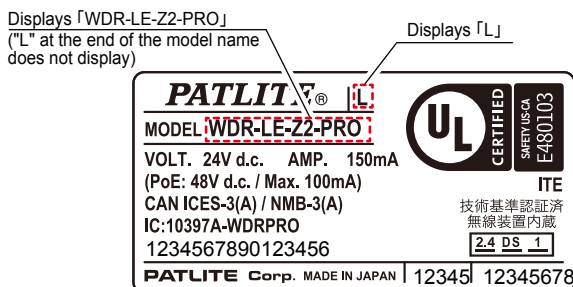
WDR-L-Z2-PRO-L (When software specification is **L**)



WDR-LE-Z2-PRO (When software specification is **Blank**)



WDR-LE-Z2-PRO-L (When software specification is **L**)

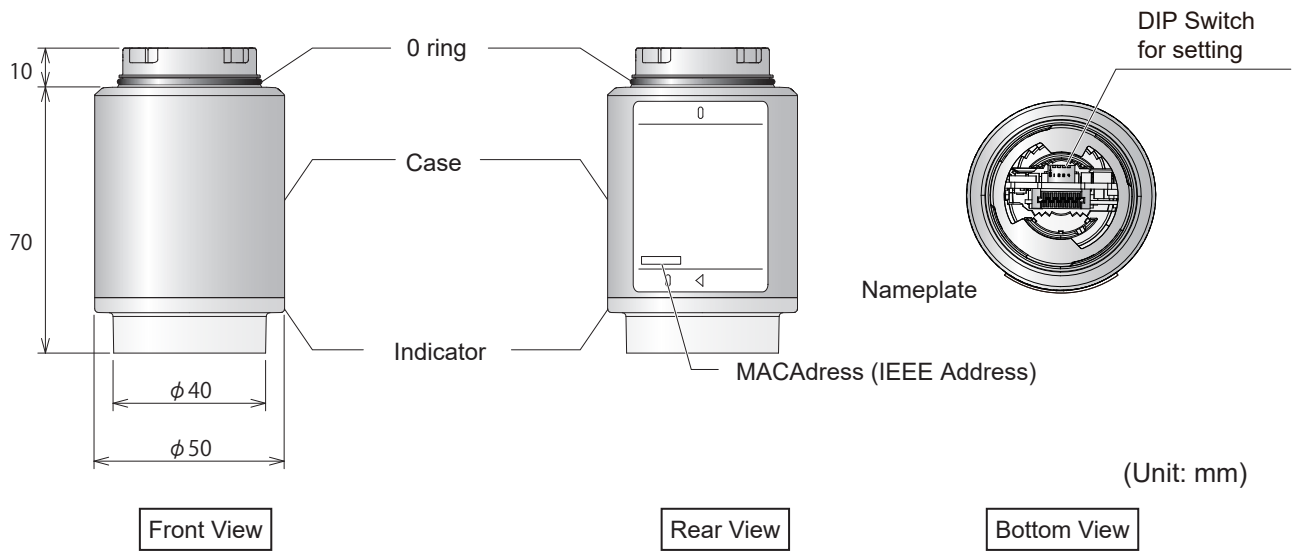


4. Part Names and Dimensions

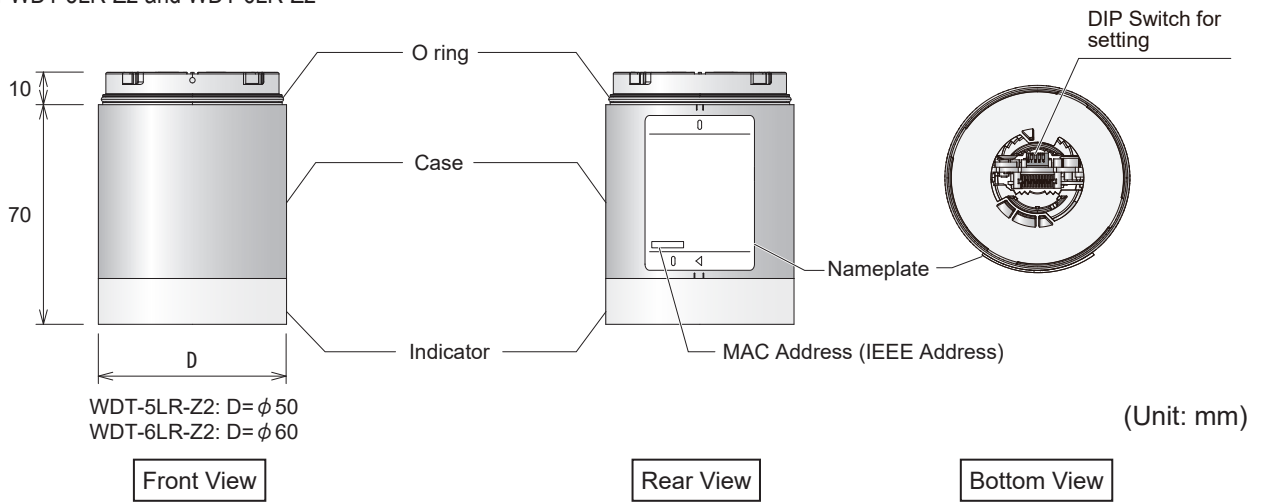
4.1. About Part Names and Dimensions

4.1.1. WDT (Transmitter)

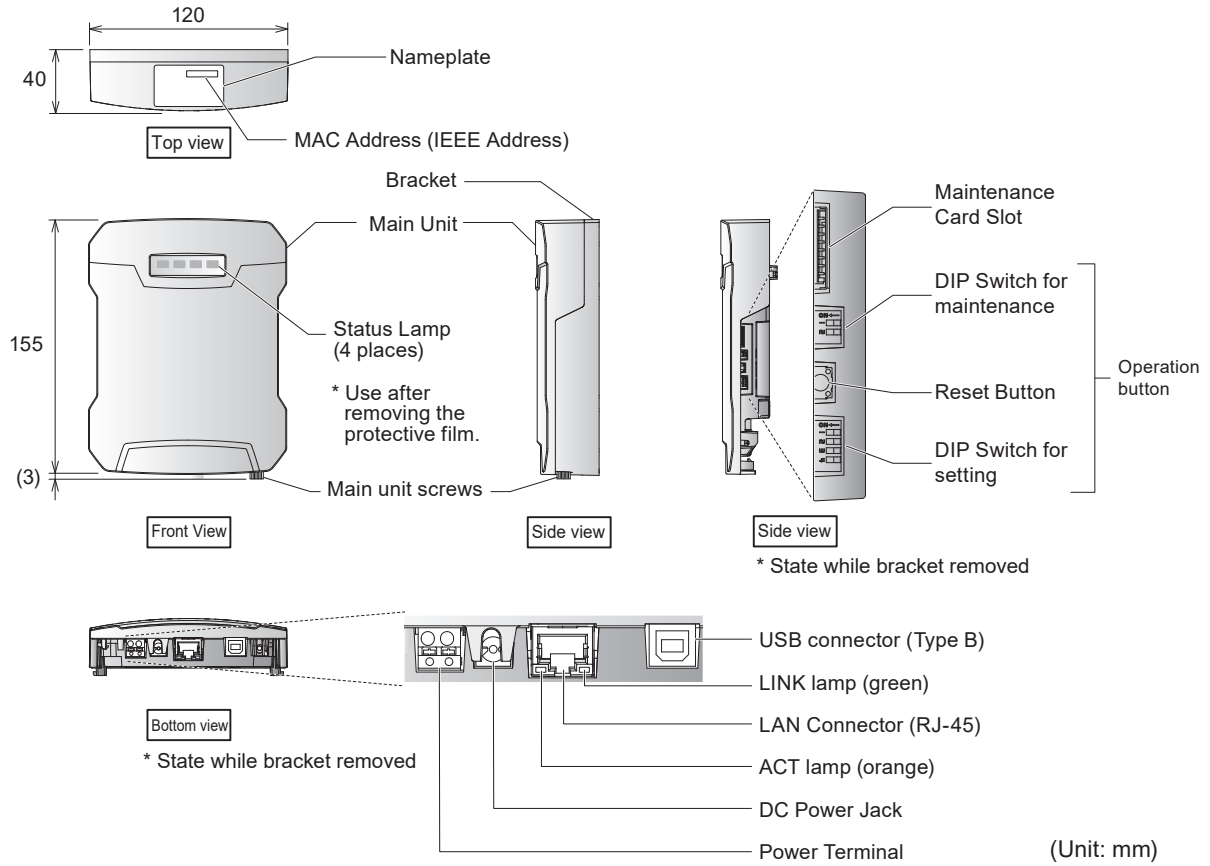
● For WDT-4LR-Z2



● For WDT-5LR-Z2 and WDT-6LR-Z2



4.1.2. WDR (Receiver)



5. Product Overview

5.1. About the WD System

To collect data available on equipment in your facility, the WD system transmits associated information (such as equipment operation data) to a host computer over the WD wireless network. By using visualization application software, you can use collected information to accurately view the capacity utilization rate, trigger improvement activities, and optimize operations. This application is not limited to production facilities and can be applied to other areas.

5.2. System Configuration

5.2.1. Glossary

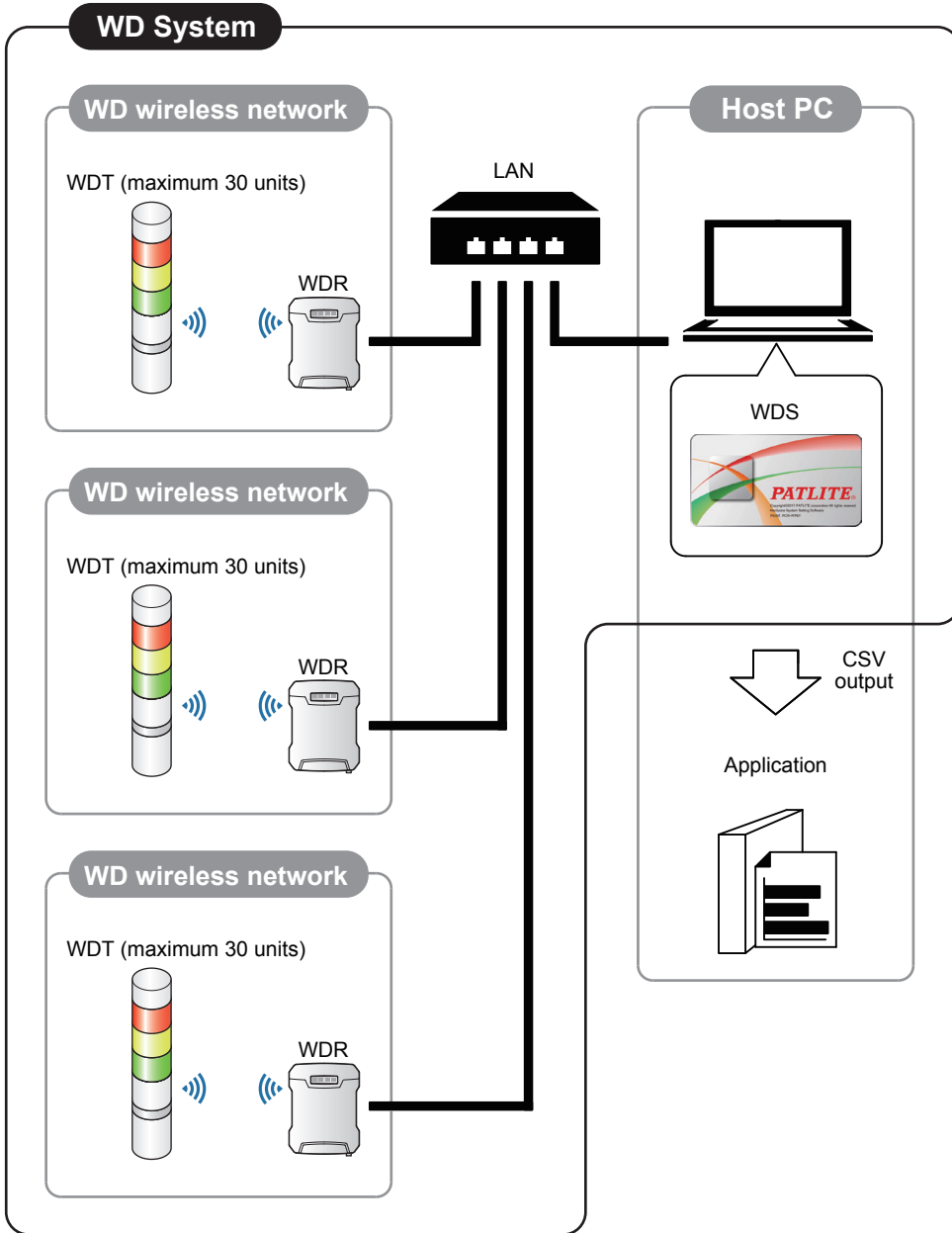
| Term | Description |
|--------------------------------|---|
| WD System | Name for the system as a whole. Can include multiple WD wireless networks and hosts. |
| WD wireless network | A part of the wireless network that consists of one WDR and multiple WDT (up to 30 units). |
| WDR | Receiver on a WD wireless network. Receives information from multiple WDT and transmits to the host. Models: WDR-L-Z2-PRO, WDR-L-Z2-PRO-L, WDR-LE-Z2-PRO, WDR-LE-Z2-PRO-L |
| WDS | Application software for WDT and WDR settings, and for collecting Signal Tower information in the WD system as CSV log data. Model: WDS-WIN01 |
| WDT | Transmitter on a WD wireless network. Collects various information from a Signal Tower and transmits the information wirelessly to WDR. Models: WDT-5E-Z2, WDT-6M-Z2, WDT-4LR-Z2, WDT-5LR-Z2, WDT-6LR-Z2 |
| Signal Tower Input Information | Input information of the Signal Tower collected by the WD system. |
| Host | Equipment for operation of the WD system. |
| Application Software* | Application software installed on the host PC. Use this application to display information collected by the WD system in a gantt chart or graph. Must be provided by the customer. |
| Maintenance PC | At maintenance, personal computer for setting up the WDT and WDR. |

*For application software, refer to "5.3. About Application Software" ( page 29).

5.2.2. WD System Configuration at Run Time

5.2.2.1. System Configuration Example for CSV File

- Configuration diagram



- Configuration

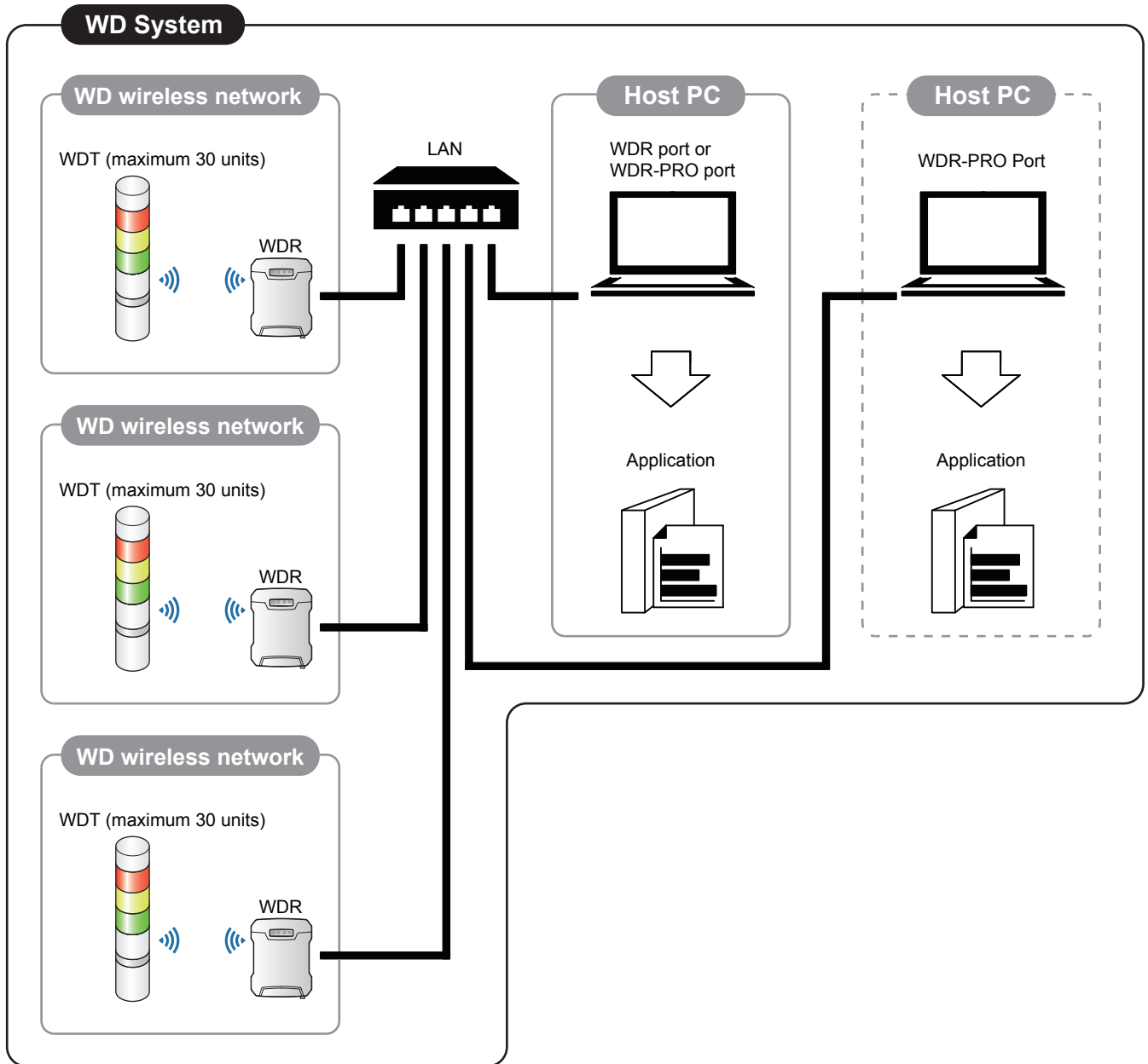
| Item | Number of configuration items | Models |
|---------|--|---|
| WDT | 1 to 30 units* ¹ per receiver | WDT-5E-Z2 / WDT-6M-Z2 / WDT-4LR-Z2 / WDT-5LR-Z2 / WDT-6LR-Z2 / WDT-6LR-Z2-PRO |
| WDR | 1 to 20 units* ² | WDR-L-Z2-PRO(-L)/WDR-LE-Z2-PRO(-L) |
| WDS | 1 | WDS-WIN01 *Version 1.04 or later |
| Host PC | 1 unit | - |

*1 For information, refer to "6.1.5. How many WDT you can connect to WDR" (page 36).

*2 When collecting CSV log data with WDS-WIN01.

5.2.2.2. Socket Communication System Configuration Example

- Configuration diagram



- Configuration

| Item | Number of configuration items | Models |
|---------|--|--|
| WDT | 1 to 30 units* ¹ per receiver | WDT-5E-Z2 / WDT-6M-Z2 / WDT-4LR-Z2 WDT-5LR-Z2 / WDT-6LR-Z2 / WDT-6LR-Z2-PRO |
| WDR | 1+ units | WDR-L-Z2-PRO(-L)/WDR-LE-Z2-PRO(-L)* ³ |
| Host PC | 1 to 2 units* ² | — |

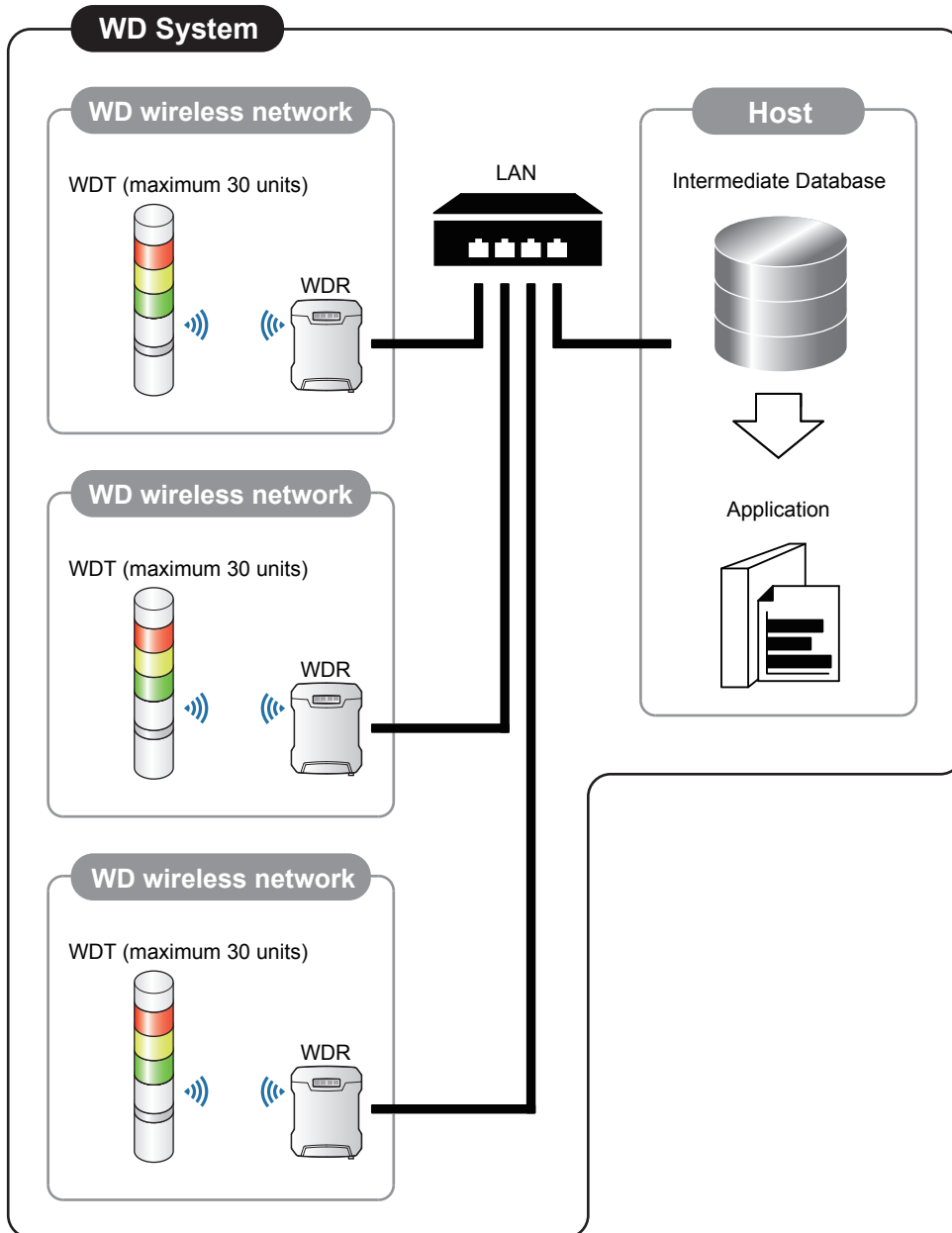
*1 For information, refer to "6.1.5. How many WDT you can connect to WDR" (☞ page 36).

*2 For WDR Port and WDR-PRO Port information, refer to "9.2.1.1. Socket Communication" (☞ page 117).

*3 The WDR port is the only port you can use on the WDR-L-Z2-PRO-L and WDR-LE-Z2-PRO-L .

5.2.2.3. Example Database Communication System Configuration

- Configuration diagram



- Configuration

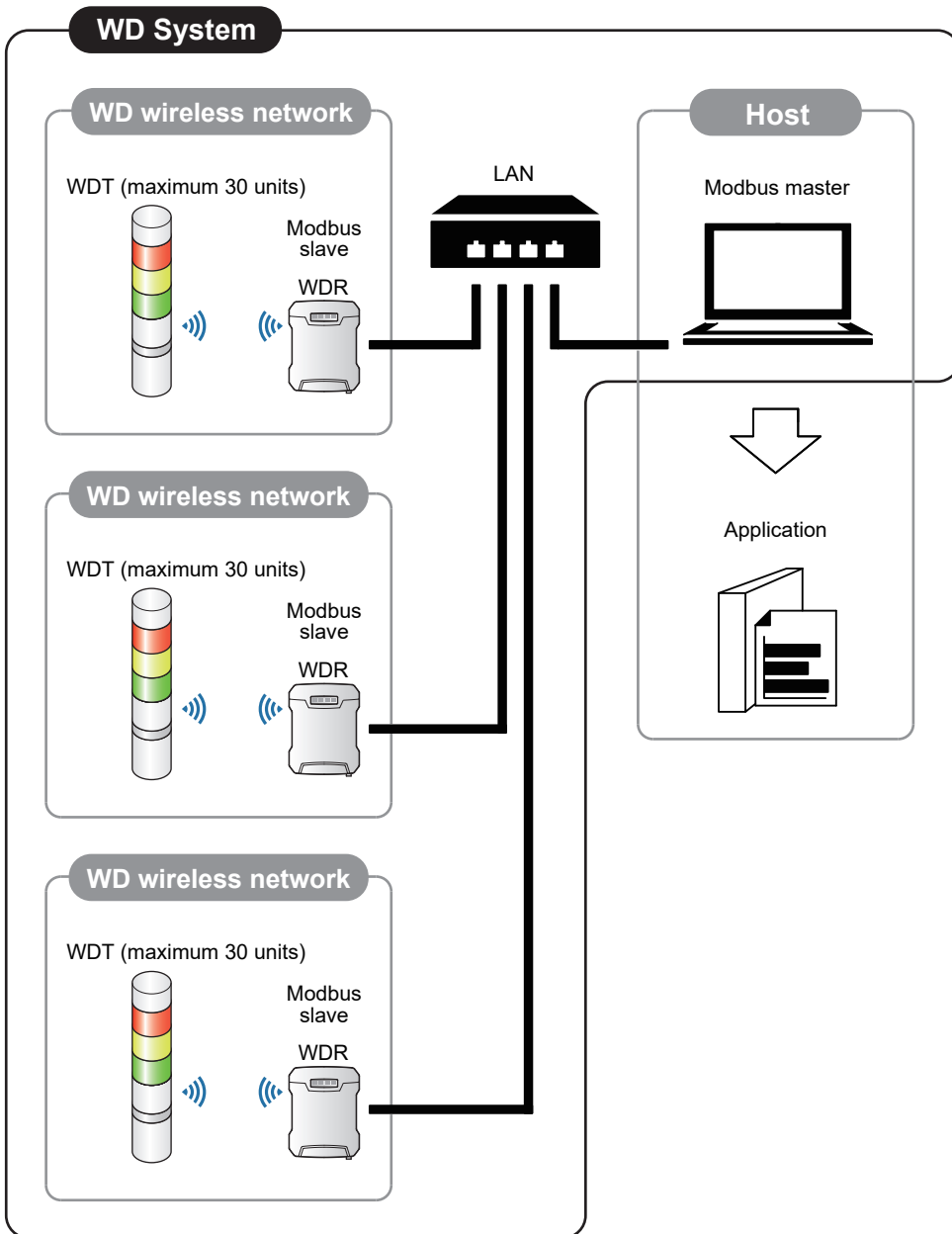
| Item | Number of configuration items | Models |
|-----------------------|--|--|
| WDT | 1 to 30 units* ¹ per receiver | WDT-5E-Z2 / WDT-6M-Z2 / WDT-4LR-Z2 WDT-5LR-Z2 / WDT-6LR-Z2 / WDT-6LR-Z2-PRO |
| WDR | 1+ unit | WDR-L-Z2-PRO/WDR-LE-Z2-PRO* ² |
| Intermediate Database | 1 unit | – |

*1 For information, refer to "6.1.5. How many WDT you can connect to WDR" (☞ page 36).

*2 WDR-L-Z2-PRO-L and WDR-LE-Z2-PRO-L cannot use database communication.

5.2.2.4. Example Modbus/TCP Communication System Configuration

- Configuration diagram



- Configuration

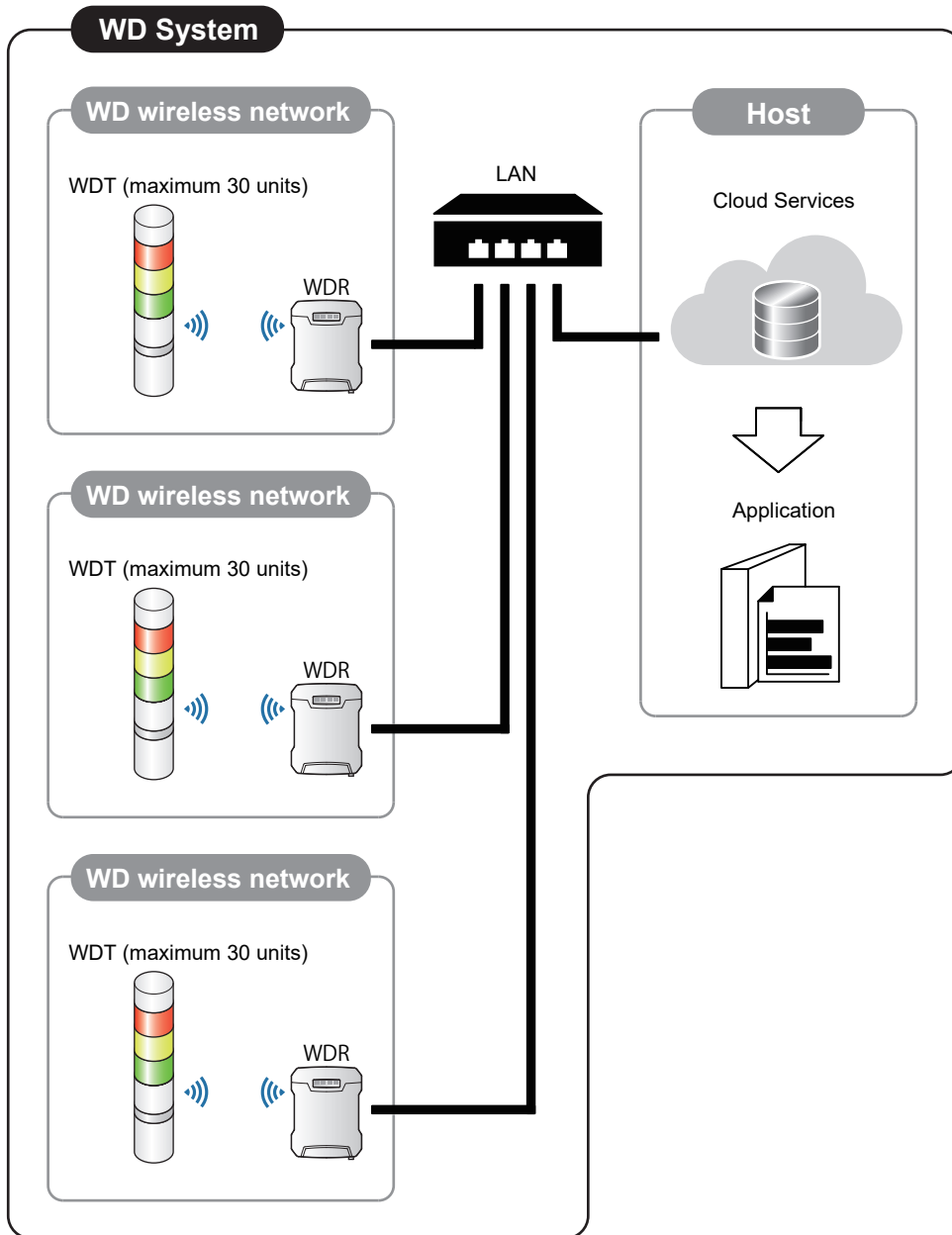
| Item | Number of configuration items | Models |
|---------------|--|--|
| WDT | 1 to 30 units* ¹ per receiver | WDT-5E-Z2 / WDT-6M-Z2 / WDT-4LR-Z2 WDT-5LR-Z2 / WDT-6LR-Z2 / WDT-6LR-Z2-PRO |
| WDR | 1+ units | WDR-L-Z2-PRO/WDR-LE-Z2-PRO* ² |
| Modbus master | 1 unit | - |

*1 For information, refer to "6.1.5. How many WDT you can connect to WDR" (☞ page 36).

*2 WDR-L-Z2-PRO-L and WDR-LE-Z2-PRO-L cannot use Modbus/TCP communication.

5.2.2.5. Example System Configuration for Cloud Communication

- Configuration diagram



- Configuration

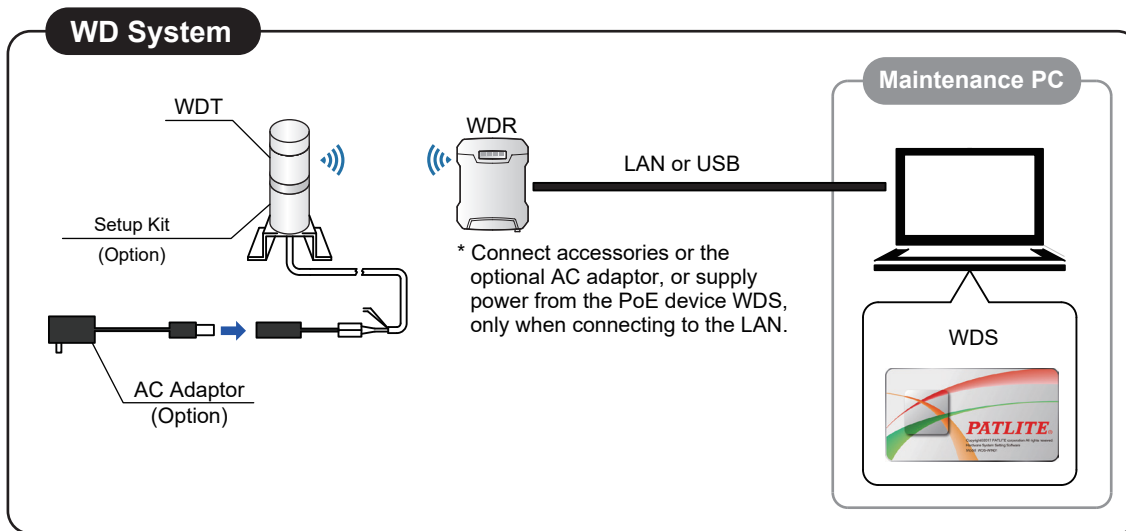
| Item | Number of configuration items | Models |
|---------------|--|--|
| WDT | 1 to 30 units* ¹ per receiver | WDT-5E-Z2 / WDT-6M-Z2 / WDT-4LR-Z2 WDT-5LR-Z2 / WDT-6LR-Z2 / WDT-6LR-Z2-PRO |
| WDR | 1+ units | WDR-L-Z2-PRO/WDR-LE-Z2-PRO* ² |
| Cloud Service | 1 unit | Siemens MindSphere |

*1 For information, refer to "6.1.5. How many WDT you can connect to WDR" (☞ page 36).

*2 WDR-L-Z2-PRO-L and WDR-LE-Z2-PRO-L cannot use Cloud Communication.

5.2.3. Example System Configuration When Setting Up Equipment (using the Setup Kit)

● Configuration diagram



● Configuration

| Item | Number of configuration items | Models |
|--|-------------------------------|--|
| WDT | Units as required | WDT-4LR-Z2 WDT-5LR-Z2 WDT-6LR-Z2 |
| Setup Kit (option) | 1 unit | WDX-4LRB WDX-5LRB WDX-6LRB |
| AC Adaptor (option) | 1 unit | ADP-001 |
| WDR | 1 unit | WDR-L-Z2-PRO(-L) WDR-LE-Z2-PRO(-L) |
| WDS | 1 | WDS-WIN01 *Version 1.04 or later |
| Maintenance PC | 1 unit | - |
| LAN Cable* ¹ | 1 | - |
| USB Cable* ² * ³ | 1 | - |

*1 When configuring the WDR settings, connect with a LAN cable.

*2 Use a USB cable 3 m or shorter.

*3 Do not connect LAN and USB cables at the same time.

CAUTION

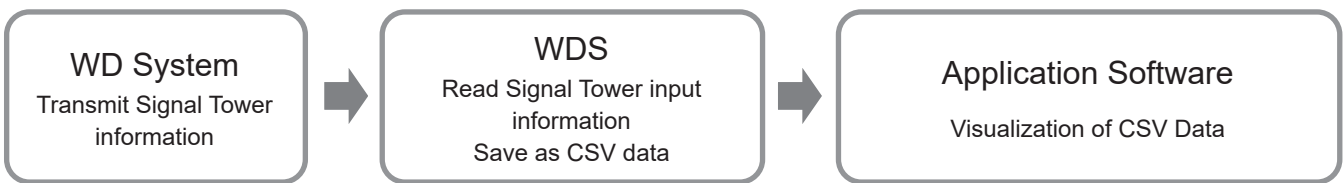
 When setting WDR, make sure the LAN cable is connected. You cannot set the WDR when a USB cable is connected.

5.3. About Application Software

⚠ CAUTION

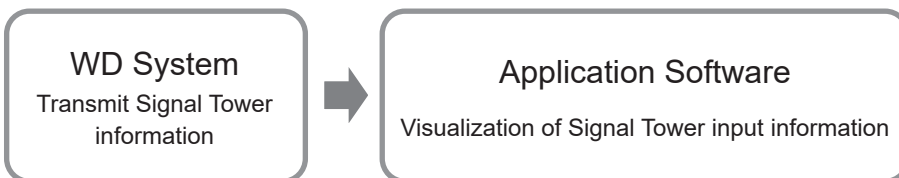
- ⚠ The customer needs to provide the application software.
- ⚠ Select a visualization application software suitable for customer visualization requirements.
- ⚠ There are five ways the WD system passes collected information to the application software: CSV File, Socket Communication, Database Communication, Modbus/TCP Communication, and Cloud Communication.

5.3.1. Pattern 1: CSV File



| No. | Application Software Preparation | References |
|-----|---|---|
| 1 | When using software packages from PATLITE partners that support the WD system | ☞ Please contact our sales office. |
| 2 | When customer develops their own solution | Refer to ☞ this manual Refer to ☞ "WDS-WIN01 Instruction Manual" |

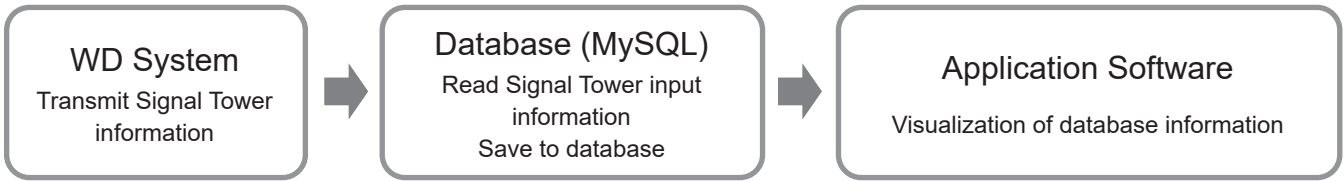
5.3.2. Pattern 2: Socket Communication



| No. | Application Software Preparation | References |
|-----|---|---|
| 1 | When using software packages from PATLITE partners that support the WD system | ☞ Please contact our sales office. |
| 2 | When customer develops their own solution | Refer to ☞ this manual Refer to ☞ "Application Notes for WD PRO Receiver"* |

*For information, contact your nearest PATLITE sales representative.

5.3.3. Pattern 3: Database Communication



| No. | Application Software Preparation | References |
|-----|---|--|
| 1 | When using software packages from PATLITE partners that support the WD system | ☞ Please contact our sales office. |
| 2 | When customer develops their own solution | Refer to ☞ this manual Refer to ☞ "Application Notes for WD PRO Receiver" |

*For information, contact your nearest PATLITE sales representative.

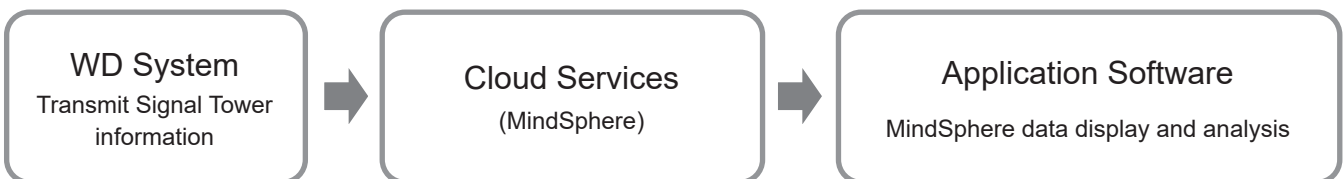
5.3.4. Pattern 4: Modbus/TCP Communication



| No. | Application Software Preparation | References |
|-----|---|--|
| 1 | When using software packages from PATLITE partners that support the WD system | ☞ Please contact our sales office. |
| 2 | When customer develops their own solution | Refer to ☞ this manual Refer to ☞ "Application Notes for WD PRO Receiver" |

*For information, contact your nearest PATLITE sales representative.

5.3.5. Pattern 5: Cloud Communication



| No. | Application Software Preparation | References |
|-----|---|------------------------------------|
| 1 | When using software packages from PATLITE partners that support the WD system | ☞ Please contact our sales office. |
| 2 | When customer develops their own solution | |

5.4. Function List

5.4.1. WDT (Transmitter)

5.4.1.1. Wireless Data Transmission Function

| Function | Description | References |
|---|---|---|
| Signal Tower Transmission Information | Function whereby the WDT transmits the status of the Signal Tower control line wirelessly to the WDR. | ☞ "9.1.1.1. Transmit Signal Tower Information" (page 111) |
| Select Format of Signal Tower Information | This function is for selecting one of two types of signal tower information, extended format or standard format. | ☞ "9.1.1.2. Select Format of Signal Tower Information" (page 111) |
| About Periodic Transmissions | Function where every 10 seconds the WDT transmits the current status of the Signal Tower control line. | ☞ "9.1.1.3. About Periodic Transmissions" (page 112) |
| Mesh Network Transmission | Function that interconnects the WDT and transmits information to the WDR over the optimum communication route. | ☞ "9.1.1.4. Mesh Network Transmission" (page 112) |
| Simple Counter Function | WDT function for saving the accumulated value (counter value) of pulse inputs (incremented 1 at a time) on a Signal Tower control line. | ☞ "9.1.1.5. Simple Counter Function" (page 113) |

5.4.1.2. Signal Wire Input Functions

| Function | Description | References |
|--------------------------------------|--|--|
| Determine Signal Tower Control Input | Function for determining the input status of the Signal Tower control line. There are two settings, normal and flashing. Set up in WDS-WIN01. This function cannot determine the input status of the Signal Tower control line used in a simple counter function. | ☞ "9.1.2.1. Determine Signal Tower Input" (page 114) |

5.4.2. WDR (Receiver)

5.4.2.1. Host Communication Function

| Function | Description | Support | | References |
|--------------------------|---|-----------------|--------------------------------|---|
| | | WDR-L(E)-Z2-PRO | WDR-L(E)-Z2-PRO-L | |
| LAN Communication | Based on LAN communication, using socket communication, database communication, and Modbus/TCP communication, you can communicate with the host at the same time. | - | - | - |
| Socket Communication | Function for communicating with applications on the host via the TCP socket. | ○ | △ (Cannot use WDR-PRO port) | ☞ "9.2.1.1. Socket Communication" (page 117) |
| Database Communication | As a MySQL client, function for connecting to the host database and outputting data. | ○ | x (Cannot use) | ☞ "9.2.1.2. Database Communication" (page 118) |
| Modbus/TCP Communication | Function for operating as a Modbus slave. | ○ | x (Cannot use) | ☞ "9.2.1.3. Modbus/TCP Communication" (page 119) |
| Cloud Communication | Function for collaborating with MindSphere. | ○ | x (Cannot use) | ☞ "7.4.3.4. Cloud Communication Settings" (page 69) |
| USB Communication | Data collected from a transmitter is output to the host via USB communication. | ○ | ○ | ☞ "9.2.1.4. USB Communication" (page 119) |

5.4.2.2. Setting and Maintenance Functions

| Function | Description | Support | | References |
|-------------------------------------|---|---|-------------------|---|
| | | WDR-L(E)-Z2-PRO | WDR-L(E)-Z2-PRO-L | |
| Receiver Wireless Settings Function | Function to set WDR wireless settings from the Web setup screen. | ○ | x (Cannot use) | ☞ "7.4.5.1. Main Unit Information" (page 81) |
| Transmitter Setting Function | Function to set WDT from the Web setup screen. | ○ (Not all WDB-D80S-PRO and WDT-6LR-Z2-PRO settings can be set up on the Web Setup Screen) | x (Cannot use) | ☞ "7.4.4.2. Wireless Settings List" (page 73) |
| Self Diagnosis Function | Function for self-diagnosis of the WD system's wireless environment. | ○ | ○ | ☞ "9.2.2. Self Diagnosis Function" (page 121) |
| Status Check Function | Function for checking, from a Web browser, the input status of the WDT Signal Tower Control Line. | ○ | x (Cannot use) | ☞ "7.4.4.4. Status Check" (page 78) |

6. Before Use

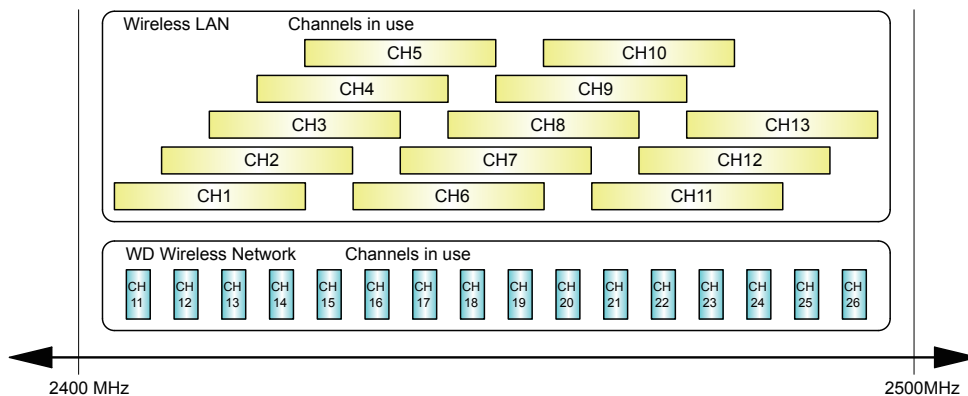
6.1. WD System Basic Information

6.1.1. About the WD Wireless Network

- The WD wireless network operates on the IEEE802.15.4. (ZigBee) compliant 2.4. GHz frequency. Although it runs on the same 2.4. GHz frequency as a wireless LAN (Wi-Fi), because it conforms to IEEE802.15.4. the WD wireless network can operate without a wireless LAN. However, if the frequencies you use overlap, the WD wireless network could experience transmission delays and other communication issues.
- The wireless communication is encrypted. The encryption standard used is AES-CCM (Advanced Encryption Standard-Counter with CBC-MAC), with an encryption key of 128 bits.

6.1.2. About Selecting a Wireless Channel

- The WD wireless network uses 16 wireless channels (CH11 to CH26).
- Select a wireless channel to avoid conflict with the frequency band of the LAN wireless channels in your installation environment.
- The relationship between frequency bands of channels on the WD wireless network and on the wireless LAN is as follows.



- The frequency of each channel on the WD wireless network is as follows.

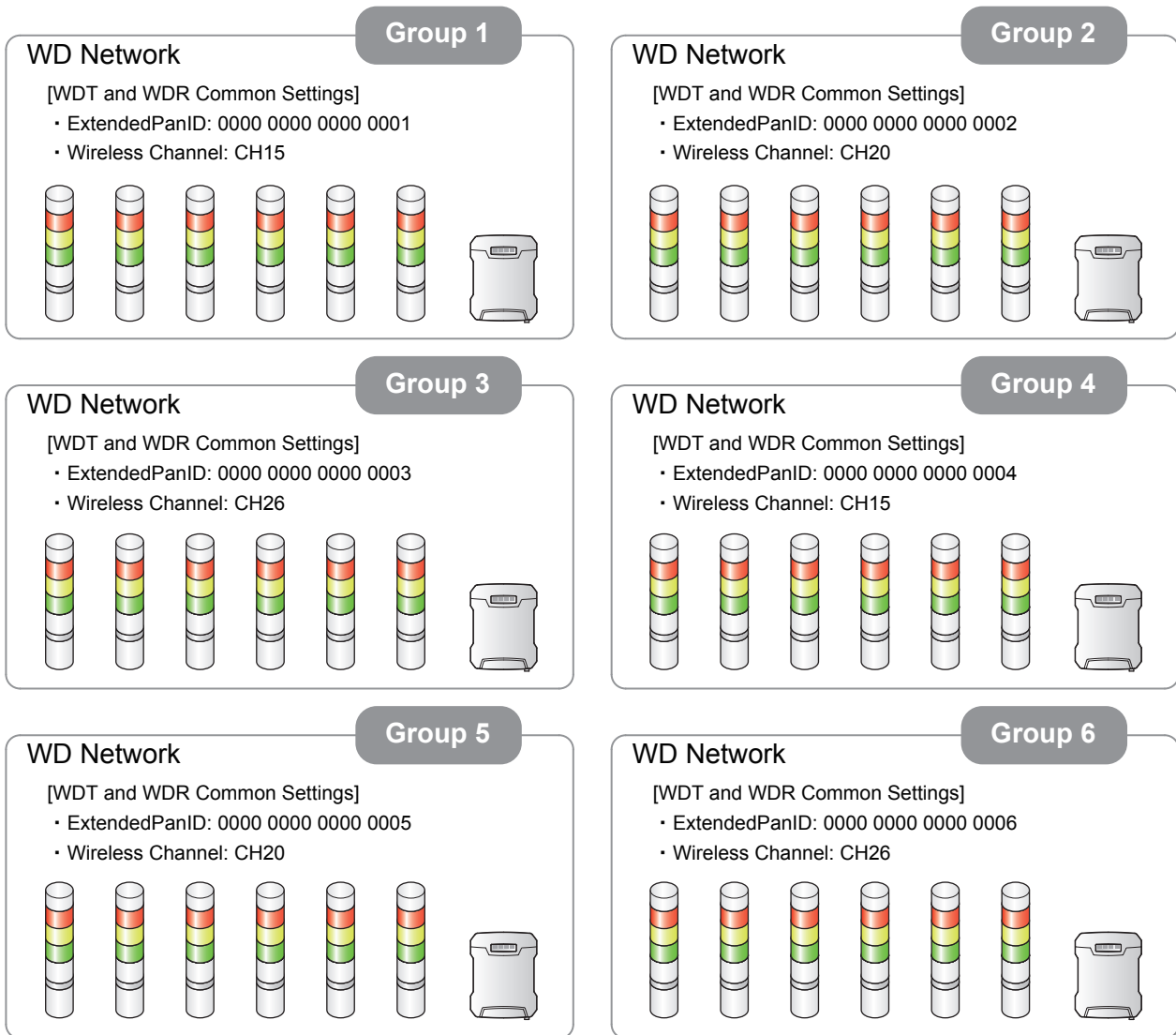
| Channel | Mid-range frequency (MHz) | Bandwidth (MHz) |
|---------|---------------------------|-----------------|
| CH11 | 2,405 | 2 |
| CH12 | 2,410 | 2 |
| CH13 | 2,415 | 2 |
| CH14 | 2,420 | 2 |
| CH15 | 2,425 | 2 |
| CH16 | 2,430 | 2 |
| CH17 | 2,435 | 2 |
| CH18 | 2,440 | 2 |

| Channel | Mid-range frequency (MHz) | Bandwidth (MHz) |
|---------|---------------------------|-----------------|
| CH19 | 2,445 | 2 |
| CH20 | 2,450 | 2 |
| CH21 | 2,455 | 2 |
| CH22 | 2,460 | 2 |
| CH23 | 2,465 | 2 |
| CH24 | 2,470 | 2 |
| CH25 | 2,475 | 2 |
| CH26 | 2,480 | 2 |

- When the wireless LAN uses three channels (CH1, CH6, and CH11), select either CH15, CH20, CH25, or CH26.
- In most cases, selecting CH25 or CH26 will enable you to avoid the wireless LAN channels.

6.1.3. About Grouping and ExtendedPanID

- The WD system requires using [ExtendedPanID] to group each WD wireless network (one WDR with multiple connected WDT). The ExtendedPanID consists of 16 single-byte, alphanumeric characters. Setup range: 0000 0000 0000 0000 to FFFF FFFF FFFF FFFE.
- You can use any combination of WDT-5E-Z2, WDT-6M-Z2, WDT-4LR-Z2, WDT-5LR-Z2, WDT-6LR-Z2, and WDT-6LR-Z2-PRO.
- The following illustrate how you can set the ExtendedPanID and wireless channels for devices in multiple groups.



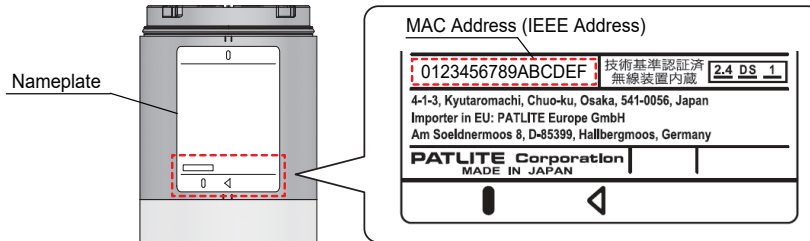
- If there are multiple channels available for selection, you should use separate wireless channels for each group. By distributing groups over multiple channels, you can reduce the load concentrated on a single wireless channel.

CAUTION

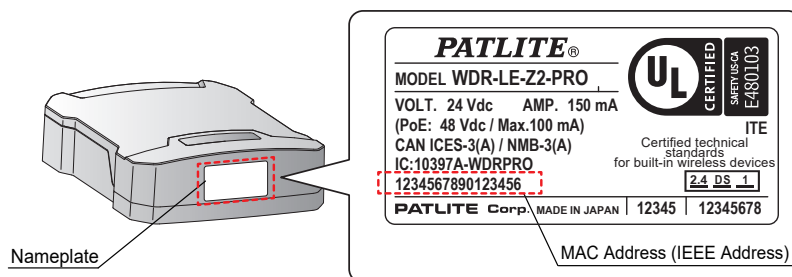
- ⊘ When there are multiple WDR in your system, do not use the same value for the ExtendedPanID. The product may not operate properly.
- ⚠ When the WDT ExtendedPanID is 0000 0000 0000 0000 (default value), regardless of the ExtendedPanID setting all the WDR may be grouped together. In this scenario, because the grouped wireless network is not stable, set any value other than 0000 0000 0000 0000 during configuration.
- ⚠ When the WDR ExtendedPanID is 0000 0000 0000 0000 (default value), the WDR MAC address (IEEE address) operates as ExtendedPanID. In this scenario, because ExtendedPanID operates with a value that is different from its set value, it is recommended to set any value other than 0000 0000 0000 0000 (default value) during configuration.

6.1.4. About the MAC Address (IEEE Address)

- Static addresses assigned to WDT and WDR for identification. This address is called a MAC address (IEEE address).
- The MAC address (IEEE Address) is printed on a nameplate on the back of the WDT.



- The MAC address (IEEE Address) is printed on a nameplate on the top of the WDR.
 (This is different from the MAC address used for LAN communication. You can see the MAC address used for LAN communication from the Web Setup Screen. For information, refer to "7.4.5.1. Main Unit Information" (☞ page 81).)



6.1.5. How many WDT you can connect to WDR

The number of WDT units you can connect to a WDR is limited by the frequency of information sent to the WDR. The average of all transmissions from all WDT connected to the WDR is limited to 240 or less per minute (transmission interval of 0.25 seconds or longer). To satisfy this condition, use the following table as a guide and determine the number of connected units.

| WDT connection limit | Estimated number of Signal Tower information transmissions / 1 WDT |
|----------------------|--|
| 30 unit | 8 times per minute |
| 20 unit | 12 times per minute |
| 10 unit | 24 times per minute |
| 5 unit | 48 times per minute |
| 1 unit | 240 times per minute |

6.1.6. About Maintain Signal Tower Status

Both the WDT and WDR can temporarily save information internally. Temporarily saved information is transmitted from WDT to WDR, and from WDR to host, in order from oldest to newest. The maximum amount of Information that can be saved temporarily is 32 for WDT, and up to 1000 for WDR connected to WDT.

Point

- When the maximum number of information is exceeded, information is deleted beginning with the oldest.
- When power on the WDT or WDR is shut down, the information is deleted.

6.2. About the Installation Environment

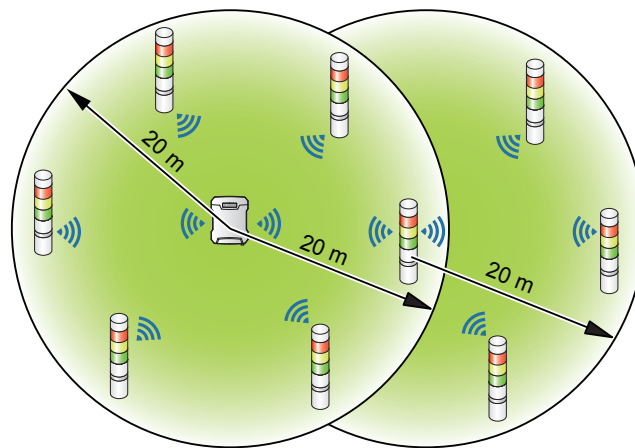
6.2.1. Installation Environment Main Points

There are five essential points to consider at installation.

| No. | Description | References |
|-----|---|---|
| 1 | There is no influence in radio waves at the installation site. Also, the radio waves at the installation site do not change over time. | ☞ "6.2.3. About the Influence of Surrounding Radio Waves" (page 38) |
| 2 | The distance between devices (WDR, WDT) does not exceed recommendations. The recommended distance between all WDT and WDR is within line of sight. | ☞ "6.2.2. Distance Between Devices" (page 37) |
| 3 | Each device (WDR and WDT) is in line of sight. To ensure good line of sight, the location should not be cluttered and should be free of any obstacles. | ☞ "6.2.4. Ensuring Line of Sight" (page 39) |
| 4 | Placement of WDR is appropriate. <ul style="list-style-type: none"> • Install in a location as high as possible. • Install away from obstacles that could disrupt radio waves. | ☞ "6.2.5. WDR Installation Position and Obstacles" (page 39) |
| 5 | Each device is always powered, and the mesh network is always available. If power is not available for one of the WDT, the communication path could get interrupted and information may not be transmitted. | - |

6.2.2. Distance Between Devices

Place the WDT within a 20 m radius (recommended line-of-site distance) of the WDR. If more distance is required, add another WDT to act as a relay.

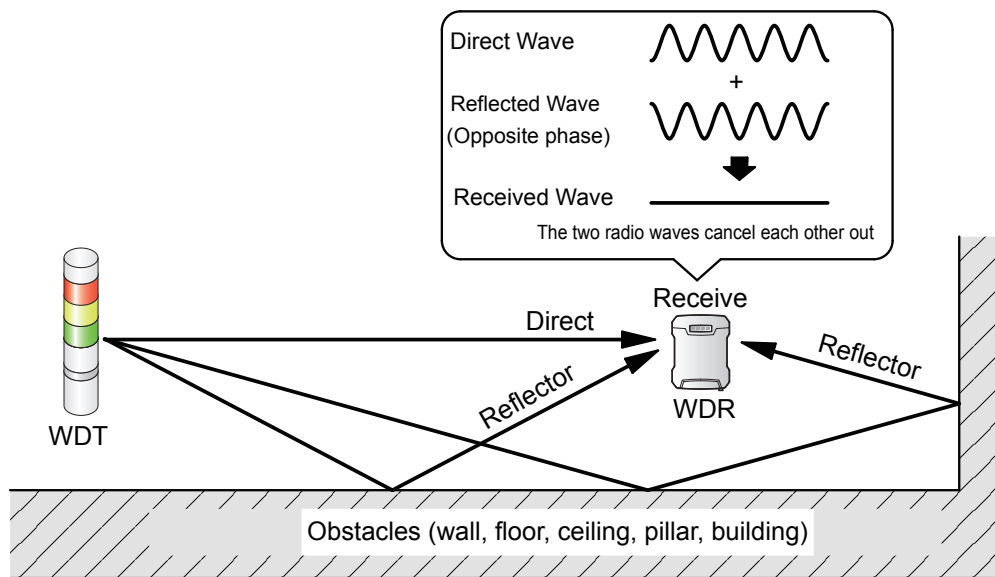


6.2.3. About the Influence of Surrounding Radio Waves

If the WD wireless network is affected by radio interference from electronics, microwave ovens, or other manufacturing equipment, normal operation may not be possible. Check the radio wave environment before installation and confirm there is no radio interference on the wireless radio bands you are planning to use.

| Causes of Radio Interference | Description |
|------------------------------|---|
| Other wireless devices | Wireless devices using the same frequency or frequencies in the same neighborhood. |
| Noise from other equipment | Noise caused by power supply circuits, electronic circuits, or oscillators. |
| Noise from the surroundings | <ul style="list-style-type: none"> • Noise from motors and engine equipment • Noise from transmission lines, power supply equipment, and industrial equipment. • Noise from microwave ovens and fluorescent lamps. |
| Surrounding obstacles* | Interference caused by phasing with own radio waves. |

*Various obstacles (wall, floor, ceiling, pillar, equipment) may exist in the installation environment. The reception of radio waves changes depending on the relationship between the position of each device (WDR, WDT), obstacles, and the surrounding environment. As shown in the figure below, radio waves transmitted from a single point are delivered to each device (WDR, WDT) from multiple directions, such as when radio waves travel in a direct line, and when radio waves reflect off obstacles. Radio wave interference could be caused by this scenario, and operation may not be possible due to canceling radio waves.



When wireless LAN and in-house PHS access points are installed in the surrounding environment, install WDR so they are 5 to 10 m or more away from access points.

6.2.4. Ensuring Line of Sight

- Good line of sight for each device (WDR, WDT) and free of any obstacles – hereafter referred to as the Fresnel Zone – is required. The Fresnel zone is a three-dimensional space, whose size is estimated as shown in the following illustration.
- If you cannot establish the Fresnel zone, sometimes the available communication distance may be shorter than usual due to obstacles inhibiting communication.

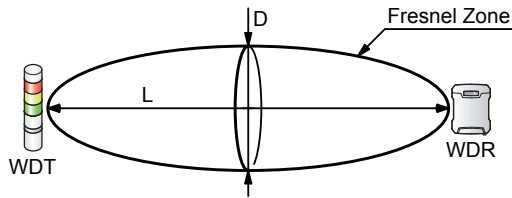


Figure 1

| L | D |
|------------------------|-----------------------|
| Line of sight distance | Fresnel zone diameter |
| 20m | 1.6m |
| 10m | 1.2m |

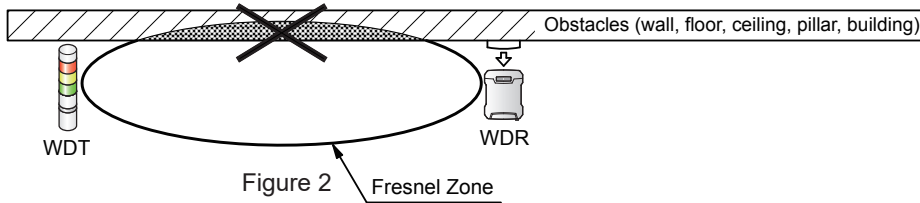


Figure 2

⚠ CAUTION

❗ When installing on a metal plate or concrete wall, install the devices in the Fresnel zone so they are free of any obstacles.

6.2.5. WDR Installation Position and Obstacles

- When onto a pillar such as the I-beam in a building, install the WDR in a direction that promotes the propagation of radio waves.
- When using the WDR in a box, use a resin box with radio wave permeability.

6.2.6. About the Signal Tower Power Supply Status

To operate this product, you need to constantly supply power to the LR series signal tower's power line. For information, refer to "8.1.1. WDR Wiring Method" (👉 page 86).

6.3. Installation Steps

This section describes the steps for setting up and installing equipment. Refer to this manual as well as instruction manuals of related products.

6.3.1. Setup Information

Have the information for the settings below prepared beforehand.

| Information required | Description | | References |
|--|---|------------------------------|---|
| Information about the equipment to connect | Equipment name and other equipment identification information | | - |
| Information about the Signal Tower | Model, power supply specifications, operation information | | - |
| WDT and WDR common settings | Wireless settings | ExtendedPanID | ☞ "6.1.3. About Grouping and ExtendedPanID" (page 35) |
| | | Wireless channels | ☞ "6.1.1. About the WD Wireless Network" (page 34) |
| WDT settings | Run time settings | Determine Signal Tower Input | ☞ "9.1.2.1. Determine Signal Tower Input" (page 114) |
| | | Power Supply Settings | *1 |
| | | Simple Counter Settings | ☞ "9.1.1.5. Simple Counter Function" (page 113) |
| | | Transmission Mode | ☞ "9.1.1. Wireless Data Transmission Function" (page 111) |

| Information required | Description | | References |
|-----------------------|--|-------------------------------|--|
| WDR setup information | Network Setup | IP Address Configuration | ☞ "7.4.2.1. Network Setup" (page 58) |
| | | IP address* ² | |
| | | Subnet Mask | |
| | | Default Gateway | |
| | | DNS Server Address | |
| | | Host Name | |
| | Clock Settings | NTP Server Address | ☞ "7.4.2.2. Clock Settings" (page 59) |
| | | Correction Interval (minutes) | |
| | | Timezone | |
| | User Authentication Settings | User Name | ☞ "7.4.2.3. User Authentication Settings" (page 62) |
| | | Password | |
| | Security Settings | Communication Method | ☞ "7.4.2.4. Security Settings" (page 63) |
| | Socket Communication Setting* ³ | Setting Port | ☞ "7.4.3.1. Socket Communication Settings" (page 64) |
| | | WDR-PRO Port 1 | |
| WDR-PRO Port 2 | | | |
| WDR Port | | | |

| Information required | Description | | References |
|----------------------------|--|---|--|
| WDR setup information | Database Communication Setting* ³ | Database Communication Function | ☞ "7.4.3.2. Database Communication Setting" (page 66) |
| | | Database Address | |
| | | Database Port Number | |
| | | Database Name | |
| | | User Name | |
| | | Password | |
| | Modbus/TCP Communication Setting* ³ | Port Number | ☞ "7.4.3.3. Modbus/TCP Communication Settings" (page 68) |
| | Cloud Communication Settings* ³ | Cloud Communication Function | ☞ "7.4.3.4. Cloud Communication Settings" (page 69) |
| | | Region | |
| | | Region Identifier | |
| | | Domain | |
| | | Client ID | |
| | | Client Secret | |
| | | Root Certificate 1 | |
| | | Root Certificate 2 | |
| Select Information | | | |
| Receiver Wireless Settings | ExtendedPanID | ☞ "7.4.4.1. Receiver Wireless Settings" (page 72) | |
| | Frequency Channel | | |
| | Network Startup Method* ⁴ | | |

*1 For information, refer to ☞ "WDS-WIN01 Instruction Manual".

*2 When not using DHCP, prepare beforehand the number of IP addresses required for use with the WDR.

*3 Set up the Socket Communication Setting, Database Communication Setting, Modbus/TCP Communication Setting, and Cloud Communication Settings only when they are used.

*4 For network startup method, use [Auto Start (Recommended)].

6.3.2. Equipment Settings

Using the setup information in "6.3.1. Setup Information", prepare the equipment. For system configuration when setting up equipment, refer to "5.2.3. Example System Configuration When Setting Up Equipment (using the Setup Kit)" (☞ page 28).

6.3.2.1. Set Up WDT

- Use the WDT system configuration software WDS-WIN01. Install WDS-WIN01 on the maintenance PC and set up the equipment. For using WDS-WIN01, refer to ☞ "WDS-WIN01 Instruction Manual".
- The setup procedure is as follows.

STEP 1 Prepare required equipment and create maintenance environment

This manual

"5.2.3. Example System Configuration When Setting Up Equipment (using the Setup Kit)" (☞ page 28)

STEP 2 Turn ON the WDR

This manual

"8.2.5. Checking the WDR Status Lamp" (☞ page 105)



After power is turned on, the WDR takes approximately 50 seconds to complete startup. Check the WDR status lamp to confirm startup is complete.

STEP 3 Set the network between the WDR and maintenance PC

WDS-WIN01 Instruction Manual

"6.1.1. WDR Network Settings"



When connecting to the WDR for the first time via LAN, set the IP address of the maintenance PC to 192.168.10.* (value other than 1).

STEP 4 Start WDS-WIN01 on the maintenance PC

WDS-WIN01 Instruction Manual

"5.3. Starting WDS-WIN01"

STEP 5 Turn ON the WDT and check the WDT wireless status with its indicator

This manual

"8.1.5. Checking Operations with WDT-PRO Indicator" (☞ page 94)

STEP 6 Set up WDT

This manual

"7.4.4.2. Wireless Settings List" (☞ page 73)

"8.1.3.2. Setup Items" (☞ page 91)

"8.1.3. Setting up the WDT Main Unit" (☞ page 91)

WDS-WIN01 Instruction Manual

"6.1.2. Set Up WDT"



To configure WDT, WDT and WDR must have a wireless connection. When the WDT and WDR are not connected wirelessly, initialize the WDT. For information, refer to "8.1.6. Initializing the WDT" (☞ page 95).

6.3.2.2. Set Up WDR

- Use the WDR Web setup screen for the WDR device settings.
- The setup procedure is as follows.

⚠ CAUTION

ⓘ When configuring the WDR settings, connect with a LAN cable.

STEP 1 Turn ON the WDR

This manual

"8.2.5. Checking the WDR Status Lamp" (☞ page 105)



After power is turned on, the WDR takes approximately 50 seconds to complete startup. Check the WDR status lamp to confirm startup is complete.

STEP 2 Set up WDR User Authentication

This manual

"7.1. Set Up the User Name and Password for the WDR's Web Setup Screen" (☞ page 49)



After setting up user authentication, to log in again start from step 3. If user authentication is not set up, you cannot proceed to the login screen.

STEP 3 Log in to the WDR Web Setup Screen

This manual

"7.2. Display WDR Web Setup Screen" (☞ page 51)

STEP 4 Set the WDR network*, time, and user authentication

This manual

"7.4.2. System Settings" (☞ page 58)

*Set the IP address last.

STEP 5 Set WDR Wireless Settings

This manual

"7.4.4.1. Receiver Wireless Settings" (☞ page 72)

*Set up also possible with system configuration software WDS-WIN01. For using WDS-WIN01, refer to ☞ "WDS-WIN01 Instruction Manual".

*For WDR-L(E)-Z2-PRO-L, set with system configuration software WDS-WIN01.

STEP 6 Set WDR Host Communication Settings

When Run Using Socket Communication

This manual

"7.4.3.1. Socket Communication Settings" (☞ page 64)

When Run Using Database Communication

This manual

"7.4.3.2. Database Communication Setting" (☞ page 66)

When Run Using Modbus/TCP Communication

This manual

"7.4.3.3. Modbus/TCP Communication Settings" (☞ page 68)

When Run Using Cloud Communication

This manual

"7.4.3.4. Cloud Communication Settings" (☞ page 69)

6.3.3. Installation Steps

CAUTION

- ❗ When deciding the installation location of each device, carefully review the following procedure regarding installation location. The installation location could cause problems such as unstable operation or communication failure.
- ❗ Install devices only after equipment setup is complete.

6.3.3.1. WDT Installation


STEP 1 Wire the LR Signal Tower

This manual

"8.1.1. WDR Wiring Method" ( page 86)


STEP 2 Attach WDT to the LR Signal Tower

This manual

"8.1.2.1. Installing to and Removing from LR Series Signal Tower" ( page 88)

STEP 3 Attach LED Unit and Buzzer Unit to LR Signal Tower

This manual

"8.1.2.2. Attaching the LED Unit and Buzzer Unit" ( page 90)

6.3.3.2. WDR Installation

STEP 1 Install WDR to the mounting surface

This manual

"8.2.1. WDR Mounting Method" ( page 96)

STEP 2 Wire the WDR

This manual

"8.2.2. WDR Wiring Method" ( page 98)

6.3.3.3. Check WDT and WDR Connection

Construct the operation environment. For information, refer to "5.2.2. WD System Configuration at Run Time" (☞ page 23).

STEP 1 Turn ON the WDT and WDR

This manual

"8.2.5. Checking the WDR Status Lamp" (☞ page 105)



After power is turned on, the WDR takes approximately 50 seconds to complete startup. Check the WDR status lamp to confirm startup is complete.

STEP 2 Check the WDT wireless status with its indicator

This manual

"8.1.5. Checking Operations with WDT-PRO Indicator" (☞ page 94)

6.3.3.4. Using WDS-WIN01 with CSV File

STEP 1 Use WDS-WIN01 to set the data save destination

WDS-WIN01 Instruction Manual

"6.2.2. Data Save Destination and CSV File Format Settings"

STEP 2 Use WDS-WIN01 to set the CSV file format

WDS-WIN01 Instruction Manual

"6.2.2. Data Save Destination and CSV File Format Settings"

STEP 3 Use WDS-WIN01 to start collecting

WDS-WIN01 Instruction Manual

"6.2.4. WDR Registration and Starting Collection"

6.3.4. Maintenance

While in operation, you can check things such as the wireless environment for the WDT and WDR, and the WDT input status.

Check the wireless environment when installed

This manual

"7.4.4.3. Wireless Connection Diagnosis" (☞ page 76)

"9.2.2. Self Diagnosis Function" (☞ page 121)

Function for checking the input status of the WDT Signal Tower Control Line

This manual

"7.4.4.4. Status Check" (☞ page 78)

6.3.5. Replace WDR-L(E)-Z2

When replacing the WDR-L(E)-Z2, follow the steps below.

6.3.5.1. Set Up WDR

STEP 1 Prepare required equipment and create maintenance environment

This manual

"5.2.2.2. Socket Communication System Configuration Example" (☞ page 24)



- When setting up only the WDR, WDT preparation is not required.



- When configuring the WDR settings, connect with a LAN cable. You cannot set the WDR when a USB cable is connected.

STEP 2 Set up the maintenance PC network



The default IP address is different on WDR-L(E)-Z2 and WDR-L(E)-Z2-PRO (-L).

- WDR-L(E)-Z2: 192.168.0.1

- WDR-L(E)-Z2-PRO(-L): 192.168.10.1

STEP 3 Turn ON the WDR

This manual

"8.2.5. Checking the WDR Status Lamp" (☞ page 105)



After power is turned on, the WDR takes approximately 50 seconds to complete startup. Check the WDR status lamp to confirm startup is complete.

STEP 4 Log in to the WDR Web browser screen

This manual

"7.1. Set Up the User Name and Password for the WDR's Web Setup Screen" (☞ page 49)

"7.2. Display WDR Web Setup Screen" (☞ page 51)

STEP 5 Set the WDR network*, time, and user authentication

This manual

"7.4.2. System Settings" (☞ page 58)

*Set the IP address last.

STEP 6 Set WDR Wireless Settings

This manual

"7.4.4.1. Receiver Wireless Settings" (☞ page 72)

*For WDR-L(E)-Z2-PRO-L, set with system configuration software WDS-WIN01.


6.3.5.2. WDR Installation

STEP 1 Remove the existing
WDR-L(E)-Z2

STEP 2 Install WDR to the mounting
surface

STEP 3 Wire the WDR

This manual

"8.2.1. WDR Mounting Method" ( page 96)

This manual

"8.2.2. WDR Wiring Method" ( page 98)



When using an AC Adaptor, make sure you use the AC Adaptor that comes with WDR-L-Z2-PRO(-L) or the AC Adaptor optional part, not the AC Adaptor that comes with WDR-L-Z2.

6.3.5.3. Check WDT and WDR Connection

STEP 1 Turn ON the WDT and WDR

STEP 2 Check the WDT wireless status with
its indicator


This manual

"8.2.5. Checking the WDR Status Lamp" ( page 105)



After power is turned on, the WDR takes approximately 50 seconds to complete startup. Check the WDR status lamp to confirm startup is complete.

This manual

"8.1.5. Checking Operations with WDT-PRO Indicator" ( page 94)

7. WDR Setup Process

To specify the various settings on this product, a user name and password are required.

After purchase, the first time you open the Web browser the [User Authentication Settings] screen appears. Set up the user name and password.

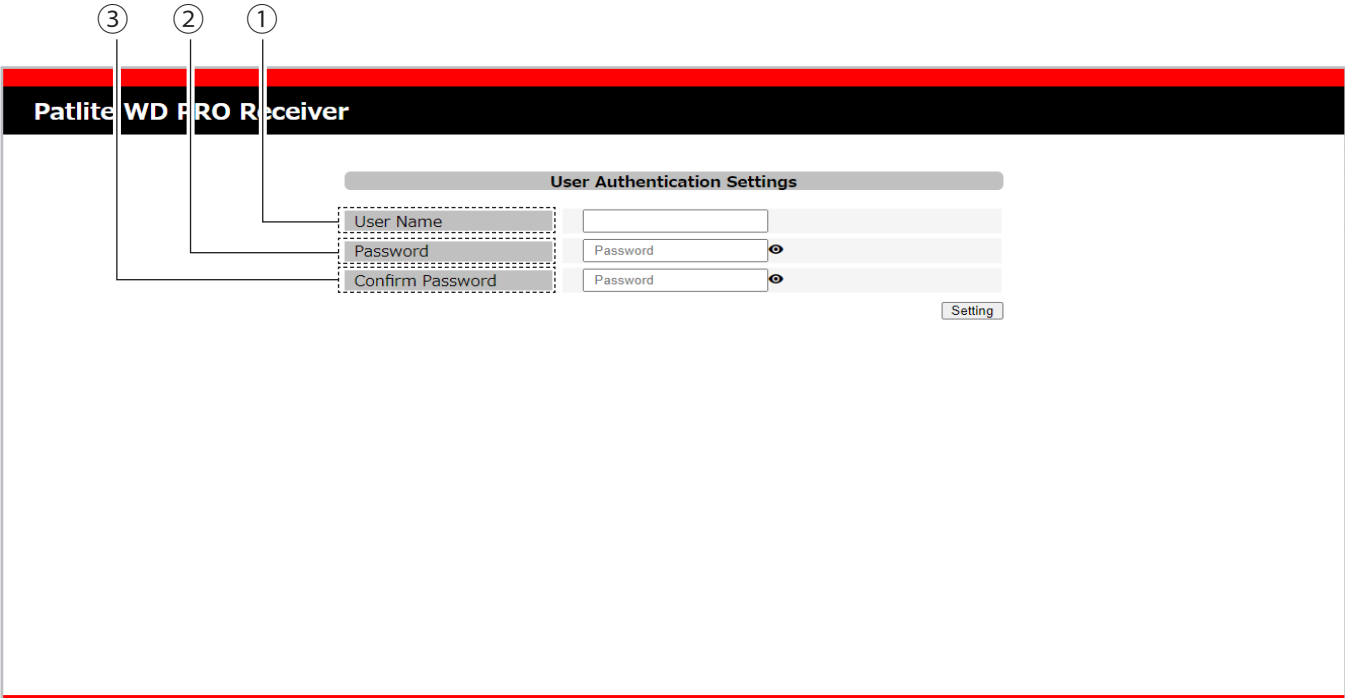
7.1. Set Up the User Name and Password for the WDR's Web Setup Screen

When the user name and password are not set up, the [User Authentication Settings] screen will appear. Set up the user name and password. After the user name and password are set up, the login screen will appear when opening the Web browser.

CAUTION

- ❗ Do not forget the user name and password. If you cannot remember either one, login will not be possible. In the unlikely event you cannot remember the user name and password, run initialization and set up the user name and password again.

After turning on the power and startup is complete, refer to "7.2. Display WDR Web Setup Screen" (👉 page 51) and start the web browser.



Patlite WDR PRO Receiver

User Authentication Settings

User Name

Password

Confirm Password

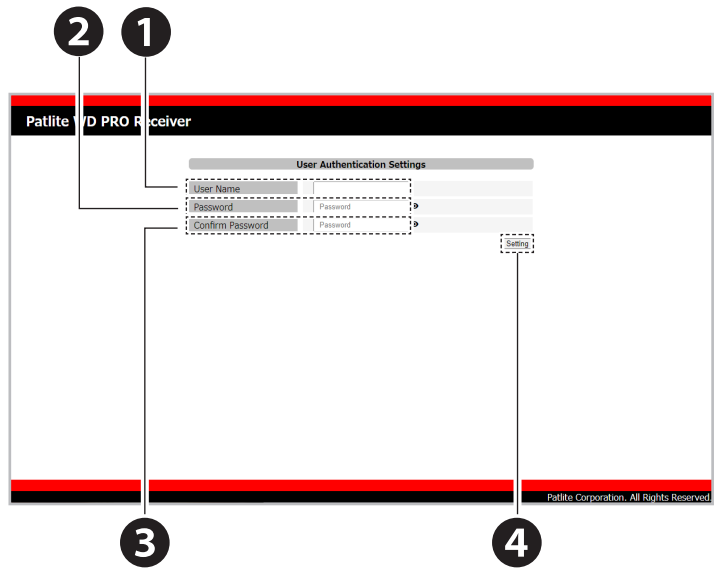
Setting

Patlite Corporation. All Rights Reserved.

| No. | Item | Description | Default Value | Input range | Setup optional |
|-----|-----------------|---------------------------------------|---------------|--|----------------|
| ① | User Name | Set a User Name. | (Blank) | Up to 16 single-byte alphanumeric characters and symbols | x |
| ② | Password | Set a Password. | (Blank) | Up to 16 single-byte alphanumeric characters and symbols | x |
| ③ | Confirm Pasword | Set a Password. (for confirmation) | (Blank) | Up to 16 single-byte alphanumeric characters and symbols | x |

- 1** In the [User Name] field, enter the desired user name.
- 2** In the [Password] field, enter the desired password.
- 3** In the [Confirm Password] field, enter the password again.
- 4** Click [Setting] to update with the defined settings.

Note: When logging in, use the set user name and password.



7.2. Display WDR Web Setup Screen

For the various settings of this product, log in from a Web browser.

Supported browsers are Google Chrome, Microsoft Edge, and Internet Explorer 11.

After turning on the power and startup is complete, start the Web browser and in the address bar enter the IP address of this product. The default address for this product is **192.168.10.1**.

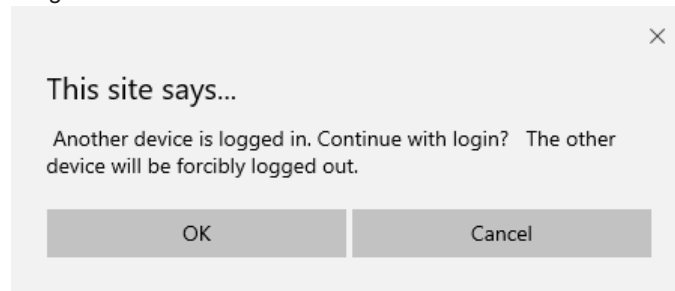
CAUTION

- ❗ When using WDR with USB communication, you cannot view the Web Setup Screen. Make sure you use LAN communication.

Point

- If the login screen does not appear or does not display correctly, refer to "10.1. Troubleshooting" (📖 page 123).
- If characters are garbled on the screen and do not display correctly, change the Web browser character encoding to Unicode (UTF-8).
- To prevent set up from multiple locations, this product prevents double login. (When you try to log in simultaneously from different locations, the [Check Login Screen] below appears.)

Check Login Screen



- You can use a pull-down menu from the top-right corner of the login screen to select the display language. You can select from three languages: [Japanese], [English], and [Simplified Chinese]. [English] is the default setting.



1 In the Web browser address bar, enter the IP address set for this product.

2 Enter the user name.*
*The default user name is patlite. Change to prevent unauthorized operation.

3 Enter the password*, and log in.
The default password is patlite. Change to prevent unauthorized operation.

The screenshot shows the login interface for the Patlite WDR PRO Receiver. At the top, there is a header with the product name and a language selection dropdown menu currently set to 'English'. Below the header is a login form. The form contains two input fields: 'User Name' and 'Password'. A 'login' button is positioned below the password field. A dashed rectangular box encloses both the 'User Name' and 'Password' input fields. A callout line with the number '2' points to the 'User Name' field, and another callout line with the number '3' points to the 'Password' field.

7.3. WDR (Receiver) Web Setup Screen

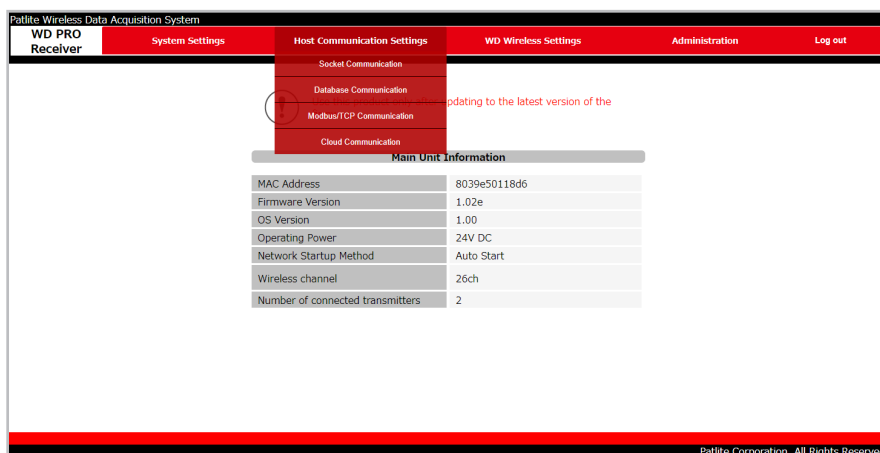
After login, go to the WDR Web Setup Screen.

CAUTION

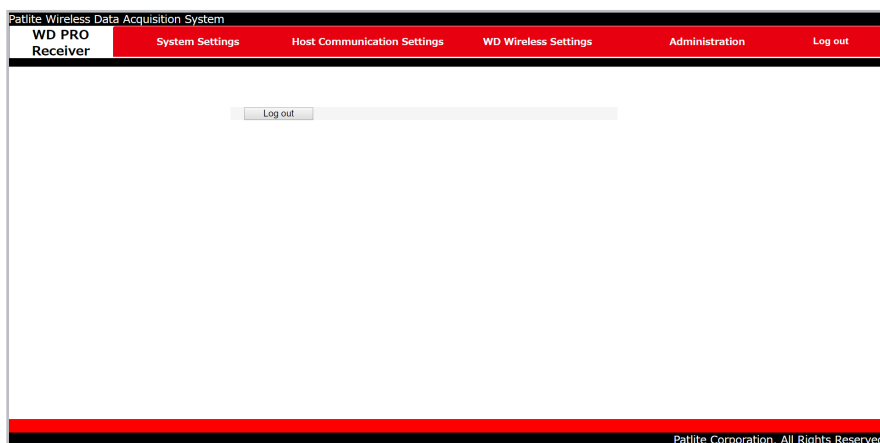
- ❗ [Database Communication], [Modbus/TCP Communication], [Cloud Communication], [Receiver Wireless Settings], [Wireless Settings List], [Status Check], and [Transmitter Username Registration] do not display on WDR-L(E)-Z2-PRO-L.
- ❗ After completing setup, either reboot or cycle the power.
- ⚠ Do not use the [Back] button in your browser. An error screen may display or the settings may not be applied properly. Operate with buttons on the Web Setup screen.

Point

- To view each setting, click the item you want to set. The selected set up screen is displayed.
- If you want to move from one of the various setting screens to another setting screen, click the item you want to set.



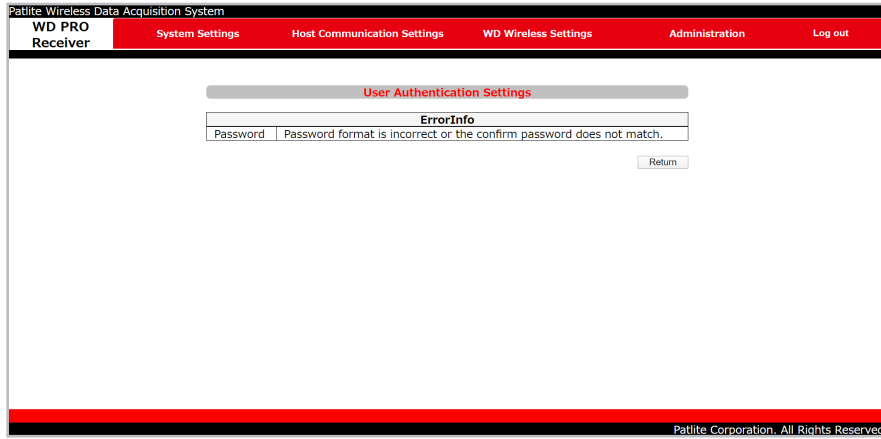
- To log out from the Web Setup Screen, in the Logout Screen click [Logout].



Point

- If a value cannot be set or an incorrect operation is performed, an error screen as shown below will display.

Error Screen Example



- You can enter the following symbols in locations that accept symbols.

| | |
|---------|---|
| Hyphen* | - |
| Period* | . |
| Sharp* | # |
| Percent | % |

| | |
|------------|---|
| Comma | , |
| Asterisk | * |
| Plus | + |
| Underscore | _ |

*Cannot use as the first character.

Patlite Wireless Data Acquisition System

WD PRO Receiver System Settings Host Communication Settings WD Wireless Settings Administration Log out

ⓘ Use this product only after updating to the latest version of the firmware.

Main Unit Information

| | |
|----------------------------------|--------------|
| MAC Address | 8039e50118d6 |
| Firmware Version | 1.02e |
| OS Version | 1.00 |
| Operating Power | 24V DC |
| Network Startup Method | Auto Start |
| Wireless channel | 26ch |
| Number of connected transmitters | 2 |

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| No. | Item | Description | References |
|-----|-----------------------------|--|--|
| ① | System Settings | You can change the [Network Setup], [Clock Settings], [User Authentication Settings], and [Security Settings]. | ☞ "7.4.2. System Settings" (page 58) |
| ② | Host Communication Settings | Configure various settings for [Socket Communication], [Database Communication], [Modbus/TCP Communication], and [Cloud Communication]. | ☞ "7.4.3. Host Communication Settings" (page 64) |
| ③ | WD Wireless Settings | Configure various settings and displays for [Receiver Wireless Settings], [Display Wireless Settings List], [Wireless Connection Diagnosis], [Check Status], and [Register Transmitter User Name]. | ☞ "7.4.4. WD Wireless Settings" (page 72) |
| ④ | Administration | Run various operations and displays for [Main Unit Information], [Update Firmware], [Initialize], and [Reboot]. | ☞ "7.4.5. Administration" (page 81) |

7.4. WDR (Receiver) Various Settings

7.4.1. Setup Items

Setup items are as follows.

| Setup Item | | Default Value | References |
|----------------------------------|--|---|-----------------|
| System Settings | Network Setup | IP Address Configuration | Set up manually |
| | | IP Address | 192.168.10.1 |
| | | Subnet Mask | 255.255.255.0 |
| | | Default Gateway | 0.0.0.0 |
| | | DNS Server Address | 0.0.0.0 |
| | | Host Name | wdr-pro |
| | Clock Settings | NTP Server Address | 0.0.0.0 |
| | | Correction Interval (minutes) | 60 |
| | | Timezone | UTC+9 |
| | User Authentication Settings | User Name | patlite |
| | | Password | patlite |
| | Security Settings | Communication Method | HTTP |
| Host Communication Settings | Socket Communication* ¹ | Setting Port | 10000 |
| | | WDR-PRO Port 1* ² | 10002 |
| | | WDR-PRO Port 2* ² | 10003 |
| | | WDR Port | 10001 |
| | Database Communication Setting* ¹ | Database Communication Function* ² | Do not use |
| | | Database Address* ² | (None) |
| | | Database Port Number* ² | 3306 |
| | | Database Name* ² | (None) |
| | | User Name* ² | (None) |
| | | Password* ² | (None) |
| | Modbus/TCP Communication Setting* ¹ | Port Number* ² | 502 |
| | Cloud Communication Settings* ¹ | Cloud Communication Function* ² | Do not use |
| | | Region* ² | Europe 1 |
| | | Region identifier* ² | eu1 |
| | | Domain* ² | mindsphere.io |
| | | Client ID* ² | (None) |
| | | Client Secret* ² | (None) |
| | | Root Certificate 1* ² | Not set |
| Root Certificate 2* ² | | Not set | |
| Select Information* ² | Select all | | |

| Setup Item | | Default Value | References |
|----------------------|----------------------------|------------------------|---|
| WD Wireless Settings | Receiver Wireless Settings | ExtendedPanID | 0000 0000 0000 0000 |
| | | Frequency Channel | Select all |
| | | Network Startup Method | Auto Start (Recommended) |
| | | | ☞ "7.4.4.1. Receiver Wireless Settings" (page 72) |

*1 Set up the Socket Communication Setting, Database Communication Setting, Modbus/TCP Communication Setting, and Cloud Communication Settings only when they are used.


*2 Cannot set on the WDR-L-Z2-PRO-L or WDR-LE-Z2-PRO-L.

7.4.2. System Settings

7.4.2.1. Network Setup

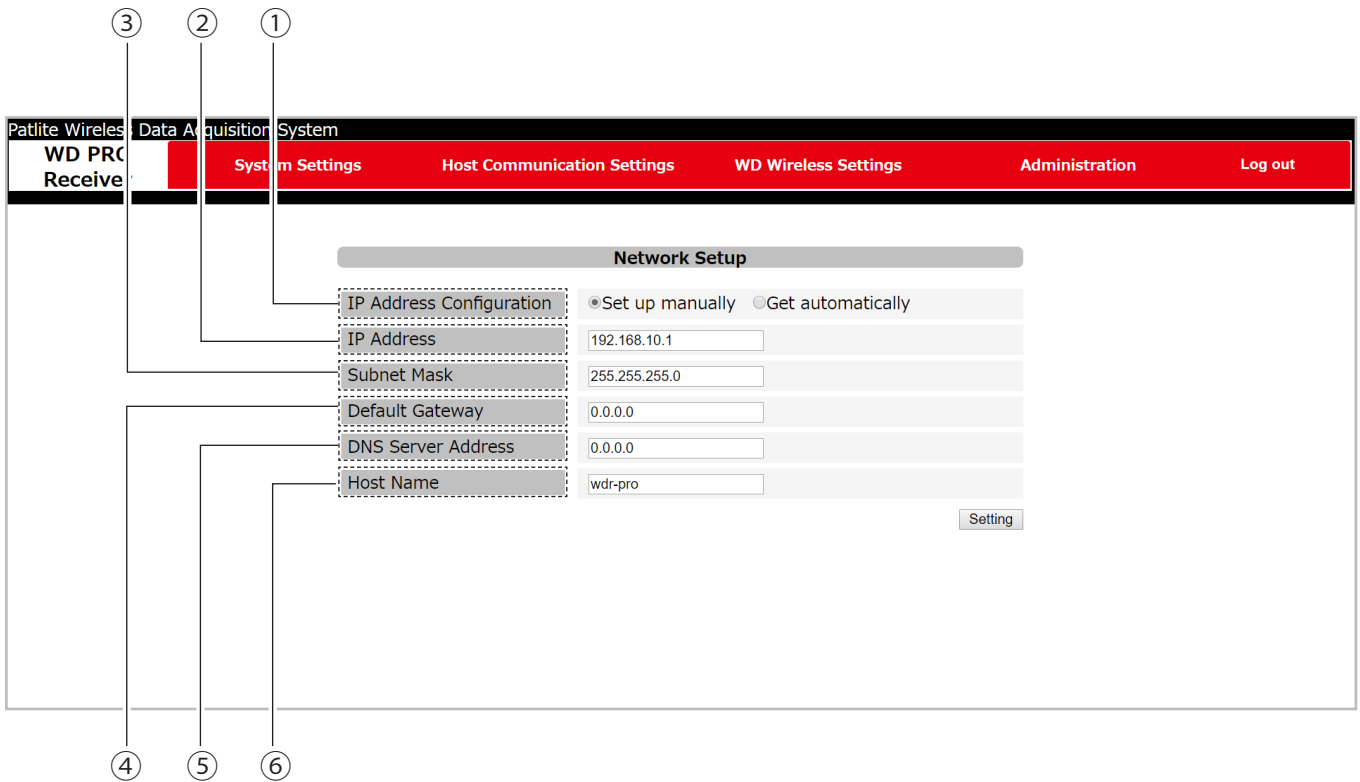
In the Network Setup screen, change the network settings.

CAUTION

 If the IP Address Configuration is set to the [Get automatically] option but access to the DHCP server is unavailable, the product starts up with the factory default network settings. With the [Get automatically] option, the DHCP function is enabled on rebooting the WDR.

Point

- After entering the network settings, click [Set] to update with the defined settings. Click [Set] to automatically reboot the network.



The screenshot shows the 'Network Setup' interface. At the top, there is a navigation bar with 'System Settings' selected. Below it, the 'Network Setup' section contains the following fields:

- IP Address Configuration:** Radio buttons for 'Set up manually' (selected) and 'Get automatically'.
- IP Address:** Text input field with value '192.168.10.1'.
- Subnet Mask:** Text input field with value '255.255.255.0'.
- Default Gateway:** Text input field with value '0.0.0.0'.
- DNS Server Address:** Text input field with value '0.0.0.0'.
- Host Name:** Text input field with value 'wdr-pro'.

Numbered callouts (1-6) point to these fields: 1 points to IP Address Configuration, 2 to IP Address, 3 to Subnet Mask, 4 to Default Gateway, 5 to DNS Server Address, and 6 to Host Name.

| No. | Item | Default Value | Input range | Description |
|-----|--------------------------|-----------------|--|--|
| ① | IP Address Configuration | Set up manually | Set up manually / Set up automatically | When using the DHCP function to get network information, select [Get automatically]. |
| ② | IP Address | 192.168.10.1 | IP address format | Cannot set when the IP Address Configuration is [Get automatically]. |
| ③ | Subnet Mask | 255.255.255.0 | | |
| ④ | Default Gateway | 0.0.0.0 | | |
| ⑤ | DNS Server Address | 0.0.0.0 | | |
| ⑥ | Host Name | wdr-pro | 63 single-byte alphanumeric characters | Enter the product's host name. |

7.4.2.2. Clock Settings

Set the clock on this product. There are two ways to set the clock on the product.

Host Computer Clock: Displays the time set on the computer.

Receiver Clock: Displays the time set on the product.

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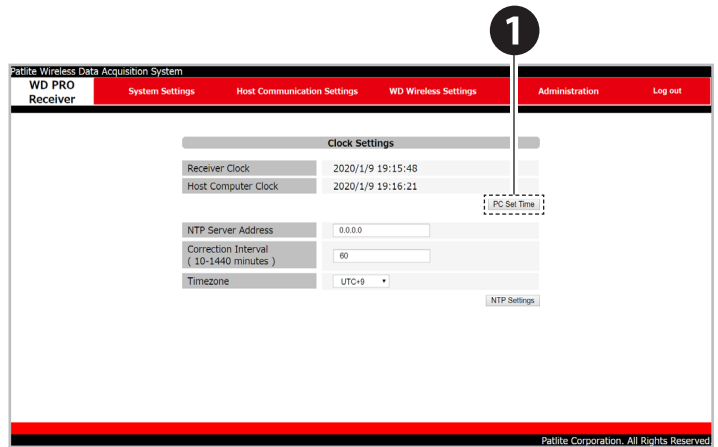
| No. | Item | Description | Default Value | Input range | Setup optional |
|-----|-------------------------------|--|---------------|---|----------------|
| ① | NTP Server Address | Set the NTP server address.* | 0.0.0.0 | IP address format, or host name up to 63 characters | ○ |
| ② | Correction Interval (minutes) | Set the interval for NTP server communication. | 60 | 10 to 1440 | x |
| ③ | Timezone | Set the timezone. | UTC+9 | All time zones, from [UTC-12] to [+14] | x |

* When you do not use a NTP server, leave the NTP server address either blank or set to 0.0.0.0.

Show the time of the logged-in PC on this product

1

Click [PC Set Time].

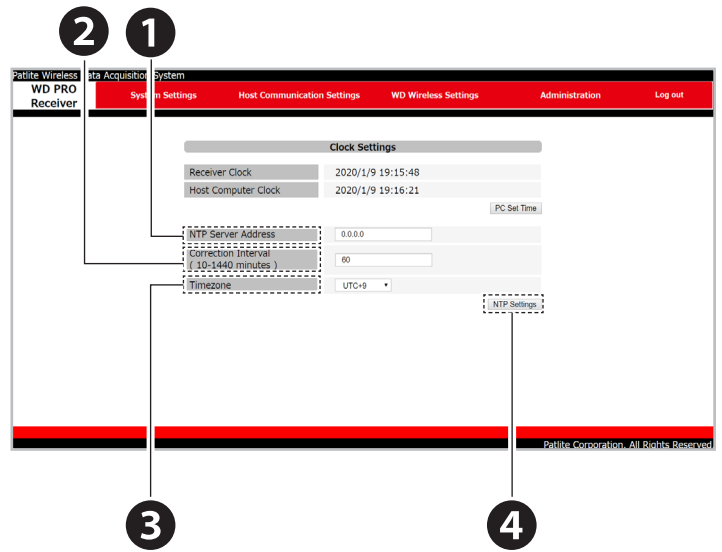


CAUTION

- ⚠ When basing the time on the PC clock, the time may be off by several seconds from the actual PC clock.
- ❗ If you do not use a NTP server, periodically check and correct the time on the product.
- ⚠ This product uses a capacitor to back up time information.
- ❗ If there is no power for about half a day, the defined time may shift or it may be reset depending on the charge on the capacitor. When operating in an environment that requires accurate time information, set the time before you begin operations.
- ⚠ If the backup expires and the clock is reset, it will show January 1, 1970.

Communicate with NTP server and adjust the time on this product

- 1 In the [NTP Server Address] field, enter either the NTP server address or its host name.
 - 2 In the [Correction Interval (minutes)] field, enter the interval of NTP server communications.
 - 3 Set the timezone*.
- *For timezone settings, refer to the table below.
- 4 Click the [NTP Settings] button to update with the defined setting.



The relationship between the timezone setting and representative cities is as follows. Refer to the table for settings.

| Setting | Name of representative city |
|---------|-----------------------------|
| UTC-12 | Baker Island |
| UTC-11 | Midway Island |
| UTC-10 | Honolulu |
| UTC-9 | Anchorage |
| UTC-8 | Los Angeles |
| UTC-7 | Denver |
| UTC-6 | Chicago / Mexico City |
| UTC-5 | New York / Ottawa |
| UTC-4 | Santo Domingo |
| UTC-3 | Rio de Janeiro |
| UTC-2 | Fernando de Noronha |
| UTC-1 | Azores |
| UTC | London |

| Setting | Name of representative city |
|---------|--|
| UTC+1 | Paris / Berlin |
| UTC+2 | Cairo |
| UTC+3 | Jeddah |
| UTC+4 | Dubai |
| UTC+5 | Karachi |
| UTC+6 | Dhaka |
| UTC+7 | Bangkok / Jakarta / Hanoi |
| UTC+8 | Beijing / Taipei / Singapore / Manila / Kuala Lumpur |
| UTC+9 | Tokyo / Seoul |
| UTC+10 | Sydney |
| UTC+11 | Nouméa |
| UTC+12 | Wellington |
| UTC+13 | Nuku'alofa |
| UTC+14 | Christmas Island |

CAUTION

⊘ Regardless of the timezone setting, do not use this product outside of supported countries and regions.

7.4.2.3. User Authentication Settings

You can set user names and passwords for logging in to the WDR Web Setup Screen. After completing setup, you can use the new user names and passwords from the next login.

CAUTION

! Change the user name and password to prevent unauthorized operation.

| No. | Item | Description | Default Value | Input range | Setup optional |
|-----|------------------|--|--|--|----------------|
| ① | User Name | Set the new user name. | (Displays the currently set user name) | Up to 16 single-byte alphanumeric characters and symbols | x |
| ② | Password | Set a new password. | (Blank) | Up to 16 single-byte alphanumeric characters and symbols | x |
| ③ | Confirm Password | Set a new password. (for confirmation) | (Blank) | Up to 16 single-byte alphanumeric characters and symbols | x |

- 1** In the [User Name] field, enter the user name you would like to use.
- 2** In the [Password] field, enter the password you would like to change.
- 3** In the [Confirm Password] field, again enter the password you would like to change.
- 4** Click [Setting] to update with the defined settings.

Note: The next time you log in, log in with the new user name and password.

7.4.2.4. Security Settings

You can select the protocol used for the WDR Web Setup Screen and communication.

⚠ CAUTION

⚠ If you select https communication, when you access the Web Setup Screen or display a pop-up, sometimes an error screen with a message such as "This site is not secure" or "This connection does not protect privacy" will appear. In the browser, click the [Details] link then click [Go to Web page] to access the Web Setup Screen. (The displayed text differs depending on your browser and browser version.)

| No. | Item | Description |
|-----|-----------|--|
| ① | Protocol* | Select either [HTTP] or [HTTPS] communication. |

*The default communication method is [HTTP].

*To download the SSL server certificate, click the [Download] button.

- 1** Select either [HTTP] or [HTTPS] communication.
- 2** Click [Setting] to update with the defined settings.

7.4.3. Host Communication Settings

7.4.3.1. Socket Communication Settings

Set the socket communication port number used for Host Communication. For information about the function, refer to "9.2.1.1. Socket Communication" (page 117).

⚠ CAUTION

- ❗ Set up only after checking port numbers in the [Socket Communication] and [Modbus/TCP Communication] settings are not duplicated. If port numbers are duplicated, an error screen will appear.
- ⚠ While using Cloud Communication, you cannot use WDR-PRO Port 1, WDR-PRO Port 2, and the WDR Port.
- ⚠ When you want to use the Settings port, select the Settings port's [Use] option.

Point

- When using WDS-WIN01, use the WDR port. While the WDR port is in use and you only need to use WDS-WIN01 for setup, you could use the Setting Port.

The screenshot shows the 'Socket Communication' settings page. It features a navigation bar at the top with 'System Settings' selected. Below the navigation bar, there are four input fields for port numbers, each with a radio button for 'Do not use' and 'Use'. The 'Use' option is selected for all ports. The ports are: Settings Port (10000), WDR-PRO Port 1 (10002), WDR-PRO Port 2 (10003), and WDR Port (10001). At the bottom right, there are 'Initialize' and 'Setting' buttons. Numbered callouts 1 through 4 point to each of the port settings respectively.

| No. | Item | Description | Default Value | Input range | Setup optional |
|-----|-----------------|--|---------------|---------------|----------------|
| ① | Setting Port | Display and set the WDS-WIN01 setting port number. | 10000 | 1024 to 65535 | x |
| ② | WDR-PRO Port 1* | Display and set the port number for the first WDR-PRO Port. | 10002 | 1024 to 65535 | x |
| ③ | WDR-PRO Port 2* | Display and set the port number for the second WDR-PRO Port. | 10003 | 1024 to 65535 | x |
| ④ | WDR Port | Display and set the port number for the WDR Port. | 10001 | 1024 to 65535 | x |

*Cannot input on WDR-L-Z2-PRO-L and WDR-LE-Z2-PRO-L.

1 Enter the port number to use for the [Setting Port], [WDR-PRO Port 1], [WDR-PRO Port 2], and [WDR Port].

*Click the [Initialize] button to enter the default values for each port.

2 Click [Setting] to update with the defined settings.

| Socket Communication | | |
|----------------------|-------|---|
| Settings Port | 10000 | Do not use <input type="checkbox"/> Use <input checked="" type="checkbox"/> |
| WDR-PRO Port 1 | 10002 | Do not use <input type="checkbox"/> Use <input checked="" type="checkbox"/> |
| WDR-PRO Port 2 | 10003 | Do not use <input type="checkbox"/> Use <input checked="" type="checkbox"/> |
| WDR Port | 10001 | Do not use <input type="checkbox"/> Use <input checked="" type="checkbox"/> |

Initialize Setting

1

2

7.4.3.2. Database Communication Setting

Set the database to link. Using the set value, you can check the connection to the database. For information about the function, refer to "9.2.1.2. Database Communication" (page 118).

⚠ CAUTION

⚠ Cannot set up on WDR-L-Z2-PRO-L and WDR-LE-Z2-PRO-L.

⚠ While using cloud communication, you cannot use database communication.

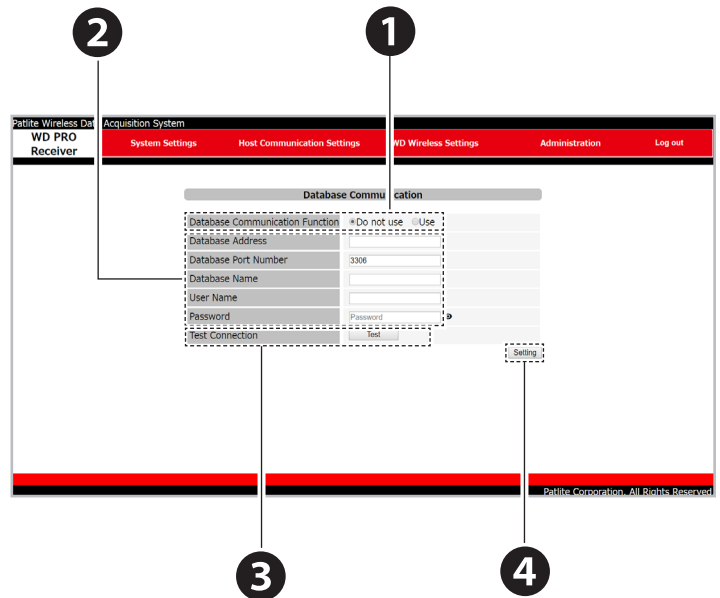
The screenshot shows the 'Database Communication' settings page in the WDR setup interface. The page has a red header with navigation tabs: 'System Settings', 'Host Communication Settings', 'WD Wireless Settings', 'Administration', and 'Log out'. The main content area is titled 'Database Communication' and contains the following fields:

- Database Communication Function:** Radio buttons for 'Do not use' (selected) and 'Use'.
- Database Address:** Text input field.
- Database Port Number:** Text input field with the value '3306'.
- Database Name:** Text input field.
- User Name:** Text input field.
- Password:** Password input field with a toggle for visibility.
- Test Connection:** A 'Test' button.

Numbered callouts 1 through 6 are placed around the interface to identify these fields. Callout 1 points to the radio buttons, 2 to the Database Address field, 3 to the Database Port Number field, 4 to the Database Name field, 5 to the User Name field, and 6 to the Password field.

| No. | Item | Description | Default Value | Input range | Setup optional |
|-----|---------------------------------|--|---------------|--|----------------|
| ① | Database Communication Function | Select whether to use the Database Communication Function. | Do not use | Do not use / Use | x |
| ② | Database Address | Display and set the database address. | (Blank) | IP address format, or host name up to 63 characters | x |
| ③ | Database Port Number | Display and set the database port number. | 3306 | 1024 to 65535 | x |
| ④ | Database Name | Display and set the database name. | (Blank) | Up to 16 single-byte alphanumeric characters and symbols | x |
| ⑤ | User Name | Display and set the database user name. | (Blank) | Up to 16 single-byte alphanumeric characters and symbols | x |
| ⑥ | Password | Display and set the database password. | (Blank) | Up to 16 single-byte alphanumeric characters and symbols | x |

- 1** To use the Database Communication, select [Use].
- 2** In **1**, if [Use] is selected, enter the [Database Address], [Database Port Number], [Database Name], [User Name], and [Password].
- 3** To run a Test Connection on the database, under [Test Connection] click the [Test] button and confirm it can connect to the database.
- 4** Click [Setting] to update with the defined settings.




Point

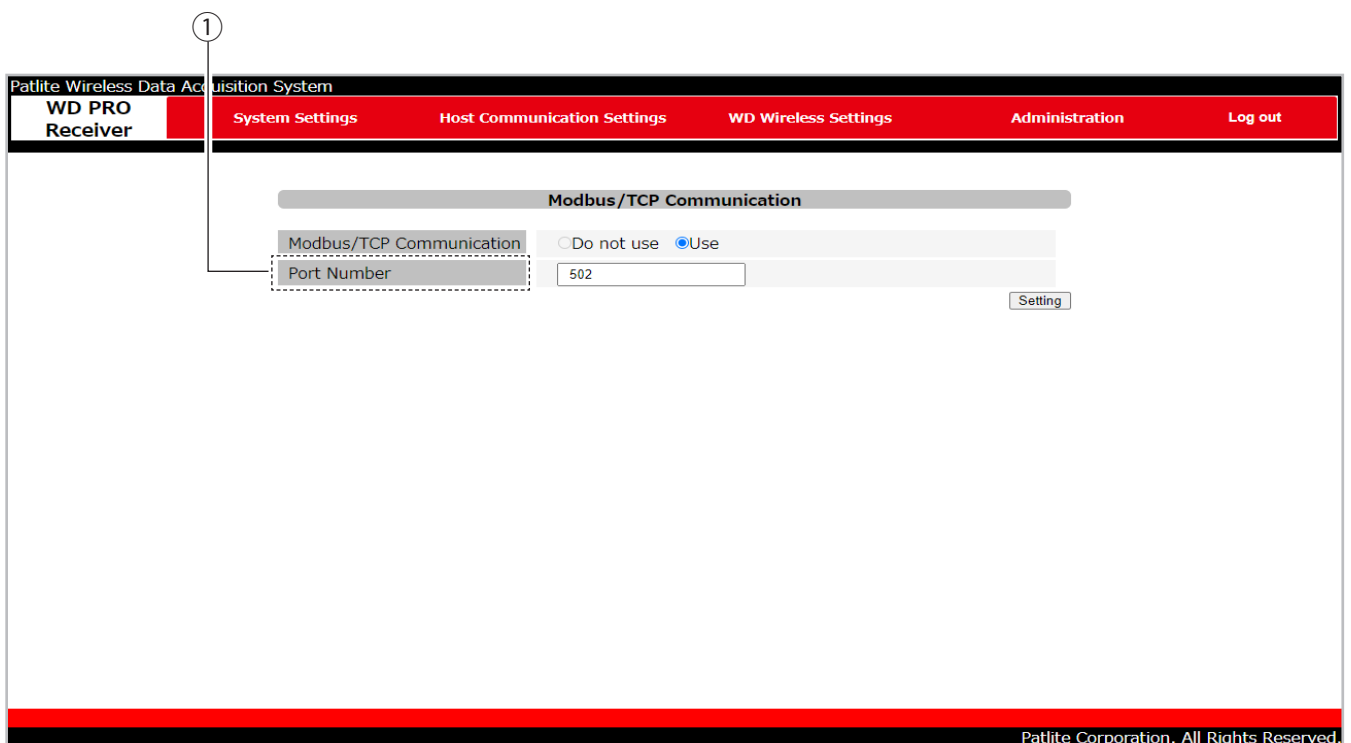
- Under [Test Connection], by clicking the [Test] button you can confirm you can connect to the database with the set value. The check result appears on a pop-up screen.

7.4.3.3. Modbus/TCP Communication Settings

Set the port number used for Modbus/TCP.

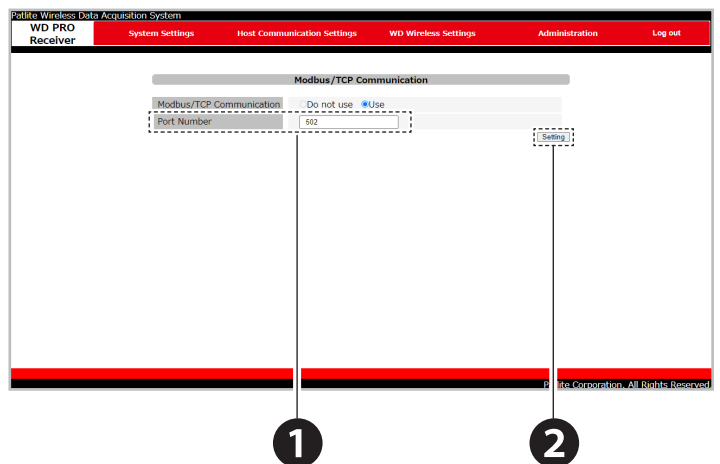
⚠ CAUTION

- ⚠ Cannot set up on WDR-L-Z2-PRO-L and WDR-LE-Z2-PRO-L.
- ⚠ While using cloud communication, you cannot use Modbus/TCP communication.
- ⚠ Set up only after checking port numbers in the [Socket Communication] and [Modbus/TCP Communication] settings are not duplicated. If port numbers are duplicated, an error screen will appear.
- ⚠ In Modbus/TCP communication, only transmitters with registered Transmitter User Names can get data. On registering transmitter user names, refer to "7.4.4.5. Register Transmitter User Name" ( page 79).



| No. | Item | Description | Default Value | Input range | Setup optional |
|-----|-------------|--|---------------|--------------------|----------------|
| ① | Port Number | Enter the port number to use for Modbus/TCP. | 502 | 502, 1024 to 65535 | x |

- 1** In the [Port Number] field, enter the port to use.
- 2** Click [Setting] to update with the defined settings.



7.4.3.4. Cloud Communication Settings

When using with Cloud Communication, set the following.

⚠ CAUTION

- ⚠ Cannot set up on WDR-L-Z2-PRO-L and WDR-LE-Z2-PRO-L.
- ⚠ When using Cloud Communication, you cannot run [Socket Communication Settings], [Database Communication Settings], or [Modbus/TCP Communication Settings] at the same time.
- ❗ While using Cloud Communication, set up WDS-WIN01 only after setting the [Socket Communication] Settings Port to [Enable].
- ⚠ To run MindSphere Communication, a separate MindSphere license is required. For information, contact your nearest PATLITE sales representative.

Patlite Wireless Data Acquisition System

WD PRO Receiver

System Settings Host Communication Settings WD Wireless Settings Administration Log out

Cloud Communication

| | |
|---------------------------------|---|
| Cloud Communication Function | <input type="radio"/> Do not use <input checked="" type="radio"/> MindSphere |
| Region | Europe 1 |
| Region identifier | eu1 |
| Domain | mindsphere.io |
| ClientID | |
| Client Secret | |
| Root Certificate1 | Not configured <input type="button" value="Choose File"/> No file chosen |
| Root Certificate2 | Not configured <input type="button" value="Choose File"/> No file chosen |
| Select Information | <input checked="" type="checkbox"/> Signal Tower Information <input checked="" type="checkbox"/> External Input Information <input checked="" type="checkbox"/> Serial Information <input checked="" type="checkbox"/> Count Information <input checked="" type="checkbox"/> Signal Tower Control Information |
| MindSphere Communication Status | - |

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| No. | Item | Description | Default Value | Input range | Setup optional |
|-----|---|---|---------------|---|----------------|
| ① | Cloud Communication Function | Select whether to use or not to use the Cloud Communication function. | Do not use | Do not use / MindSphere | x |
| ② | Region Information | Select the MindSphere region licensed by the user. | Europe1 | Europe1 / Europe2 / China1 | x |
| | Region Identifier Value | Automatically set when the Region Information is selected. Do not change. | eu1 | Up to 20 single-byte alphanumeric characters and symbols | x |
| | Domain | Automatically set when the Region Information is selected. Do not change. | mindsphere.io | Up to 20 single-byte alphanumeric characters and symbols | x |
| ③ | Client ID* ¹ | ID that is issued when MindSphere is licensed. | (Blank) | Up to 100 single-byte alphanumeric characters and symbols | x |
| ④ | Client Secret* ¹ | Key that is issued when MindSphere is licensed. | (Blank) | Up to 50 single-byte alphanumeric characters and symbols | x |
| ⑤ | Root Certificate 1* ¹ * ² | Root certificate setup status for MindSphere communication via HTTPS. | Not set | Only legitimate certificate data is valid (text format) | x |
| ⑥ | Root Certificate 2* ¹ * ² | Root certificate (application) setup status for MindSphere communication via HTTPS. | Not set | Only legitimate certificate data is valid (text format) | ○ |
| ⑦ | Select Information | Select the information for MindSphere communication. | (Select all) | Signal Tower Information / External Input Information / Serial Information / Count Information / Signal Tower Control Information | x |
| ⑧ | MindSphere Communication Status | Displays the connection status with MindSphere. | - | Communication normal / Communication error | - |

*1 Set up the required information as described in the materials and instructions provided when MindSphere is licensed. Operations will not work if settings are incorrect.

*2 When assigning file names, set a different file name for Root Certificate 1 and Root Certificate 2.

1 When using the Cloud Communication Function select [MindSphere]; when not using the Cloud Communication Function, select [Do not use].

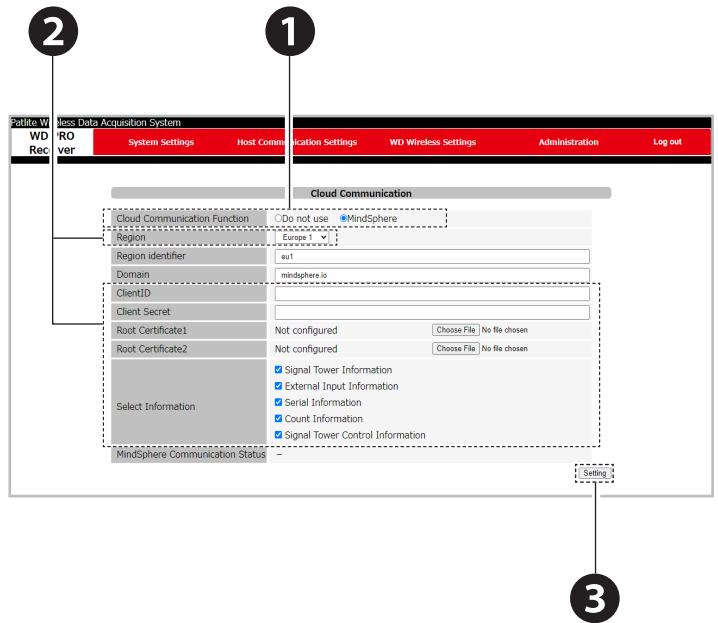
2 When [MindSphere] is selected in step **1**, set the [Region], [Client ID], [Client Secret], [Root Certificate], and [Select Information].

*The following are things you can do when [MindSphere] is selected.

| Select Information Items | Description | Limitations |
|----------------------------------|--|--------------|
| Signal Tower Information | Select when uploading to the cloud. | - |
| External Input Information | | WDT-PRO only |
| Serial Information | | |
| Count Information | | - |
| Signal Tower Control Information | Select when controlling the signal tower over the cloud. | WDT-PRO only |

3 Click [Setting] to update with the defined settings.

- Note:
- Client ID, Client Secret, and Root Certificate are all information provided by MindSphere. For information, contact your nearest PATLITE sales representative.
 - If you cannot upload data to MindSphere, check the MindSphere communication status. When there is a communication error, review settings for missing or incorrect setting values, an expired certificate, and so on, and if the problem continues, contact our sales office.



7.4.4. WD Wireless Settings

7.4.4.1. Receiver Wireless Settings

Set up the WDR wireless settings.

⚠ CAUTION

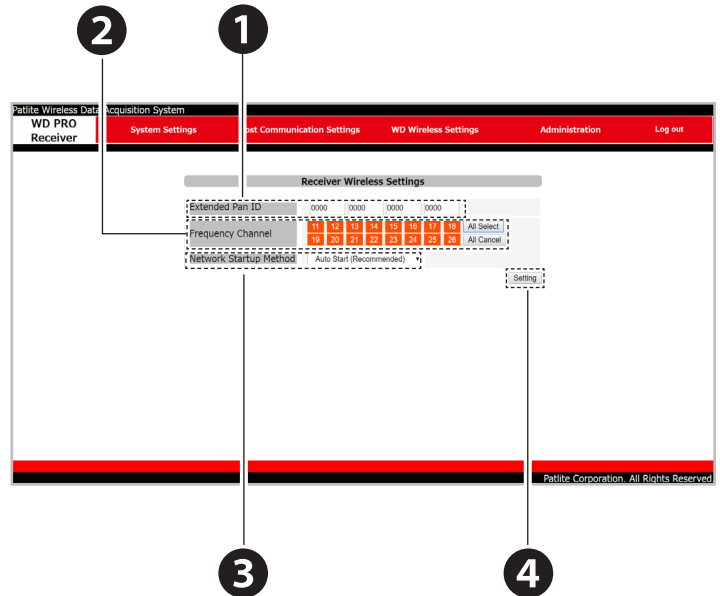
- ⚠ Cannot select on WDR-L-Z2-PRO-L and WDR-LE-Z2-PRO-L. Set WDR wireless settings with system configuration software WDS-WIN01.
- ⚠ When ExtendedPanID is 0000 0000 0000 0000, the WDR MAC address (IEEE address) is used as ExtendedPanID.
- ❗ Select at least one frequency channel. Additionally, select CH values that include the CH set up on the WDT.
- ❗ For the [Network Startup Method], select [Auto Start (Recommended)].

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| No. | Item | Description | Default Value | Input range | Setup optional |
|-----|------------------------|---|--------------------------|---|----------------|
| ① | ExtendedPanID* | Enter the ID for grouping the WDT. For information, refer to "6.1.3. About Grouping and ExtendedPanID" (☞ page 35). | 0000 0000 0000 0000 | Enter single-byte alphanumeric characters (0 to 9 and A to F) | x |
| ② | Frequency Channel | Select the wireless frequency band for the WD system. For information, refer to "6.1.1. About the WD Wireless Network" (☞ page 34). | (Select all) | CH11 / CH12 / CH13 / CH14 / CH15 / CH16 / CH17 / CH18 / CH19 / CH20 / CH21 / CH22 / CH23 / CH24 / CH25 / CH26 | x |
| ③ | Network Startup Method | Select the [Network Startup Method] for when the WDR is powered on. | Auto Start (Recommended) | Auto Start (Recommended) / Manual Start | x |

*Setup range is 0000 0000 0000 0000 to FFFF FFFF FFFF FFFE.

- 1 Enter the [ExtendedPanID].
- 2 Select* the [Frequency Channel].
*Click [All Select] to select all frequency channels. Click [All Cancel] to clear selection of all frequency channels.
- 3 Selects* the [Network Startup Method].
*If there is no particular reason otherwise, select [Auto Start (Recommended)].
- 4 Click [Setting] to update with the defined settings.

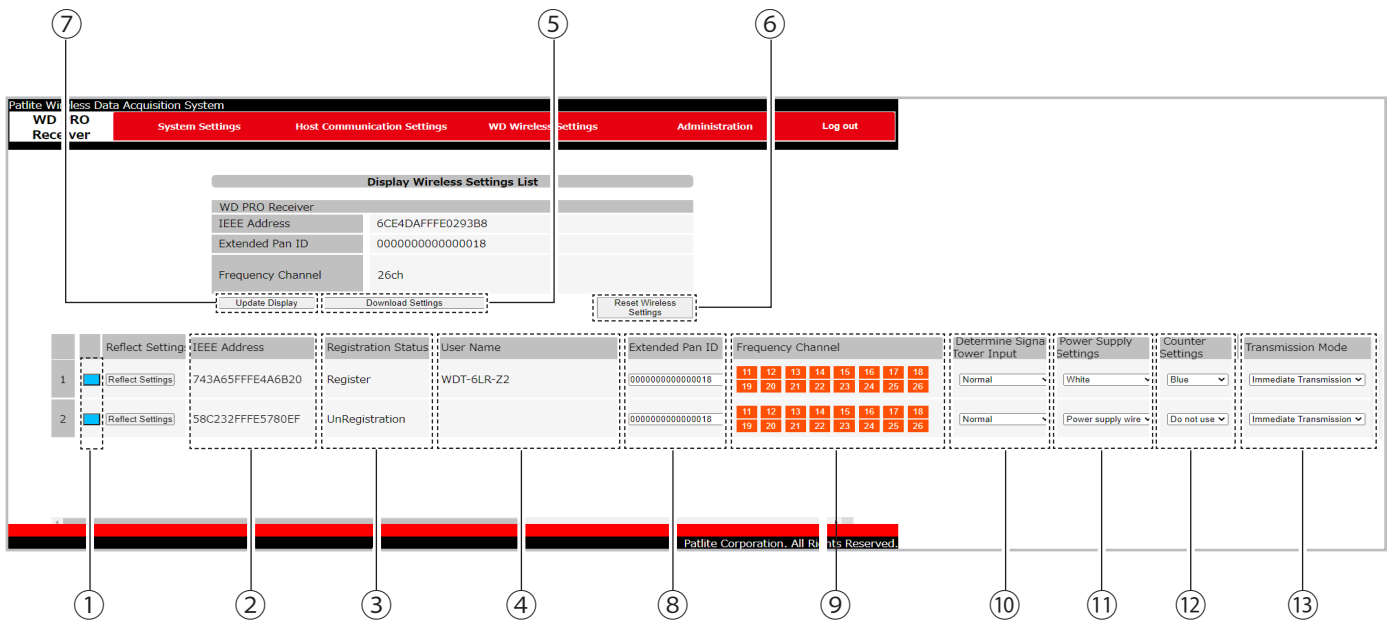


7.4.4.2. Wireless Settings List

Check or set the WDT currently connected to the WDR.

⚠ CAUTION

- ⚠ Cannot select on WDR-L-Z2-PRO-L and WDR-LE-Z2-PRO-L.
- ⚠ The blue button for the call transmitter does not work on WDT-5E/6M-Z2.
- ❗ When the WDT ExtendedPanID is 0000 0000 0000 0000 (default value), regardless of the ExtendedPanID setting all the WDR may be grouped together. In this scenario, because the grouped wireless network is not stable, set any value other than 0000 0000 0000 0000 during configuration.
- ❗ Set the same frequency channel as the WDR you want to group.
- ❗ Depending on the WDT model, the selection is different for the [Power Supply Settings].
 - WDT-4LR-Z2/WDT-5LR-Z2/WDT-6LR-Z2: Select [Power Supply Wire].
 - WDT-5E-Z2/WDT-6M-Z2: Select the wire that is supplying power, either [Red] or [White].
- ⚠ The set value for Counter Settings is for WDT-4LR-Z2/WDT-5LR-Z2/WDT-6LR-Z2 (ver3.06 or later). You cannot set a buzzer for WDT-5E-Z2/WDT-6M-Z2.
- ⚠ When DIP switch No.2. is ON, the set value for Counter Settings on the WDT-5LR-Z2/WDT-6LR-Z2 is [DIP Switch (Blue)]. For information, refer to "8.1.4. WDT DIP Switch Operations" (☞ page 93).
- ❗ For the [Counter Settings], even if you select [Do not use], the accumulated counter value in the WDT is not cleared. To clear the counter, use one of the following methods. Then, edit the [Counter Settings] to [Do not use].
 - In WDS-WIN01, clear the counter value. For information, refer to ☞ "WDS-WIN01 Instruction Manual".
 - Turn off the power supply on the WDT main unit.
- ❗ Not all WDB-D80S-PRO and WDT-6LR-Z2-PRO settings can be set up on the Web Setup Screen. Set up in WDS-WIN01. For information, refer to ☞ "WDS-WIN01 Instruction Manual".



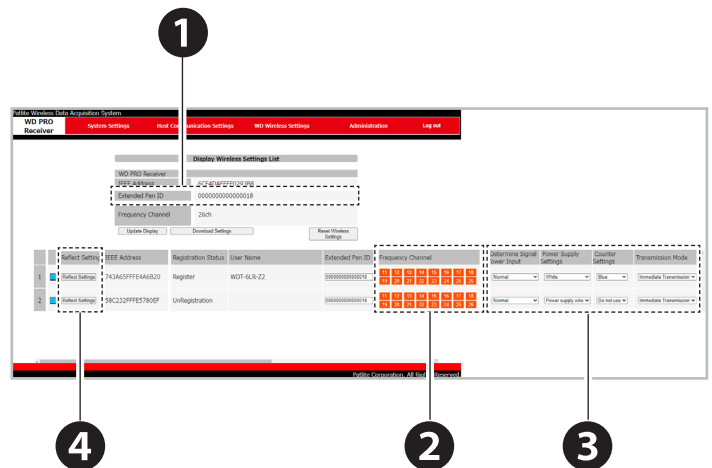
| No. | Item | Description | | | | | | | | |
|---------------------|--|--|-----------|---------------------|----------------|-------|----------------|-------|---------------------|--|
| ① | Call Transmitter | Click the blue button and the indicator for the associated WDT flashes blue for about 10 seconds. For information, refer to "8.1.5. Checking Operations with WDT-PRO Indicator" (page 94). | | | | | | | | |
| ② | IEEE Address | Displays the WDT MAC address (IEEE address). For information, refer to "6.1.4. About the MAC Address (IEEE Address)" (page 36). | | | | | | | | |
| ③ | Registration Status | If the WDT has its IEEE Address registered in [Register Transmitter User Name], "Registered" is displayed. If the WDT does not have its IEEE Address registered, "Not registered" is displayed. For information, refer to "7.4.4.5. Register Transmitter User Name" (page 79). | | | | | | | | |
| ④ | User Name | Displays the WDT user name registered in [Register Transmitter User Name]. For information, refer to "7.4.4.5. Register Transmitter User Name" (page 79). | | | | | | | | |
| ⑤ | Download Settings | Click to download the settings file. <table border="1"> <tr> <td>File name</td> <td>TransmitterList.csv</td> </tr> <tr> <td>Character code</td> <td>UTF-8</td> </tr> <tr> <td>Linebreak code</td> <td>CR+LF</td> </tr> <tr> <td>CSV file structure*</td> <td>IEEE Address, User Name, ExtendedPanID, Frequency Channel, Determine Signal Tower Input, Power Supply Settings, Counter Settings,Transmission Mode</td> </tr> </table> | File name | TransmitterList.csv | Character code | UTF-8 | Linebreak code | CR+LF | CSV file structure* | IEEE Address, User Name, ExtendedPanID, Frequency Channel, Determine Signal Tower Input, Power Supply Settings, Counter Settings,Transmission Mode |
| File name | TransmitterList.csv | | | | | | | | | |
| Character code | UTF-8 | | | | | | | | | |
| Linebreak code | CR+LF | | | | | | | | | |
| CSV file structure* | IEEE Address, User Name, ExtendedPanID, Frequency Channel, Determine Signal Tower Input, Power Supply Settings, Counter Settings,Transmission Mode | | | | | | | | | |
| ⑥ | Reset Wireless Settings | Click to send a disconnect request to all connected WDT. | | | | | | | | |
| ⑦ | Update Display | Click to update the WDT connection status. | | | | | | | | |

*Example CSV File Structure

```
IEEE Address,User Name,Extended Pan Id,Frequency Channel,Determine Signal Tower Input,Power Supply Settings,Counter Settings,Transmission Mode
1234:5678:abcd:ef01,WDT01,0123:4567:89ab:cdef,26ch,Normal,Power Supply Wire,Do not use,Immediate Transmission
1234:5678:abcd:ef02,WDT02,0123:4567:89ab:cdef,26ch,Flashing(medium),Red,Red,Request Transmission
:
:
```

| No. | Item | Description | Input range | Setup optional |
|-----|------------------------------|---|---|----------------|
| ⑧ | ExtendedPanID | Enter the ID for grouping the WDR. For information, refer to "6.1.3. About Grouping and ExtendedPanID" (☞ page 35). | Enter single-byte alphanumeric characters (0 to 9 and A to F) | x |
| ⑨ | Frequency Channel | Select the wireless frequency band for the WD system. For information, refer to "6.1.1. About the WD Wireless Network" (☞ page 34). | CH11 / CH12 / CH13 / CH14 / CH15 / CH16 / CH17 / CH18 / CH19 / CH20 / CH21 / CH22 / CH23 / CH24 / CH25 / CH26 | x |
| ⑩ | Determine Signal Tower Input | Select the process used to determine the signal tower input status. For information, refer to "9.1.2.1. Determine Signal Tower Input" (☞ page 114). | Normal / Flashing (short) / Flashing (medium) / Flashing (long) | x |
| ⑪ | Power Supply Settings | Select the signal wire for the power supply. | Power supply wire: Red, yellow, green, blue, or white | x |
| ⑫ | Counter Settings | Select the signal wire for the Simple Counter Function. For information, refer to "9.1.1.5. Simple Counter Function" (☞ page 113). | Do not use, red, amber, green, blue, white or buzzer | x |
| ⑬ | Transmission Mode | Select the type of transmission operation for the signal tower status. For information, refer to "9.1.1.1. Transmit Signal Tower Information" (☞ page 111). | Immediate transmission or Request transmission | x |

- 1 Enter the [ExtendedPanID].
- 2 Select the [Frequency Channel].
- 3 Select [Determine Signal Tower Input], [Power Supply Settings], [Counter Settings], and [Transmission Mode].
- 4 Click [Reflect Settings] to update with the defined settings.



7.4.4.3. Wireless Connection Diagnosis

You can analyze WD system's wireless environment and check the WDR status. To analyze the current wireless environment, select [Current status]. To analyze the wireless environment periodically for a specified period, select [Set Period].

For information on wireless connection diagnosis, refer to "9.2.2. Self Diagnosis Function" (☞ page 121).

⚠ CAUTION

⚠ If you run Wireless Connection Diagnosis while the WDT is disconnected, download and diagnosis results cannot be displayed.

| No. | Item | Description | | | | | | | | |
|--------------------|--|--|-----------|----------------------------------|----------------|-------|----------------|-------|--------------------|--|
| ① | Interval | Set the period for the wireless connection diagnosis. Select either [Current Status] or [Set Period]. *When [Set period] is selected, you can enter a diagnosis period from 1 to 72 hours. | | | | | | | | |
| ② | Diagnosis | [Start] begins diagnosis of the wireless environment. [Stop] interrupts diagnosis of the wireless environment. | | | | | | | | |
| ③ | Diagnosis Result | <p>Displays the diagnosis status of the wireless environment.</p> <ul style="list-style-type: none"> • Stop: Wireless connection diagnosis is not executed. • Diagnosis in progress: Wireless connection diagnosis is running. • Diagnosis complete: Wireless connection diagnosis is complete. • Error *1: Wireless connection diagnosis is not operating normally. <p>• When there is a wireless connection diagnosis result, you can download the diagnosis result in CSV file format.</p> <table border="1" style="width: 100%;"> <tr> <td>File name</td> <td>WirelessDiagnosisInformation.csv</td> </tr> <tr> <td>Character code</td> <td>UTF-8</td> </tr> <tr> <td>Linebreak code</td> <td>CR+LF</td> </tr> <tr> <td>CSV file structure</td> <td>date and time, User name, IEEE address, diagnosis result</td> </tr> </table> <p>●Example CSV File Structure</p> <pre style="border: 1px solid black; padding: 5px;"> 2019/11/14 12:00, WDT01 , 1234:5678:abce:ef01,A 2019/11/14 12:00, WDT02 , 1234:5678:abce:ef02,B 2019/11/14 12:10, WDT01 , 1234:5678:abce:ef01,B 2019/11/14 12:10, WDT02 , 1234:5678:abce:ef02,C : : </pre> <p>Click [Diagnosis Result] to display diagnostic results in a pop-up screen.</p> | File name | WirelessDiagnosisInformation.csv | Character code | UTF-8 | Linebreak code | CR+LF | CSV file structure | date and time, User name, IEEE address, diagnosis result |
| File name | WirelessDiagnosisInformation.csv | | | | | | | | | |
| Character code | UTF-8 | | | | | | | | | |
| Linebreak code | CR+LF | | | | | | | | | |
| CSV file structure | date and time, User name, IEEE address, diagnosis result | | | | | | | | | |

*1 When the Wireless Connection Diagnosis results display "Error", refer to "10.1. Troubleshooting" (☞ page 123).

1 For the diagnosis timing, select whether to diagnose the [Current Status] or via a [Set Period].

- When [Set period] is selected, you can enter a diagnosis period from 1 to 72 hours.

2 Click the [Start] button to start wireless connection diagnosis.

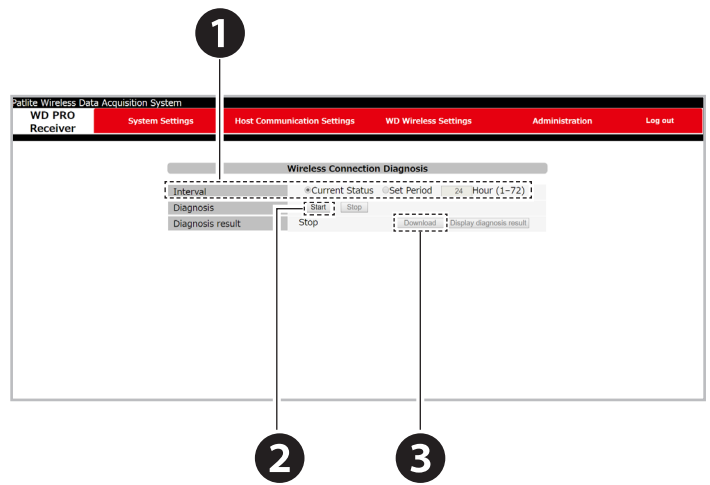
- While the diagnosis is in progress, the diagnosis result column displays the text "Diagnosis in progress".
- While the diagnosis is in progress, the entered diagnosis time* is displayed.

* For [Current Status], "0 hours" is displayed.

- Click the [Stop] button to interrupt the wireless diagnosis.

3 After completing a diagnosis of the wireless environment, click the [Download] button to download the diagnosis results.

- Even if the wireless connection diagnosis is interrupted, if there is a diagnosis result you can download the CSV file.
- Diagnosis results are ranked in five levels: A, B, C, D, and E. For information, refer to "9.2.2. Self Diagnosis Function" (☞ page 121).
- After completing diagnosis of the wireless environment, click [Display Diagnosis Result] to pop up the diagnosis result screen.



Pop-up screen

| User Name | IEEE Address | 2011/11/19 | | | | | | | | | | | |
|-----------|---------------------|------------|---|-------|---|-------|---|-------|---|-------|---|-------|---|
| | | 11:00 | | 12:00 | | 13:00 | | 14:00 | | 15:00 | | 16:00 | |
| WDT03 | 0025-5CFF-FE8A-8EAC | A | B | C | D | E | E | E | E | E | E | E | E |
| WDT02 | 6C64-DAFF-FE01-9CAB | A | B | C | D | E | E | E | E | E | E | E | E |
| WDT01 | 743A-65FF-FE4A-4B25 | A | B | C | D | E | E | E | E | E | E | E | E |

About ranking diagnostic results

| Rank | Description |
|--------|---|
| Green | The transmitter communication status with the receiver was sufficient quality. There are no issues with the radio environment. |
| Yellow | Through the operation, the receiver communication with the transmitter was not stable with sufficient quality using communication data communication hopping with other transmitters. There are no issues with the radio environment. |
| Orange | Through the operation, the receiver communication with the transmitter was not stable with sufficient quality using communication data communication hopping with other transmitters. As long as the other transmitters stop using intermediate devices to operate, there are no issues with the radio environment. |
| Red | The quality of the communication with the receiver was insufficient. It is recommended to adjust the radio environment as communication can be lost at any time. |
| Grey | The transmitter operation stopped with the receiver. The radio environment must be changed. |

- Click the call transmitter's blue button and the indicator for the associated WDT flashes blue for about 10 seconds. For information, refer to "8.1.5. Checking Operations with WDT-PRO Indicator" (☞ page 94).

Point

- The wireless environment diagnosis results are saved until you run the wireless connection diagnosis again, WDR is turned off, WDR is initialized, or WDR is rebooted.

7.4.4.4. Status Check

Lists the Signal Tower Control Line input status for each WDT. Every 8 seconds, get the latest input status for the Signal Tower control line and update the screen. The Status Check displays in a pop-up screen.

! CAUTION

- ! Cannot select on WDR-L-Z2-PRO-L and WDR-LE-Z2-PRO-L.
- ! While the screen is updating (about 8 seconds), multiple changes to the Signal Tower Control Line input status do not display.

Point

- You can display up to 30 units.
- Function that displays the input status of the Signal Tower Control Line. To analyze equipment operations such as "accurately view capacity utilization rate", prepare the application software separately. For application software, refer to "5.3. About Application Software" (☞ page 29) and contact our sales office.
- WDT registered with user names are displayed first. (In order of registration)



Buzzer status

- → Buzzer on
- → Buzzer off

* Gets the buzzer status only when the WDT is setup to be able to get the buzzer status. (Cannot get using WDT-5E-Z2 or WDT-6M-Z2.)

WDT name

Transmitter User Name

- If registered → Display transmitter user name
- If not registered → Display MAC address (IEEE address)

Call Transmitter button

Click the call transmitter button and the indicator for the associated WDT flashes blue for about 10 seconds.
* Does not display on WDT-5E-Z2 or WDT-6M-Z2. Also does not display when WDT is not connected.

Status of Signal Tower Control Line

| | | | |
|---------|--|---|--|
| • Red | | : | |
| • Amber | | : | |
| • Green | | : | |
| • Blue | | : | |
| • White | | : | |

Light on / Flashing* Light off

* Displays when [Determine Signal Tower Input] is [Flashing].

Frame: WDT status

- → Display connection status
- → Disconnected status (Displays only WDT with registered transmitter user names.)

7.4.4.5. Register Transmitter User Name

You can register a name (user name) for the WDT.

By using a CSV file, you can register everything in one step, or output everything to a file in one step.

! CAUTION

- ⚠ Cannot set up on WDR-L(E)-Z2-PRO-L.
- ⚠ If the CSV file includes information on more than 30 WDT, only the first 30 units are recorded.
- ⚠ If you register a file that cannot be read, an error screen appears.
- ⚠ You can register a maximum 20 characters for Transmitter User Names. If you register with more characters, only up to the twentieth character is saved.

Point

- When a user name is registered, the status of "7.4.4.2. Wireless Settings List" changes from "Not registered" to "Registered".
- Modbus/TCP Communication unit identifiers are assigned, in order, from the top of the CSV file used for registration.

Register Transmitter User Name

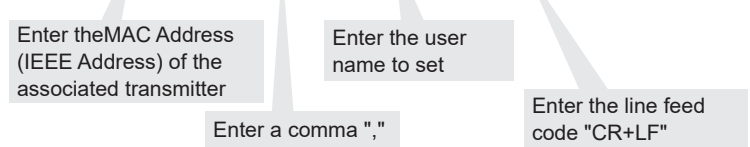
1 Click the [Choose File] button and select the CSV file*.

*CSV files you can select are as follows.

| | |
|--------------------|-------------------------|
| Character code | UTF-8 |
| Linebreak code | CR+LF |
| CSV file structure | IEEE address, user name |

- CSV file configuration example (when registering user names for 20 transmitters)

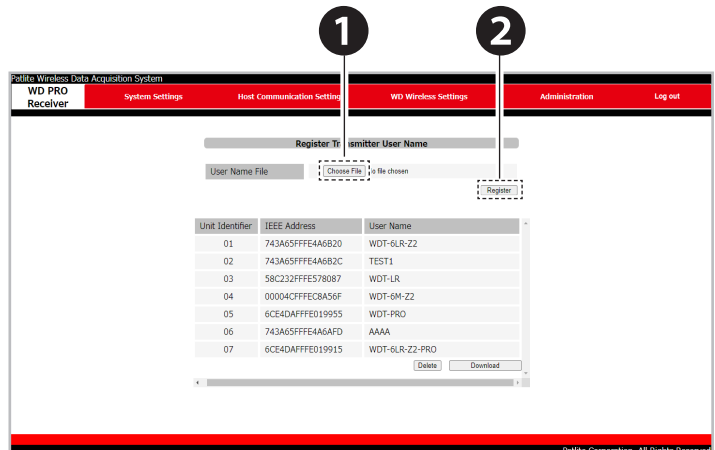
```
00255CFFFEBABDDC, Line ○○ Transmitter 1 ← Modbus/TCP Communication unit identifier "01H"
00255CFFFEBABDDD, Line △△ Transmitter 2 ← Modbus/TCP Communication unit identifier "02H"
:
:
00255CFFFEBABDDF, Line ×× Transmitter 20 ← Modbus/TCP Communication unit identifier "14H"
```



2 Click the [Register] button.

*Upload of selected CSV files begins, WDT user names are written at once, and displayed in a list.

Note: If you register a CSV file with a different structure than shown above, or if you register a CSV file with two or more of the same transmitter MAC addresses (IEEE address), an error screen will appear.



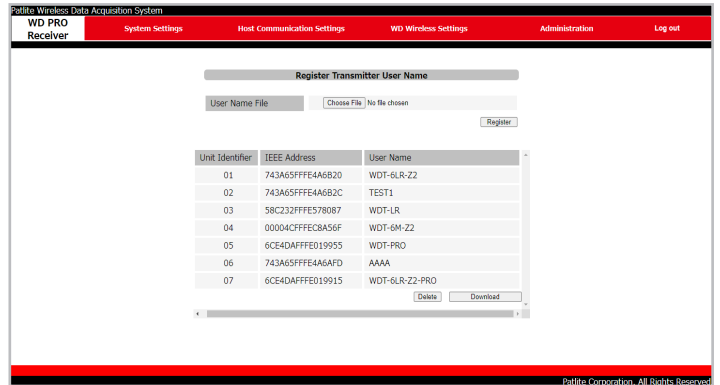
Download Transmitter User Name

1 Click the [Download] button.

2 Specify the save destination and save.

*The file format for the saved file is as follows.

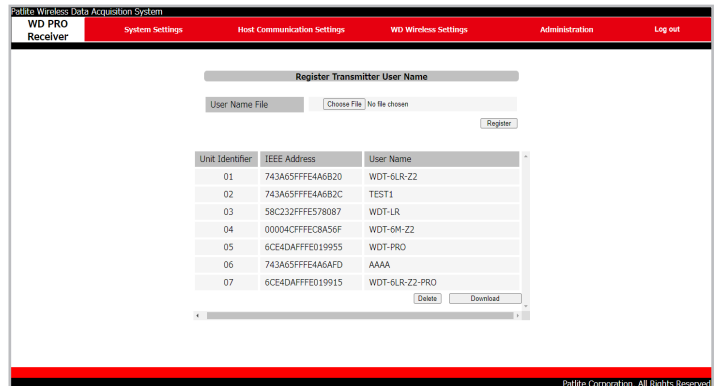
| | |
|--------------------|-------------------------|
| Character code | UTF-8 |
| Linebreak code | CR+LF |
| CSV file structure | IEEE address, user name |



Delete Transmitter User Name

1 Click the [Delete] button.

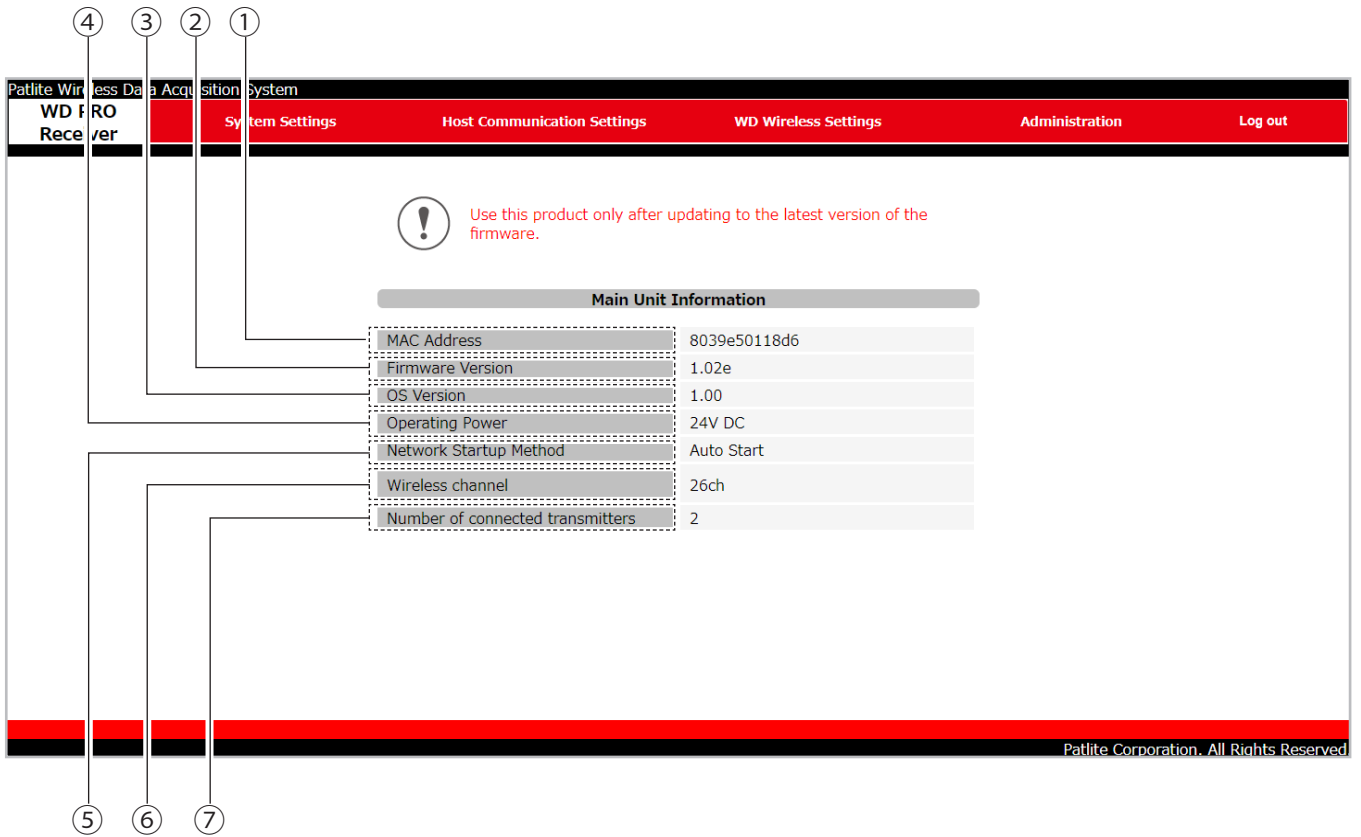
*Clicking the [Delete] button will also delete the transmitter user name list from the displayed list.



7.4.5. Administration

7.4.5.1. Main Unit Information

You can check the information of connected WDR.



| No. | Item | Description | References |
|-----|----------------------------------|--|---|
| ① | MAC Address | Displays the WDR LAN MAC address. | - |
| ② | Firmware Version | Displays the version of the WDR firmware. | - |
| ③ | OS Version | Displays the version of the WDR operating system. | - |
| ④ | Operating Power* | Displays the power being supplied to the WDR. When operating with power from the AC Adaptor or power terminal block, displays "24V DC", and when operating with PoE, displays "PoE". | - |
| ⑤ | Network Startup Method | Displays the [Network Startup Method] for when the WDR is powered on. Displays either [Auto start] or [Manual start]. | ☞ "7.4.4.1. Receiver Wireless Settings" (page 72) |
| ⑥ | Wireless channel | Displays the wireless channel currently used by WDR. | - |
| ⑦ | Number of connected transmitters | Displays the number of WDT connected to the WDR. | - |

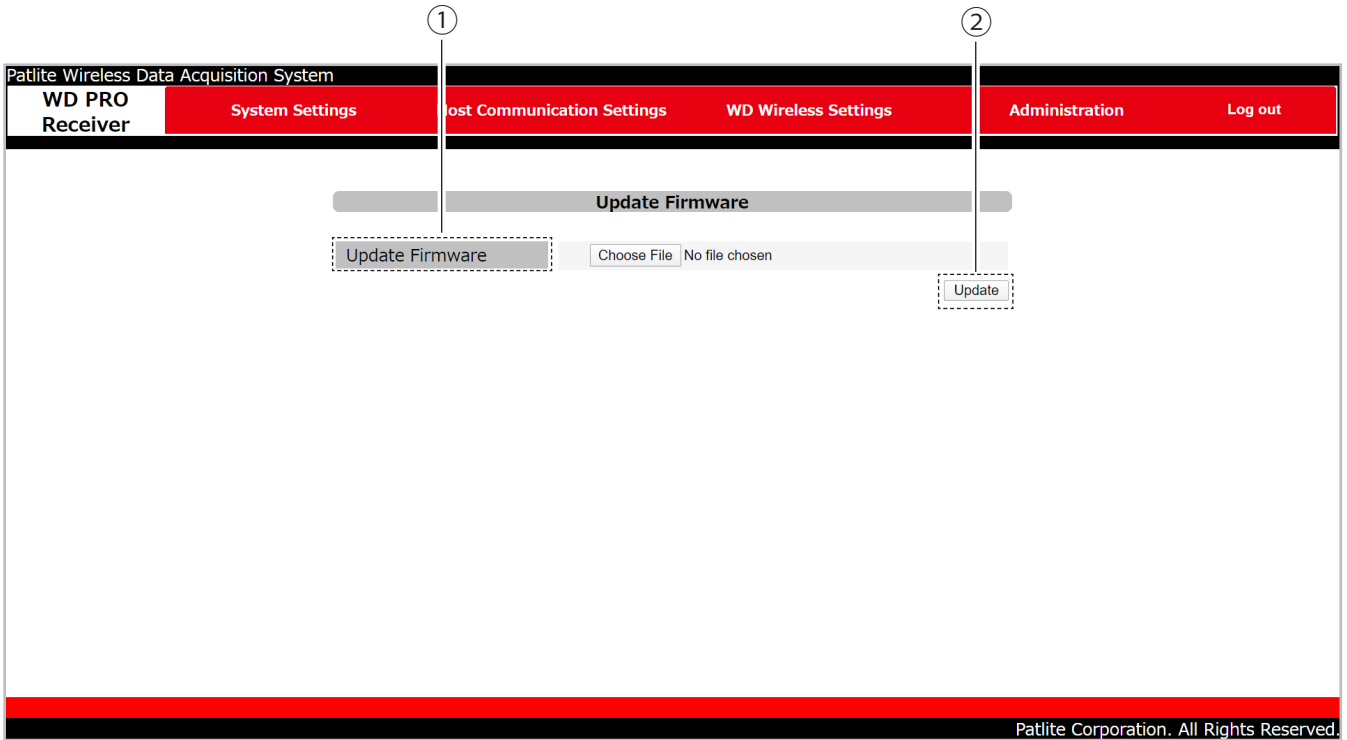
*When both the PoE power supply and 24 VDC power supply (AC adaptor or power terminal) are connected, PoE takes priority.

7.4.5.2. Update Firmware

You can update the WDR firmware. After the firmware is updated, the unit reboots.

CAUTION

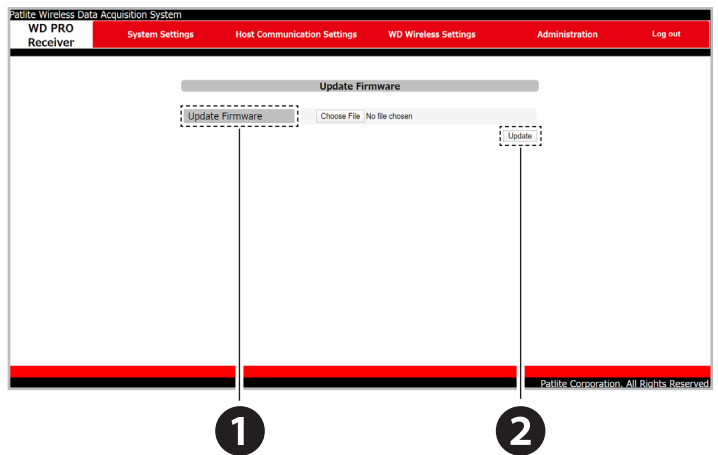
- ⊘ Do not turn off the power or disconnect the LAN cable while updating. Failure to follow this instruction could result in product failure.
- ❗ If you downgrade the firmware, make sure you initialize the product.



| No. | Item | Description |
|-----|-----------------|--|
| ① | Update Firmware | Click button and specify the firmware to write to the WDR. |
| ② | Update | Click [Update] to start updating the firmware. |

1 Click [Choose File] button and specify the firmware to write to the WDR.

2 Click [Update] to start updating the firmware.



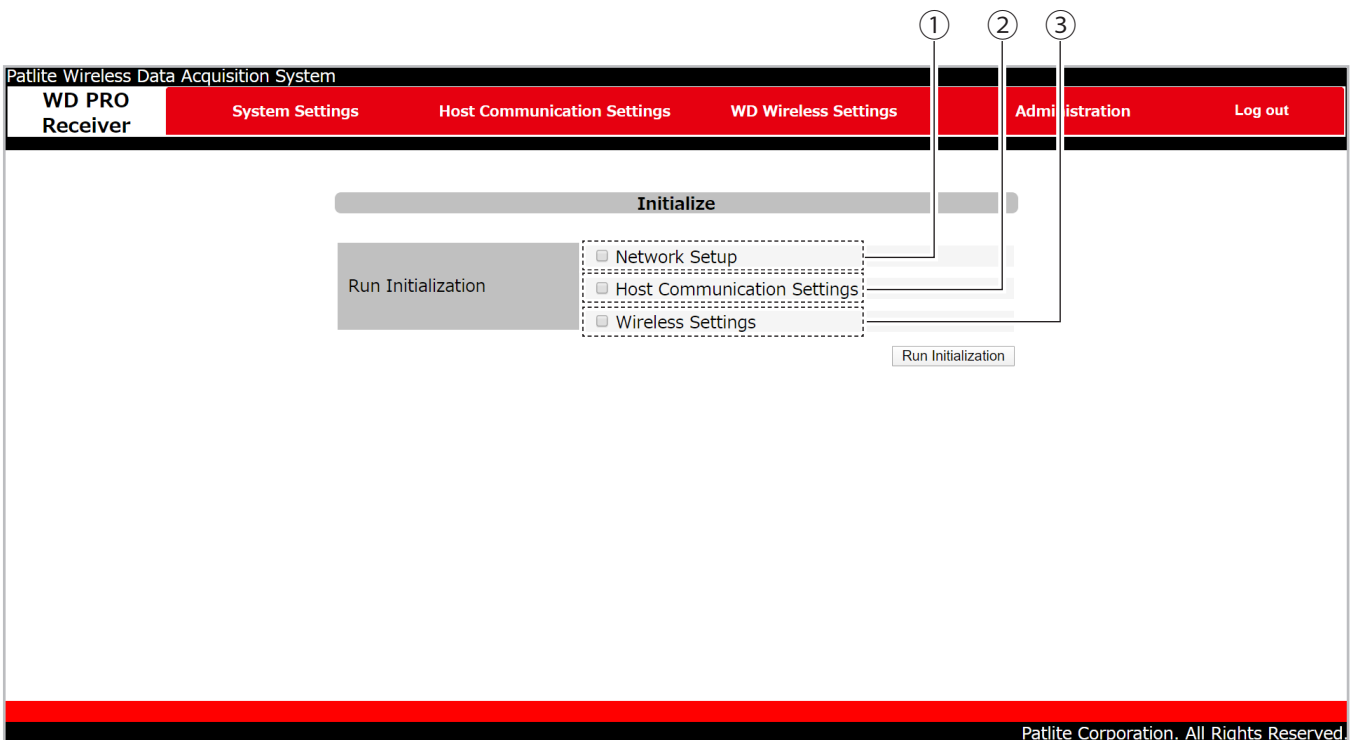
7.4.5.3. Initialize

Initializes the WDR settings. You can select the items that you want to initialize.

⚠ CAUTION

❗ When network settings are initialized, the IP address is reset to the factory default. Make sure you set up the network again.

⚠ When initialization is run, the Signal Tower information, wireless quality information, counter information, and various log data are also initialized.



| No. | Initialization Items | Initialization Setting | References |
|-----|-----------------------------|---|--|
| ① | Network Setup | Settings in the Network Setup screen are initialized. | ☞ "7.4.2.1. Network Setup" (page 58) |
| ② | Host Communication Settings | Settings in the Socket Communication screen, Database Communication screen, Modbus/TCP Communication screen, and Cloud Communication Settings screen are initialized. | ☞ "7.4.3.1. Socket Communication Settings" (page 64) ☞ "7.4.3.2. Database Communication Setting" (page 66) ☞ "7.4.3.3. Modbus/TCP Communication Settings" (page 68) ☞ "7.4.3.4. Cloud Communication Settings" (page 69) |
| ③ | Wireless Settings | Settings in the Receiver Wireless Settings screen are initialized. | ☞ "7.4.4.1. Receiver Wireless Settings" (page 72) |

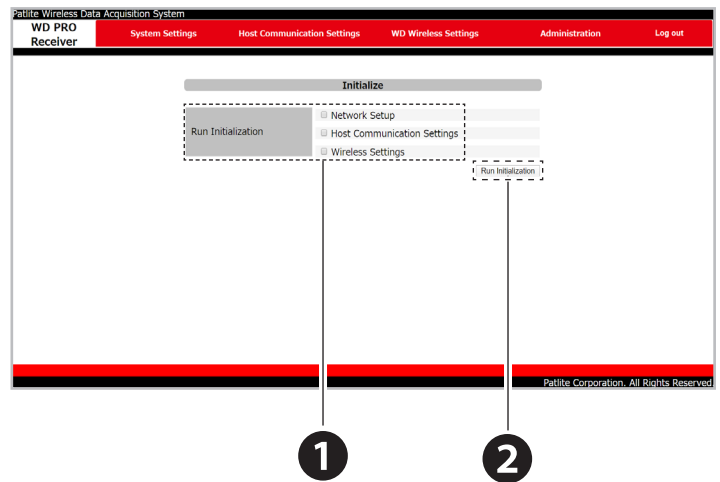
1 Select the settings to initialize* from the list of initialization items.

*You can select multiple items.

2 Click the [Run Initialization] button.

3 WDR is automatically rebooted.

- Note:
- Check the WDR status lamp to check the reboot status. For information, refer to "8.2.5. Checking the WDR Status Lamp" (☞ page 105).
 - For information on initialization items, refer to "8.2.6. Initializing the WDR" (☞ page 107).



7.4.5.4. Reboot

This product is rebooted when you click the [Reboot] button.

⚠ CAUTION

⚠ When rebooting, the Signal Tower information, wireless quality information, counter information, and various log data are initialized.

Patlite Wireless Data Acquisition System

WD PRO Receiver | System Settings | Host Communication Settings | WD Wireless Settings | Administration | Log out

Reboot

Reboot Reboot

Patlite Corporation. All Rights Reserved.

| No. | Item | Description |
|-----|--------|-----------------------|
| ① | Reboot | Reboots this product. |

1 Click the [Reboot] button.

*A confirmation for reboot displays in a pop-up screen.

2 Click* [OK].

*Reboot is started (reboot is complete after about 50 seconds).

*While rebooting, the WDR status lamp remains lit as normal. For information, refer to "8.2.5. Checking the WDR Status Lamp" (page 105).

3 After reboot is complete, log in to the WDR Setup Screen

(refer to "7.2. Display WDR Web Setup Screen" (page 51))

Patlite Wireless Data Acquisition System

WD PRO Receiver | System Settings | Host Communication Settings | WD Wireless Settings | Administration | Log out

Reboot

Reboot Reboot

Patlite Corporation. All Rights Reserved.

Pop-up Screen

×

This site says...

Do you want to restart?

OK

Cancel

2

8. Operation

8.1. How to Use the WDT

8.1.1. WDR Wiring Method

For the wiring method, carefully read and follow the instructions in the LR Series Instruction Manual.

! WARNING

- ⊘ Before any wiring or fuse replacement, disconnect the power. Failure to follow this instruction could result in a short-circuit and product damage.
- ⊘ Supply only the correct power, direct current or alternating current, and use the proper voltage. Failure to follow this instruction could result in fire.

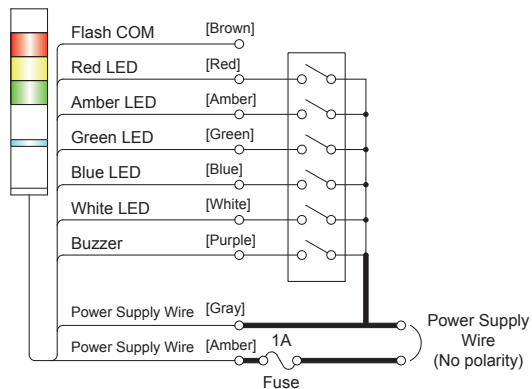
! CAUTION

- ❗ To operate the WDT, you need to constantly supply power to the LR series signal tower's power line. The voltage for the target models are as follows.

- Applicable models:

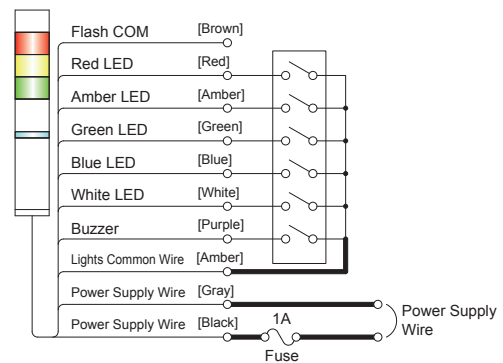
LR □ - □ 01/LR □ - □ 02

- Signal tower rated voltage: 12 to 24 VDC



- Applicable models: LR □ - □ M2

- Signal tower rated voltage: 100 to 240 VAC



- ❗ To protect external equipment, install a fuse on the power supply side.

- Recommended fuse: 250 V / 1 A 5x20 mm Fast-blow glass tube fuse

*When the signal tower rated voltage is 100 to 240 VAC, use the following parts.

- If you are not using a regulated power supply, use a fuse that meets or exceeds Class CC.
- Use a fuse holder with UL Standards certification.

- ❗ Insulate the leads of unused signal tower control wires, one by one. Failure to follow this instruction could result in a short-circuit and product damage.

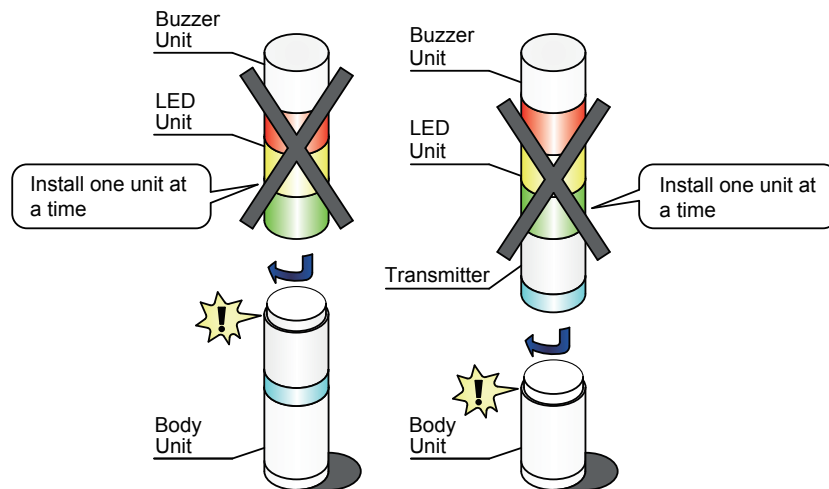
8.1.2. Attaching and Detaching the WDT

! WARNING

- ⊘ Before installing and wiring this product, be sure that it is disconnected from the power source. Failure to comply may result in fire, electrocution or product malfunction.

! CAUTION

- ❗ The maximum number of attachment units per Signal Tower is: 5 LED units + 1 buzzer unit + this product (transmitter unit). Do not exceed this maximum.
- ⊘ Do not apply excessive force onto this product or the body unit. Doing so may damage the product.
- ⊘ Do not touch the connectors of the units, or the LED bulbs on the LED unit. Doing so may damage the product.
- ⊘ During assembly, be sure to securely lock each unit into place. If any units are loose, it may result in product damage.
- ⊘ **When** attaching or detaching units (transmitter, LED unit, or buzzer unit) to and from the body unit or the transmitter, attach or detach units one at a time. Failure to follow these instructions could result in equipment damage.
- ⚠ If you are having difficulty attaching/detaching the units, try with the body unit of the LR Signal Tower secured, or with work gloves on..
- ⚠ In order to maintain waterproofing, the WDT-4LR-Z2 is designed to be tightly secured onto the Signal Tower. Be sure to tightly lock each unit into place

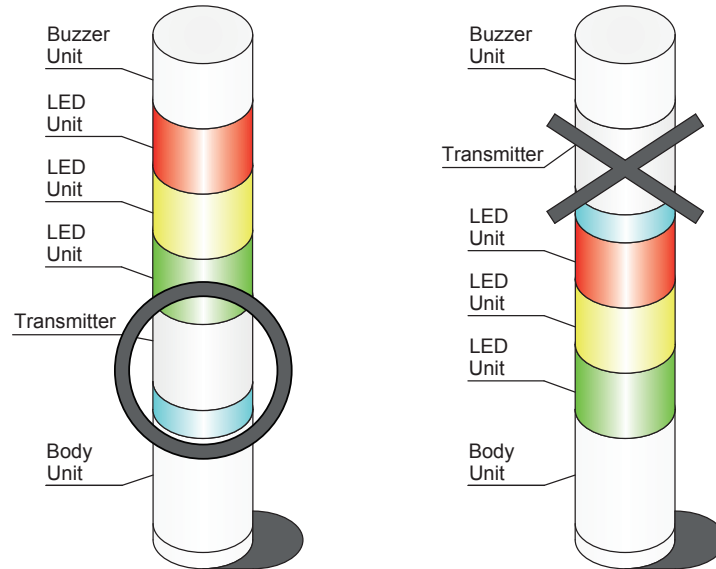


8.1.2.1. Installing to and Removing from LR Series Signal Tower

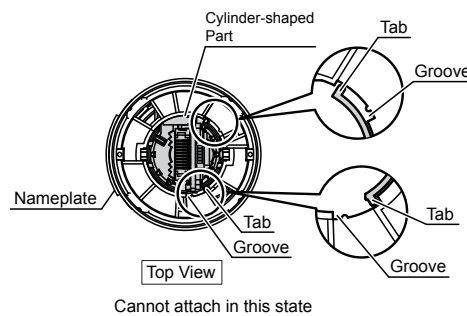
When installing or removing WDT, follow the instructions below to attach and detach parts (such as the LED unit and buzzer unit) from the LR Signal Tower.

⚠ CAUTION

- ⊘ This product is to be installed right above the body unit of the LR Signal Tower. If it is installed above the LED units, it will be difficult to see the indicator lights on the transmitter.



- ⓘ If the transmitter does not attach properly to the body unit, confirm the tab of the cylinder-shaped part at the top of the transmitter is fitted correctly into the groove. If the tab is outside the groove as shown in the figure (right), refer to the figure below on how to reposition it. Additionally, depending on how the transmitter is removed, the tab may come out of the groove (as shown in Figure 1) when detaching from the body unit. Attaching while the tab is still in this state may cause damage.



- ⚠ If you are having difficulty attaching/detaching the units, try with the body unit of the LR Signal Tower secured, or with work gloves on.
- ⚠ In order to maintain waterproofing, the WDT-4LR-Z2 is designed to be tightly secured onto the Signal Tower. Be sure to tightly lock each unit into place

Point

● If the transmitter does not attach properly to the body unit, in the center of the underside of the product, turn the cylinder-shaped part counter-clockwise. Next, turn the cylinder-shaped part until it snaps into place, then attach it to the body unit.

● For WDT-4LR-Z2

| | | |
|-----------------|-----------------|---------------------------|
| <p>■ Attach</p> | <p>■ Detach</p> | <p>■ Positioning Mark</p> |
|-----------------|-----------------|---------------------------|

● For WDT-5LR-Z2/WDT-6LR-Z2

| | | |
|-----------------|-----------------|---------------------------|
| <p>■ Attach</p> | <p>■ Detach</p> | <p>■ Positioning Mark</p> |
|-----------------|-----------------|---------------------------|

8.1.2.2. Attaching the LED Unit and Buzzer Unit

⚠ CAUTION

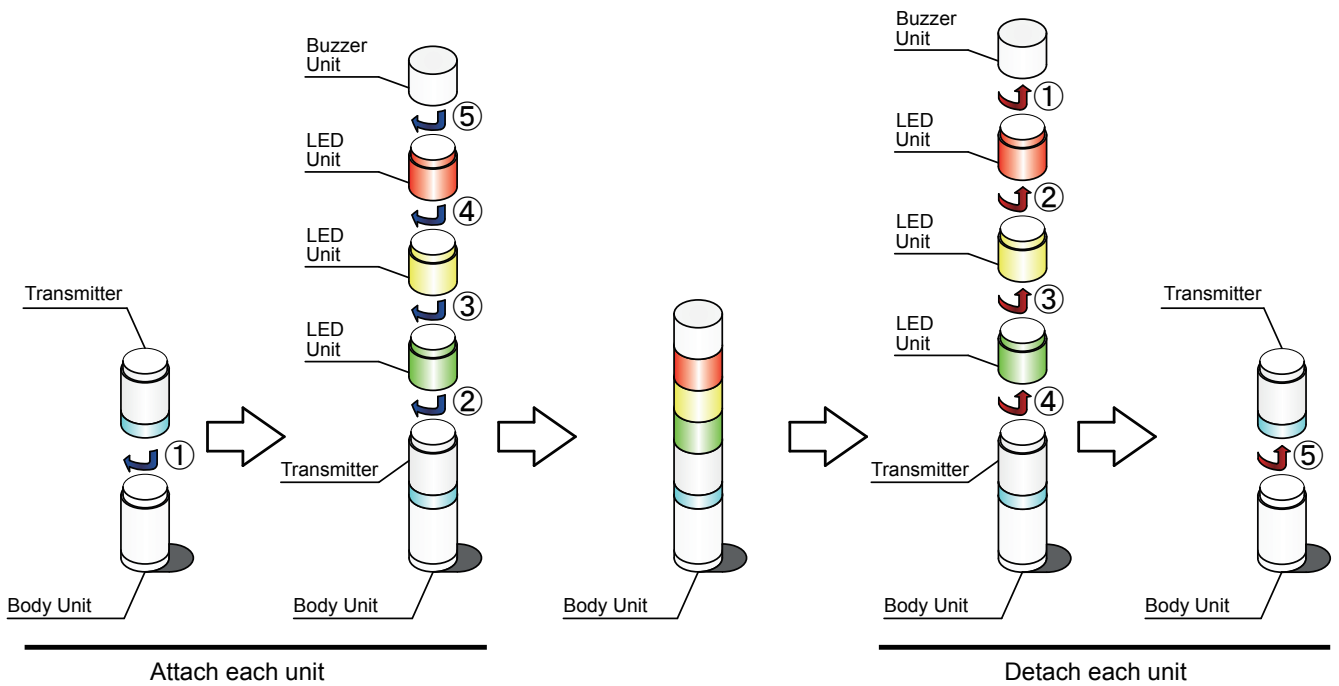
- ❗ Attach or detach units one at a time.
- ⚠ In order to maintain waterproofing, the WDT-4LR-Z2 is designed to be tightly secured onto the Signal Tower. Be sure to tightly lock each unit into place.
- ⚠ If you are having difficulty attaching/detaching the units, try with the body unit of the LR Signal Tower secured, or with work gloves on.

Attach 1 unit at a time

Attach 1 unit at a time

Order of Attaching/Detaching Units

Attach and detach units in the following order.



8.1.3. Setting up the WDT Main Unit

8.1.3.1. Setup Process

- For WDT setup, use the system configuration software WDS-WIN01.
- Download WDS-WIN01 from our website, and install on the computer that will be used to set up and configure the system. (Customer registration is required for downloading from the home page)
For information about usage and setup, refer to ["WDS-WIN01 Instruction Manual"](#).
- For the set up process of the WDR Web Setup screen, refer to "7. WDR Setup Process" ([page 49](#)).
- When using WDT-5E/6M-Z2 or 4LR / 5LR / 6LR-Z2, you can also set up on the WDR Web Setup Screen. For information, refer to "7.4.4.2. Wireless Settings List" ([page 73](#)).

8.1.3.2. Setup Items

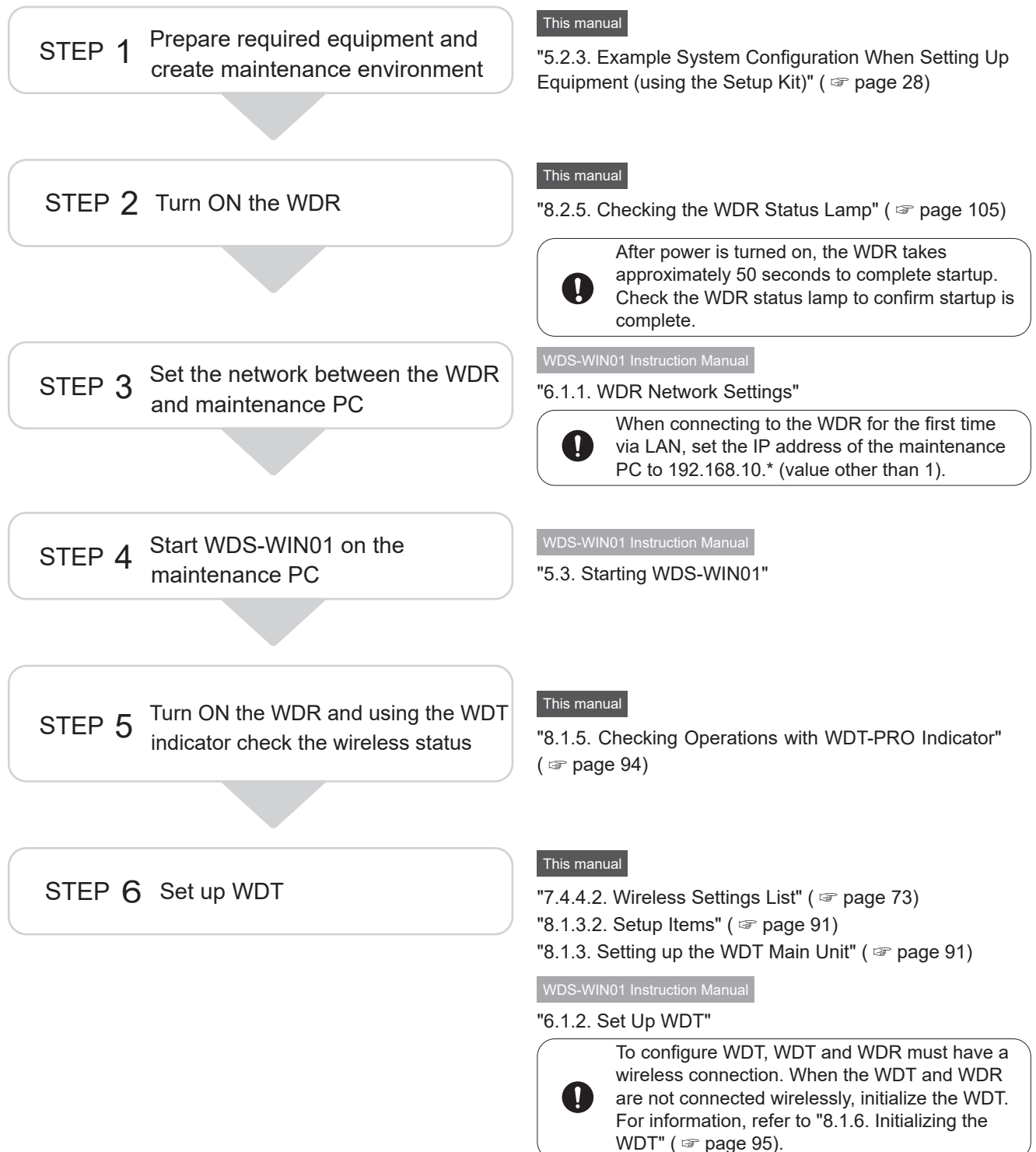
Setup items are as follows.

| Setup Item | | WDS-WIN01 Setup Items | Default Value | References |
|--------------------|---|------------------------------|------------------------|---|
| Wireless Settings | ExtendedPanID Settings | ExtendedPanID | 0000 0000 0000 0000 | "6.1.3. About Grouping and ExtendedPanID" (page 35) |
| | Frequency Channel Settings | Frequency Channel | Select all | "6.1.1. About the WD Wireless Network" (page 34) |
| Operation Settings | Determine Signal Tower Input Setting | Determine Signal Tower Input | Flashing (medium) | "9.1.2.1. Determine Signal Tower Input" (page 114) |
| | Power Supply Settings | Power Supply Settings | Power Supply Wire | * |
| | Simple Counter Settings | Counter Settings | Do not use | "9.1.1.5. Simple Counter Function" (page 113) |
| | Input Information Transmission Timing Setting | Transmission Mode | Immediate Transmission | "9.1.1.1. Transmit Signal Tower Information" (page 111) |

*For this product's settings, select [Power Supply Wire]. For information, refer to ["WDS-WIN01 Instruction Manual"](#).

8.1.3.3. Required Equipment

- For system configuration when setting up WDT equipment, refer to "5.2.3. Example System Configuration When Setting Up Equipment (using the Setup Kit)" (☞ page 28). For setting up a WDT device, use the system configuration software WDS-WIN01.
- Install WDS-WIN01 on the maintenance PC and set up the equipment.
For information about using WDS-WIN01, refer to ☞ "WDS-WIN01 Instruction Manual".
- The setup procedure is as follows.



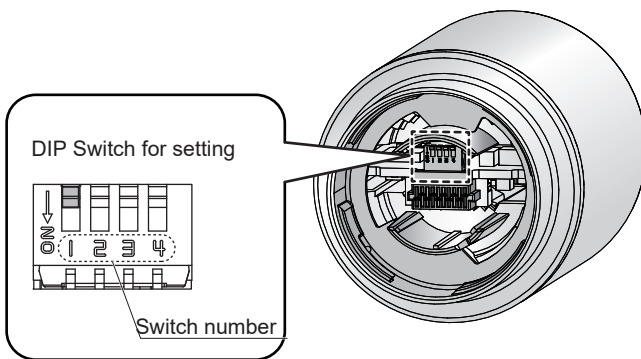
8.1.4. WDT DIP Switch Operations

! CAUTION

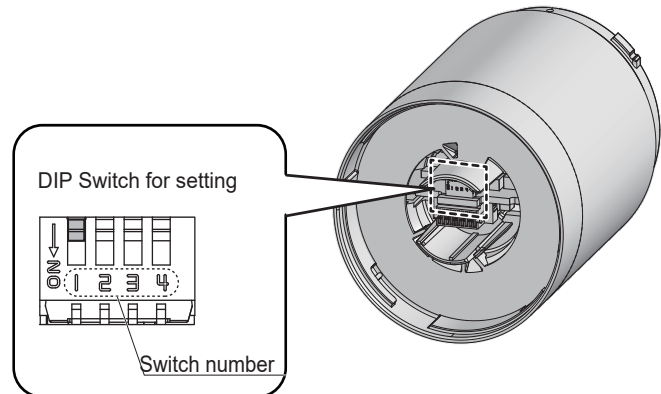
- ⊘ Do not use excessive force on this product. Failure to follow this instruction could result in deformed frame and product damage.
- ⊘ Do not use sharp tipped objects with this product. Operation may become impossible as scratches develop on switches and switch contacts are interfered with.

WDT dip switches are on the bottom of the main unit.

For WDT-4LR-Z2



For WDT-5LR-Z2 and WDT-6LR-Z2



•DIP Switch Settings

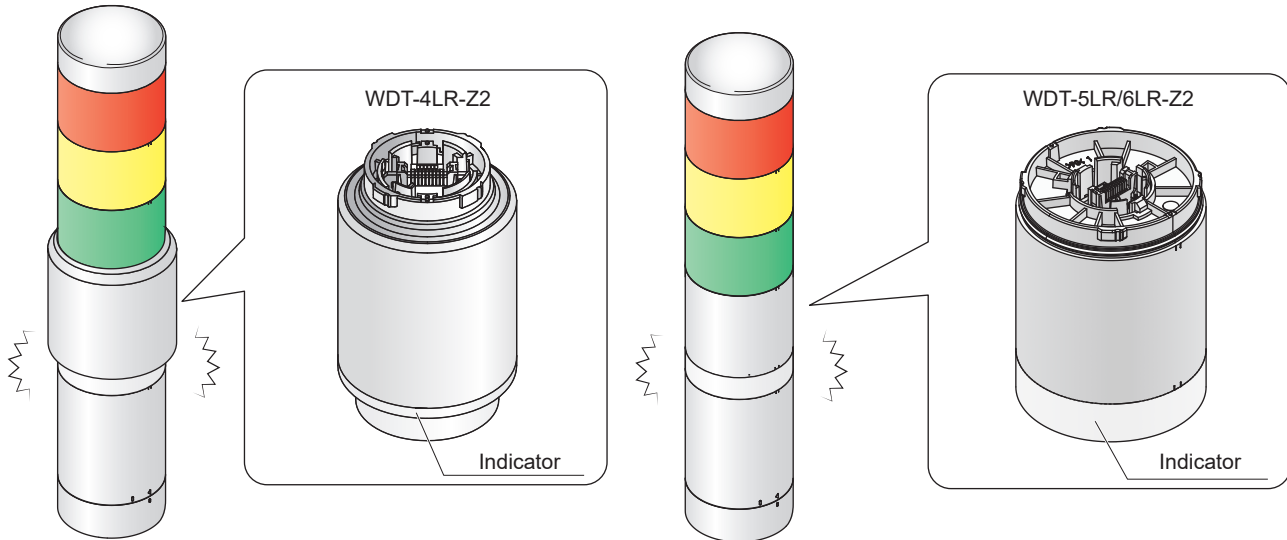
| Switch number | Description | Initial Settings | References |
|---------------|--|------------------|---|
| 1 | Initialize setting values <ul style="list-style-type: none"> • OFF: Normally use with this setting OFF. • ON: Initializes the value for various settings. | OFF | ☞ "8.1.6. Initializing the WDT" (page 95) |
| 2 | Methods for defining Count Input signal wire <ul style="list-style-type: none"> • OFF: Define with the WDS-WIN01 simple counter settings. • ON: Use blue Signal Tower control wire (fixed). | OFF | ☞ "9.1.1.5. Simple Counter Function" (page 113) |
| 3 | Select format of Signal Tower information <ul style="list-style-type: none"> • OFF: Send in standard format. • ON: Send in extended format. | OFF | ☞ "9.1.1.2. Select Format of Signal Tower Information" (page 111) |
| 4 | Periodic Transmission <ul style="list-style-type: none"> • OFF: Normally use with this setting OFF. • ON: Send transmissions at regular intervals. | OFF | ☞ "9.1.1.3. About Periodic Transmissions" (page 112) |

8.1.5. Checking Operations with WDT-PRO Indicator

Check using the indicator on the main unit.

For WDT-4LR-Z2

For WDT-5LR-Z2 and WDT-6LR-Z2



●Indicator Light Status

| Status | Indicator Light | Status |
|--|---------------------------------|---|
| Wireless Communication Quality Display | Green pulse*1 | Indicates a good status. This status indicates the product can communicate directly with the WDR without relying on other WDT. (If the WDT and WDR are close together (within tens of centimeters), WDT may display a red pulse. For an accurate display, use units with a separation of about 1 m.) |
| | Amber pulse*1 | Direct wireless connection with the WDR is not good, but the connection with nearby WDT is good. If nearby WDT have a green pulse, that WDT is used as a repeater for communication. |
| | Red pulse*1 | Connection is not good with any WDR or WDT in the WD wireless network. |
| | Red light on | Product is waiting to join the WD Network. |
| Operation Status | Flashing blue | When the WDT receives a specific command from the host, flashes blue for approximately 10 seconds. |
| | Alternating Red→Green→Red→Green | Operating in initialization mode. |
| Error Status*2 | Flashing red | Error has occurred in WDT. |

*1 Pulse is where the lamp fades between bright and dark repeatedly.

*2 When the indicator light shows an error status, refer to "10.1. Troubleshooting" (□ page 123).

8.1.6. Initializing the WDT

Follow the steps below to run initialization.

1

Turn on DIP switch 1 on WDT.

2

Attach the WDT to the LR series signal tower, and turn it ON.

- After a few seconds, the indicator repeatedly alternates between red and green. At this time, initialization is complete.

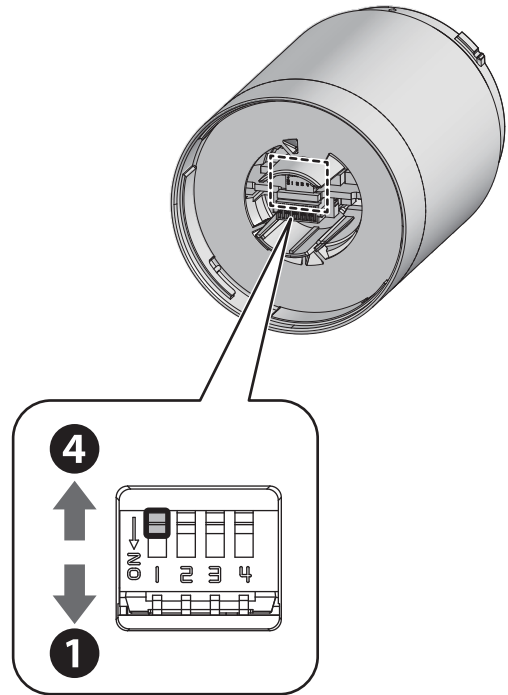
3

Turn OFF, and detach the WDT from the LR series signal tower.

4

Turn off DIP switch 1 on WDT.

- For setup items that are initialized, refer to "8.1.3.2. Setup Items" (☞ page 91).



8.2. How to Use the WDR

8.2.1. WDR Mounting Method

WARNING

- ❗ Before any work is done, make sure power is disconnected.
- ❗ Affix the product to the bracket before supplying power to the product.

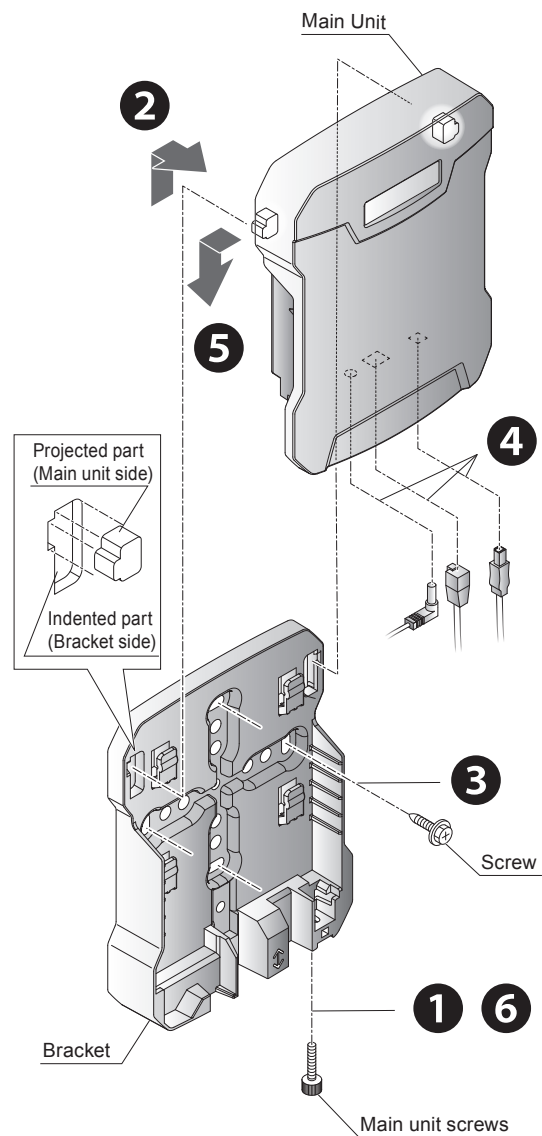
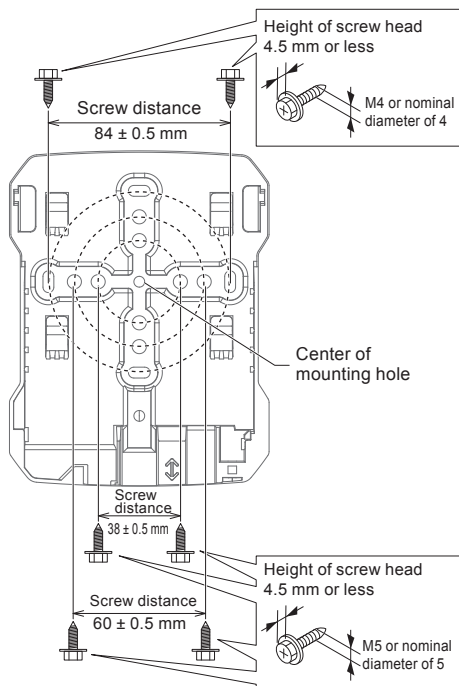
CAUTION

- ❗ The mounting location should satisfy the following conditions.
 - Minimal vibration
 - Sufficient strength
 - Flat

- 1** Remove the main unit screws from the product.
 Note: •Be careful not to drop the mounting screws.
- 2** Slide the main unit up and detach from the bracket.
- 3** Use screws to secure the bracket to the mounting surface.

| | |
|--------------------|-----------|
| Recommended Torque | 1.4 N · m |
|--------------------|-----------|

- Note: • Screws to affix the bracket are not included. Please provide your own. (bracket thickness: 6 mm)
- Center with the mounting hole, and affix screws at two or more locations.



- 4** Connect a USB or LAN cable to the main unit, and connect the lead wires to the AC Adaptor or power terminal.

(☞ "8.2.2. WDR Wiring Method" (page 98))

- 5** Line up the indented part of the main unit with the projected part of the bracket, then slide the main unit down to attach to the bracket.

Note: •When attaching the main unit to the bracket, take care not to pinch the cable.

- Confirm the left and right sides of the projected/indented parts line up.
- Slide the main unit until it clicks.

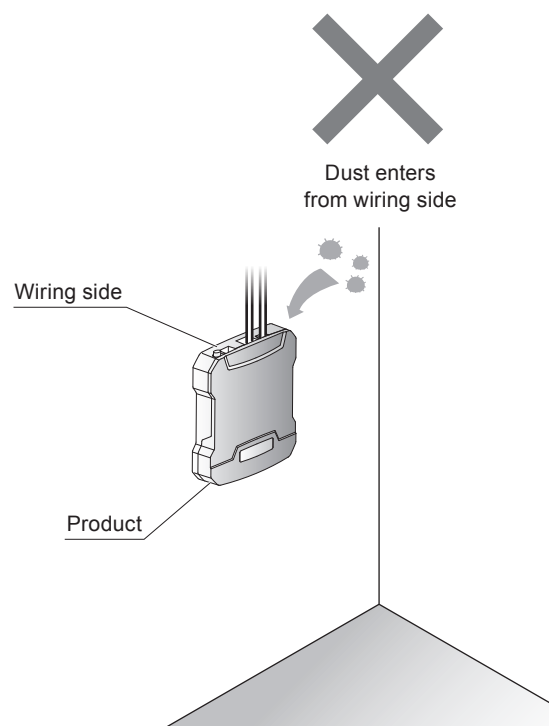
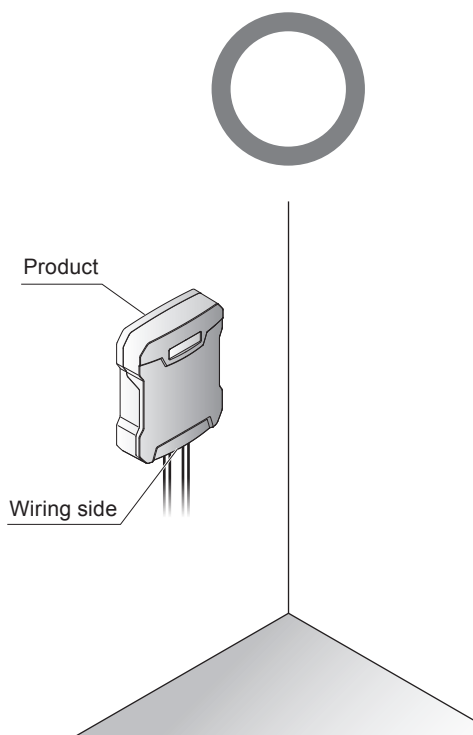
- 6** Use the main unit screws to secure the main unit to the bracket.

Note: •Use the main unit screws to securely attach the main unit and bracket.

- Do not tighten the main unit screws more than necessary. Failure to follow these instructions could result in equipment damage.
- Be careful not to drop the mounting screws.

⚠ CAUTION

- !** When installing the product in a wall, install with the wiring side down. If the wiring side is up, dust and other intrusions may enter the product and cause a malfunction.



8.2.2. WDR Wiring Method

This product does not include the USB cable, LAN cable, and lead wires. Please provide your own.

WARNING

- ❗ Wire the LAN cable, AC Adaptor, or lead wires without supplying power, and affix the product to the bracket before supplying power to the product.

CAUTION

- ❗ Input power from either the power terminal or the AC Adaptor. (Power input is not required when connecting either a USB cable or LAN cable with PoE.)

NOTICE

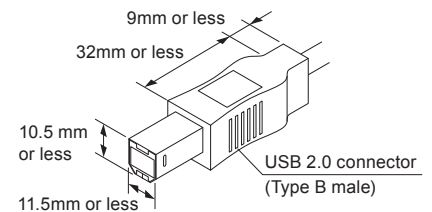
- Use only IEEE802.3af compliant products with the PoE power supply.
- When both the PoE power supply and 24 VDC power supply are connected, PoE takes priority.

8.2.2.1. USB Cable Wiring Method

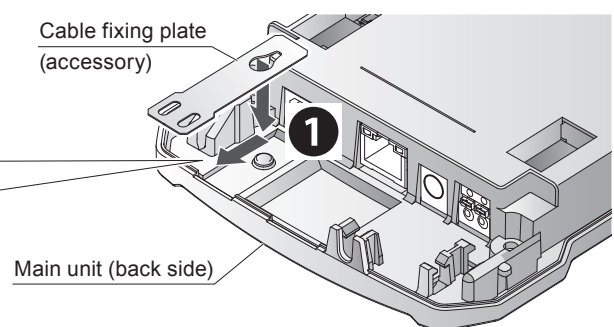
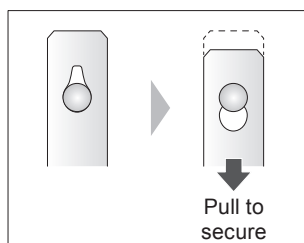
To prevent the USB connector from disconnecting, secure the USB cable to the cable fixing plate, included.

CAUTION

- ❗ Use the supplied cable tie.
- ❗ Use a USB cable 3 m or shorter.
- ❗ When the USB connector is connected, LAN communication is not possible. Only connect the cables that will be used.
- ❗ For the USB cable connector that connects to the main unit, select one that satisfies the shape and dimensions shown in the figure to the right.



- 1 Attach the cable fixing plate to the main unit.

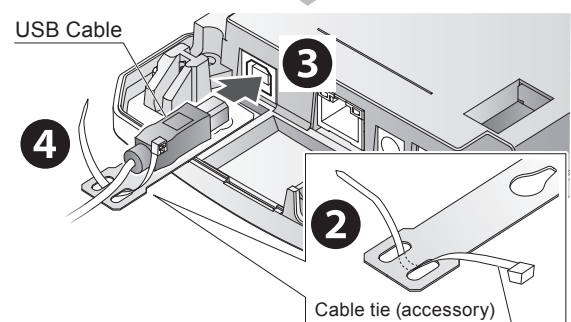


- 2 Attach a cable tie to the cable fixing plate.

- 3 Insert the USB cable into the main unit's USB connector.

- 4 Secure the USB cable with the cable ties.

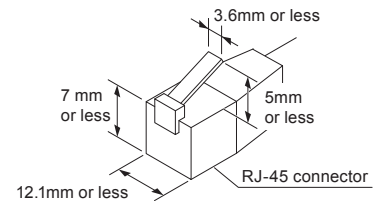
Note: Use nippers to cut any excess from cable ties.



8.2.2.2. LAN Cable Wiring Method

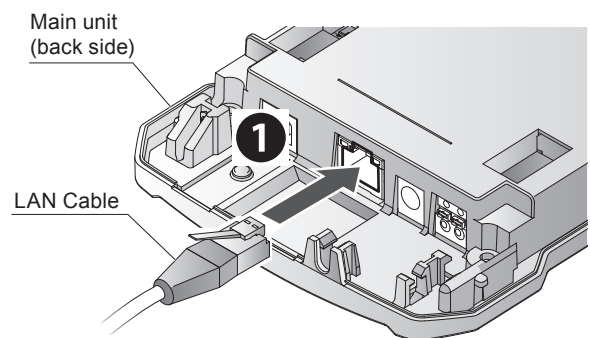
⚠ CAUTION

- ⊘ Do not run the LAN cable outdoors. Failure to follow this instruction could result in equipment damage as a result of lightning.
- ❗ The LAN cable should be rated for Category 5e or higher (Category 6 or higher recommended).
(You can use either straight cable or cross cable.)
- ❗ For the LAN cable RJ-45 connector that connects to the main unit, select one that satisfies the shape and dimensions shown in the figure to the right.
- ⊘ When the LAN cable is connected, do not also connect a USB cable.
- ❗ When using PoE as a power supply, use a LAN cable 50 m or shorter.



- 1** Insert the LAN cable into the main unit's LAN port.

Note: Push in the LAN cable until it clicks.



8.2.2.3. Power Supply Wiring Method

There are three different power supplies for this product: AC adaptor, power terminal and PoE.

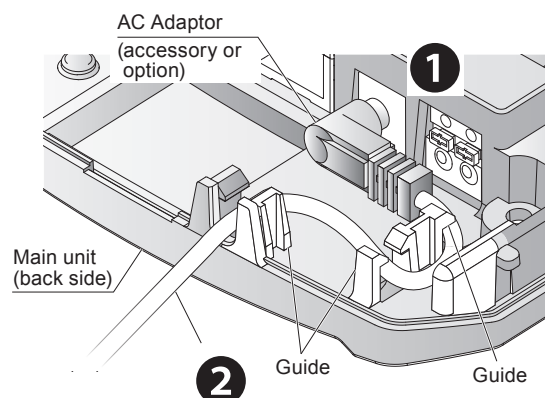
When power is supplied from a PoE device, power is not required from an AC adaptor or power terminal.

When AC Adaptor Power Supply

⚠ CAUTION

- ❗ You can only use the supplied AC Adaptor or ADP-001 (option) in the main unit's DC power jack.

- 1** Insert the plug of the AC Adaptor (accessory or option) into the main unit's DC power jack.
- 2** Pass the AC Adaptor cord along the guides.

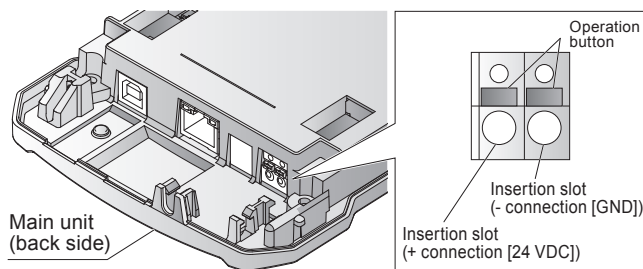


When Using Power Terminal Power Supply

! WARNING

- !** Be careful you insert the lead wires in the correct slots. Failure to follow this instruction could result in short-circuit and fire.
- !** After connecting the lead wires, confirm none of the live parts are exposed. If the live parts are exposed, a short circuit between the lead wires could result in burnout or fire.
- ⊘** Do not use a power supply of 100 W or more. Failure to follow this instruction could result in fire or electric shock.

●Power Terminal Pin Arrangement



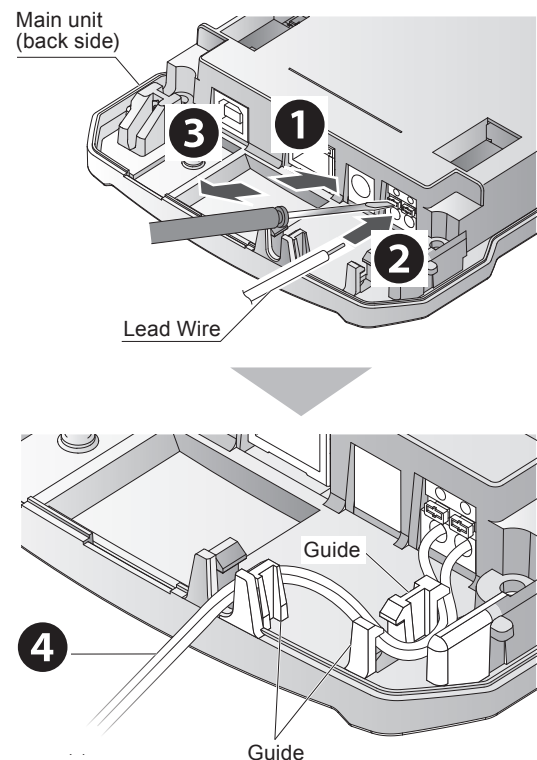
●Recommended lead wire specifications

| | |
|----------------------------|---------------------------------|
| Wire Type | UL1007/UL1430 |
| Wire Gauge (Stranded Wire) | φ 0.51 to 1.29 mm (AWG24 to 16) |

Use wire with temperature rating of 75°C or higher, and copper wire conductors.

●Power Terminal Wiring Method

- 1** Press a flat-blade screwdriver on the push button of the power terminal and push.
- 2** Insert the stripped lead wire into the insertion slot.
Note: Insert the lead wire straight in.
- 3** Pull out the screwdriver from the push button.
Note: Check if the lead wire is locked into place.
- 4** As illustrated, pass the lead wires along the guides.

**Point**

- Use a slotted screwdriver with a blade width of 3 mm or less, and blade thickness of 0.6 mm or less. (Or equivalent)
- Do not press the push button harder than necessary with the screwdriver. Failure to follow this instruction could result in equipment damage.
- Strip 6 to 7 mm of insulation from the lead wire.
- When removing the lead wire, do not simply pull the wire to remove it. (Make sure you first press the push button down with a flat-blade screwdriver to release the lock.)

8.2.3. Setting up the WDR Main Unit

8.2.3.1. Setup Process

Use the WDR Web setup screen for WDR settings.

For the set up process of the Web Setup screen, refer to "7. WDR Setup Process" (☞ page 49).

8.2.3.2. Setup Items

| | Setting | Default Value | References |
|--|---|-----------------|--|
| Network Setup | IP Address Configuration | Set up manually | ☞ "7.4.2.1. Network Setup" (page 58) |
| | IP Address | 192.168.10.1 | |
| | Subnet Mask | 255.255.255.0 | |
| | Default Gateway | 0.0.0.0 | |
| | DNS Server Address | 0.0.0.0 | |
| | Host Name | wdr-pro | |
| Clock Settings | NTP Server Address | 0.0.0.0 | ☞ "7.4.2.2. Clock Settings" (page 59) |
| | Correction Interval (minutes) | 60 | |
| | Timezone | UTC+9 | |
| User Authentication Settings | User Name | patlite | ☞ "7.4.2.3. User Authentication Settings" (page 62) |
| | Password | patlite | |
| Security Settings | Communication Method | HTTP | ☞ "7.4.2.4. Security Settings" (page 63) |
| Socket Communication Settings* ¹ | Setting Port | 10000 | ☞ "7.4.3.1. Socket Communication Settings" (page 64) |
| | WDR-PRO Port 1* ² | 10002 | |
| | WDR-PRO Port 2* ² | 10003 | |
| | WDR Port | 10001 | |
| Database Communication Setting* ¹ | Database Communication Function* ² | Do not use | ☞ "7.4.3.2. Database Communication Setting" (page 66) |
| | Database Address* ² | (None) | |
| | Database Port Number* ² | 3306 | |
| | Database Name* ² | (None) | |
| | User Name* ² | (None) | |
| | Password* ² | (None) | |
| Modbus/TCP Communication Setting* ¹ | Port Number* ² | 502 | ☞ "7.4.3.3. Modbus/TCP Communication Settings" (page 68) |

| Setting | | Default Value | References |
|--|--|-----------------------------|---|
| Cloud Communication Settings* ¹ | Cloud Communication Function* ² | Do not use | ☞ "7.4.3.4. Cloud Communication Settings" (page 69) |
| | Region* ² | Europe 1 | |
| | Region Identifier* ² | eu1 | |
| | Domain* ² | mindsphere.io | |
| | Client ID* ² | (None) | |
| | Client Secret* ² | (None) | |
| | Root Certificate 1* ² | Not set | |
| | Root Certificate 2* ² | Not set | |
| Select Information* ² | Select all | | |
| Receiver Wireless Settings* ³ | ExtendedPanID | 0000 0000 0000 0000 | ☞ "7.4.4.1. Receiver Wireless Settings" (page 72) |
| | Frequency Channel | Select all | |
| | Network Startup Method | Auto Start (Recommended) | |

*1 Set up the Socket Communication Setting, Database Communication Setting, Modbus/TCP Communication Setting, and Cloud Communication Settings only when they are used.

*2 Cannot set on the WDR-L-Z2-PRO-L or WDR-LE-Z2-PRO-L.

*3 Set WDR-L-Z2-PRO-L and WDR-LE-Z2-PRO-L in WDS-WIN01.

8.2.3.3. Required Equipment

- For system configuration when setting up WDR equipment, refer to "5.2.3. Example System Configuration When Setting Up Equipment (using the Setup Kit)" (☞ page 28).
- Use the WDR Web setup screen for the WDR device settings.
- The setup procedure is as follows.

STEP 1 Turn ON the WDR



STEP 2 Set up WDR User Authentication



STEP 3 Log in to the WDR Web Setup Screen



STEP 4 Set the WDR network*, time, and user authentication



STEP 5 Set WDR Wireless Settings



STEP 6 Set WDR Host Communication Settings

When Run Using Socket Communication

When Run Using Database Communication

When Run Using Modbus/TCP Communication

When Run Using Cloud Communication

This manual

"8.2.5. Checking the WDR Status Lamp" (☞ page 105)

! After power is turned on, the WDR takes approximately 50 seconds to complete startup. Check the WDR status lamp to confirm startup is complete.

This manual

"7.1. Set Up the User Name and Password for the WDR's Web Setup Screen" (☞ page 49)

! After setting up user authentication, to log in again start from step 3. If user authentication is not set up, you cannot proceed to the login screen.

This manual

"7.2. Display WDR Web Setup Screen" (☞ page 51)

This manual

"7.4.2. System Settings" (☞ page 58)

*Set the IP address last.

This manual

"7.4.4.1. Receiver Wireless Settings" (☞ page 72)

*Set up also possible with system configuration software WDS-WIN01. For using WDS-WIN01, refer to ☞ "WDS-WIN01 Instruction Manual".

*For WDR-L(E)-Z2-PRO-L, set with system configuration software WDS-WIN01.

This manual

"7.4.3.1. Socket Communication Settings" (☞ page 64)

This manual

"7.4.3.2. Database Communication Setting" (☞ page 66)

This manual

"7.4.3.3. Modbus/TCP Communication Settings" (☞ page 68)

This manual

"7.4.3.4. Cloud Communication Settings" (☞ page 69)

8.2.4. WDR DIP Switch Operations

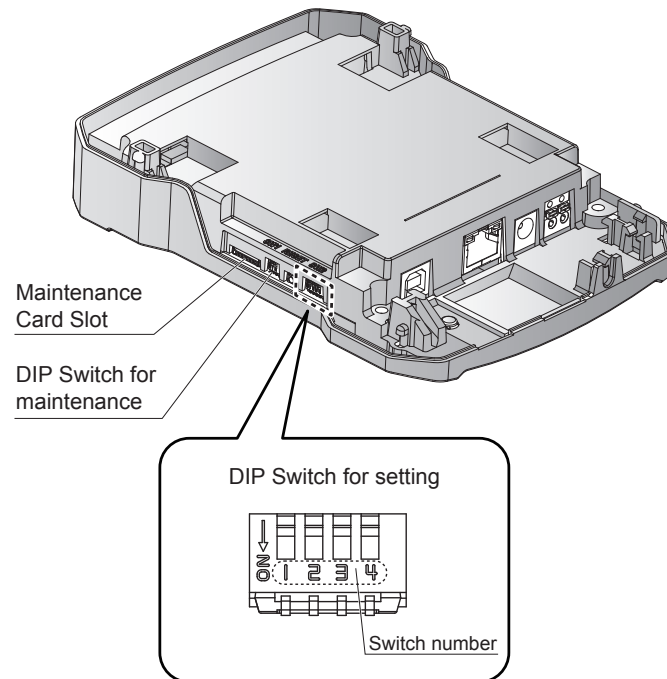
! WARNING

- Before installing and wiring this product, be sure that it is disconnected from the power source. Failure to comply may result in fire, electrocution or product malfunction..

! CAUTION

- Do not use excessive force on this product. Failure to follow this instruction could result in deformed frame and product damage.
- Do not use sharp tipped objects with this product. Operation may become impossible as scratches develop on switches and switch contacts are interfered with.
- The initial setting for the maintenance DIP switch is OFF. Do not set ON.
- Do not insert anything into the maintenance card slot.

The product's DIP switches are located where you detach the direct mount bracket.



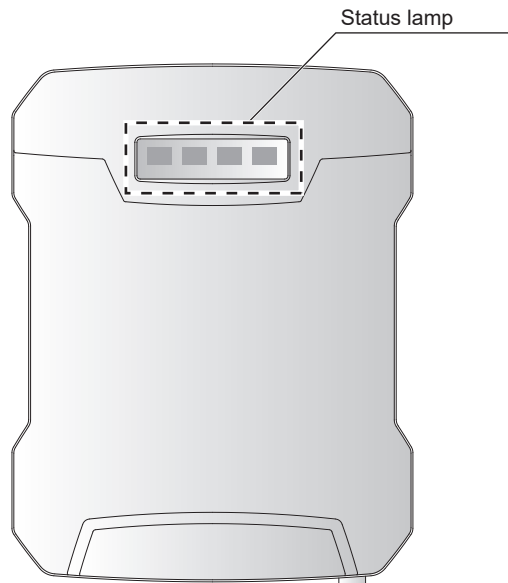
●DIP Switch Settings

| Switch number* | | | | Description |
|----------------|-----|-----|-----|---|
| 1 | 2 | 3 | 4 | |
| OFF | OFF | OFF | OFF | Runs normal operations. |
| ON | OFF | OFF | OFF | Initializes Network Setup and User Settings. ☞ "8.2.6. Initializing the WDR" (page 107) |
| ON | ON | OFF | OFF | User authentication settings (user name and password) are initialized. ☞ "8.2.6. Initializing the WDR" (page 107) |
| ON | ON | ON | ON | Initializes all the settings. ☞ "8.2.6. Initializing the WDR" (page 107) |

*The initial settings are all OFF.

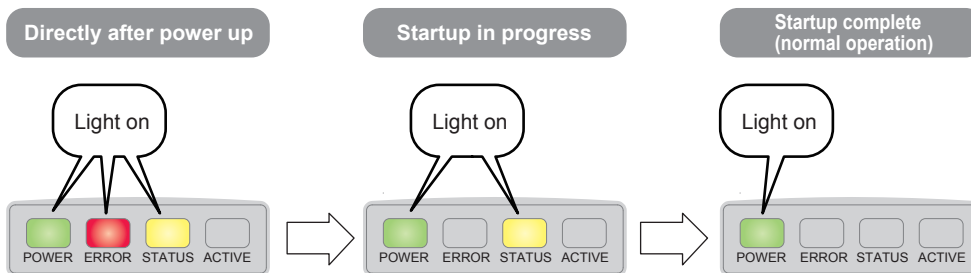
8.2.5. Checking the WDR Status Lamp

Use the lights on the main unit's status lamp to check the operation.

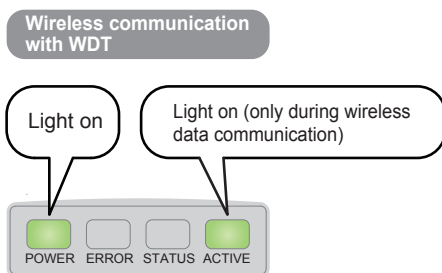


• Normal Status

- From powering-on to completing startup, lights are as follows.

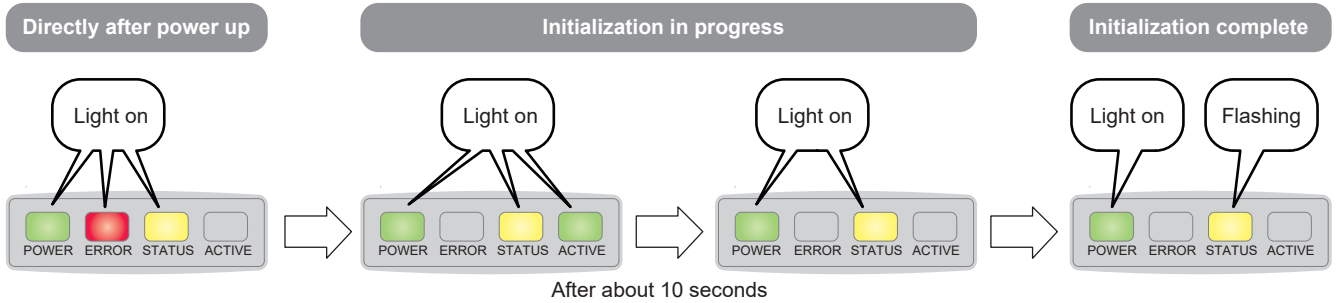


- The ACTIVE lamp lights up when there is WDT wireless data communication.

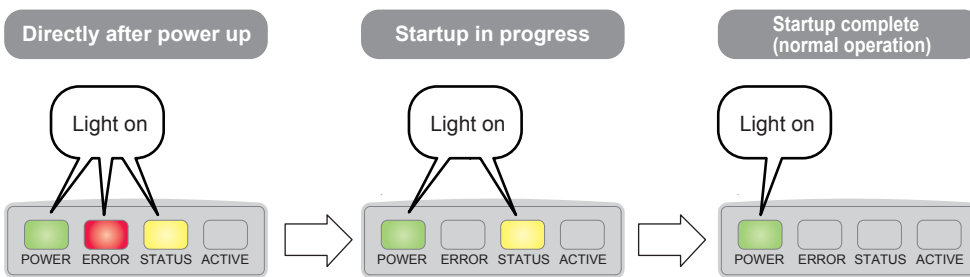


●Initialization Status

- When initializing with the Setting DIP switch, lights up as follows.

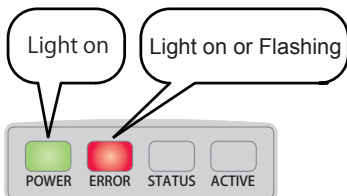


- When initializing with the Web Setup Screen, lights up the same as the normal status.



●Error Status*

- When an error occurs, the ERROR lamp either lights up or flashes.



*When the status lamp indicates an error status, refer to "10.1. Troubleshooting" (page 123).

8.2.6. Initializing the WDR

To initialize the WDR, there are 2 patterns*, either use dip switches or the Web Setup Screen. Different items are initialized with each method.

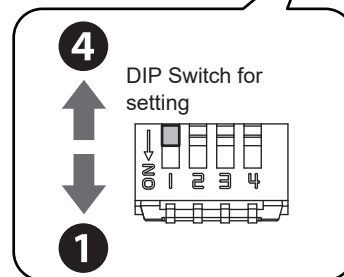
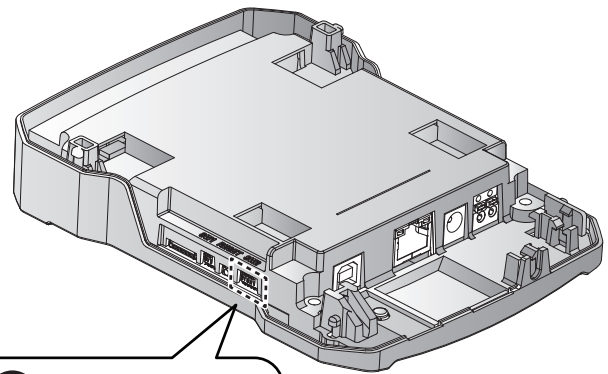
| Initialization Items | | | Initialize from the Web Setup Screen | | | Initialize from DIP Switches | | |
|-----------------------------------|---------------------------------|---------------------------------|--------------------------------------|-----------------------------|-------------------|--|------------------------------|--------------|
| | | | Network Setup | Host Communication Settings | Wireless Settings | Network Setup/User Authentication Settings | User Authentication Settings | All Settings |
| System Settings | Network Setup | IP Address Configuration | • | | | • | | • |
| | | IP Address | • | | | • | | • |
| | | Subnet Mask | • | | | • | | • |
| | | Default Gateway | • | | | • | | • |
| | | DNS Server Address | • | | | • | | • |
| | | Host Name | • | | | • | | • |
| | Clock Settings | NTP Server Address | | | | | | • |
| | | Correction Interval (minutes) | | | | | | • |
| | | Timezone | | | | | | • |
| | User Authentication Settings | User Name | | | | • | • | • |
| Password | | | | | • | • | • | |
| Security Settings | Communication Method | | | | | | • | |
| Host Communication Settings | Socket Communication Settings | Setting Port | | • | | | | • |
| | | WDR-PRO Port 1 | | • | | | | • |
| | | WDR-PRO Port 2 | | • | | | | • |
| | | WDR Port | | • | | | | • |
| | Database Communication Settings | Database Communication Function | | • | | | | • |
| | | Database Address | | • | | | | • |
| | | Database Port Number | | • | | | | • |
| | | Database Name | | • | | | | • |
| | | User Name | | • | | | | • |
| | Password | | • | | | | • | |
| Modbus/TCP Communication Settings | Port Number | | • | | | | • | |

| Initialization Items | | | Initialize from the Web Setup Screen | | | Initialize from DIP Switches | | |
|--------------------------------|------------------------------|---|--------------------------------------|-----------------------------|-------------------|--|------------------------------|--------------|
| | | | Network Setup | Host Communication Settings | Wireless Settings | Network Setup/User Authentication Settings | User Authentication Settings | All Settings |
| Cloud Communication Settings | Cloud Communication Function | | • | | | | • | |
| | Region | | • | | | | • | |
| | Region identifier | | • | | | | • | |
| | Domain | | • | | | | • | |
| | Client ID | | • | | | | • | |
| | Client Secret | | • | | | | • | |
| | Root Certificate 1 | | • | | | | • | |
| | Root Certificate 2 | | • | | | | • | |
| Select Information | | • | | | | • | | |
| Receiver Wireless Settings | ExtendedPanID | | | • | | | • | |
| | Frequency Channel | | | • | | | • | |
| | Network Startup Method | | | • | | | • | |
| Register Transmitter User Name | Transmitter User Name | | | | | | • | |
| Language settings | | | | | | | | |

*When any pattern is initialized, the Signal Tower information, wireless quality information, counter information, and various log data are also initialized.

Initialize with Setting DIP Switch

- 1** Set ON the WDR Setting DIP switch.
 - When initializing the Network Setup and User Authentication Settings, set [1] to ON.
 - When initializing the User Authentication Settings, set [1], and [2] to ON.
 - When initializing all the settings, set [1], [2], [3], and [4] to ON.
- 2** Power up the WDR.
 - Check the WDR status lamp to check the initialization status. For information, refer to "8.2.5. Checking the WDR Status Lamp" (☞ page 105).
- 3** Power down the WDR.
- 4** Set OFF WDR Setting DIP switches [1], [2], [3], and [4].



Initialize from the Web Setup Screen



For information, refer to "7.4.5.3. Initialize" (☞ page 83).

8.2.7. Rebooting WDR

To reboot the WDR, there are two patterns, either use the reset switch or the Web Setup Screen.


Using Reset Switch

CAUTION

-  Do not use excessive force on this product. Failure to follow this instruction could result in deformed frame and product damage.
-  Do not use sharp tipped objects with this product. Operation may become impossible as scratches develop on switches and switch contacts are interfered with.

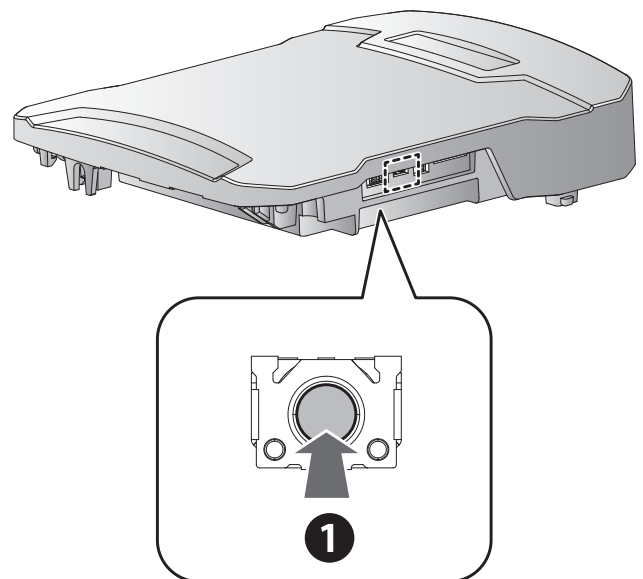
1

While the WDR status indicates startup complete, press the reset switch.

- Check the WDR status lamp to check the reboot status. For information, refer to "8.2.5. Checking the WDR Status Lamp" ( page 105).

2

After about 50 seconds, the [STATUS] lamp turns off and reboot is complete.



Reboot from the Web Setup Screen

For information, refer to "7.4.5.4. Reboot" ( page 85).

9. Function Details

9.1. WDT Functions

9.1.1. Wireless Data Transmission Function

9.1.1.1. Transmit Signal Tower Information

- Function whereby the WDT transmits the status of the Signal Tower control line wirelessly to the WDR. For the timing of transmissions, you can select from the following two types of settings.

| Setting* | Description |
|------------------------|---|
| Immediate Transmission | Send immediately after the status of the signal tower control line changes. |
| Request Transmission | Send only after receiving a request from the host PC. |

*Select the setting in WDS-WIN01 or the WDR Web Setup Screen.

*The initial setting is [Immediate Transmission].

- Signal tower information transmitted by the WDT is as follows.

| Item | Description | | | | | |
|-------------|-------------------------------|-------|-------|------|-------|--------------------------|
| Description | Signal display | | | | | Buzzer* |
| | Red | Amber | Green | Blue | White | |
| Status | Light on, Flashing, Light off | | | | | Buzzer on, Buzzer off |

*Only when extended format is selected.

- Relationship between the units and wiring

Regardless of the number and whether each unit (LED Unit, Buzzer Unit) connected to the WDT Signal Tower exists, the Signal Tower transmits information input to the signal tower control line.

9.1.1.2. Select Format of Signal Tower Information

Function for selecting the format of signal tower information transmitted by the WDT. You can select the following two types of formats.

| Setting* | Description |
|-----------------|--|
| Extended Format | Can set up six types of signal tower control lines (red, amber, green, blue, white, and buzzer). |
| Standard Format | <ul style="list-style-type: none"> Format compatible with WDT-5E-Z2 and WDT-6M-Z2. From five types (red, amber, green, blue, and white), can set up four signal tower control lines. |

*Select using the Setting DIP switches. For information, refer to "8.1.4. WDT DIP Switch Operations" ( page 93).

*The initial setting is [Standard Format].

9.1.1.3. About Periodic Transmissions

- WDT can be set up to automatically transmit information at defined intervals. When Periodic Transmission is enabled, information is transmitted at about 10 second intervals.
- If the number of information transmissions is as low as a few times per hour, the communication is more stable if you set [Enable]. With this setting, you can select from the following 2 types.

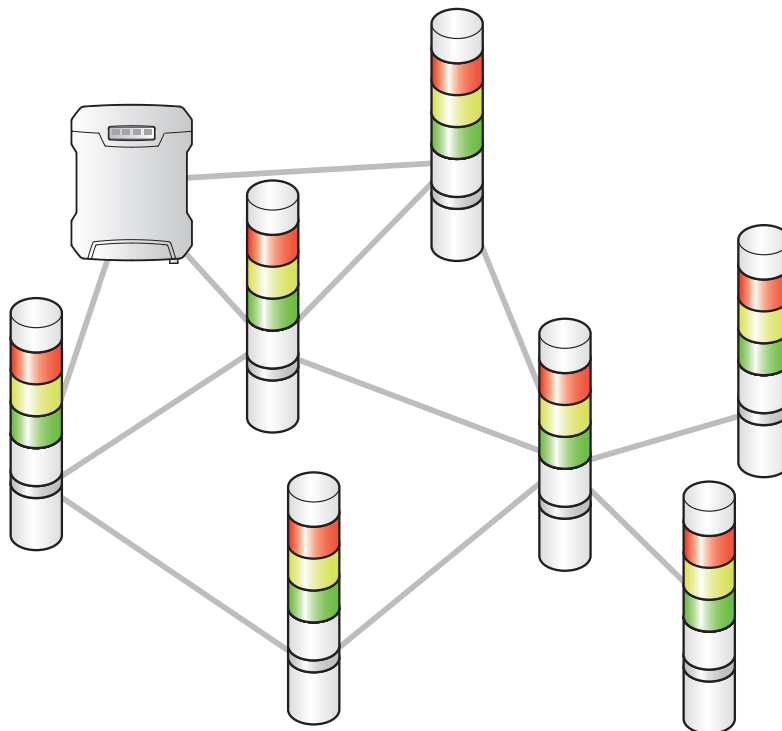
| Setting* | Description |
|----------|---|
| None | Periodic transmissions are not performed. |
| Yes | Send transmissions at regular intervals. |

*Select using the Setting DIP switches. For information, refer to "8.1.4. WDT DIP Switch Operations" (☞ page 93).

*The initial setting is [Disable].

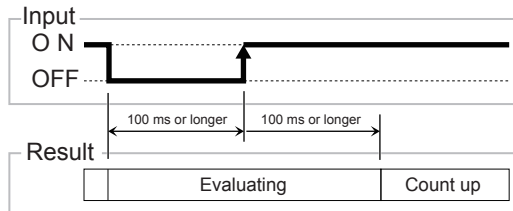
9.1.1.4. Mesh Network Transmission

Function that interconnects the WDT and transmits information to the WDR over the optimum communication route. A dense mesh status increases communication redundancy. The following is an illustration showing the mesh status.



9.1.1.5. Simple Counter Function

- WDT function for saving the accumulated value (counter value) of pulse inputs (incremented 1 at a time) on a Signal Tower control line.
- At startup the counter value is 0 (initial value).
- The value range of the counter is 0 to 4,294,967,295.
- Pulse inputs are determined using the following criteria.



Point

- When counting up exceeds the upper limit, the counter value returns to 1.
- When the power is shut down, the counter value is cleared to 0.
- In WDS-WIN01, you can reset the counter value to 0 (initial value).
- Regardless of changes in states, the Signal Tower information in the counter settings is not transmitted. The Signal Tower information is treated as if the light is off and buzzer is off.

*Select the Signal Tower control line for the simple counter in WDS-WIN01 or with DIP switches on the WDT main unit. For information, refer to "8.1.4. WDT DIP Switch Operations" (☞ page 93)

*When set with the WDT Setting DIP switch, it is fixed to blue. When set in WDS-WIN01 or WDR Web Setup Screen, you can select from red, yellow, green, blue, white, and buzzer.

*The default setting for the simple counter is [Do not use].

9.1.2. Signal Tower Input Functions

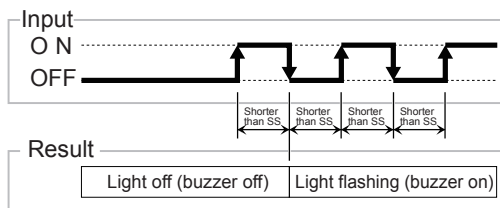
9.1.2.1. Determine Signal Tower Input

- There are two types for determining Signal Tower control line inputs, [Normal] and [Flashing]. Select in WDS-WIN01 or the WDR Web Setup Screen. If there is no flashing state to get, use [Normal].

| Setting* ¹ | Determination | Description |
|--|---------------|--|
| Normal | Light on | When the Signal Tower control line input status changes OFF→ON, the result is "light on" and the information is transmitted. |
| | Light off | When the Signal Tower control line input status changes ON→OFF, the result is "light off" and the information is transmitted. |
| Flashing Determination* ² * ³ | Flashing | When the Signal Tower control line input status repeatedly alternates ON→OFF→ON→OFF..., the result is "flashing" and the information is transmitted. Select from the following 3 determination speeds. • Flashing (short) • Flashing (medium) • Flashing (long) |
| | Light on | When the Signal Tower control line input status changes OFF→ON, the result is "light on" and the information is transmitted. |
| | Light off | When the Signal Tower control line input status changes ON→OFF, the result is "light off" and the information is transmitted. |

*1 The initial setting is [Flashing (medium)].

*2 Flashing is determined when there are two status changes within a defined period. This period is called "SS seconds". You can select "SS seconds" from three different time periods.



- Flashing (short): SS seconds = 0.7. seconds
- Flashing (medium): SS seconds = 1.5. seconds
- Flashing (long): SS seconds = 2.5. seconds

*3 There is not [Flashing] status in the buzzer signal. When determined as flashing, the buzzer on information is transmitted.

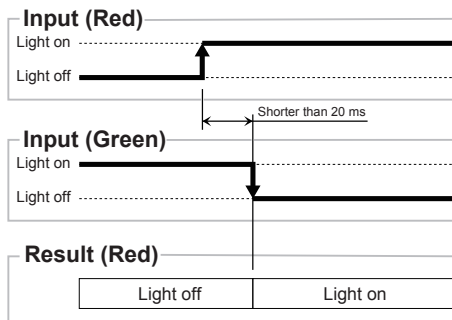
- The status and determination operations are as follows. Information in brackets "()" represent buzzer operation.

| Setting | Determination | Description | |
|---------|---------------|----------------------|------------------|
| | | Change in state | Operation result |
| Normal | Light on | Light off → light on | |
| | Light off | Light on → light off | |

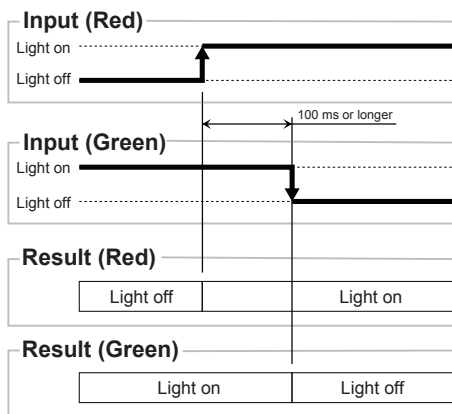
| Setting | Determination | Description | |
|------------------------|---------------|----------------------|--|
| | | Change in state | Operation result |
| Flashing Determination | Flashing | Light off → flashing | <p>Input O N OFF</p> <p>Shorter than SS</p> <p>Result Light off (buzzer off) Light flashing (buzzer on)</p> |
| | | Light on → flashing | <p>Input O N OFF</p> <p>Shorter than SS</p> <p>Result Light on (buzzer on) Light flashing (buzzer on)</p> |
| | Light on | Light off → light on | <p>Input O N OFF</p> <p>SS+100 ms or longer</p> <p>Result Light off (buzzer off) Light on (buzzer on)</p> |
| | | Flashing → Light on | <p>Input O N OFF</p> <p>Shorter than SS</p> <p>SS+100 ms or longer</p> <p>Result Light flashing (buzzer on) Light on (buzzer on)</p> |
| | Light off | Light on → light off | <p>Input O N OFF</p> <p>SS+100 ms or longer</p> <p>Result Light on (buzzer on) Light off (buzzer off)</p> |
| | | Flashing → light off | <p>Input O N OFF</p> <p>Shorter than SS</p> <p>SS+100 ms or longer</p> <p>Result Light flashing (buzzer on) Light off (buzzer off)</p> |

⚠ CAUTION

- ❗ Input a signal based on the above timing for the determination operation. Determination may not be possible using any other timing than the above determination operation.
- ❗ When using normal determination and you need to change the input state of multiple signal tower control lines at the same time, the interval between these state changes need to be within 20 ms.



- ❗ When using normal determination and you do not need to change the input state of multiple signal tower control lines at the same time, the interval between these state changes need to be 100 ms or longer.



9.2. WDR Functions

9.2.1. Host Communication Function

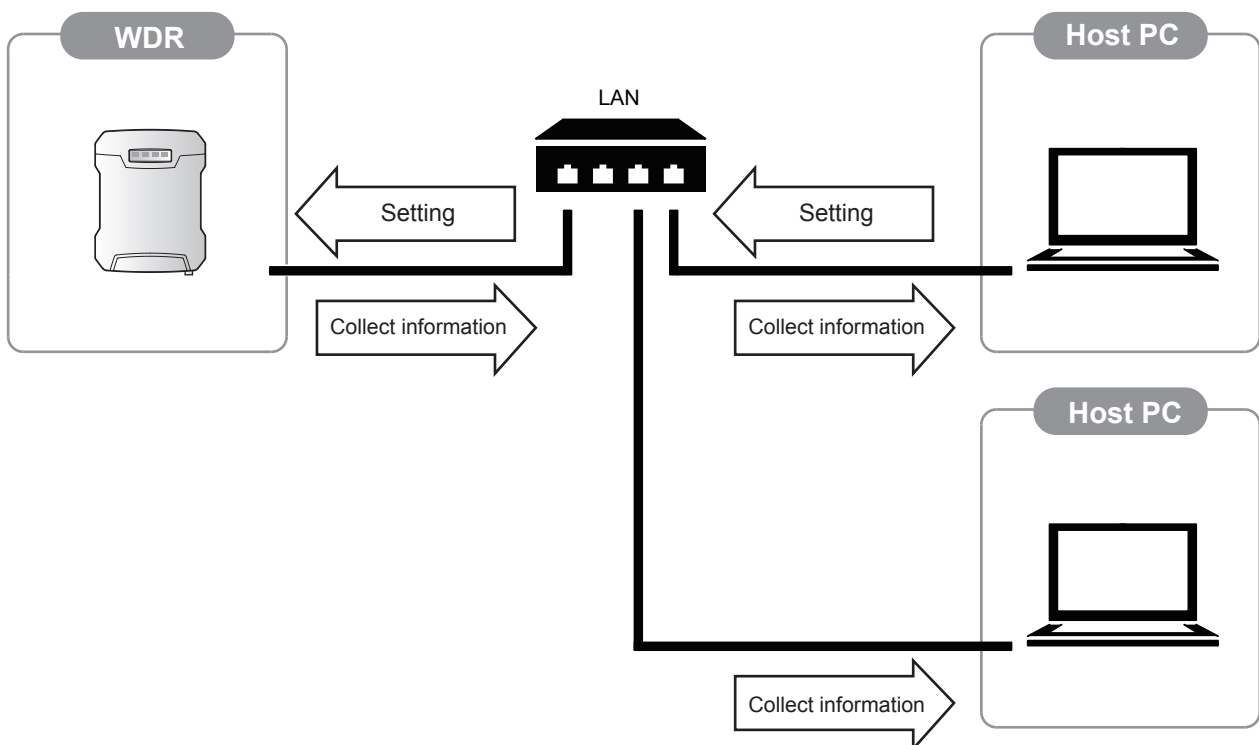
9.2.1.1. Socket Communication

- Function for communicating with applications on the host via the TCP socket. WDR operates as a TCP server and listens for connection requests from host applications.
- The following four ports can be set for socket communication. For setup, refer to "7.4.3.1. Socket Communication Settings" (☞ page 64).
- When using WDS-WIN01 with CSV File, use the WDR port. When the WDR port is in use and you only need to use WDS-WIN01 for setup, use the Setting Port.
- For information on the WD PRO port, refer to ☞ "Application Notes for WD PRO Receiver".

| Item | Description |
|----------------|--|
| Setting Port | Settings port on the WDR and WDT. Receives only setting-related commands from the host. |
| WDR-PRO Port 1 | <ul style="list-style-type: none"> • Port for collecting WDT information. Cannot set WDR or WDT. • You can independently use port 1 and port 2 at the same time. |
| WDR-PRO Port 2 | |
| WDR Port | Port for collecting WDT information, and for setting WDR and WDT. |

⚠ CAUTION

⚠ Cannot use WDR-PRO Port 1 and 2 on the WDR-L-Z2-PRO-L or WDR-LE-Z2-PRO-L.



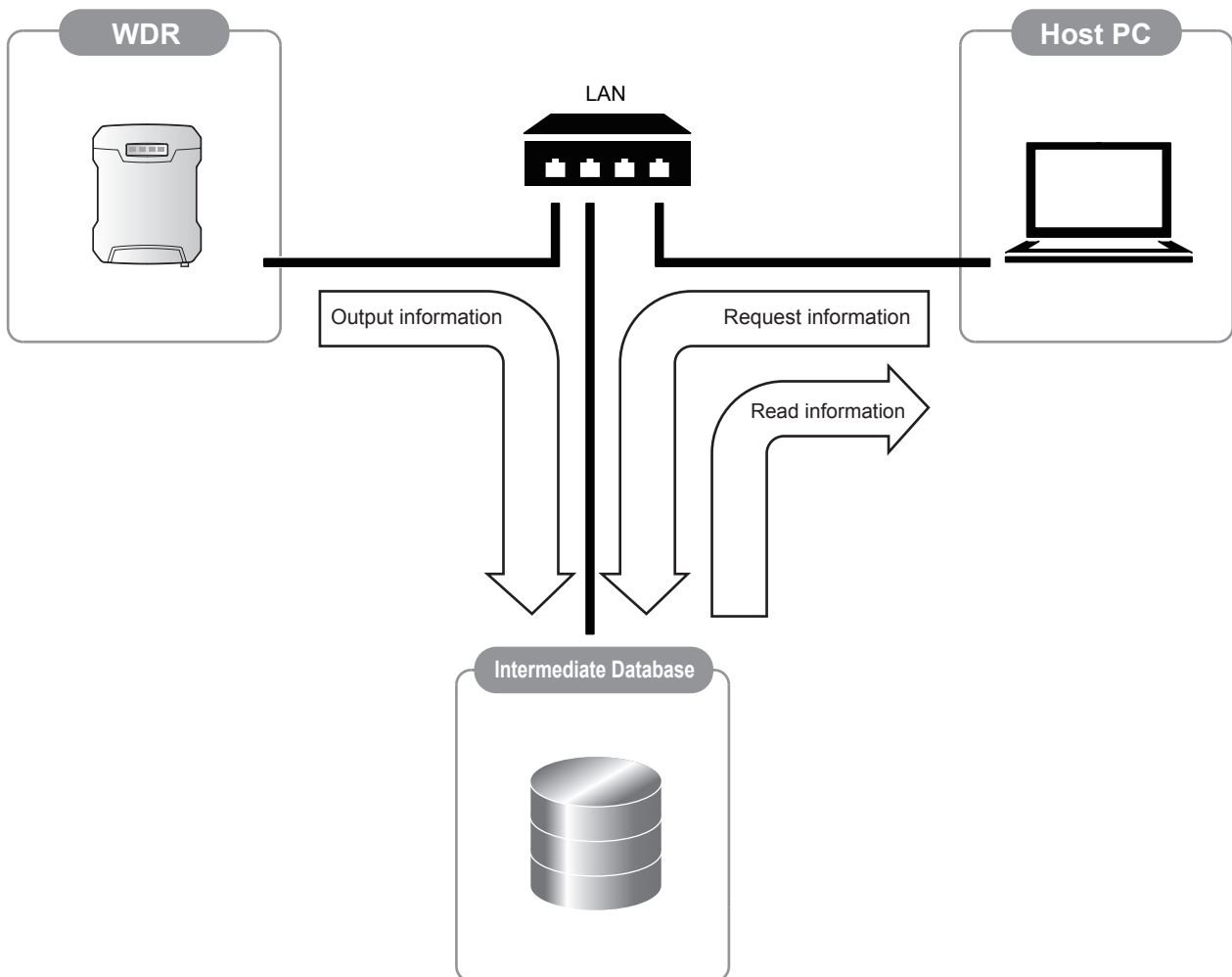
9.2.1.2. Database Communication

As a MySQL client, function for connecting to the database and outputting data. Update to the database occurs immediately after changing the Signal Tower information. For setup, refer to "7.4.3.2. Database Communication Setting" (page 66).

| | |
|---------------------|---|
| Supported Databases | MySQL 5.6 or later |
| SQL Command | <ul style="list-style-type: none"> • INSERT (record insertion) • UPDATE (simple counter only) |

! CAUTION

⚠ Cannot use this function on the WDR-L-Z2-PRO-L or WDR-LE-Z2-PRO-L.

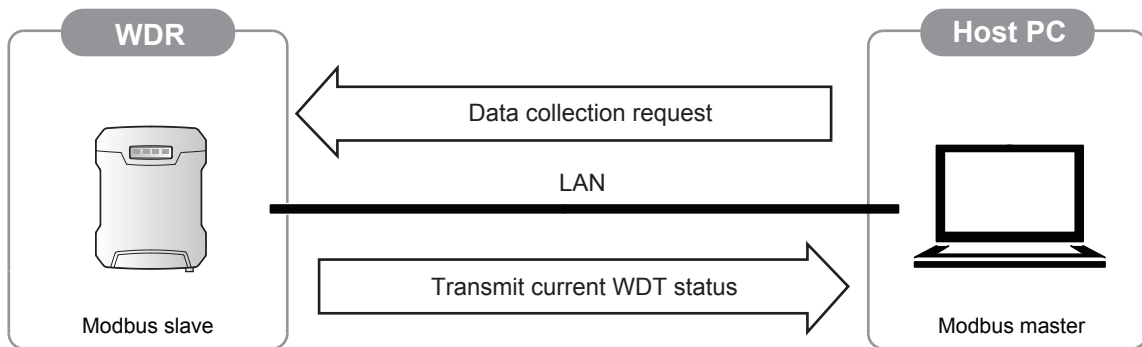


9.2.1.3. Modbus/TCP Communication

Operating as a Modbus slave, transmits the current WDT status in response to data requests from the Modbus master. For setup, refer to "7.4.3.3. Modbus/TCP Communication Settings" (☞ page 68).

! CAUTION

- ⚠ Cannot use this function on the WDR-L-Z2-PRO-L or WDR-LE-Z2-PRO-L.
- ⚠ Cannot get the WDT status change history.



Point

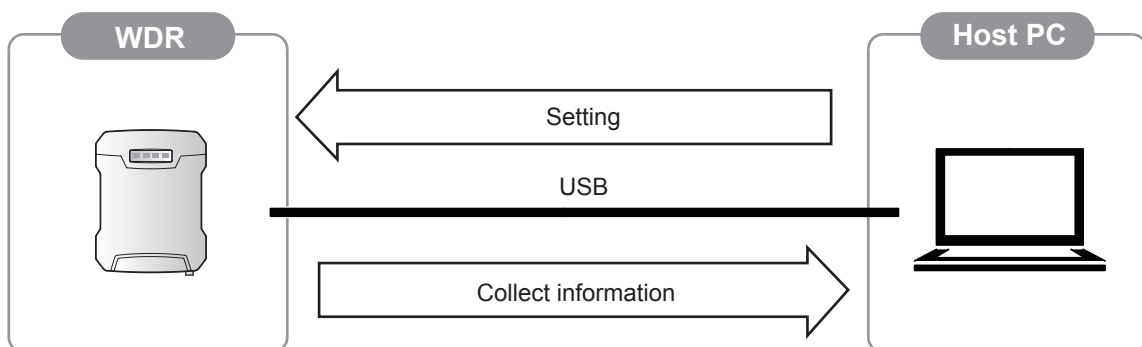
- Only transmitters with registered Transmitter User Names can get data. For information, refer to "7.4.4.5. Register Transmitter User Name" (☞ page 79).

9.2.1.4. USB Communication

Data collected from a transmitter is output to the host via USB communication.

! CAUTION

- ⚠ When connected via USB, you cannot access the Web browser screen.
- ⊘ During LAN communication, do not connect to USB.



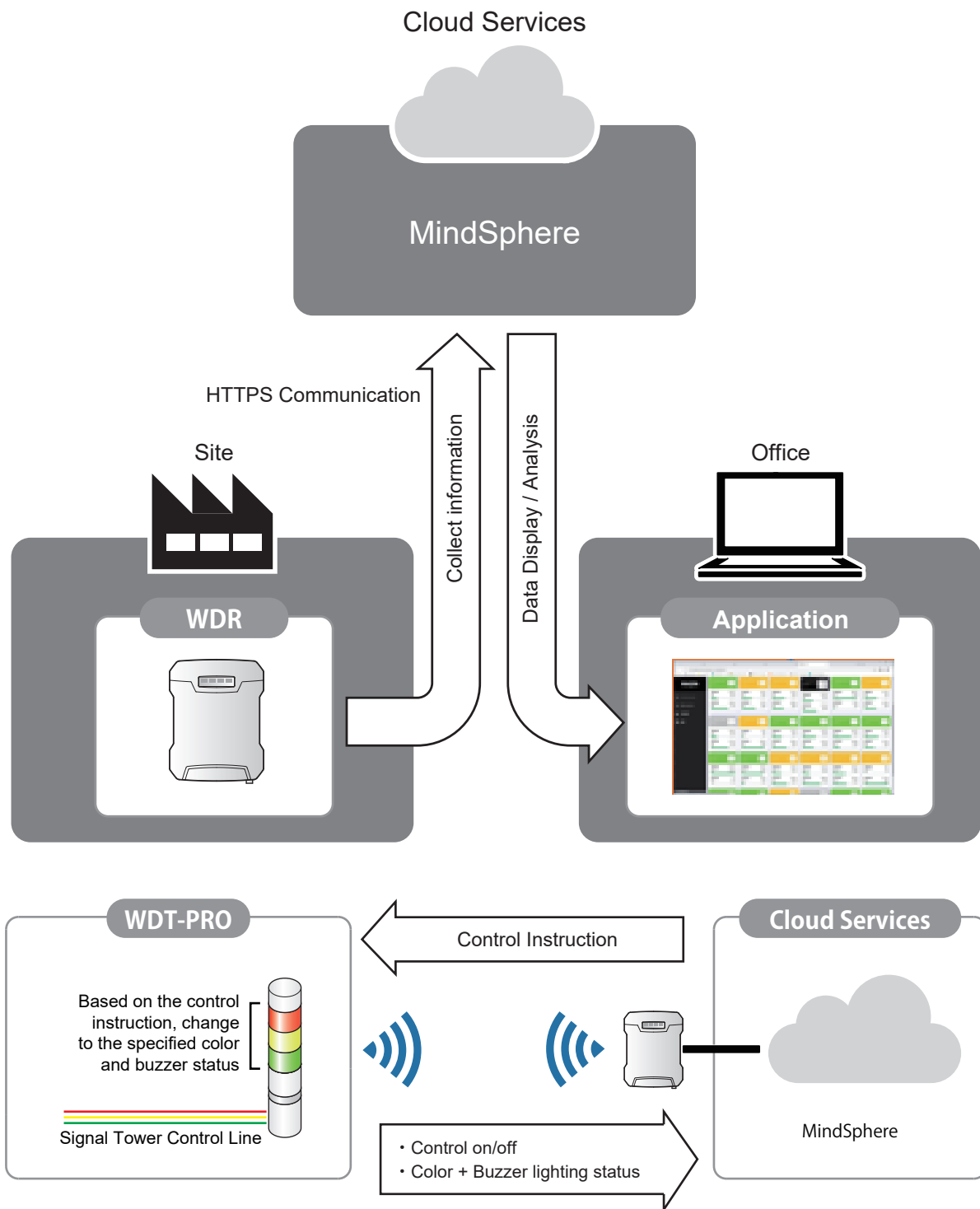
9.2.1.5. Cloud Communication

You can select MindSphere as a cloud service.


By linking with MindSphere, you can upload the WDT status and partially control WDT. For the set up process, refer to "7.4.3.4. Cloud Communication Settings" (page 69).

⚠ CAUTION






⚠ You cannot use this function on WDR-L-Z2-PRO-L or WDR-LE-Z2-PRO-L.



9.2.2. Self Diagnosis Function

- This function evaluates the communication quality of the WDT on the WD system. You can either diagnose the current wireless environment, or diagnose the wireless environment continuously for a specified period. For setup and operation, refer to "7.4.4.3. Wireless Connection Diagnosis" ( page 76).

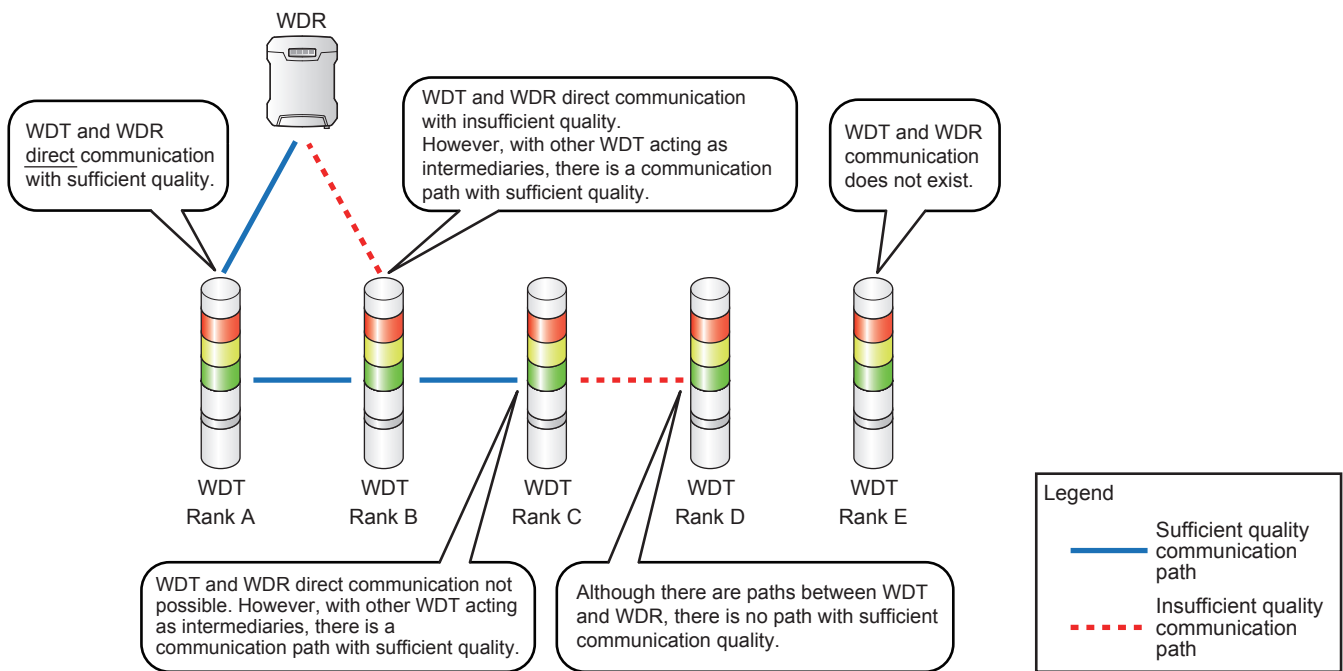
CAUTION

-  The evaluation result from this function is only a prediction of results and does not guarantee the transmitter's communication quality.
-  Since evaluation results are largely affected by the installation environment, evaluation results may differ each time it is run.
-  Evaluation results are predicted based on changes in radio field intensity, which is affected by communication distance and obstacles. Therefore, evaluation results do not include the effects of noise that could completely block radio waves.
-  During the diagnosis period, a large amount of data is transmitted and received via wireless communication, which could significantly delay Signal tower information, or be lost altogether.
-  If the WDT and WDR are close together (within tens of centimeters), a diagnosis of rank D may occur. For an accurate diagnosis, use with a separation of about 1 m.

- For each WDT, diagnosis results are ranked in five levels: A, B, C, D, and E.

| Rank | Description |
|------|--|
| A | WDT communicates directly with the WDR with sufficient quality. There are no issues with the installation environment. |
| B | Although the WDT does not communicate with sufficient quality for direct communication with the WDR, the WDT can communicate with sufficient quality using communication paths (communication hopping) using other WDT. There are no issues with the installation environment. |
| C | Although the WDT does not communicate directly with the WDR, the WDT can communicate with sufficient quality using communication paths (communication hopping) using other WDT. As long as the other WDT acting as intermediaries continue to operate, there are no issues with the installation environment. |
| D | The quality of the communication path between WDT and WDR is insufficient. Although communication is currently possible, it is recommended to adjust the installation environment as communication can be lost at any time. |
| E* | WDT cannot communicate with the WDR. The installation environment must be changed. |

*Rank E will not appear for WDT that have not had their transmitter user name registered on the WDR Web Setup Screen.



- Changes to the installation environment are recommended for diagnosis results of rank D or E. Communication quality is greatly affected by conditions in the installation environment, try the following .

| No. | Method | Effect |
|-----|---|--|
| 1 | Adjust the position, height, and orientation of WDR and WDT. | Nearby objects interfere with and reflect radio waves from wireless communication. Communication may improve by moving, even as little as 1 m, the position or height of WDR and WDT. |
| 2 | To reduce their impact on wireless communication, move metal objects out of the way. | If there is a large metal object in the installation environment, there may be spots where radio waves cannot reach. Communication may improve by moving metal objects out of the way. |
| 3 | Add WDT to the WD wireless network to act as a repeater and enable communication hopping. | Adding a WDT to the WD wireless network increases the choice of communication paths. Even adding a WDT near the WDR could improve communication quality of the entire WD wireless network. |

10. Troubleshooting

10.1. Troubleshooting

10.1.1. WDT (Transmitter)

| Issue | Checklist |
|--|--|
| Indicator does not light up. | Check if the unit is installed correctly. |
| | Check if wiring for the power supply is correct. |
| The indicator is flashing red. (not pulsing) | Turn off the power on the WDT and turn on again. If it continues to flash red, it may be an indication that the settings are corrupted. Initialize the product and set up again. |
| The indicator does not change from a red light to a red pulse. | Wireless connection with WDR is in progress. <ul style="list-style-type: none"> • Depending on the radio wave environment, it may take some time to complete the connection. Check the indicator again after about 5 minutes. • Check if the WDR is working properly. • The ExtendedPanID in the WDR must match the wireless channel setting for a connection. Make sure the settings are correct. • Check for any sources of noise (such as microwave ovens) in the surrounding area that could impede wireless communication. |
| The indicator flashes blue. | When the host sends a call command to the WDT, the indicator flashes blue for a short period of time. |
| The indicator flashes alternating between green and red. | Starting up in initialization mode. If operations are normal, turn off DIP switch 1 on the product. |
| The host cannot determine if the WDT is available. | If a wireless connection cannot be completed, the host cannot check if the WDT is available. Check if the indicator on the target WDT is pulsing, to indicate connection is complete. |
| Cannot get the buzzer input information. | When Signal Tower information format is [Standard Format], cannot get buzzer input information. Set [Extended Format]. |
| Counter value is not increasing. | Use Setting DIP switches or WDS-WIN01 to select the Signal Tower control line to use with the simple counter. |

10.1.2. WDR (Receiver)

| Issue | Checklist |
|--|---|
| Login screen does not display. | Check if the LAN cable is connected properly. |
| | Check if the IP address settings on the product are incorrect. |
| | Check if the IP address settings on the PC are incorrect. |
| | For IP address settings, refer to "7.4.2.1. Network Setup" (☞ page 58). |
| Login screen does not display correctly. | Update the browser information. |
| | In the browser settings, enable Javascript and automatic page loading. |
| The POWER status lamp does not turn on. | When using the DC power jack, connect only the supplied AC Adaptor. |
| | When using a screwless terminal block, check the polarity (+/-) of the power lines and turn on the power supply. |
| | When power is supplied from an USB cable, do not use a hub. Normal operation may not be possible as the current may be insufficient. |
| | When supplying power over a LAN cable (PoE), connect the product to the PoE power supply. |
| The ERROR status lamp is red. | Turn off the power on the WDR and turn on again. If it continues to display red, it may be an indication that the WDR may have failed. Please contact your local sales representative. |
| The STATUS lamp is yellow. | The lamp is yellow while WDR is starting up, or in initialization mode and starting up. If it is starting up, wait awhile for startup to complete and the lamp will turn off. When starting up from initialization mode, set OFF all Setting DIP switches then turn the power back on. |
| The STATUS lamp is flashing yellow. | After the WDR is initialized, the lamp flashes yellow. Set all Setting DIP switches OFF before turning the power back on. |
| The ACTIVE status lamp turns green irregularly. | While the WDR uses wireless communication, the lamp turns green at irregular intervals. |
| Connected to the host via USB, but cannot communicate. | After selecting the correct port, connect the COM port. Operation when connecting via a hub has not been confirmed. Use this product by connecting directly to the USB port. |
| Connected to the host via LAN, but cannot communicate. | The default is 192.168.10.1. If you changed the IP address, set that IP address and connect. If you do not know the IP address anymore, initialize the LAN communication settings and check the communication again. |
| There is no notice on the host that the WDT has powered down. | WDT disconnect notices from the 30th unit and beyond are not output. |
| Wireless Connection Diagnosis result is showing "Error". | Run Wireless Connection Diagnosis again. If "Error" continues to display, restart the WDR unit and run Wireless Connection Diagnosis again. If "Error" still continues to display, it may be an indication that the WDR has failed. Please contact your local sales representative. |
| Popup does not display. | Make sure your browser settings are not blocking pop-ups. |
| While using a cloud connection (MindSphere), the MindSphere communication status on the cloud connection screen shows a communication error. | <p>Normal communication may not be possible due to an error in the settings or an issue with the connection to MindSphere.</p> <ul style="list-style-type: none"> • Confirm the settings for Region Information, Client ID, Client Secret, and Root Certificate 1 and 2, and also confirm the certificate has not expired. • Confirm the LAN cable is connected properly. |

11. Specifications

11.1. WDT (Transmitter)

| Item | Description | | |
|-------------------------------|---|---|---|
| | WDT-4LR-Z2 | WDT-5LR-Z2 | WDT-6LR-Z2 |
| Connected Model | LR4 Series Signal Tower body unit top attachment | LR5 Series Signal Tower body unit top attachment | LR6 Series Signal Tower body unit top attachment |
| Rated Voltage* | 24 VDC | | |
| Operating Voltage Range* | 19.0 to 26.4 VDC | | |
| Rated Current Consumption* | Maximum 55 mA | | |
| Operating Ambient Temperature | -10 °C to +50 °C | | |
| Operating Ambient Humidity | 85% RH or less, no condensation | | |
| Storage Ambient Temperature | -20 °C to +60 °C | | |
| Storage Ambient Humidity | 85% RH or less, no condensation | | |
| Mounting Location | Indoors | | |
| Mounting Method | Upright | | |
| Protection Rating | IP65 (IEC 60529), NEMA TYPE 4X,13 | | |
| Mass | 70 g | 74 g | 85 g |
| Telecommunication Protocols | IEEE 802.15.4. (wireless communication) | | |
| Communication Frequency | 2405 MHz to 2480 MHz (16 channels) | | |
| Communication Distance | Approximately 30 m from source (reference value) | | |
| External Contact Input | Control Signal Input | | |
| Number of Contacts | 6 contacts (red, amber, green, blue, white, and buzzer) | | |
| Input Reaction Time | 100 ms or longer | | |
| Display Unit | Indicator for monitoring the status | | |
| Operation Unit | DIP Switch for setting | | |

* These values are specifications for the transmitter unit. Specifications may change without prior notice.

11.2. WDR (Receiver)

11.2.1. General Specifications

| Item | | Description | |
|-------------------------------------|---------------------------------------|---|-------------------|
| | | WDR-L-Z2-PRO(-L) | WDR-LE-Z2-PRO(-L) |
| Rated Voltage | Power Terminal DC power jack | 24 VDC | |
| | PoE power supply | 48 VDC | |
| | USB bus power | 5 VDC | |
| | AC Adaptor accessory | 100 - 240 VAC 50/60Hz | - |
| Operating Voltage Range | Power Terminal DC power jack | 21.6. to 26.4 VDC | |
| | PoE power supply | 43 to 57 VDC | |
| | USB bus power | 4.75 to 5.25 VDC | |
| | AC Adaptor accessory | 90 - 264 VAC | - |
| Rated Current Consumption | Standard | 100 mA (at 24 VDC) 70 mA (PoE: at 48 VDC) 300 mA (USB: at 5 VDC) | |
| | Maximum | 150 mA (at 24 VDC) 100 mA (PoE: at 48 VDC) 500 mA (USB: at 5 VDC) | |
| Rated Power Consumption | Standard | 3.0 W (AC Adaptor accessory: at 100 VAC) | - |
| | Maximum | 4.5 W (AC Adaptor accessory: at 100 VAC) | - |
| Power Supply Input | Power Terminal | Screwless Terminal Block | |
| | DC Power Jack | AC Adaptor DC power jack | |
| | USB | USB Type B (USB bus power compatible) | |
| | LAN (PoE) | LAN Connector (IEEE802.3af Class0 compliant) | |
| Ambient Operating Temperature | Main Unit | -10°C to 50°C | |
| | AC Adaptor accessory | 0°C to 40°C | - |
| Ambient Operating Humidity | | 85% RH or less, no condensation, no freezing | |
| Storage Ambient Temperature | Main Unit | -20°C to 60°C | |
| | AC Adaptor accessory | -10°C to 70°C | - |
| Storage Ambient Humidity | | 85% RH or less, no condensation, no freezing | |
| Mounting Location / Mounting Method | | Indoor/Horizontal installation Wall mounting Ceiling mounting | |
| Protection Rating | | IP20 | |
| Mass | | 300 g ± 10% (except AC Adaptor accessory) | |
| Status lamp | | Status display LED x 4 | |
| Operation | | Setting DIP switch, Maintenance DIP switch, Reset switch | |
| Accessory | Cable tie x 1, cable fixing plate x 1 | | |
| | AC Adaptor x 1 | | - |

11.2.2. Communication Specifications

| Item | | Description |
|-----------------------------------|----------------------------------|---|
| | | WDR-L(E)-Z2-PRO(-L) |
| Wireless Connection Specification | Transmitter Options | WDT-4LR-Z2, WDT-5LR-Z2, WDT-6LR-Z2, WDT-6LR-Z2-PRO, WDT-5E-Z2 WDT-6M-Z2 (mixed use possible) |
| | Communication Standard | IEEE 802.15.4. compliant |
| | Communication Frequency | 2405 MHz to 2480 MHz (16 channels) |
| | Transmission Method | Direct Sequence Spread Spectrum (DSSS) |
| | Wireless Communication method | Compliant with ZigBee standard |
| | Number of connected transmitters | Maximum 30 units* ¹ |
| | Transmission Output | Maximum 3 mW (at the antenna feed) |
| | Communication Distance | Approximately 30 m from source (reference value)* ² |
| Interface Specifications | Network Communication Format | Ethernet IEEE802.3. compliant 10BASE-T/100BASE-TX/1000BASE-T (Auto-MDI/MDIX compatible) |
| | USB connection | Type-B connector, USB 1.1/USB 2.0 full speed compatible |
| References | | <p>*1 Because of the characteristics of radio waves, the actual number may vary depending on the installation location, communication environment, and communication frequency.</p> <p>*2 Because of the characteristics of radio waves, the actual number may vary depending on the installation location and communication environment.</p> |

■ For customers in China

微功率短距离无线电发射设备 (F 类设备)

- 不得擅自改变使用场景或使用条件、扩大发射频率范围、加大发射功率 (包括额外加装射频功率放大器), 不得擅自更改发射天线;
- 不得对其他合法的无线电台 (站) 产生有害干扰, 也不得提出免受有害干扰保护;
- 应当承受辐射射频能量的工业、科学及医疗 (ISM) 应用设备的干扰或其他合法的无线电台 (站) 干扰;
- 如对其他合法的无线电台 (站) 产生有害干扰时, 应立即停止使用, 并采取措施消除干扰后方可继续使用;
- 在航空器内和依据法律法规、国家有关规定、标准划设的射电天文台、气象雷达站、卫星地球站 (含测控、测距、接收、导航站) 等军民用无线电台 (站)、机场等的电磁环境保护区域内使用微功率设备, 应当遵守电磁环境保护及相关行业主管部门的规定;
- 使用微功率短距离无线电发射设备应当符合国家无线电管理有关规定

11.3. Supported Countries and Regions

11.3.1. WDT (Transmitter)

| Model | Supported Countries and Regions |
|--|--|
| WDT-4LR-Z2 WDT-5LR-Z2 WDT-6LR-Z2 | Japan, USA, Europe, Korea, Taiwan, Thailand, China, Mexico, Philippines, Vietnam, Canada, Malaysia, Singapore |

* Do not use outside of supported countries and regions. Failure to do so may come into conflict with the law.

11.3.2. WDR (Receiver)

| Model | Supported Countries and Regions |
|-------------------|--|
| WDR-L-Z2-PRO(-L) | Japan only |
| WDR-LE-Z2-PRO(-L) | Japan, USA, Europe, Korea, Taiwan, Thailand, China, Mexico, Philippines, Vietnam, Canada, Malaysia, Singapore |

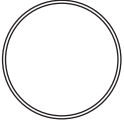
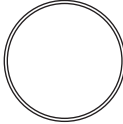
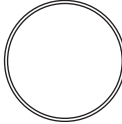
* Do not use outside of supported countries and regions. Failure to do so may come into conflict with the law.

12. Replacement and Optional Parts

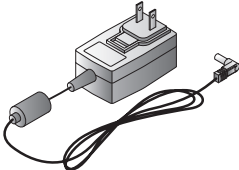
12.1. Replacement Parts

Various parts are available to the customer for exchange or replacement.

12.1.1. WDT (Transmitter)

| O-ring 40 | O-ring 50 | O-ring 60 |
|---|---|--|
| WDT-4LR replacement parts | WDT-5LR replacement parts | WDT-6LR replacement parts |
|  5 pieces |  5 pieces |  5 pieces |


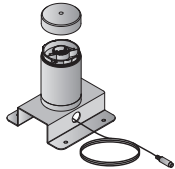
12.1.2. WDR (Receiver)

| AC Adaptor |
|--|
| WDR-L-Z2-PRO(-L) replacement parts |
| 5pieces  |

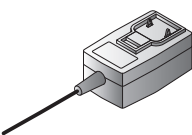
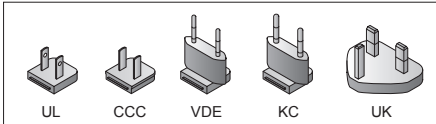
12.2. Optional Parts

This product includes the following related products and optional parts.

●Related products

| Software | Setup Kit | | |
|---|---|----------|----------|
| WDS-WIN01 | WDX-4LRB | WDX-5LRB | WDX-6LRB |
|  |  | | |

●Optional parts

| AC Adaptor |
|---|
| ADP-001 |
|   |

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This chapter clarifies the license for the free software used in WDR.

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13.1.1. Version 1.0

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```
<one line to give the program's name and a brief idea of what it does.>  
Copyright (C) 19yy <name of author>
```

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```
Gnomovision version 69, Copyright (C) 19xx name of author Gnomovision comes with  
ABSOLUTELY NO WARRANTY; for details type `show w'. This is free software, and you are  
welcome to redistribute it under certain conditions; type `show c' for details.
```

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```
Yoyodyne, Inc., hereby disclaims all copyright interest in the program `Gnomovision' (a  
program to direct compilers to make passes at assemblers) written by James Hacker.
```

```
<signature of Ty Coon>, 1 April 1989  
Ty Coon, President of Vice
```

That's all there is to it!

13.1.2. Version 2.0

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```

```
<signature of Ty Coon>, 1 April 1989
Ty Coon, President of Vice
```

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The "System Libraries" of an executable work include anything, other than the work as a whole, that (a) is included in the normal form of packaging a Major Component, but which is not part of that Major Component, and (b) serves only to enable use of the work with that Major Component, or to implement a Standard Interface for which an implementation is available to the public in source code form. A "Major Component", in this context, means a major essential component (kernel, window system, and so on) of the specific operating system (if any) on which the executable work runs, or a compiler used to produce the work, or an object code interpreter used to run it.

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```
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```
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```

```
<signature of Ty Coon>, 1 April 1990
Ty Coon, President of Vice
```

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13.2.2. Version 3.0

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13.4. Python Software Foundation License

A. HISTORY OF THE SOFTWARE

Python was created in the early 1990s by Guido van Rossum at Stichting Mathematisch Centrum (CWI, see <http://www.cwi.nl>) in the Netherlands as a successor of a language called ABC. Guido remains Python's principal author, although it includes many contributions from others.

In 1995, Guido continued his work on Python at the Corporation for National Research Initiatives (CNRI, see <http://www.cnri.reston.va.us>) in Reston, Virginia where he released several versions of the software.

In May 2000, Guido and the Python core development team moved to BeOpen.com to form the BeOpen PythonLabs team. In October of the same year, the PythonLabs team moved to Digital Creations, which became Zope Corporation. In 2001, the Python Software Foundation (PSF, see <https://www.python.org/psf/>) was formed, a non-profit organization created specifically to own Python-related Intellectual Property. Zope Corporation was a sponsoring member of the PSF.

All Python releases are Open Source (see <http://www.opensource.org> for the Open Source Definition). Historically, most, but not all, Python releases have also been GPL-compatible; the table below summarizes the various releases.

| Release | Derived from | Year | Owner | GPL-compatible? (1) |
|-----------------|--------------|-----------|------------|---------------------|
| 0.9.0 thru 1.2. | | 1991-1995 | CWI | yes |
| 1.3. thru 1.5.2 | 1.2 | 1995-1999 | CNRI | yes |
| 1.6 | 1.5.2 | 2000 | CNRI | no |
| 2.0 | 1.6 | 2000 | BeOpen.com | no |
| 1.6.1 | 1.6 | 2001 | CNRI | yes (2) |
| 2.1 | 2.0+1.6.1 | 2001 | PSF | no |
| 2.0.1 | 2.0+1.6.1 | 2001 | PSF | yes |
| 2.1.1 | 2.1+2.0.1 | 2001 | PSF | yes |
| 2.1.2 | 2.1.1 | 2002 | PSF | yes |
| 2.1.3 | 2.1.2 | 2002 | PSF | yes |
| 2.2. and above | 2.1.1 | 2001-now | PSF | yes |

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