

# **KW2D Series RFID Reader User's Manual**

Thank you for purchasing this IDEC product. Before using this product, please confirm that there are no mistakes with your order. Carefully read this manual and use this product correctly.

## Safety Precautions

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- Read the "KW2D Series User's Manual" to ensure correct operation before starting installation, wiring, operation, maintenance, and inspection of the KW2D Series.
- If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.
- All KW2D Series modules are manufactured under IDEC's rigorous quality control system, but users must add a backup or failsafe provision to the control system when using the KW2D Series in applications where heavy damage or personal injury may be caused, in case the KW2D Series should fail.
- Implement security measures, such as those for unauthorized access to this product from external devices, on the network system side. IDEC Corporation bears no responsibility for losses, damages, and/or other expenses that occur directly or indirectly as a result of unauthorized access or other security failures.
- As a security measure, always use a firewall or another tool and block accessible IP addresses and ports.
- In this manual, safety precautions are categorized in order of importance:



Warning notices are used to emphasize that improper operation may cause severe personal injury or death.



Caution notices are used where inattention might cause personal injury or damage to equipment.



- This product is not designed for use in applications requiring a high degree of reliability and safety, such as applications for medical devices, nuclear power, railroads, aerospace, and automotive devices. The KW2D Series should not be used for such applications.
- Turn off power to the KW2D Series before installation, removal, wiring, maintenance, and inspection of the KW2D Series. Failure to turn power off may cause damage, electrical shocks or fire hazard. If such a circuit is configured inside the KW2D Series, Failure of the KW2D Series may cause disorder of the control system, damage, or accidents.
- Special expertise is required to install, wire, and operate the KW2D Series. People without such expertise must not use the KW2D Series.
- Install the KW2D Series according to the instructions described in the "KW2D Series User's Manual". Improper installation will result in falling, failure, or malfunction of the KW2D Series.



- Install the KW2D Series in environments described in the "KW2D Series User's Manual". If the KW2D Series is used in places where the KW2D Series is subjected to high-temperature, high-humidity, condensation, corrosive gases, excessive vibrations, or excessive shocks, then electrical shocks, fire hazard, or malfunction will result.
- Prevent the KW2D Series from falling while moving or transporting the KW2D Series, otherwise damage or malfunction of the KW2D Series will result.
- Wiring must use lead sizes that are appropriate for the applied voltage and current.
- Prevent metal fragments and pieces of wire from dropping inside the KW2D Series housing. Put a cover on the KW2D Series modules during installation and wiring. Ingress of such fragments and chips may cause fire hazard, damage, or malfunction.
- Use SELV power supply that is reinforced or double-insulated from MAINS without any risk of electric shock, and Limited Energy (LIM) Circuit.
- Do not disassemble, repair, or modify the KW2D Series modules. There is a risk of serious accident, such as electric shock, damage, fire, and malfunction.

This device complies with part 15 of FCC Rules and 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 harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Le présent appareil est conforme à la partie 15 des règles de la FCC et aux normes des 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, et (2) l'appareil doit accepter tout brouillage subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

### FCC CAUTION

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

- Electromagnetic waves are generated from the front unit, so—excluding when using tags—stay more than 5 cm away from the front unit.
- When disposing of the KW2D Series, do so in accordance with national and local regulations.

Note:

- This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.
- Use a Category 5 or higher STP shielded cable for the LAN cable.

Symbol	Meaning
	Reference to web manual with QR code.
	Ground the functional ground terminal to ensure stable operation fo the equipment.

## Introduction

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This manual describes the functions, configuration methods, and safety precautions of the KW2D Series RFID Reader and the KW RFID Configurator configuration software.

Read this manual to ensure the correct understanding of the functions and performance of the KW2D Series RFID Reader and the KW RFID Configurator configuration software. Store this manual carefully so it can be read at any time.

IDEC Corporation makes the latest product manual PDFs available on our website at no additional cost. Please download the latest product manual PDFs from our website.

## Publication History

September 2020    First Edition

## Notes

- IDEC Corporation holds all rights related to this manual and the KW RFID Configurator. Unauthorized duplication, reprinting, sales, transfers, and leasing are prohibited.
- The contents of this manual and the KW RFID Configurator may change without prior notification.
- IDEC Corporation bears no responsibility for the results of using this manual or the KW RFID Configurator.
- We have taken all possible measures with the content of this product, but if you notice any portions that are unclear, or any mistakes, please contact the dealer where purchased, an IDEC sales office, or the customer service line.

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FeliCa is a registered trademark of Sony Corporation.

Mifare is a registered trademark of NXP Semiconductors.

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## Regarding Laws and Compatible Standards

This product adheres to the laws and compatible standards of all countries involved, as shown below.

### European laws and standards

This product complies with the following EU directives.

- EMC Directive
- RoHS Directive
- Radio Equipment Directive

To comply with these directives, this product has been designed and evaluated on the basis of the following international and European standard.

- IEC/EN 61131-2
- ISO/IEC 18000-3
- ISO/IEC 14443 Type A
- ISO/IEC 18092
- JIS X6319-4
- ISO/IEC 15693

### North America laws and standards

This product complies with the following standards.

- UL61010-1/CAN/CSA C22.2 No. 61010-1-12
- UL 61010-2-201

### RFID communication standards

- ISO/IEC 14443 Type A
- ISO/IEC 18092
- JIS X6319-4
- ISO/IEC 15693

### Radio law certification

This product has received certification for the following radio laws.

- MIC (Japan)
- FCC/ISED (USA/Canada)
- NCC (Taiwan)
- Radio Equipment Directive (EU)

For details on applicable standards and EU directives, please contact the dealer where purchased or check the IDEC website.

# About the Warranty of the Products

## 1. Warranty Period

The Products are warranted for 3 years from the date of purchase, or from the date of delivery completion.

## 2. Extent of Warranty

IDEC CORPORATION is responsible for failures or defects of the Products during the above warranty period, either a replacement part will be provided or the defective parts of the Products will be repaired free of charge.

If such failure or defects should occur, please offer them to the distributor, dealer or IDEC CORPORATION with the materials in which the date of purchase is specified.

\* The expenses for installation and construction at the time of repair will not be borne.

## 3. Start

September 1, 2020.

## 4. Indemnification

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- 1) The Products are used or operated beyond the conditions or environment range as described in catalog, specifications or instruction; or
- 2) The failure or defects of the Products arise from the cause other than the Products; or
- 3) The Products are improved, modified or altered by the party other than IDEC; or
- 4) The failure or defects and damages of the Products arise from the usage of the Product in the way that is not intended; or
- 5) The failure or defects and damages of the Products arise from the cause beyond IDEC's control including, but not limited to, fire, earthquake, flood, lightning, other natural disasters, and acts of God; or
- 6) The failure or defects and damages of the Products arise from the relocation, transportation or drop after you purchase the Products; or
- 7) The failure or defects and damages of the Products arise from improper installation; or
- 8) Maintenance and inspection are not carried out in accordance with instruction.

\* The customer is responsible for checking the operation of programmable Products. IDEC CORPORATION bears no responsibility for the operation of programs created by the customer and for damages that occur as a result of those programs.

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## 5. Extent of Service

The price of the Products will not include the fee for any service such as sending technicians and engineers, IDEC CORPORATION will charge you the fee for the following:

- 1) Instruction for installment and visiting for test operation, including, but not limited to creating application software and operation tests; and
- 2) Maintenance and inspection, arrangement and repair; and
- 3) Technical assistance and technical education; and
- 4) Product test and inspection based on you request.

## Abbreviations, Names, and Terms

Item	Description
KW2D Series RFID Reader	The general term for this product. KW2D-R100Q4E, KW2D-RH100Q4E
KW2D special tag	The general term for this product's special tags. KW9Z-T1**, KW9Z-T2**
RFID tag	The general term for RF tags and non-contact IC cards that support IC tag standards.
Non-contact IC card	The general term for card type RF tags that support IC tag standards.
IC tag standards	Standards for RFID tags.
KW RFID Configurator	The software for creating project data for the KW2D Series RFID Reader.
Project	The KW2D Series RFID Reader settings and tag list to which UIDs and authorities are registered.
Tag list	A list to which UIDs and authorities are registered.
UID	An abbreviation for unique identifier. A unique ID number stored in the RFID tag that cannot be overwritten. It is a data string with a maximum length of 10 bytes.
Tag information	The general term for the UID, authority, Name1, and Name2 to register for a tag.
Authority	One byte of information associated with the UID.
Verification result	The information obtained as the result of verifying UIDs. This information includes the UID, authority, and IC tag standard.
Host device	A device that supports Modbus TCP client.
Shared memory	Memory for Modbus TCP communications that the KW2D Series RFID Reader makes available.
Name1, Name2	Text strings that can be set as desired in the tag list.
Lock operation	The state in which the verification result is held in shared memory.

## Symbols Used in the Manual

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The following symbols are used in the manual to simplify the descriptions.

### Notes

Symbol	Meaning
	Indicates information about items that carry the risk of death or serious injury if the product is used improperly.
	Indicates information about items that carry the risk of personal injury or physical damage if the product is used improperly.
	Indicates information about items that must be observed or that are easily mistaken when using the product.
	Indicates supplemental information about an item or helpful information that you should know.

**Supplier's Declaration of Conformity**  
**47 CFR § 2.1077 Compliance Information**

Unique Identifier: KW2D-R100Q4E or KW2D-RH100Q4E

Responsible Party – U.S. Contact Information

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1175 Elko Drive, Sunnyvale, CA 94089-2209, USA  
Tel: +1-408-747-0550 opencontact@idec.com

FCC Compliance Statement

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.

# Contents

Safety Precautions.....	Preface-1
Introduction .....	Preface-2
Publication History.....	Preface-2
Notes .....	Preface-2
Trademarks .....	Preface-2
Regarding Laws and Compatible Standards.....	Preface-3
About the Warranty of the Products .....	Preface-4
Abbreviations, Names, and Terms .....	Preface-5
Symbols Used in the Manual .....	Preface-6
Notes .....	Preface-6
<b>Chapter 1 Overview of the KW2D Series RFID Reader .....</b>	<b>1-1</b>
Introduction to the KW2D Series RFID Reader .....	1-1
Type Numbers .....	1-1
Type Numbers and Functions List.....	1-2
KW2D Series RFID Reader Type Numbers and Functions .....	1-2
KW2D Special Tag Type Numbers and Functions .....	1-2
KW2D Series RFID Reader Features .....	1-3
KW2D Series RFID Reader Functions .....	1-4
System Configuration .....	1-5
Introduction to the KW RFID Configurator.....	1-6
Overview of Communication Functions.....	1-7
<b>Chapter 2 Product Specifications.....</b>	<b>2-1</b>
Specifications.....	2-1
Operating Environment Specifications .....	2-1
Electrical Specifications .....	2-2
Mechanical Specifications .....	2-2
Ethernet Communication Specifications .....	2-3
RFID Interface Specifications .....	2-3
KW2D Special Tag Specifications.....	2-3
Names of LSIs in Tested Tags.....	2-4
Part Names and Functions .....	2-5
Dimensions .....	2-7
Main Body.....	2-7
Tag.....	2-8
Front Cover .....	2-8
<b>Chapter 3 Installation and Wiring .....</b>	<b>3-1</b>
Installation and Wiring Precautions .....	3-1
Installation Space .....	3-1
Attachment Methods .....	3-2
Back Unit Removal and Attachment Methods .....	3-2
Front Cover Removal and Attachment Methods .....	3-4
Panel Mounting Method .....	3-7
Drilling the Mounting Hole .....	3-9
Mounting Hole Layout .....	3-9
Mounting Centers Example .....	3-9
Power Supply and Power Supply Wiring .....	3-10
Power Supply.....	3-10
Power Supply Voltage .....	3-10
Power Supply Wiring .....	3-10
Power Supply Terminal Block Wiring Method .....	3-11
Terminals .....	3-12
Terminals for the Terminal Block.....	3-12
Applicable Wire .....	3-14
Recommended Tools .....	3-15
Wiring Directions and Panel Indicators.....	3-16

<b>Chapter 4</b>	<b>KW RFID Configurator .....</b>	<b>4-1</b>
	Overview of the KW RFID Configurator .....	4-1
	Operating Environment .....	4-1
	Installing the Software.....	4-1
	Uninstalling the Software.....	4-1
	Starting and Exiting the Software .....	4-1
	<b>Configuration and Functions .....</b>	<b>4-3</b>
	Configuration of the KW RFID Configurator .....	4-3
	Menu Bar Commands.....	4-4
	File.....	4-5
	Online .....	4-7
	Help.....	4-15
	<b>Toolbar .....</b>	<b>4-16</b>
	<b>Settings Tabs .....</b>	<b>4-17</b>
<b>Chapter 5</b>	<b>Functions and Settings.....</b>	<b>5-1</b>
	Setup Using the KW RFID Configurator .....	5-1
	<b>KW2D Series RFID Reader Statuses and Operations.....</b>	<b>5-2</b>
	Operation Mode.....	5-2
	Detection Mode .....	5-4
	Lock Mode .....	5-8
	Adjusting the RFID Tag Detection Sensitivity .....	5-13
	Setup from the Host Device Using Coil Relays .....	5-14
	<b>KW2D Series RFID Reader Functions .....</b>	<b>5-16</b>
	Read UID Function.....	5-16
	UID Verification Function.....	5-17
	Ethernet Communication Function .....	5-18
	Projects .....	5-20
	<b>Modbus TCP Server.....</b>	<b>5-21</b>
	Communication Specifications.....	5-21
	Shared Memory .....	5-22
	<b>Maintenance Communication Server.....</b>	<b>5-25</b>
	Communication Specifications.....	5-25
	Functions.....	5-25
<b>Chapter 6</b>	<b>Troubleshooting .....</b>	<b>6-1</b>
	Errors .....	6-1
	Checking Errors with the LED Indicator Colors.....	6-1
	Checking Errors with the Input Relays.....	6-1
	Troubleshooting .....	6-2
<b>INDEX.....</b>	<b>INDEX-1</b>	

# Chapter 1 Overview of the KW2D Series RFID Reader

This chapter describes an overview of the KW2D Series RFID Reader and its system configuration.

## Introduction to the KW2D Series RFID Reader

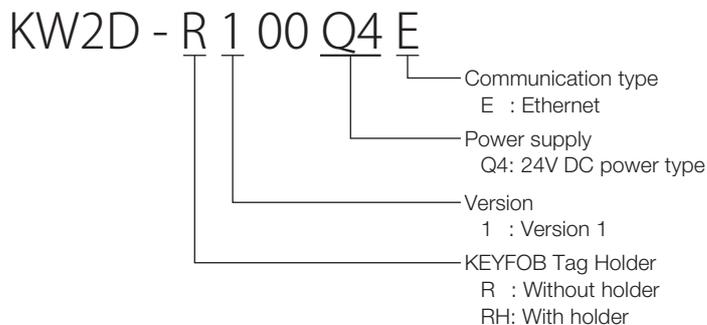
The KW2D Series RFID Reader is an RFID reader equipped with a verification function. Both card type and KEYFOB type RFID tags are supported.

The KW2D Series RFID Reader can work with a host device using communication functions, such as maintenance communication server and Modbus TCP server. Use the KW RFID Configurator for the creation and management of RFID tags and projects that are used with the KW2D Series RFID Reader.

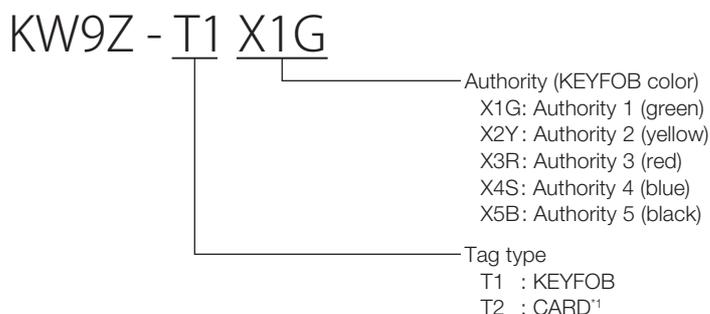
## Type Numbers

This section gives the type numbers for the KW2D Series RFID Reader.

### • KW2D Series RFID Reader



### • KW2D Special Tag



\*1 The authority for the CARD type is "T2X0: Authority 10" only.

### • Cover



## Type Numbers and Functions List

### KW2D Series RFID Reader Type Numbers and Functions

Type No.	Power Supply	Ethernet Port	Holder
KW2D-R100Q4E	24V DC	Yes	None
KW2D-RH100Q4E	24V DC	Yes	Yes

### KW2D Special Tag Type Numbers and Functions

Type No.	Tag Type	Tag Color	Default Authority					
			1	2	3	4	5	10
KW9Z-T1X1G	KEYFOB	Green	Yes	-	-	-	-	-
KW9Z-T1X2Y		Yellow	-	Yes	-	-	-	-
KW9Z-T1X3R		Red	-	-	Yes	-	-	-
KW9Z-T1X4S		Blue	-	-	-	Yes	-	-
KW9Z-T1X5B		Black	-	-	-	-	Yes	-
KW9Z-T2X0	CARD	-	-	-	-	-	-	Yes



For details on product specifications, see "Chapter 2 Product Specifications" on page 2-1.

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## KW2D Series RFID Reader Features

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This section describes the features of the KW2D Series RFID Reader.

The KW2D Series RFID Reader is a compact RFID reader equipped with an Ethernet port that can be mounted in a 22-mm diameter hole in a panel surface.

- **Panel Surface Mounted**

This RFID reader can be mounted in a 22-mm diameter hole.

- **Communication Functions**

The KW2D Series RFID Reader supports the following types of communication.

- Maintenance communication server
- Modbus TCP server
- Find RFID readers

The KW2D Series RFID Reader can be connected a computer on which the KW RFID Configurator has been installed, and it can be connected to devices such as operator interfaces and PLCs that support the Modbus TCP client.

- **Verification Function**

The KW2D Series RFID Reader can verify UIDs in RFID tags against UIDs that were registered in advance.

## KW2D Series RFID Reader Functions

This section describes the functions of the KW2D Series RFID Reader.

- **Read UID Function**

This function reads the UID of KW2D special tags and general-purpose card type RFID tags.

- **UID Verification Function**

The KW2D Series RFID Reader is equipped with an RFID antenna (13.56 MHz band) and can verify UIDs read from RFID cards against UIDs that were registered in advance. The following three types of IC tag standards are supported.

IC Tag Standard	Non-contact IC Card/Tag Name
ISO/IEC 14443 Type A	MIFARE (NXP)
ISO/IEC 18092	FeliCa (Sony)
ISO/IEC 15693	Tag-it (Texas Instruments), I-CODE (NXP)

- **Read Confirmation Function**

The read status of the RFID tag can be confirmed with the buzzer.

- **Status Confirmation Function**

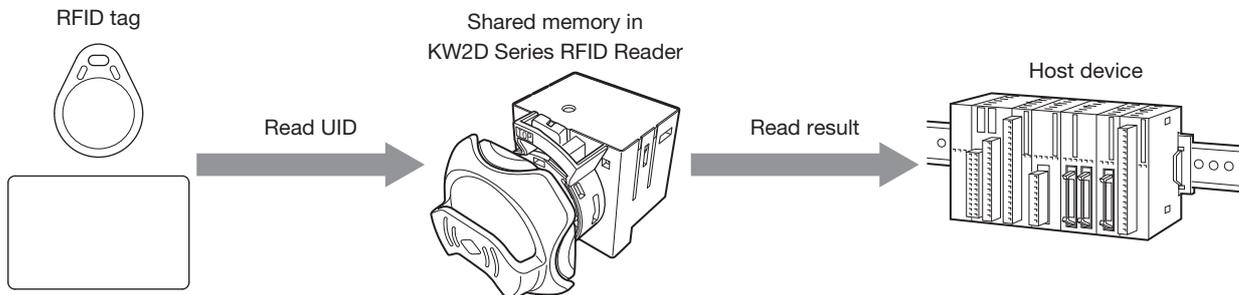
The operating status and error status of the KW2D Series RFID Reader can be checked with the three colors of LED indicators (white, green, and red) on the front of the KW2D Series RFID Reader.



The buzzer and LED indicators can be enabled or disabled. The buzzer and LED indicators can also be controlled from the host device. For more information on remote control of the buzzer and LED indicators, see "Chapter 5 Remote Control of Buzzer and LEDs" on page 5-15.

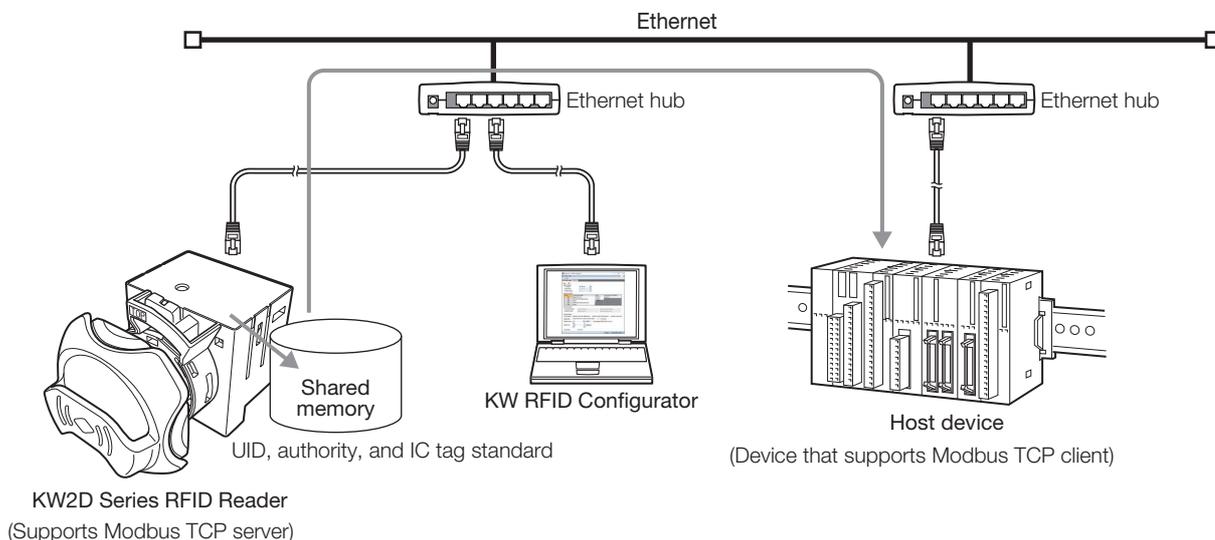
## System Configuration

There are two system configurations for using the KW2D Series RFID Reader: the system configuration used for actual operation and the system configuration for creating a project for operation. Use the KW RFID Configurator dedicated configuration software to create a project.



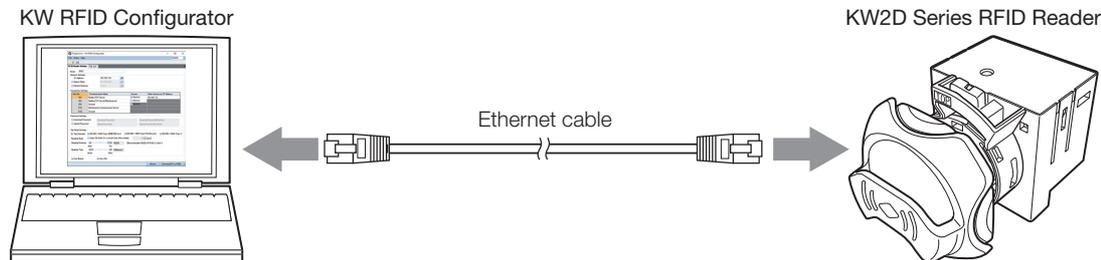
### • System Configuration During Operation

The KW2D Series RFID Reader can be used in the following system configuration. The devices that can be connected depend on the model. For details, see "Chapter 2 Product Specifications" on page 2-1.



### • System Configuration During Project Creation

To use the KW2D Series RFID Reader, you must download a project to it. Use the KW RFID Configurator to create the project. You can connect the KW2D Series RFID Reader to a computer and download the created project over Ethernet communication.



## Introduction to the KW RFID Configurator

The KW RFID Configurator is dedicated software for the KW2D Series RFID Reader to monitor tag information read by the KW2D Series RFID Reader, configure the KW2D Series RFID Reader settings, and create tag lists. The collection of settings and created data is called a project.

Build the environment required for operation by using the KW RFID Configurator to create a project and downloading that project to the KW2D Series RFID Reader.

The KW RFID Configurator has the following functions.

- **Find RFID Readers**

If you do not know the IP address of a KW2D Series RFID Reader, you can search for its IP address. The default IP address of the KW2D Series RFID Reader is 192.168.1.50.

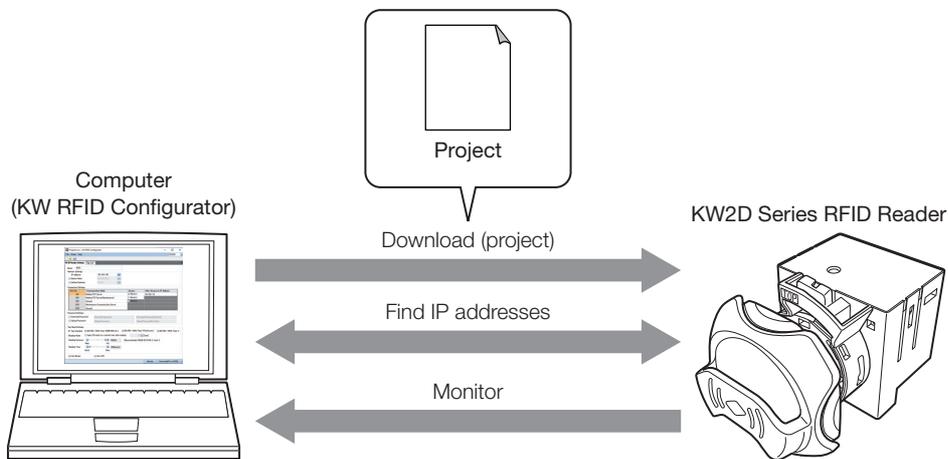
- **Create Project**

Create the tag list and configure the KW2D Series RFID Reader settings.

If necessary, create the tag list while monitoring the KW2D Series RFID Reader.

- **RFID Reader Monitor**

You can monitor the status of the KW2D Series RFID Reader and the UIDs.



## Overview of Communication Functions

The Ethernet port is standard equipment on the KW2D Series RFID Reader to enable communication using Ethernet. There are a total of five connections that can be used for various communications: three Modbus TCP server connections and two maintenance communication server connections.

- **Communication Functions**

Modbus TCP Server	Modbus TCP server can be used to exchange data between the KW2D Series RFID Reader and a host device that supports the Modbus TCP client protocol. For details, see "Chapter 5 Modbus TCP Server" on page 5-21.
Maintenance Communication Server	Maintenance communication server can be used with a computer or PLC to upload and download projects and to monitor UIDs detected by the KW2D Series RFID Reader. For details, see "Chapter 5 Maintenance Communication Server" on page 5-25.
Find RFID Readers	If you forget the IP address of a KW2D Series RFID Reader, you can find the RFID readers connected to the network. For details, see "Chapter 4 [RFID Reader List] Dialog Box" on page 4-14.

- **Communication Interface**

Ethernet Port	The KW2D Series RFID Reader can communicate with Ethernet communication-compatible host devices such as computers using this port. Maintenance communication and Modbus TCP communication can be used.
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# Chapter 2 Product Specifications

This chapter describes the part names and specifications of the units that make up the KW2D Series RFID Reader.

## Specifications

The specifications of this product are as follows.



Be careful when using card type KW2D special tags. These tags have a smaller temperature range than the KW2D Series RFID Reader itself. If card type KW2D special tags are used outside the specified temperature range, there is a risk of deformation, damage, or malfunction.

## Operating Environment Specifications

Ambient Operating Temperature	-25 to +55°C (no freezing)	
Ambient Storage Temperature	-40 to +80°C (no freezing)	
Relative Humidity	10 to 95% RH (no condensation)	
Storage Humidity	10 to 95% RH (no condensation)	
Pollution Degree	Front of panel	3 (IEC 60664-1)
	Inside panel	2 (IEC 60664-1)
Degree of Protection <sup>*1</sup>	Front unit <sup>*2</sup>	IP65 or IP67 (IEC 60529)
	Back unit	IP20 (IEC 60529)
Atmosphere	No corrosive gas	
Altitude or Air Pressure	During use	1013 to 795 hPa (0 to 2000 m)
	During transport	1013 to 701 hPa (0 to 3000 m)
Installation Location	Indoors	
Overvoltage Category	II	
Vibration Resistance	Durability	30 Hz, half amplitude 1.5 mm
	Malfunction	5 to 55 Hz, half amplitude 0.5 mm
Shock Resistance	Durability	1000 m/s <sup>2</sup>
	Malfunction	100 m/s <sup>2</sup>
EMC Immunity	IEC/EN 61131-2 Zone B, EN 301-489-3 compatibility	

\*1 IP ratings are not applicable to UL certification.

\*2 Front of panel only

## Electrical Specifications

Rated Input Voltage	24V DC	
Power Supply Fluctuation Range	20.4 to 28.8V DC (including ripple)	
Current Draw	100mA maximum (24V DC)	
Allowable Time for Instantaneous Power Loss	1 ms or longer (when rated power supply voltage)	
Withstand Voltage	Between power and FE terminals	500V AC, 1 minute
	Between LAN port and internal circuit	500V AC, 1 minute
Insulation Resistance	Between power and FE terminals	100 MΩ or higher (500V DC insulation resistance tester)
	Between LAN port and internal circuit	100 MΩ or higher (500V DC insulation resistance tester)
Inrush Current	25 A or lower	
Isolation	Between LAN port and internal circuit	Transformer isolation
Ground	D-type ground (Class 3 ground)	
Functional Ground Wire	See "Chapter 3 Power Supply and Power Supply Wiring" on page 3-10.	
Power Supply Wire	See "Chapter 3 Power Supply and Power Supply Wiring" on page 3-10.	
Effect of Improper Power Supply Connection	Reverse polarity	Normal operation
	Improper voltage or frequency	Permanent damage may be caused
	Improper lead connection	Permanent damage may be caused
Weight (approx.)	70 g	

## Mechanical Specifications

Power Supply Terminals	Terminal configuration	Push-in terminals
	Wire pull force	AWG24 ≥ 10 N, AWG22 ≥ 15 N, AWG20 ≥ 20 N, AWG18 ≥ 30 N, AWG16 ≥ 40 N
	Insertion/removal durability	25 times minimum
	Recommended operation force of Pusher	20 N (40 N maximum)
Tag Holder <sup>*1</sup>	Insertion/removal durability	10,000 times minimum
Indicators <sup>*2</sup>	Three colors of LEDs (red: 2, green: 2, white: 4)	
Buzzer <sup>*3</sup>	Single tone with fixed volume	
Case Materials	Front cover and back cover, KEYFOB holder	PBT
	Front base, back base	PA66
	Lens	PCT

\*1 This holder is for mounting the KEYFOB type tag (KW9Z-T1X\*\*).

\*2 For details on illumination conditions, see "Chapter 5 KW2D Series RFID Reader Statuses and Operations" on page 5-2.

\*3 For details on buzzer operation conditions, see "Chapter 5 KW2D Series RFID Reader Statuses and Operations" on page 5-2.

## Ethernet Communication Specifications

Communication Type	IEEE 802.3 compliant	
Connector	Connector	RJ45
	Pull force	15 N
	Insertion/removal durability	100 times minimum
Isolation	Pulse transformer isolated	
Transmission Speed	10BASE-T and 100BASE-TX	
Communication Functions	Modbus TCP server and maintenance communication server	
Cable	Category 5 or higher rated twisted pair cable with a maximum length of 100 m	

## RFID Interface Specifications

Communication Standards	ISO/IEC 14443 (Type A), ISO/IEC 18092, JIS X6319-4, and ISO/IEC 15693	
Communication Speed	Felica	212 kbps
	ISO/IEC 14443A	106 kbps
	ISO 15693	26.5 kbps
Wireless Frequency	13.56 MHz (HF band)	
Supported Tags <sup>1</sup>	Card type	ISO/IEC 14443 Type A, ISO/IEC 18092, JIS X6319-4, and ISO/IEC 15693
	KEYFOB type	ISO/IEC 14443 Type A
Tag Reading Distance <sup>2</sup>	Card type	0 to 15 mm
	KEYFOB type	0 to 5 mm
Tag Reading Position <sup>3</sup>	Center of tag stationary in center of front unit	
Tag Reading Time	300 to 3000 [msec] (adjustable with [Reading Time] in the KW RFID Configurator)	

\*1 Multiple tags cannot be read.

\*2 The tag reading distance is a value that was measured using the tags listed in "Names of LSIs in Tested Tags" on page 2-4 that IDEC has tested. The tag reading distance will vary depending on the tag that is actually used and the operating environment.

\*3 The tag reading position is the value using a standard IDEC tag placed near the center of the reader. The tag reading distance changes with the tag and operating environment.



- The listed value is that in an ideal environment that is not affected by radio waves and metals in the surrounding area. Carefully check the performance of this product in your environment.
- For installation, see "Chapter 3 Installation and Wiring Precautions" on page 3-1.

## KW2D Special Tag Specifications

Ambient Operating Temperature	Card type	0 to +50°C (no freezing)
	KEYFOB type	-25 to +55°C (no freezing)
Ambient Storage Temperature	Card type	-20 to +50°C (no freezing)
	KEYFOB type	-25 to +75°C (no freezing)
Relative Humidity	Card type	20 to 90% RH (no condensation)
	KEYFOB type	60% RH or less (no condensation)
Storage Humidity	Card type	90% RH or less (no condensation)
	KEYFOB type	60% RH or less (no condensation)
Reading Distance <sup>1</sup>	Card type	0 to 10 mm
	KEYFOB type	0 to 5 mm

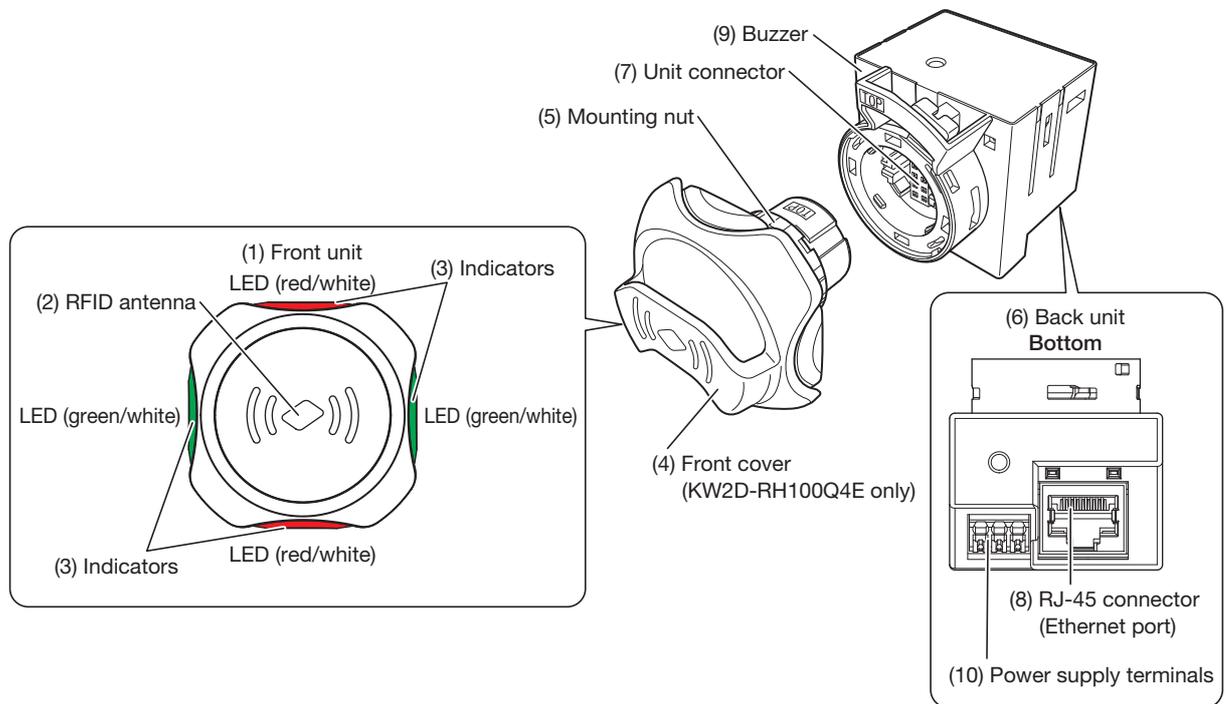
\*1 The tag reading distance is a value that was measured using the tags listed in "Names of LSIs in Tested Tags" on page 2-4 that IDEC has tested. The tag reading distance will vary depending on the tag that is actually used and the operating environment.

## Names of LSIs in Tested Tags

NFC Type	Manufacturer Name	Tag Type	
		Card Type	KEYFOB Type
Type A	MIFARE CLASSIC 1K (NXP)	Yes	-
	MIFARE UL (NXP)	Yes	Yes
Type V	ICODE SLI (NXP)	Yes	-
	ICODE SLIX (NXP)	Yes	-
	Tag-it HF-I Plus (TI)	Yes	-
	Tag-it HF-I Pro (TI)	Yes	-
	my-d SRF55V10P (Infineon)	Yes	-
	my-d SRF55V02P (Infineon)	Yes	-
	MB89R118B (Fujitsu)	Yes	-
	MB89R118C (Fujitsu)	Yes	-
Type F	RC-S962 (Standard) (Sony)	Yes	-
	RC-S965 (Lite) (Sony)	Yes	-
	RC-S966 (Lite-S) (Sony)	Yes	-

## Part Names and Functions

This section describes the configuration of the main body of the KW2D Series RFID Reader and the names of parts. The main body is composed of the front unit (1) and the back unit (6).



### (1) Front unit

This unit is mounted on the front surface of the panel. The RFID antenna (2) and indicators (3) are built into this unit.

### (2) RFID antenna

The antenna used to communicate with RFID tags.

### (3) Indicators

Built into the front unit. The indicators turn on and off when the KW2D Series RFID Reader is operating.

For details on LED illumination conditions, see "Chapter 5 KW2D Series RFID Reader Statuses and Operations" on page 5-2.

LED Indicator	Description
LED (red)	This LED turns on and flashes when there is an error in reading or verifying a UID and when not communicating with a Modbus TCP server (port number: 502).
LED (white)	This LED flashes when the KW2D Series RFID Reader is operating. It flashes slowly (interval of 1 sec) during operation and it flashes quickly (interval of 100 msec) when reading an RFID tag.
LED (green)	This LED turns on and flashes when reading and verifying a UID is normal and when communication with a Modbus TCP server (port number: 502) is normal.

### (4) Front cover (KW2D-RH100Q4E only)

This holder cover is for mounting the KEYFOB type tag (KW9Z-T1X\*\*).

### (5) Mounting nut

Fixes the front unit to the mounting panel.

### (6) Back unit

The unit stored inside the panel. The RFID reading circuit, Ethernet interface circuit, power supply interface circuit, buzzer, and other components are built into this unit.

### (7) Unit connector

This connector is used to connect the front unit and back unit.

**(8) RJ-45 connector (Ethernet port)**

This port is used to connect a host device.

Connect a LAN cable and this port allows Ethernet communication with connected devices that are equipped with an Ethernet interface.

LED	Status
Steady yellow	When a device compatible with the network is connected to the RJ-45 connector
Flashing green	When the KW2D Series RFID Reader is sending or receiving data

**(9) Buzzer**

Notifies the user of the result of reading and verifying a UID. For details on buzzer operation conditions, see "Chapter 5 KW2D Series RFID Reader Statuses and Operations" on page 5-2.

**(10) Power supply terminals**

These terminals are used to supply DC power (24V DC) to the KW2D Series RFID Reader.



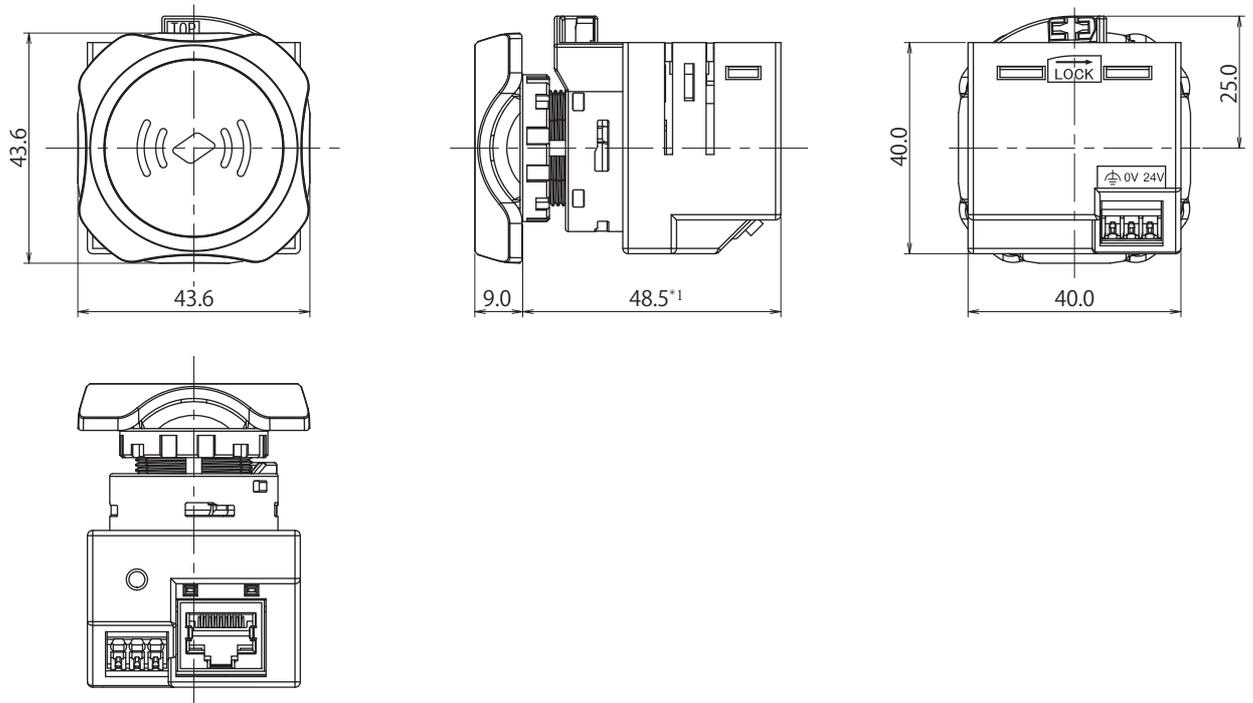
For details on KW2D Series RFID Reader installation, see "Chapter 3 Installation and Wiring" on page 3-1.

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## Dimensions

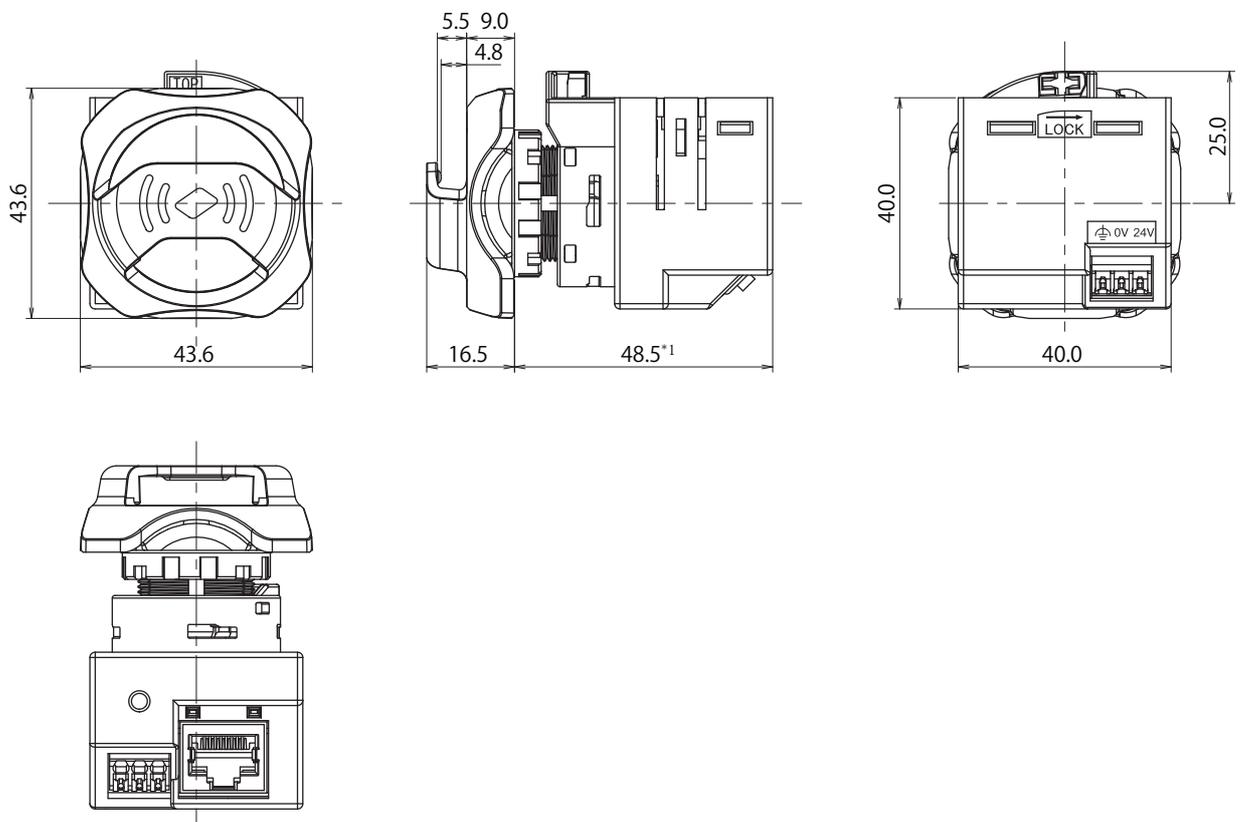
### Main Body

Without holder: KW2D-R100Q4E



(Unit: mm)

With holder: KW2D-RH100Q4E



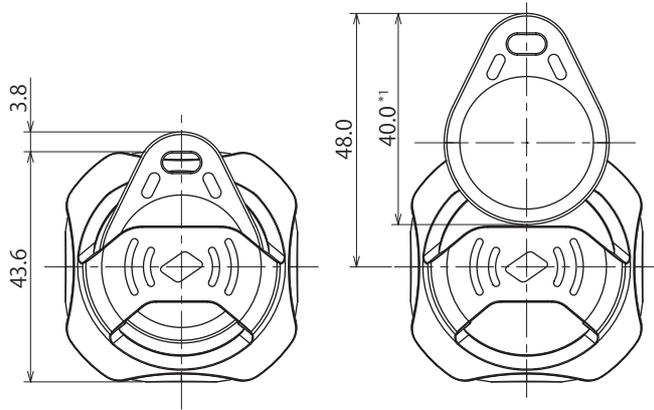
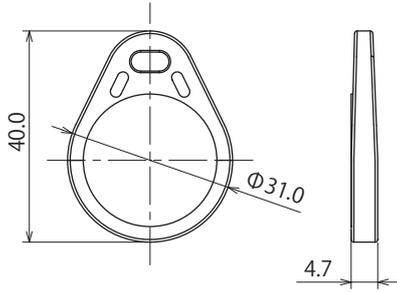
(Unit: mm)

\*1 The height is the length to the front of the mounting panel.

### Tag

KEYFOB type: KW9Z-T1X1G, KW9Z-T1X2Y, KW9Z-T1X3R, KW9Z-T1X4S, and KW9Z-T1X5B

Dimensions when KEYFOB type tag is inserted and when mounted

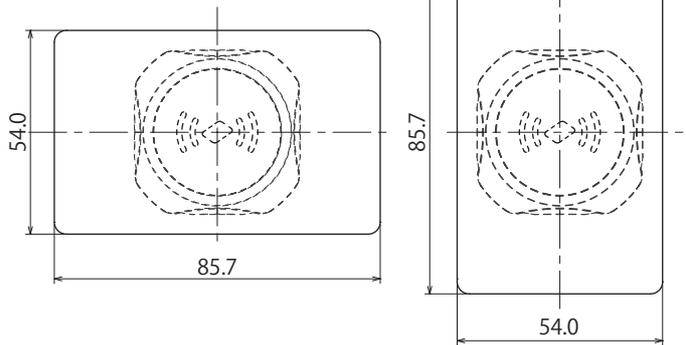
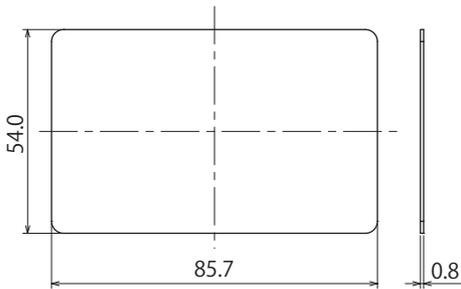


\*1 Minimum dimension when KEYFOB is equipped

(Unit: mm)

Card type: KW9Z-T2X0

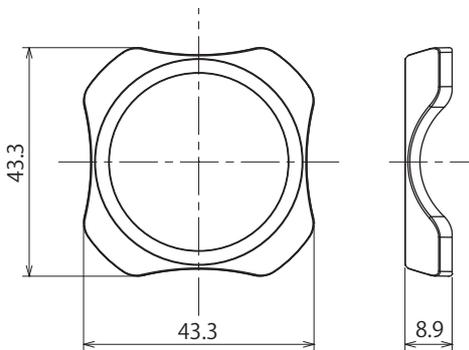
Dimensions when reading



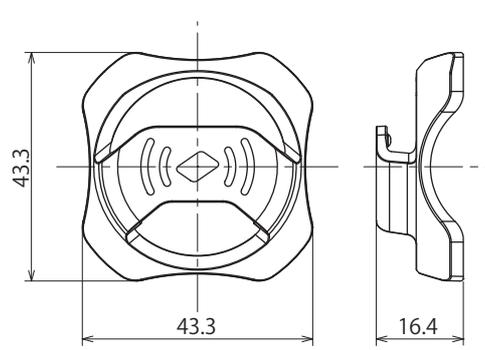
(Unit: mm)

### Front Cover

KW9Z-CV



KW9Z-CVH



(Unit: mm)

# Chapter 3 Installation and Wiring

This chapter describes how to install and wire the KW2D Series RFID Reader.

Carefully read and understand the content in this manual to correctly use the KW2D Series RFID Reader.

## Installation and Wiring Precautions

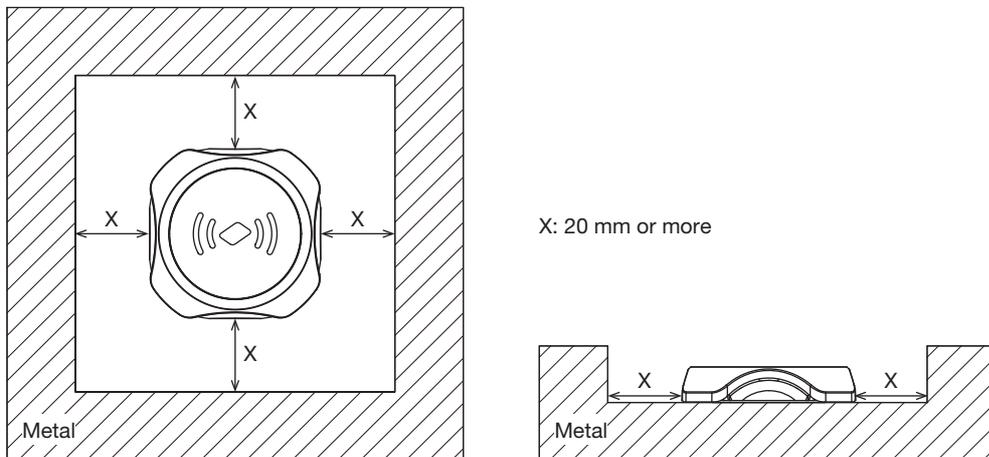
This section describes the precautions when installing and wiring the KW2D Series RFID Reader.



- Always turn off the power before installation, removal, wiring, maintenance, and inspection. There is a risk of electric shock and fire.
- Intended to be mounted on a Flat surface of type 1 enclosure.

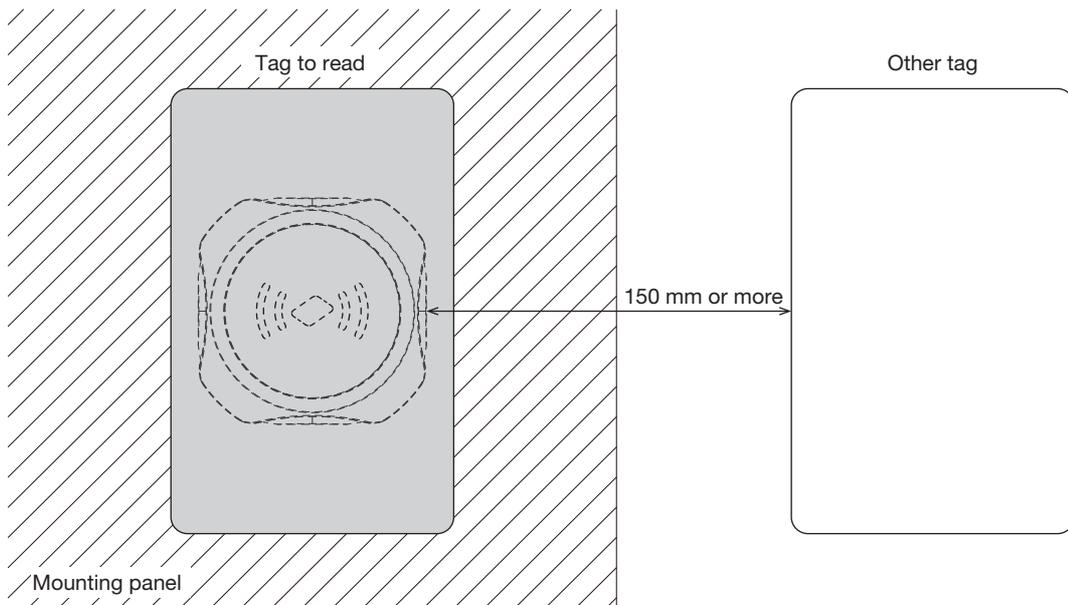
## Installation Space

Metal around the front unit will affect the reading distance of RFID tags. If the front unit is surrounded with metal, separate the metal from the front unit by 20 mm or more.



## When Multiple Tags Are in the Reading Area

The wrong tag may be detected. Keep tags that should not be read 150 mm or more from the area around the front unit.



## Attachment Methods

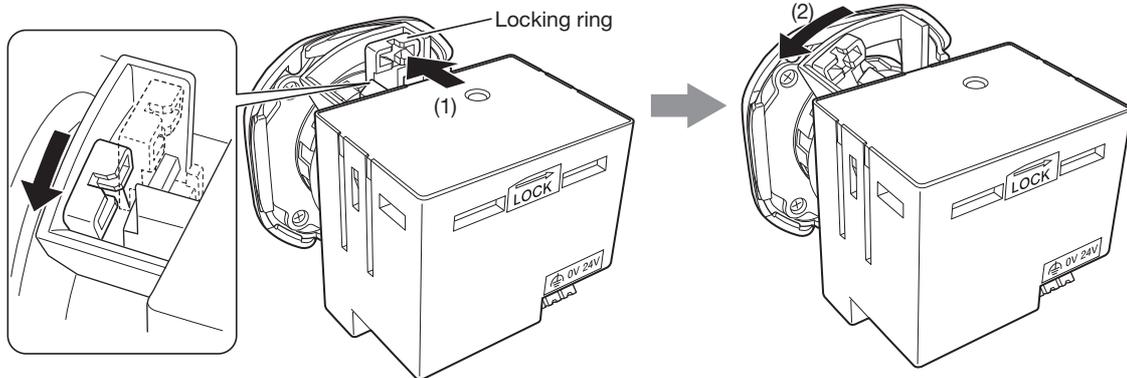
This section describes the attachment methods for the KW2D Series RFID Reader.

### Back Unit Removal and Attachment Methods

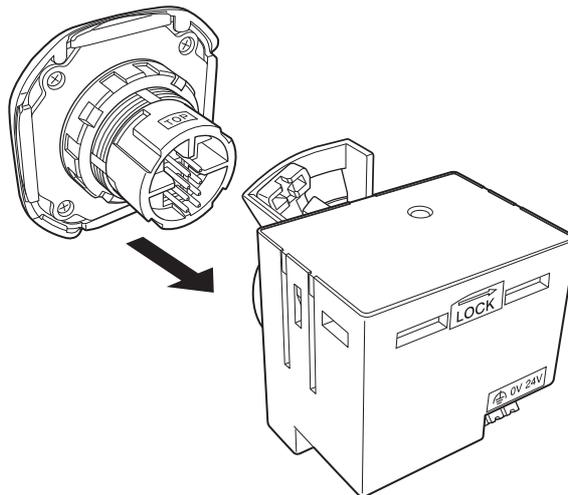
This section describes how to remove and attach the front unit and back unit.

- **Removing the Back Unit**

1. While pressing the locking ring (1) on the back unit, push it in the opposite direction indicated by "LOCK→" (2).



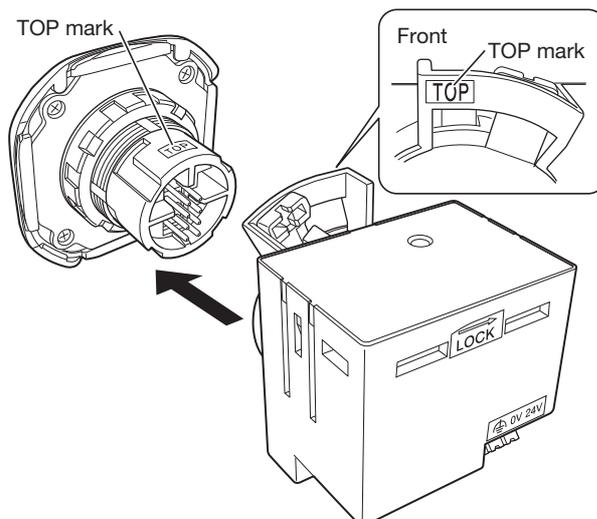
2. Remove the back unit from the front unit.



This completes separating the front unit and back unit.

### • Attaching the Back Unit

1. Align the TOP marks on the front unit and the back unit, and then insert the back unit into the front unit.

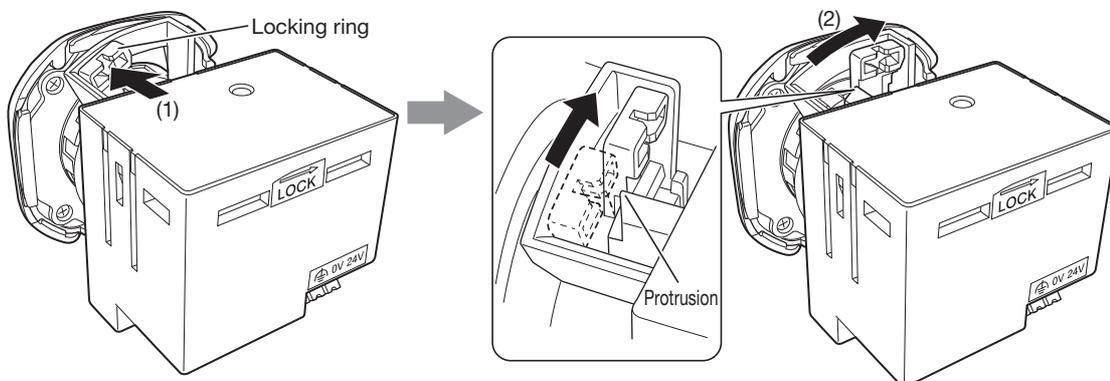


You cannot insert the back unit into the front unit if the locking ring is in the locked position ("LOCK→"). Always confirm that the locking ring is in the unlocked position (opposite direction of "LOCK→").

2. Confirm that the back unit is inserted fully into the front unit, and then while pressing the locking ring (1) on the back unit, push it in the direction indicated by "LOCK→" (2).



- Confirm that the locking ring is on the other side of the protrusion. The lock is not fully engaged if the locking ring is not in the lock position on the other side of the protrusion.
- After attaching the back unit to the front unit, confirm that the back unit does not come off.

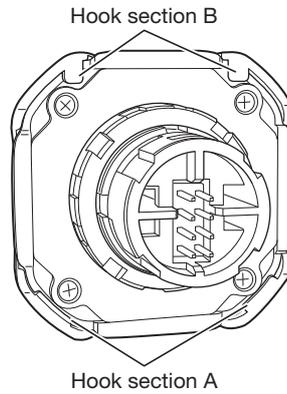


This completes attaching the front unit and back unit.

## Front Cover Removal and Attachment Methods

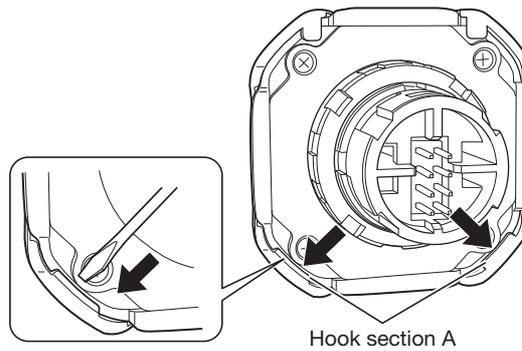
This section describes how to remove and attach the front unit and front cover.

The front cover is fixed to the front unit with hook section A and hook section B on the backside of the front unit. Hook section A is found in two locations and hook section B is also found in two locations.

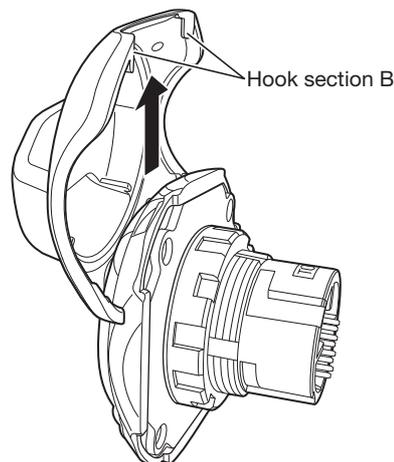


### • Removing the Front Cover

1. Separate the front unit and back unit. (page 3-2)
2. Press a flat blade screwdriver with a thin tip near hook section A in two locations and remove the front cover (hook section A).



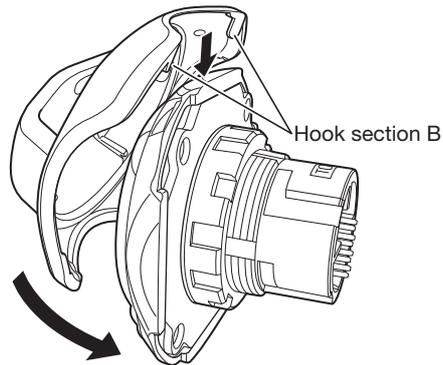
3. Slide the front cover up (in the direction of the arrow) and release hook section B.



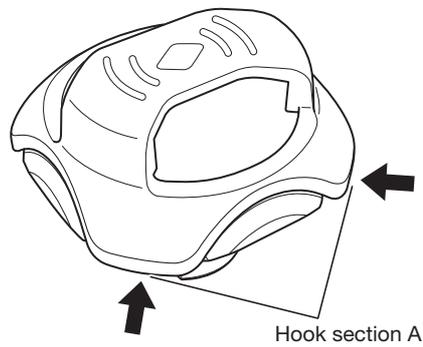
This completes separating the front cover and front unit.

### • Attaching the Front Cover

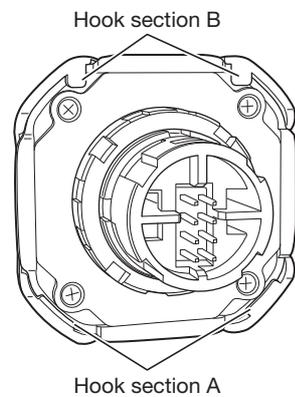
1. Attach hook section B of the front cover to the front unit.



2. Push hook section A onto the front unit.



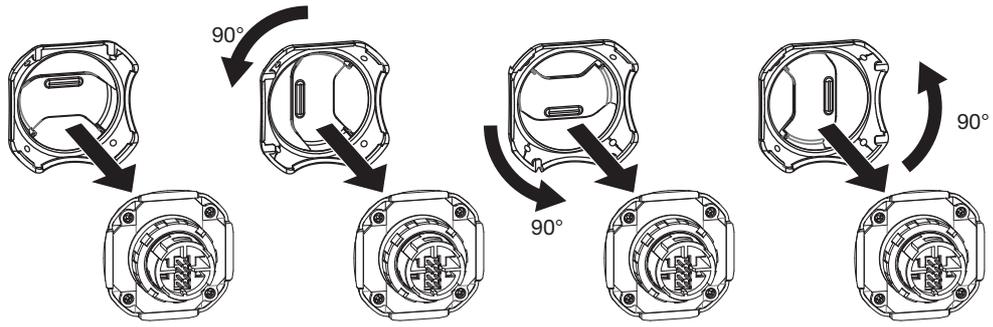
This completes attaching the front cover and front unit.



- Confirm that hook section A and hook section B are firmly attached to the front unit.
- After attaching the front cover to the front unit, confirm that the front cover does not come off.



The front cover can be attached with a pitch of 90°.



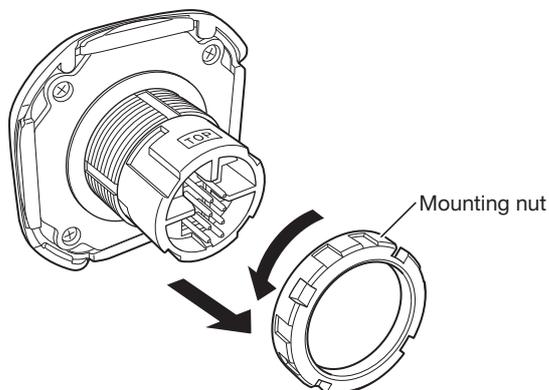
The front cover is attached in this direction when shipped from the factory.

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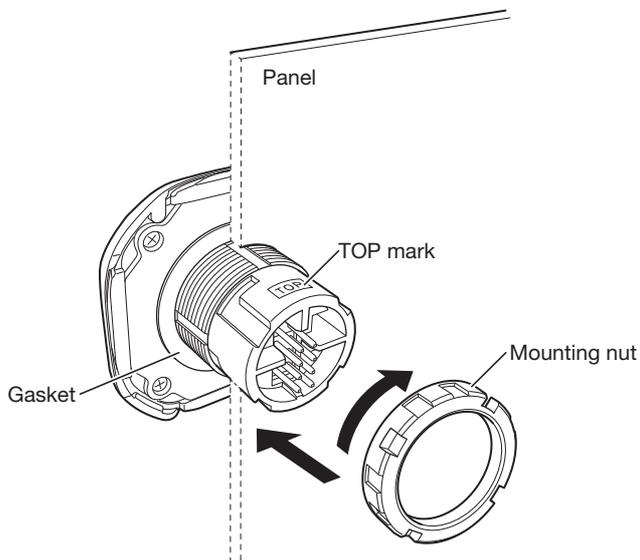
## Panel Mounting Method

This section describes how to mount the KW2D Series RFID Reader to the panel.

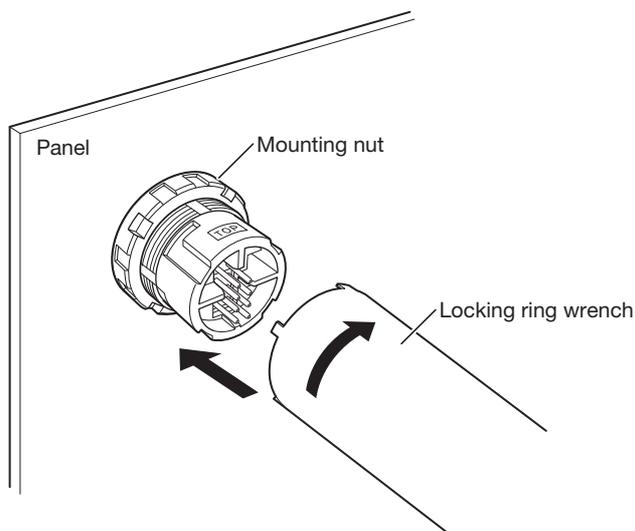
1. Separate the front unit and back unit. (page 3-2)
2. Remove the mounting nut from the front unit.



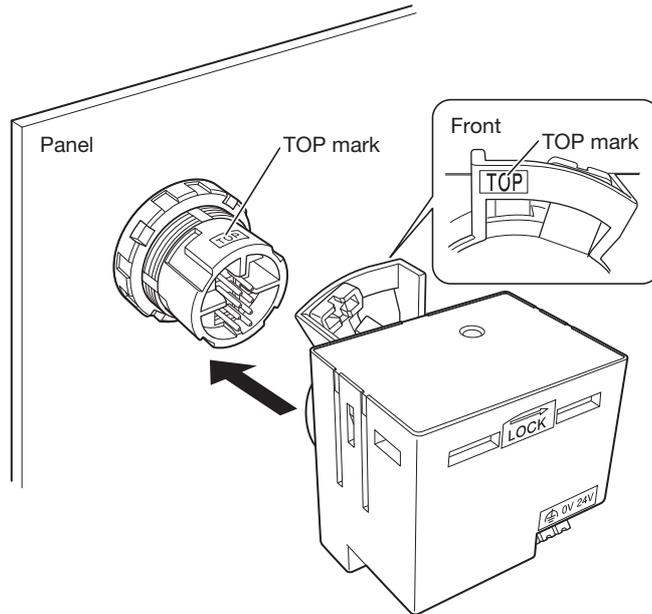
3. Insert the front unit into the mounting hole from the front of the panel, and then attach the mounting nut from the back of the panel.



4. Use the locking ring wrench to tighten the mounting nut to the specified tightening torque (2.0 N·m).



- Align the TOP marks on the front unit and the back unit, and then insert the back unit into the front unit.

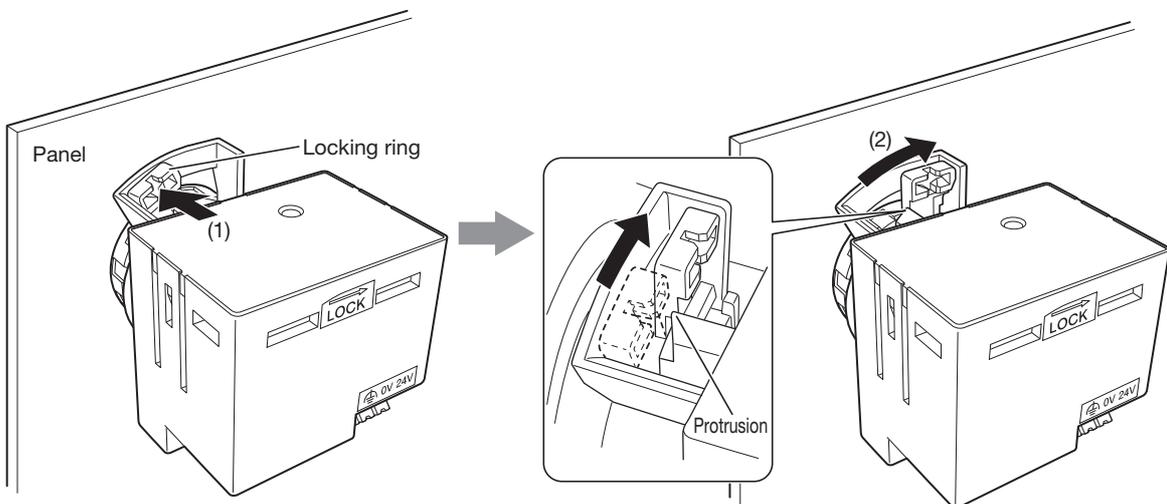


You cannot insert the back unit into the front unit if the locking ring is in the locked position. Always confirm that the locking ring is in the unlocked position.

- Confirm that the back unit is inserted fully into the front unit, and then while pressing the locking ring (1) on the back unit, push it in the direction indicated by "LOCK→" (2).



Confirm that the locking ring is on the other side of the protrusion. The lock is not fully engaged if the locking ring is not in the lock position on the other side of the protrusion.



This completes mounting the KW2D Series RFID Reader to the panel.



- When separating the front unit and back unit, switch the locking ring to the unlocked position (opposite direction of "LOCK→").
- Tighten the mounting nut to the specified tightening torque of 2.0 N·m.
- Use caution as the mounting nut may break if needle-nose pliers or another tool are used to tighten the mounting nut to more than the required torque.  
Locking ring wrench: IDEC type no. MW9Z-T1
- After attaching the back unit to the front unit, confirm that the back unit does not come off.

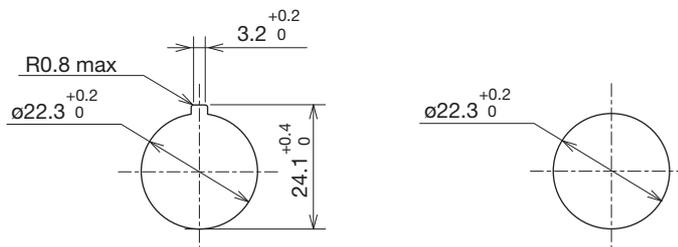


The KW2D Series RFID Reader can be mounted to metal panels (such as steel and aluminum) and resin panels (such as plastic).

## Drilling the Mounting Hole

### Mounting Hole Layout

Drill a mounting hole in the panel with the dimensions shown in one of the following diagrams.



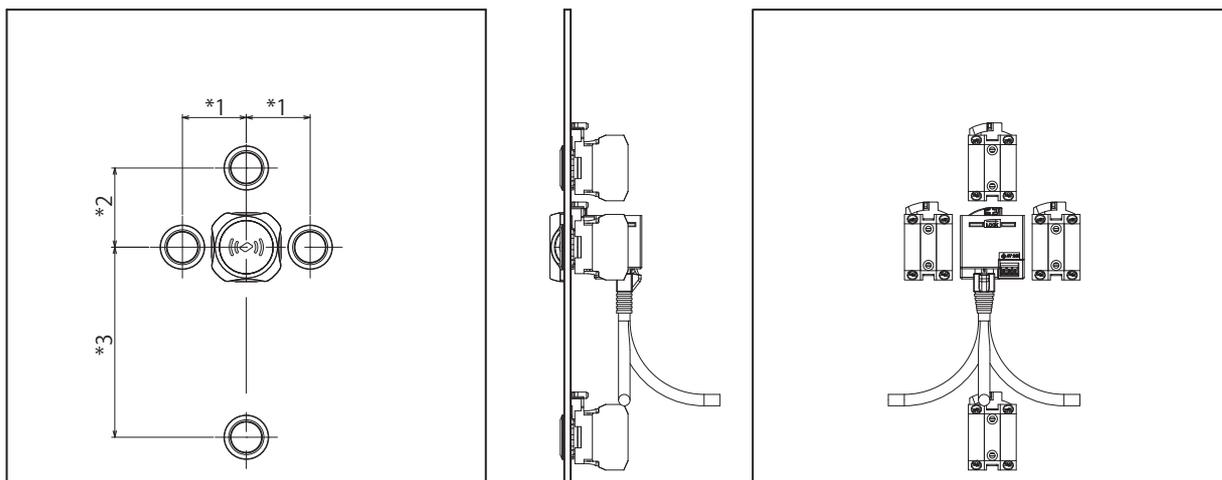
(Unit: mm)

### Mounting Centers Example

This example shows the centers when mounting the KW2D Series RFID Reader and IDEC switches on the same panel.



- The numeric values given in the following diagram are a guide for the restrictions on wiring in the panel. These numeric values will change depending on the cables that are used.
- Use centers that take into consideration the usability of tags (KEYFOB type/card type) and other obstructions.
- If multiple KW2D Series RFID Readers are installed close together, the radio waves will interfere and tags cannot be read.
- Ensure a space of 150 mm or more between the centers of neighboring front units.



	CW Series	LW Series	LBW Series
*1	40	38	36
*2	50	41	39
*3	120	115	115

(Unit: mm)

## Power Supply and Power Supply Wiring

This section describes the power supply connections of the KW2D Series RFID Reader.

### Power Supply



- Always turn off the power before wiring.
- Use SELV power supply that is reinforced or double-insulated from MAINS without any risk of electric shock, and Limited Energy (LIM) Circuit.
- Keep all wiring a sufficient distance away from high voltage and high current cables. Make wiring as short as possible.
- Carefully observe the precautions when wiring the product.
- Ground the functional ground terminal for stable operation of the product.

### Power Supply Voltage

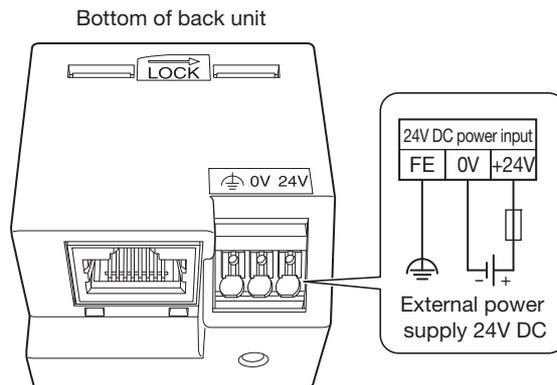
The power supply voltage that can be used with the KW2D Series RFID Reader is 20.4 to 28.8 V DC.



Do not use a power supply voltage outside this range.

### Power Supply Wiring

- The KW2D Series RFID Reader has a push-in type terminal block.
- An inrush current of 25 A or lower (when input is +24 V) flows when the power is turned on. Use a power supply with sufficient capacity.
- Make the power line as short as possible.
- Run the power line as far away as possible from motor lines.
- The following table shows the signals that correspond to the signal codes. Be careful not to mistake the connections.



Label/Symbol	Signal Wire
24 V	Power supply (+24 V)
0 V	Power supply (0 V)
	Functional ground (FE)

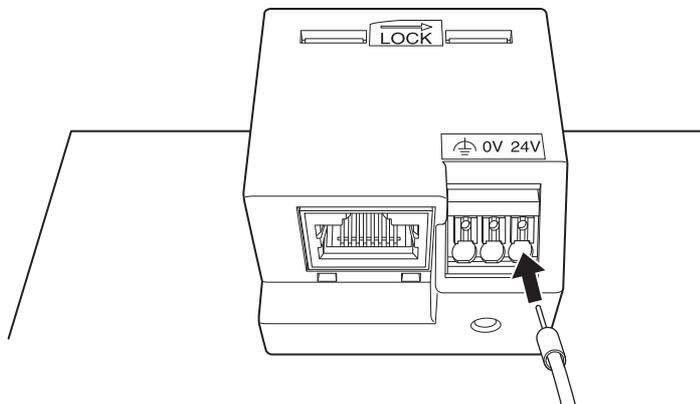
## Power Supply Terminal Block Wiring Method

This section describes the removal and attachment methods for terminals in the power supply terminal block.

### • Connecting the wire

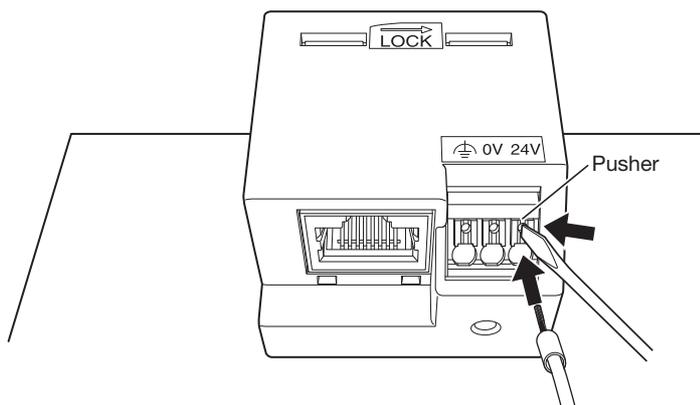
#### ■ Stranded wires with ferrules or solid wire

1. Insert the wire to the back of the wire port.
2. After wiring, tug lightly to make sure that the wire is properly connected.



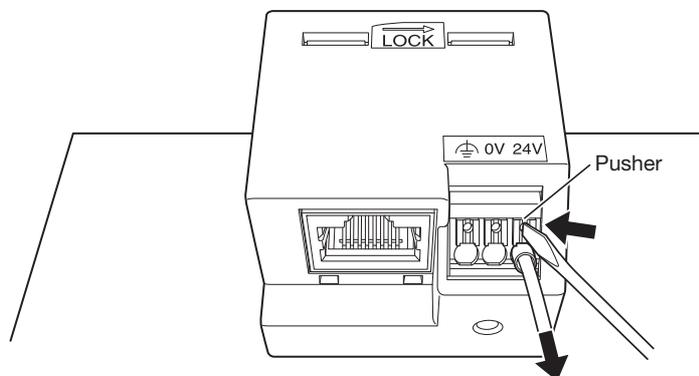
#### ■ Stranded wire

1. While pressing the pusher (white button) using a flat blade screwdriver. Insert the wire fully in the wiring port. Wire is connected when the pusher is released.
2. After wiring, tug lightly to make sure that the wire is properly connected.



### • Removing the Wire

1. Press the pusher with a flat blade screwdriver and pull the wire straight out.

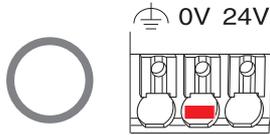


- Always turn off the power before working.
- Operate the pusher with about 20 N of force. The product may break and no longer function if you press with excessive force.
- The product may be damaged and no longer function if you pull out the wire without pressing the pusher or if you pull the wire at an angle.
- Take care with the insertion direction of the wires.
- After connecting a wire, tug lightly to make sure that the wire is properly connected.

• **Precautions When Inserting Wires**

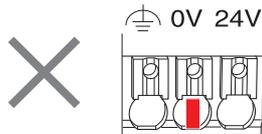
- Crimping dimensions: W2.1×H1.48 mm  
Maximum connectable crimping size is W2.1×H1.48. Make sure that the ferrule size will be smaller than this dimension. (Recommended crimping tool, see "Recommended Tools" on page 3-15.
- Connect the ferrules to the terminal block with the direction shown in the following diagram.

Ferrule: Longer direction is horizontal



- Do not insert the ferrules with the direction shown in the following diagram. The clamp and spring may break and no longer function.

Ferrule: Longer direction is vertical

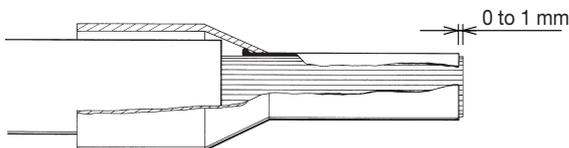


## Terminals

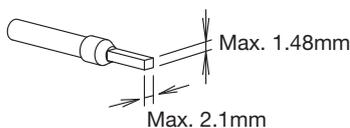
This section describes the type and usage method of terminals.

### Terminals for the Terminal Block

- Choose an appropriate ferrule for the wire.
- For details, see "Wire Size and Recommended Ferrules" on page 3-14.
- Cut the wire carefully to get a flat end.
- Make sure that ferrule sleeve is completely filled by the conductor. Depending on the cross section, the conductor should protrude approx. 0 to 1 mm from the ferrule sleeve.



- When crimping, refer to the instructions of the crimping tool.
- Crimping dimensions: W2.1×H1.48 mm  
Maximum connectable crimping size is W2.1×H1.48. Make sure that the ferrule size will be smaller than this dimension. (Recommended crimping tool, see "Recommended Tools" on page 3-15.



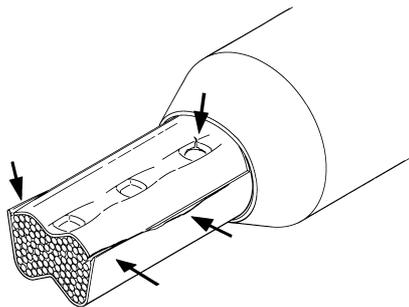
- If a tool other than the recommended crimping tool is used, the ferrule may not be crimped to the appropriate size and the Power supply terminals may be deformed and may not operate normally.
- Pin crimp terminals cannot be used.

### • Precautions When Crimping Wires

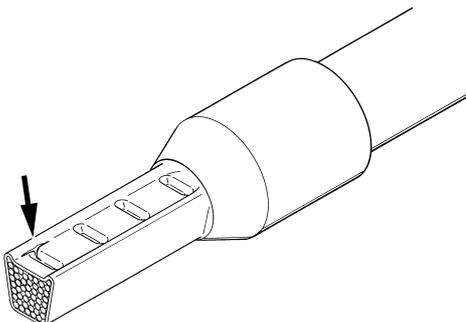
Observe the following precautions when crimping wires.

- Cracks along the sides and die impressions
- Splitting of the ferrules
- Asymmetrical crimping shape
- Extreme burrs formed along the sides
- Ferrule not filled by conductor
- Insulation cover damaged by the crimping jaw
- Conductor insulation not pushed into the insulated cover
- Ferrule bent longitudinally after crimping
- Single conductors pushed back by protruding from the insulated cover
- Single conductor squeezed off

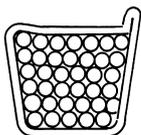
Formation of cracks at the sides. Sides split open



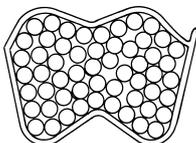
Formation of cracks at the impressions of the crimping jaw.



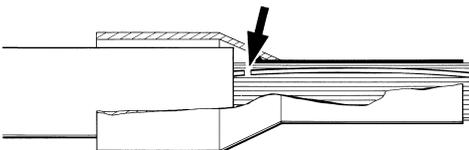
Asymmetrical crimping shape. Burr formation on one side.



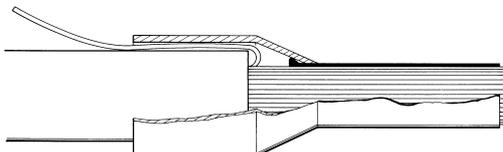
Asymmetrical crimping shape. Burr formation on one side.



Single conductor squeezed off.



Single conductor pushed back.



## Applicable Wire

When wiring, use the applicable wires shown below.

To crimp the ferrules shown below, use a special crimping tool.

To the terminal block, use the recommended screwdriver. The recommended ferrules and tools are manufactured by Weidmüller.

### • Applicable Wire and Specifications

Applicable Wire	0.25 to 1.5 mm <sup>2</sup> (AWG16 to 24)
Wire Strip Length <sup>*1</sup>	8±1 mm <sup>*2</sup>
Ferrule Size <sup>*1</sup>	H0.5 to H1.5 (without insulated cover)
	H0.25 to H0.75 (with insulated cover)

\*1. For details on ferrules, see "Wire Size and Recommended Ferrules" table below.

\*2. Strip the sheath of the wire 8±1 mm from the end.



Make sure that the stranded wires do not loosen when using wiring without ferrules.

### • Wire Size and Recommended Ferrules

Numbers in parentheses are order numbers for Weidmüller products.

#### Ferrules without Insulated Covers

Applicable Wire (Stranded Wire)		Wire Strip Length	Model Number (Order Number)
AWG	mm <sup>2</sup>		
20	0.50	10 to 11 mm	H0.5/10 (9004050000)
18	0.75	10 to 11 mm	H0.75/10 (0542500000)
17	1.00	10 to 11 mm	H1.0/10 (0282800000)
16	1.50	10 to 11 mm	H1.5/10 (0186500000)

#### Ferrules with Insulated Covers

Applicable Wire (Stranded Wire)		Wire Strip Length	Model Number (Order Number)
AWG	mm <sup>2</sup>		
24	0.25	10 to 11 mm	H0.25/12 HBL (9025760000)
22	0.34	10 to 11 mm	H0.34/12 TK (9025770000)
20	0.50	10 to 11 mm	H0.5/14 OR (0690700000)
20	0.50	10 to 11 mm	H0.5/14S OR (9004560000) <sup>*1</sup>
20	0.50	10 to 11 mm	H0.5/14S W (9004590000) <sup>*1</sup>
18	0.75	10 to 11 mm	H0.75/14 W (0462900000)

\*1 UL wire compatible with insulated cover

## Recommended Tools

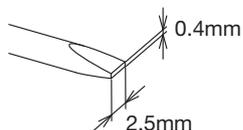
The following recommended tools can be used. The recommended tools are manufactured by Weidmüller.

Tool Name		Model Number (Order Number)
Flat blade screwdriver	Normal type	SDS 0.4×2.5×75 (9009030000)
	With insulated cover	SDIS 0.4×2.5×75 (9008370000)
Crimping tool		PZ6/5 (90011460000)



Caution

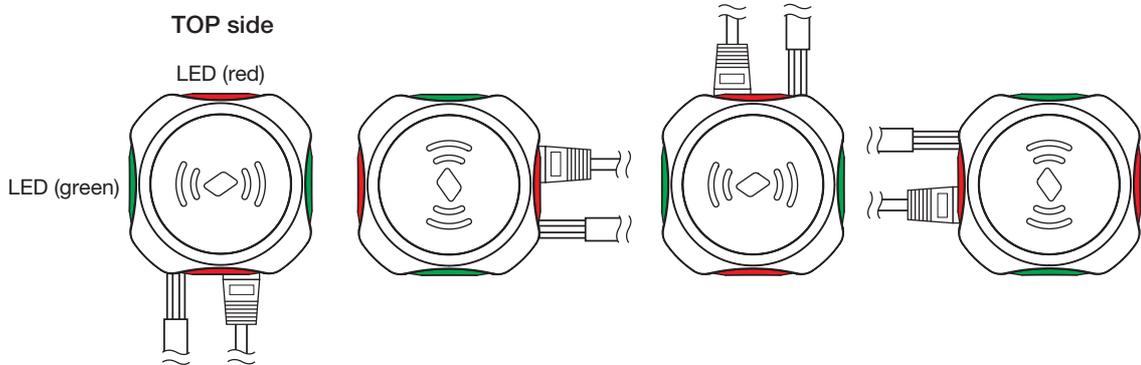
- Do not touch live terminals. There is a risk of electric shock.
- Do not touch the power supply terminals immediately after turning the power off. There is a risk of electric shock.
- When powered, the terminals that are connected to external devices may become hot. Do not touch the terminals immediately after turning the power off.
- Insert the wire all the way to the tip of the ferrule and crimp it.
- Only one wire can be inserted in one connector hole. Do not attach two or more wires to one connector hole.
- If you use a tool other than the recommended tools, the wire cannot be crimped into the appropriate shape. This may deform Power supply terminals and cause the product to no longer function correctly.
- If you use a crimping tool other than the recommended crimping tool, be careful regarding the dimensions of the crimp. For details on the dimensions, see the crimp dimensions listed in "Terminals for the Terminal Block" on page 3-12.
- Use a flat blade screwdriver with a tip 2.5 mm wide and 0.4 mm high.



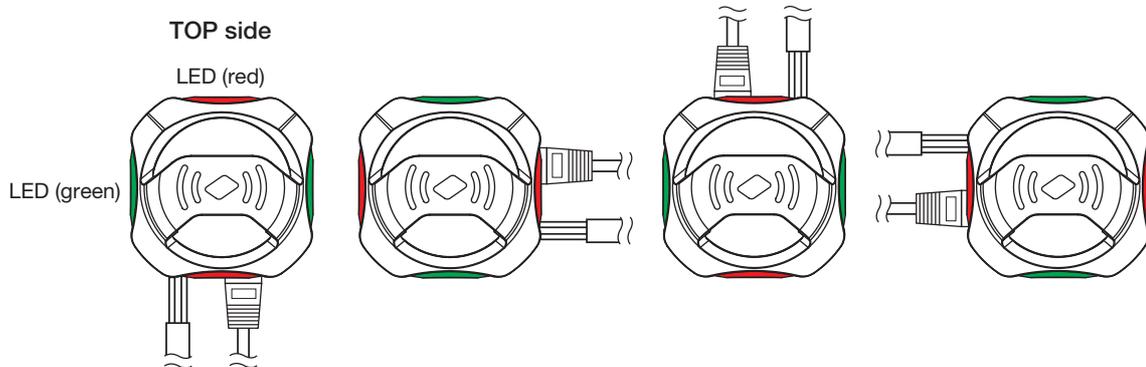
## Wiring Directions and Panel Indicators

This section describes the wiring directions of the KW2D Series RFID Reader and the LED indicators on the front unit.  
The position of the LED indicators (green and red) on the front unit changes according to the wiring direction.

### ■ KW2D-R



### ■ KW2D-RH



The above illustration of the KEYFOB tag holder type (Type number: KW2D-RH) shows examples of the directions of the LED indicators and wiring.

Attach the front cover according to the wiring direction.

When changing the direction of the wiring, change the front cover so the KEYFOB tag can be inserted from the top. For information on attaching the front cover, see "Front Cover Removal and Attachment Methods" on page 3-4.

# Chapter 4 KW RFID Configurator

This chapter describes the KW RFID Configurator.

## Overview of the KW RFID Configurator

The KW RFID Configurator is software used to configure settings for KW2D Series RFID Reader and to check its operation.

### Operating Environment

The operating environment of the KW RFID Configurator is as follows.

Item	Description
OS	Windows 10
CPU	1.0 GHz or faster
Memory	1 GB or more
Environment	Microsoft .NET Framework 4.0 or higher

### Installing the Software

This section describes the procedure to install the KW RFID Configurator.

1. Download the KW RFID Configurator installer from the download site on the IDEC homepage.
2. Double-click the downloaded installer. The installer window is displayed. Install the software by following the on-screen instructions. This concludes installing the KW RFID Configurator.

### Uninstalling the Software

This section describes the procedure to uninstall the KW RFID Configurator.

1. Right the [Start] button and click [Apps and Features].  
[Apps & features] is displayed.
2. Select "KW RFID Configurator" and click the [Uninstall] button.  
The setup program is started.
3. Click the [Yes] button on the uninstall confirmation message.  
The selected application is deleted.  
This concludes uninstalling the KW RFID Configurator.

### Starting and Exiting the Software

#### • Starting the KW RFID Configurator

This section describes the procedure to start the KW RFID Configurator.

1. Click the [Start] button and then click [KW RFID Configurator].  
This starts the KW RFID Configurator.

#### • Exiting the KW RFID Configurator

This section describes the procedure to exit the KW RFID Configurator.

1. Click the [x] button at the top right of the window.  
This exits the KW RFID Configurator.



You can also start the KW RFID Configurator by double-clicking its icon on the desktop.

- **Checking the KW RFID Configurator Version Number**

This section describes the procedure to check the KW RFID Configurator version.

1. On the menu bar, click [Help] > [Version].  
The [About KW RFID Configurator] dialog box is displayed.
2. You can check the KW RFID Configurator version with this dialog box.



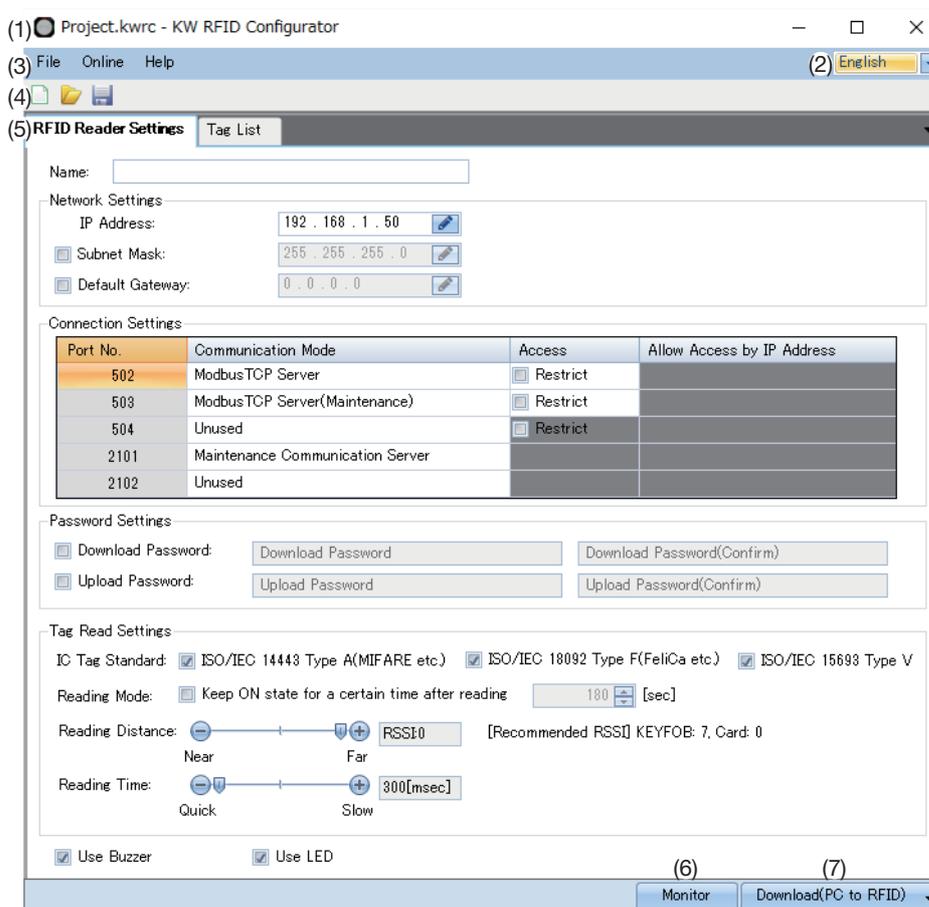
When finished, click [OK] button.

This concludes the procedure to check the KW RFID Configurator version.

## Configuration and Functions

### Configuration of the KW RFID Configurator

This chapter describes the names and functions of the elements that make up the KW RFID Configurator.



#### (1) Title bar

Displays the name of the project being edited and the name of the software "KW RFID Configurator".

#### (2) Language

Select the display language of the software from the following.  
"Japanese", "English", or "Chinese"

#### (3) Menu bar

Displays commands to create a project and transfer the project to the KW2D Series RFID Reader.  
For details, see "Menu Bar Commands" on page 4-4.

#### (4) Toolbar

Displays command buttons to create a new project, open a project, and save a project.  
For details, see "Toolbar" on page 4-16.

#### (5) Settings tabs

Configures the basic settings of the KW2D Series RFID Reader and sets the authority of RFID tag UIDs.  
For details, see "Settings Tabs" on page 4-17.

#### (6) Monitor

Monitors a KW2D Series RFID Reader. This is the same function as [Online] > [Monitor] on the menu bar. For details, see "Online" on "(3) Monitor" on page 4-7.

#### (7) Download

Downloads the project or tag list only to the KW2D Series RFID Reader. This is the same function as [Online] > [Download] on the menu bar. For details, see "Online" on "(1) Download(PC to RFID)" on page 4-7.

## Menu Bar Commands

The commands that can be executed from the menu bar are as follows.

- **File**

Command	Description
New Project	Creates a new project.
Open Project	Opens a created project.
Save Project	Saves the project being edited.
Save Project As	Saves the project being edited with a new name.
Project Property	Configures the properties of the project.

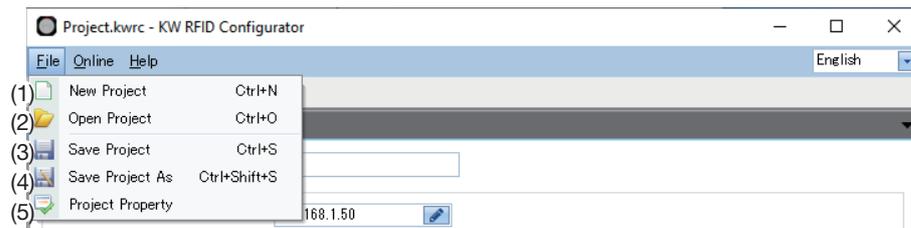
- **Online**

Command	Description
Download(PC to RFID)	Downloads the project or tag list only to the KW2D Series RFID Reader.
Upload(RFID to PC)	Uploads the project from the KW2D Series RFID Reader.
Monitor	Monitors a KW2D Series RFID Reader.
Communication Settings	Configures the details of maintenance communication.
Reset RFID Reader to factory settings	Resets a KW2D Series RFID Reader to the factory settings.

- **Help**

Command	Description
Manual	Displays the included manual (this PDF).
Version	Displays version information about the KW RFID Configurator.

## File



### (1) New Project

Creates a new project.



A confirmation message is displayed if the project being edited is not saved.

- To save the project, click the [Yes] button. A new project will be created after the project is saved.
- To discard the changes to the project, click the [No] button. A new project will be created without saving the project.
- Click the [Cancel] button to return to the KW RFID Configurator.

### (2) Open Project

Opens a created project.

The [Open] dialog box is displayed. Select a project file (\*.kwrc) and click the [Open] button.



- A confirmation message is displayed if the project being edited is not saved.
  - To save the project, click the [Yes] button. The [Open] dialog box is displayed after saving the project.
  - To discard the changes to the project, click the [No] button. The [Open] dialog box is displayed without saving the project.
  - Click the [Cancel] button to return to the KW RFID Configurator.
- If a project password was set, the [Confirm Password] dialog box is displayed. Enter the password and click the [OK] button. The project password is set on the [Project Property] dialog box. For details, see "[Project Property] Dialog Box" on page 4-6.
- A project created with a new version of the KW RFID Configurator cannot be opened with an old version of the software.

### (3) Save Project

Saves the project being edited.

If a new project was created, the [Save Project As] dialog box is displayed. Enter the file name (\*.kwrc) and click the [Save] button to save the project file.

### (4) Save Project As

Saves the project being edited with a new name.

The [Save Project As] dialog box is displayed. Enter the file name (\*.kwrc) and click the [Save] button to save the project file.

### (5) Project Property

Configures the project password and character encoding for the tag list.

The [Project Property] dialog box is displayed. For details, see "[Project Property] Dialog Box" on page 4-6.

- [Project Property] Dialog Box



**(1) Use Project Password**

Select this check box to password protect access to the project file.

The [Confirm Password] dialog box is displayed when you open a created project from [File] > [Open Project] on the menu bar.

**(2) Password**

Enter the password. The entered characters are masked with \* (asterisks).

The length of the password is 8 to 16 characters. Only single-byte alphanumeric characters and symbols can be used.

The password can be set only when the [Use Project Password] check box is selected.



Manage the password appropriately so that third parties do not know it. If you forget the password to a project, you can no longer open that project file.

**(3) Password(Confirm)**

Enter the same password that you entered in [Password].

**(4) Character Code of Tag List**

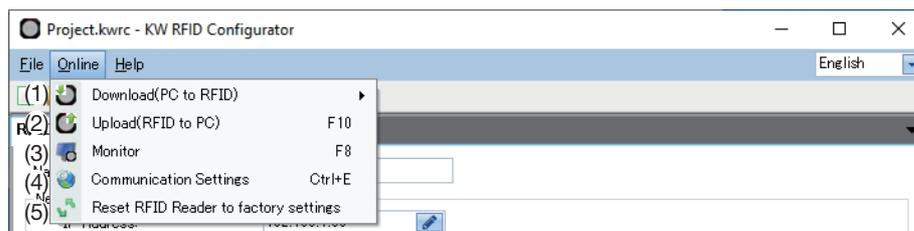
Select the character encoding that is used in the tag list from the following.

"UTF-8", "ASCII", "Japanese (Shift-JIS)", "Chinese (GB2312)", or "European (ISO 8859-1)"



If there are characters in the tag list that cannot be converted using the selected character encoding, those characters are displayed as "?".

## Online



### (1) Download(PC to RFID)

Downloads the project to the KW2D Series RFID Reader.

- All Settings : Downloads all settings in the project to the KW2D Series RFID Reader. The [Download(PC to RFID)] dialog box is displayed. For details, see "[Download(PC to RFID)] Dialog Box" on page 4-8.
- Tag List Only : Downloads only the tag list settings in the project to the KW2D Series RFID Reader. The tag list settings can be downloaded to multiple KW2D Series RFID Readers (50 maximum). The [Tag List Download(PC to RFID)] dialog box is displayed. For details, see "[Tag List Download (PC to RFID)] Dialog Box" on page 4-9.

### (2) Upload(RFID to PC)

Uploads the project from the KW2D Series RFID Reader.

The [Upload(RFID to PC)] dialog box is displayed. For details, see "[Upload(RFID to PC)] Dialog Box" on page 4-10.

### (3) Monitor

Monitors a KW2D Series RFID Reader.

The [RFID Reader Monitor] dialog box is displayed. For details, see "[RFID Reader Monitor] Dialog Box" on page 4-11.

### (4) Communication Settings

Configures the timeout used in maintenance communication and the network adapter in the computer that is used.

The [Communication Settings] dialog box is displayed. For details, see "[Communication Settings] Dialog Box" on page 4-12.

### (5) Reset RFID Reader to factory settings

Resets a KW2D Series RFID Reader to the factory settings.

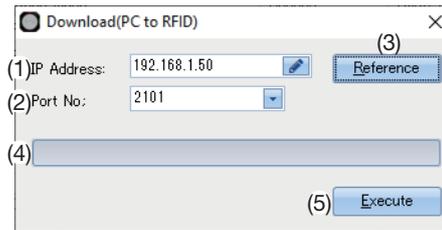
The [Reset RFID Reader to factory settings] dialog box is displayed. For details, see "[Reset RFID Reader to factory settings] Dialog Box" on page 4-13.



If you download a project to the KW2D Series RFID Reader and change its IP address, the computer may no longer recognize the KW2D Series RFID Reader, depending on the operating environment. The KW2D Series RFID Reader is recognized by waiting briefly before making the connection or by disconnecting and then reconnecting the Ethernet cable connected to the computer.

### • [Download(PC to RFID)] Dialog Box

This dialog box is used to download all settings in the project to the KW2D Series RFID Reader.



#### (1) IP Address

Specifies the IP address of the target KW2D Series RFID Reader.

#### (2) Port No.

Select the port number of the target KW2D Series RFID Reader from "2101" or "2102".

#### (3) [Reference] button

The [RFID Reader List] dialog box is displayed. Specify the IP address of the target KW2D Series RFID Reader with the [RFID Reader List] dialog box. For details, see "[RFID Reader List] Dialog Box" on page 4-14.

#### (4) Progress bar

Displays the progress of the download.

#### (5) [Execute] button

Executes the download of the project.

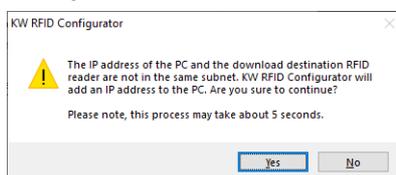


- A confirmation message is displayed if the System Software version of the KW2D Series RFID Reader differs from the version included with KW RFID Configurator.

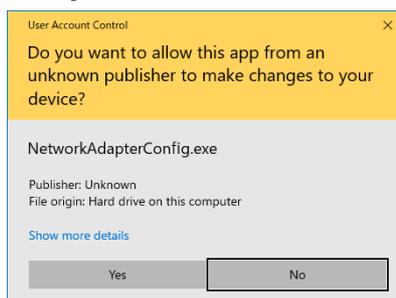
- To update the System Software of the KW RFID Configurator, click the [Yes] button. The System Software of the KW2D Series RFID Reader will be updated and the download will start.
- To keep the System Software of the KW RFID Configurator, click the [No] button. The download will start without updating the System Software of the KW2D Series RFID Reader.
- Click the [Cancel] button to return to the KW RFID Configurator.
- If a download password was set for the KW2D Series RFID Reader project, the [Confirm Password] dialog box is displayed. Enter the password and click the [OK] button. The download will start only if the password matches. For the download password, see "(4) Password Settings" on page 4-18.
- If the IP address of the KW2D Series RFID Reader connected by the Ethernet cable is not in the same subnet as the computer running KW RFID Configurator, you must set an IP address in the same subnet for the computer. The KW RFID Configurator has a function to add an IP address in the same subnet as the KW2D Series RFID Reader to the computer. Click the [Yes] button on Message 1. Message 2 is displayed. Click the [Yes] button on Message 2. The IP address is automatically added.

This function is available in functions that connect to the RFID reader, such as downloading, uploading, and monitoring.

- Message 1

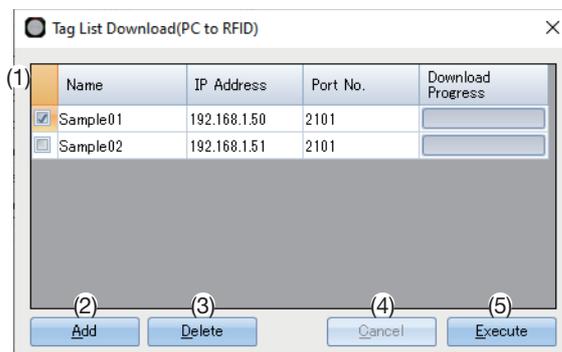


- Message 2



### • [Tag List Download (PC to RFID)] Dialog Box

This dialog box is used to download only the tag list settings in the project to the KW2D Series RFID Reader. The tag list settings can be batch downloaded to multiple KW2D Series RFID Readers (50 maximum).



#### (1) List of download targets

Displays the list of target KW2D Series RFID Readers.

(Download target check box): Select this check box to download the tag list to the corresponding KW2D Series RFID Reader.

Name : Displays the name of the KW2D Series RFID Reader.

IP Address : Displays the IP address of the KW2D Series RFID Reader.

Port No. : Displays the port number of the KW2D Series RFID Reader.

Download Progress : Displays the progress of the download.

"Completed" is displayed when the download finishes normally. "Failed" is displayed when the download finishes with an error.

#### (2) [Add] button

Adds a KW2D Series RFID Reader to the list of download targets.

The [RFID Reader List] dialog box is displayed. Specify the IP address of the target KW2D Series RFID Reader with the [RFID Reader List] dialog box. For details, see "[RFID Reader List] Dialog Box" on page 4-14.

#### (3) [Delete] button

Deletes the selected KW2D Series RFID Reader from the list of download targets.

#### (4) [Cancel] button

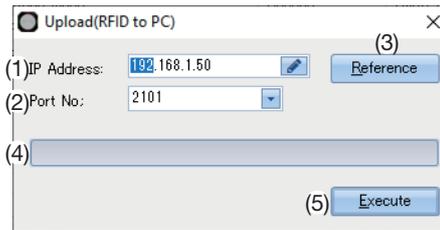
Cancels the download of the tag list and returns to the KW RFID Configurator.

#### (5) [Execute] button

Executes the download of the tag list.

- **[Upload(RFID to PC)] Dialog Box**

This dialog box is used to upload the project from the KW2D Series RFID Reader.



**(1) IP Address**

Specifies the IP address of the source KW2D Series RFID Reader.

**(2) Port No.**

Select the port number of the source KW2D Series RFID Reader from "2101" or "2102".

**(3) [Reference] button**

The [RFID Reader List] dialog box is displayed. Specify the IP address of the source KW2D Series RFID Reader with the [RFID Reader List] dialog box. For details, see "[RFID Reader List] Dialog Box" on page 4-14.

**(4) Progress bar**

Displays the progress of the upload.

**(5) [Execute] button**

Executes the upload of the project.



If an upload password was set for the KW2D Series RFID Reader project, the [Confirm Password] dialog box is displayed. Enter the password and click the [OK] button. The upload will start only if the password matches. For the upload password, see "(4) Password Settings" on page 4-18.

## • [RFID Reader Monitor] Dialog Box

This dialog box is used to monitor a KW2D Series RFID Reader.

No.	IC Tag Standard	UID	Authority
1	ISO/IEC 15693 Type V	E0070000003382FA	1
2	ISO/IEC 15693 Type V	E0070000003382FB	1
3	ISO/IEC 15693 Type V	E0070000003382FC	Unregistered

### (1) IP Address

Specifies the IP address of the KW2D Series RFID Reader to monitor.

### (2) Port No.

Select the port number of the KW2D Series RFID Reader to monitor from "2101" or "2102".

### (3) [Reference] button

The [RFID Reader List] dialog box is displayed. Specify the KW2D Series RFID Reader to monitor with the [RFID Reader List] dialog box. For details, see "[RFID Reader List] Dialog Box" on page 4-14.

### (4) [Connect] button / [Disconnect] button

Connects or disconnects the KW2D Series RFID Reader to monitor.

The [IP Address], [Port No.], and [Reference] buttons are disabled while the KW2D Series RFID Reader is connected.



- When connecting to a KW2D Series RFID Reader, monitoring will start if the KW RFID Configurator tag list and the tag list in the KW2D Series RFID Reader are the same. If the KW RFID Configurator tag list and the tag list in the KW2D Series RFID Reader are different, a confirmation message will be displayed.
  - To upload the tag information from the tag list in the KW2D Series RFID Reader and then connect to the RFID reader, click the [Yes] button.
  - To connect to the KW2D Series RFID Reader without uploading the tag information from its internal tag list, click the [No] button. However, it is recommended to perform the upload before monitoring.
  - Click the [Cancel] button to return to the [RFID Reader Monitor] dialog box without starting monitoring.
- When connecting to a KW2D Series RFID Reader, if previously read tag information exists in the tag list, a confirmation message is displayed.
  - To discard the tag information and connect to the RFID reader, click the [Yes] button.
  - To keep the tag information and connect to the RFID reader, click the [No] button.

**(5) Target Information**

Displays information on the KW2D Series RFID Reader to monitor.

Name	: Displays the name of the KW2D Series RFID Reader.
System Software	: Displays the System Software version of the KW2D Series RFID Reader.
Online/Offline	: Displays the connection status between the KW RFID Configurator and the KW2D Series RFID Reader.

**(6) List of tag information**

Displays the list of tag information read by the KW2D Series RFID Reader. A maximum of 50 items of tag information can be displayed. Tag information is not displayed for the 51st and subsequent items.

No.	: Displays the number (1 to 50) of the tag information that was read.
IC Tag Standard	: Displays the RFID tag standard of the tag information that was read.
UID	: Displays the UID of the tag information that was read.
Authority	: Displays the authority of the tag information that was read. "Unregistered" is displayed if the authority was not registered.

**(7) [Save unregistered UID to Tag List] button**

Registers UIDs with [Authority] set to [Unregistered] to the tag list of the project being edited.

A confirmation message is displayed. Click the [Yes] button. The KW2D Series RFID Reader is disconnected and the UIDs are registered to the tag list.

Click the [No] button to return to the [RFID Reader Monitor] dialog box without registering UIDs.

**(8) [Clear] button**

Deletes the tag information read from the KW2D Series RFID Reader from the list of tag information.

A confirmation message is displayed. Click the [Yes] button.

Click the [No] button to return to the [RFID Reader Monitor] dialog box without deleting the tag information.

**(9) [Finish] button**

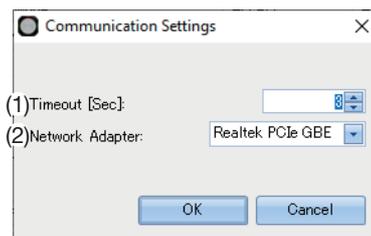
Closes the [RFID Reader Monitor] dialog box and returns to the KW RFID Configurator.

A confirmation message is displayed when connected to a KW2D Series RFID Reader. Click the [Yes] button.

Click the [No] button to return to the [RFID Reader Monitor] dialog box.

- **[Communication Settings] Dialog Box**

This dialog box is used to configure the timeout used in maintenance communication and the network adapter in the computer that is used.

**(1) Timeout**

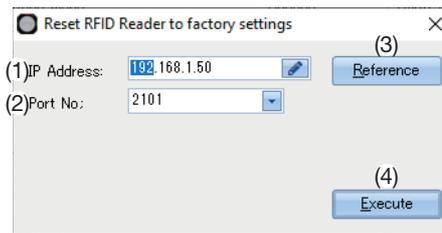
Sets the timeout used in maintenance communication (3 to 10 sec).

**(2) Network Adapter**

Select the network adapter in the computer that is used. Only enabled network adapters are displayed. Disabled network adapters, such as those not connected with an Ethernet cable, are not displayed.

### • [Reset RFID Reader to factory settings] Dialog Box

This dialog box is used to reset a KW2D Series RFID Reader to the factory settings.



#### (1) IP Address

Specifies the IP address of the KW2D Series RFID Reader to reset to the factory settings.

#### (2) Port No.

Select the port number of the KW2D Series RFID Reader to reset to the factory settings from "2101" or "2102".

#### (3) [Reference] button

The [RFID Reader List] dialog box is displayed. Specify the KW2D Series RFID Reader to reset to the factory settings with the [RFID Reader List] dialog box. For details, see "[RFID Reader List] Dialog Box" on page 4-14.

#### (4) [Execute] button

Executes the reset of the KW2D Series RFID Reader.

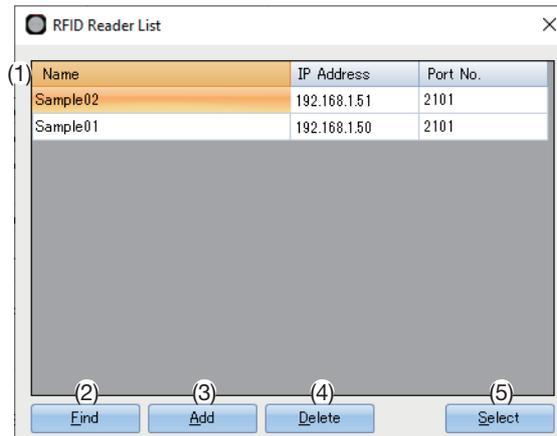
A confirmation message is displayed. Hold an RFID tag with factory reset authority up to the KW2D Series RFID Reader to reset within 30 seconds.

- If an RFID tag set with factory reset authority is recognized, a message asking to perform the initialization is displayed. Click the [OK] button within 3 sec.
- If an RFID tag set with factory reset authority is not recognized, a reset failed message is displayed. Click the [OK] button. You are returned to the [Reset RFID Reader to factory settings] dialog box without resetting the RFID reader.

For details on factory reset authority, see "(5) Factory reset authority" on page 4-21.

### • [RFID Reader List] Dialog Box

This dialog box is used to manage the KW2D Series RFID Readers that connect to the computer over maintenance communication.



#### (1) Target list

Displays the list of target KW2D Series RFID Readers.

Name : Displays the name of the KW2D Series RFID Reader. To change the name, enter the new name when the cell is selected.

IP Address : Displays the IP address of the KW2D Series RFID Reader. To change the IP address, enter the new IP address when the cell is selected.

Port No. : Displays the port number of the KW2D Series RFID Reader. To change the port number, click the cell when selected, and then select the port number from "2101" or "2102".

#### (2) [Find] button

Searches for KW2D Series RFID Reader on the same network that can be connected to the computer over maintenance communication.

Information on KW2D Series RFID Readers that were found is added to the target list. A maximum of 50 devices can be added.

#### (3) [Add] button

Adds a target KW2D Series RFID Reader to the target list.

A new row is added to the target list. Set the name, IP address, and port number. A maximum of 50 devices can be added.

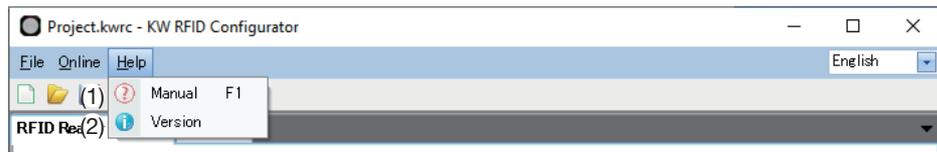
#### (4) [Delete] button

Deletes a target KW2D Series RFID Reader from the target list.

#### (5) [Select] button

Returns to the original dialog box and registers the KW2D Series RFID Reader selected in the target list.

## Help



### (1) Manual

Displays the included manual (PDF).

### (2) Version

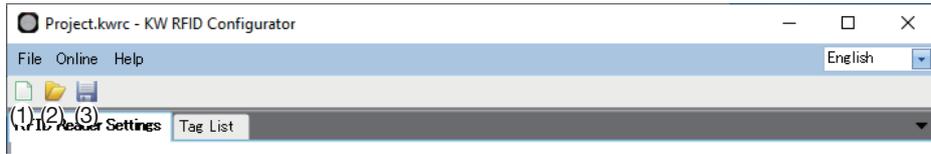
Displays version information about the KW RFID Configurator.

The [About KW RFID Configurator] dialog box is displayed. You can check the KW RFID Configurator version with this dialog box. For details, see "Checking the KW RFID Configurator Version Number" on page 4-2.

## Toolbar

---

Command buttons to create a new project, open a project, and save a project are located on the toolbar.



### (1) New Project

Creates a new project. For details, see "(1) New Project" on page 4-5.

### (2) Open Project

Displays a created project. For details, see "(2) Open Project" on page 4-5.

### (3) Save Project

Saves the project being edited.

If a new project was created, the [Save Project As] dialog box is displayed. Enter the file name (\*.kwrc) and click the [Save] button to save the project file.

## Settings Tabs

These tabs are used to configure the basic settings of the KW2D Series RFID Reader and to set the authority of RFID tag UIDs.

### • [RFID Reader Settings] Tab

This tab is used to configure the basic settings of the KW2D Series RFID Reader.

The screenshot shows the 'RFID Reader Settings' window with the following sections:

- (1) Name:** A text input field.
- (2) Network Settings:**
  - IP Address: 192 . 168 . 1 . 50
  - Subnet Mask: 255 . 255 . 255 . 0
  - Default Gateway: 0 . 0 . 0 . 0
- (3) Connection Settings:** A table with columns: Port No., Communication Mode, Access, and Allow Access by IP Address.
 

Port No.	Communication Mode	Access	Allow Access by IP Address
502	ModbusTCP Server	<input type="checkbox"/> Restrict	
503	ModbusTCP Server(Maintenance)	<input type="checkbox"/> Restrict	
504	Unused	<input type="checkbox"/> Restrict	
2101	Maintenance Communication Server		
2102	Unused		
- (4) Password Settings:**
  - Download Password: Download Password, Download Password(Confirm)
  - Upload Password: Upload Password, Upload Password(Confirm)
- (5) Tag Read Settings:**
  - IC Tag Standard:  ISO/IEC 14443 Type A(MIFARE etc.)  ISO/IEC 18092 Type F(FeliCa etc.)  ISO/IEC 15693 Type V
  - Reading Mode:  Keep ON state for a certain time after reading 180 [sec]
  - Reading Distance: Near to Far slider, RSSI0 [Recommended RSSI] KEYFOB: 7, Card: 0
  - Reading Time: Quick to Slow slider, 300[msec]
- (6) Use Buzzer:**
- (7) Use LED:**

Buttons at the bottom: Monitor, Download(PC to RFID)

#### (1) Name

Enter the name of the KW2D Series RFID Reader. Up to 16 bytes can be set as ASCII characters.

#### (2) Network Settings

Sets information for connecting the KW2D Series RFID Reader to a network.

- IP Address** : Specifies the IP address of the KW2D Series RFID Reader. (The default value is "192.168.1.50")  
The input format is "xxx.xxx.xxx.xxx". "xxx" stands for a numeric value from 0 to 255.  
Ensure that IP addresses are unique when connecting multiple devices to the same network.
- Subnet Mask** : To change the subnet mask of the KW2D Series RFID Reader, select this check box and specify the subnet mask.  
The input format is "xxx.xxx.xxx.xxx". "xxx" stands for a numeric value from 0 to 255.  
Set the same value on all devices. If this check box is cleared, the value is "255.255.255.0".
- Default Gateway** : To change the default gateway of the KW2D Series RFID Reader, select this check box and specify the default gateway.  
The input format is "xxx.xxx.xxx.xxx". "xxx" stands for a numeric value from 0 to 255.  
Set this value to use a router. Leave this value blank if not required.

**(3) Connection Settings**

Sets the connections to use for the KW2D Series RFID Reader. The port numbers used in Ethernet communication by the KW2D Series RFID Reader and the assigned communication modes are as follows.

- 502 : "ModbusTCP Server" is the assigned communication mode.  
To restrict access to the KW2D Series RFID Reader, select the [Restrict] check box, and then enter the IP address from which access is allowed in the [Allow Access by IP Address] field.
- 503 : "ModbusTCP Server(Maintenance)" is the assigned communication mode.  
To restrict access to the KW2D Series RFID Reader, select the [Restrict] check box, and then enter the IP address from which access is allowed in the [Allow Access by IP Address] field.
- 504 : Select "Unused" or "ModbusTCP Server(Maintenance)" for the communication mode.  
If "ModbusTCP Server(Maintenance)" is selected, access to the KW2D Series RFID Reader can be restricted. To restrict access to the KW2D Series RFID Reader, select the [Restrict] check box, and then enter the IP address from which access is allowed in the [Allow Access by IP Address] field.
- 2101 : "Maintenance Communication Server" is the assigned communication mode.
- 2102 : Select "Unused" or "Maintenance Communication Server" for the communication mode.

**(4) Password Settings**

- Download Password : Select this check box to password protect downloading the project to the KW2D Series RFID Reader.
- Download Password : Enter the password. The entered characters are masked with \* (asterisks).  
The length of the password is 8 to 16 characters. Only single-byte alphanumeric characters and symbols can be used.  
The password can be set only when the [Download Password] check box is selected.
- Download Password(Confirm) : Enter the same password that you entered in [Download Password].
- Upload Password : Select this check box to password protect uploading the project from the KW2D Series RFID Reader.
- Upload Password : Enter the password. The entered characters are masked with \* (asterisks).  
The length of the password is 8 to 16 characters. Only single-byte alphanumeric characters and symbols can be used.  
The password can be set only when the [Upload Password] check box is selected.
- Upload Password(Confirm) : Enter the same password that you entered in [Upload Password].



Manage the passwords appropriately so that third parties do not know them. If you forget the download password, use the [Reset RFID Reader to factory settings] function in the KW RFID Configurator to reset the RFID reader. The project saved in the KW2D Series RFID Reader will be deleted and the settings will be reset to the factory settings. For details, see "[Reset RFID Reader to factory settings] Dialog Box" on page 4-13.

**(5) Tag Read Settings**

- IC Tag Standard : Select the check boxes of the IC tag standards to read with the KW2D Series RFID Reader. "ISO/IEC 14443 Type A(MIFARE etc.)", "ISO/IEC 18092 Type F(FeliCa etc.)", "ISO/IEC 15693 Type V"
- Reading Mode : To keep the ON state for a certain amount of time after reading the RFID tag, select the [Keep ON state for a certain time after reading] check box and specify the amount of time to keep the ON state (1 to 28,800 sec).
- Reading Distance : Specify the distance at which the KW2D Series RFID Reader can read RFID tags in 8 steps by sliding the slider or clicking /.
- The RSSI value (0 to 7) of each specified step is displayed to the right of the slider.  
The RSSI value indicates the received signal strength, which is the signal strength when the KW2D Series RFID Reader reads the RFID tag. An RSSI value of 7 (near) means the strongest signal strength and a value of 0 (far) means the weakest signal strength. The signal strength becomes smaller the further the distance between the KW2D Series RFID Reader and RFID tag. For this reason, the KW2D Series RFID Reader controls the distance between the RFID reader and RFID tag by judging the detection of the RFID tag only when the RSSI value is greater than or equal to the set RSSI value.  
For example, when the RSSI value is 7 (received signal strength: maximum), reading signal strengths lower than 7 is abandoned.
- Reading Time : Specify the response time to read the RFID tag in 10 steps by sliding the slider or clicking /.
- The time (300 to 3000 msec in increments of 300 msec) of each specified step is displayed to the right of the slider.

**(6) Use Buzzer**

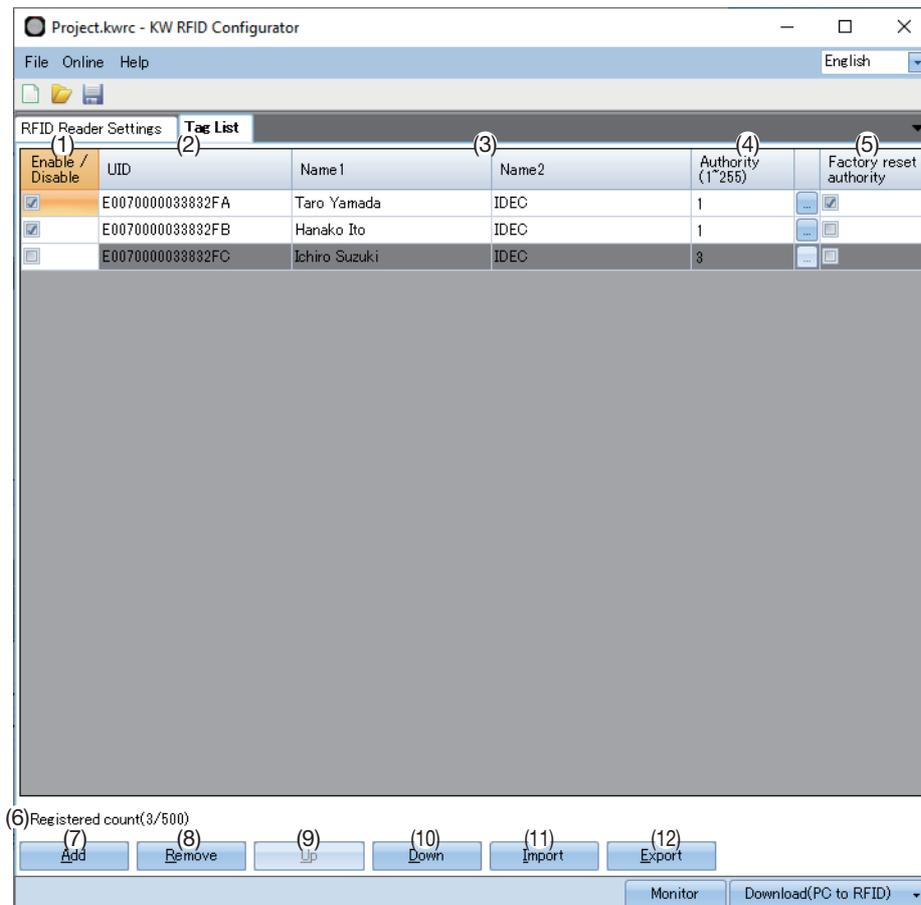
Select this check box to sound the buzzer according to the operation of the KW2D Series RFID Reader.

**(7) Use LED**

Select this check box to turn on or flash the LEDs according to the operation of the KW2D Series RFID Reader.

## • [Tag List] Tab

This tab is used to batch manage the tags used with the KW2D Series RFID Reader on the tag list.



### (1) Enable / Disable

Select this check box to enable the RFID tag.



All RFID tag settings are downloaded to the KW2D Series RFID Reader regardless of check box selections.

### (2) UID

Enter the UID of the RFID tag. The UID can be entered up to 20 digits only with characters that can be used as hexadecimal digits. If the number of digits is odd, "0" is added to the end of the UID to make the number of digits even.



Be careful not to enter duplicate UIDs. If you enter a UID that is already registered, an error message is displayed and that UID cannot be registered.

### (3) Name1, Name2

Enter any name freely. The maximum length is 18 bytes.

The character encoding set for [Character Code of Tag List] on the [Project Property] dialog box is used. If there are characters that cannot be converted, those characters are displayed as "?". For details, see "[Project Property] Dialog Box" on page 4-6.

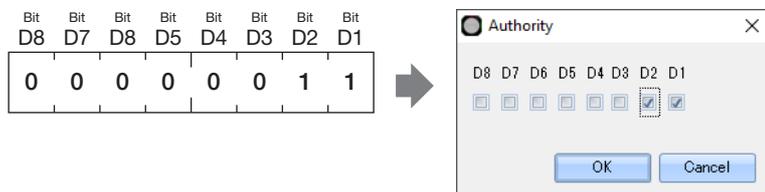
**(4) Authority**

Specifies the authority (1 to 255) for the UID.

Click  to display the [Authority] dialog box.

Select the check boxes to turn the bits on and off. The set authority is displayed in bit format. Assigning the devices to control to each bit makes the authority easier to use.

For example, when the authority is 3, the value is "00000011" in binary. Select the D1 and D2 check boxes.



When a download or upload password is set, always select the [Factory reset authority] check box for one or more RFID tags. Change the check boxes on the [Authority] dialog box and click the [OK] button. The authority is updated when the dialog box is closed.

**(5) Factory reset authority**

An RFID tag set with factory reset authority is used when resetting the KW2D Series RFID Reader in situations such as when the download password is forgotten. Select this check box to set the authority to allow the KW2D Series RFID Reader to be reset. The RFID tag can be used to reset the KW2D Series RFID Reader in situations such as when the download password is forgotten.



Always select the [Factory reset authority] check box for one or more RFID tags. An error will occur when downloading the project to the KW2D Series RFID Reader if the [Factory reset authority] check box is cleared for all RFID tags.

**(6) Registered count**

Displays the number of registered RFID tags.

**(7) [Add] button**

Adds an RFID tag to the list. A maximum of 500 RFID tags can be added.

**(8) [Remove] button**

Deletes the selected RFID tag from the list.

**(9) [Up] button**

Moves the selected RFID tag up in the list.

**(10) [Down] button**

Moves the selected RFID tag down in the list.

**(11) [Import] button**

The [Open] dialog box is displayed.

Select a tag list that was exported to a CSV file (.csv) or a Unicode text file (.txt) and click the [Open] button. The selected tag list is imported into the tag list.

The tag list being edited is also overwritten.

**(12) [Export] button**

The [Save Project As] dialog box is displayed.

Select the location to save the file, enter a file name, and then click the [Save] button. The tag list being edited is saved as a CSV file (.csv) or a Unicode text file (.txt).

The saved tag list can be imported with the [Import] button.

# Chapter 5 Functions and Settings

This chapter describes the operations and functions of the KW2D Series RFID Reader.

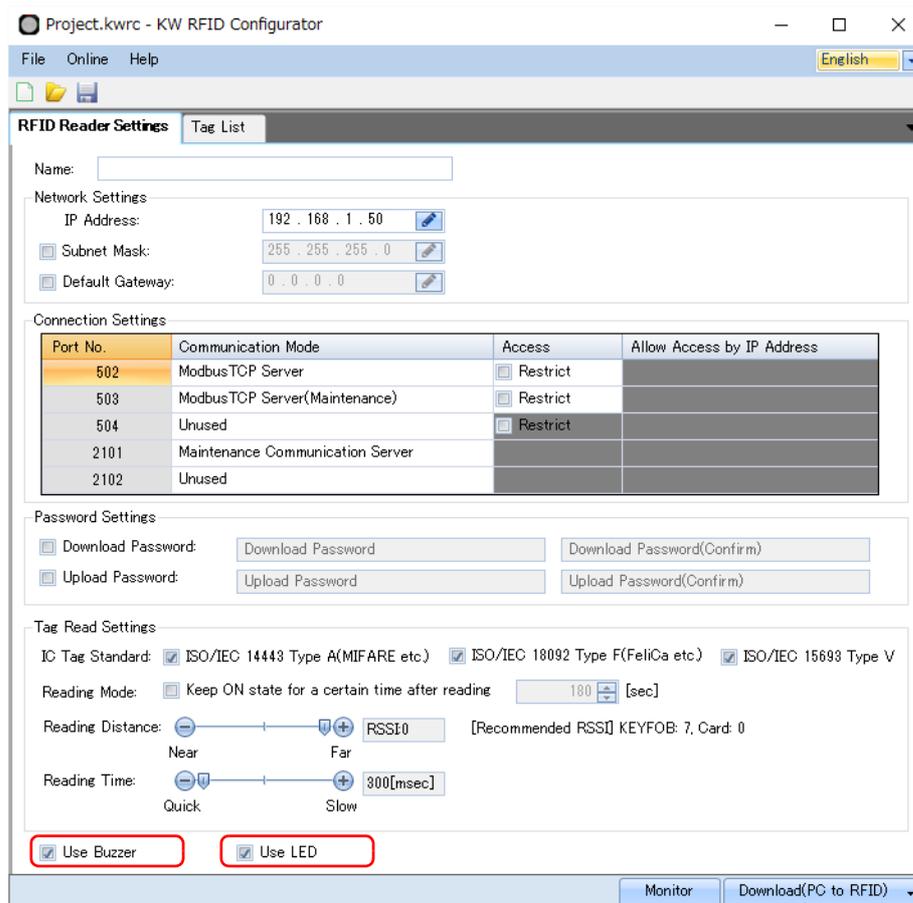
The operation of the KW2D Series RFID Reader can be checked with the buzzer and LED indicators. However, the behavior of the buzzer and LED indicators depends on the status of the KW2D Series RFID Reader and the settings in KW RFID Configurator. The statuses of the KW2D Series RFID Reader are classified into three modes: "operation mode", "detection mode", and "lock mode".

## KW2D Series RFID Reader Statuses and Operations

Status Name	Operation
Operation mode	Power start, reset, stopped, running
Detection mode	RFID tag detection, verification, waiting for verification result communication (reading), waiting for result command from host device, detection result
Lock mode	Lock, cancel lock

## Setup Using the KW RFID Configurator

The basic operation of the buzzer and LED indicators on the KW2D Series RFID Reader are configured using the KW RFID Configurator. To use the buzzer, select the [Use Buzzer] check box on the [RFID Reader Settings] tab. To use the LED indicators, select the [Use LED] check box on the [RFID Reader Settings] tab.



The buzzer and LEDs do not operate if the [Use Buzzer] and [Use LED] check boxes on the [RFID Reader Settings] tab are cleared. However, the buzzer and LEDs do operate when the product is "started" and "reset".

## KW2D Series RFID Reader Statuses and Operations

This section describes the statuses and operations of the KW2D Series RFID Reader.

### Operation Mode

This section describes the operations in "operation mode".

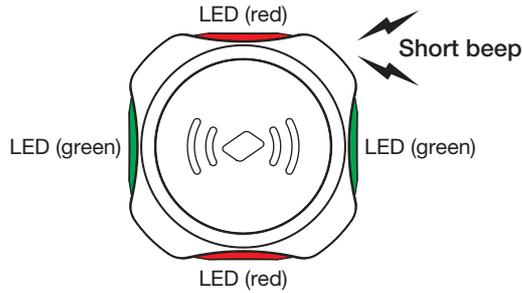
"Operation mode" has the following statuses: "power start", "reset", "stopped", and "running".

#### Power Start and Reset

This section describes the "power start" and "reset" statuses.

"Power start" and "reset" are statuses for when the KW2D Series RFID Reader is performing initialization processing.

The LEDs (green) and LEDs (red) turn on for 2 sec when the power is turned on (or reset).



Status	LED Indicator	Buzzer Sound	Description
When starting	LEDs (green) on LEDs (red) on	One short beep	KW2D Series RFID Reader is performing initialization processing

#### Stopped

This section describes the "stopped" status.

"Stopped" is the status for when the KW2D Series RFID Reader has stopped detection processing of RFID tags.

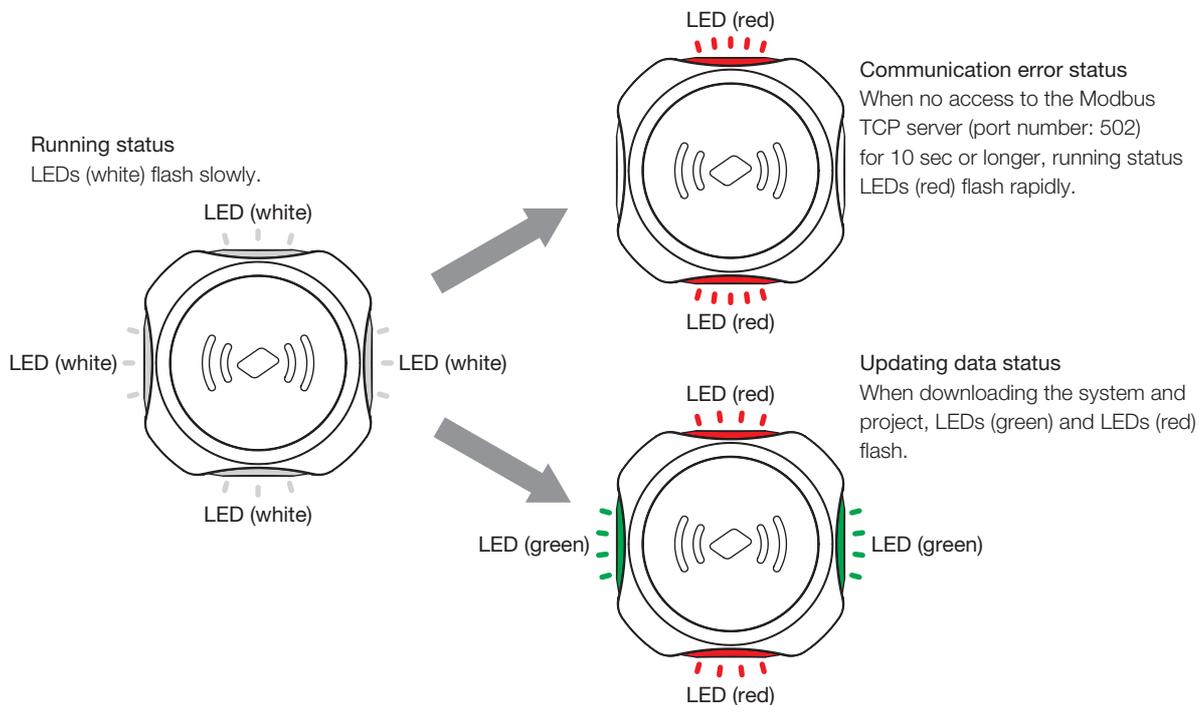
All LEDs are turned OFF. A transition can be made to the "stopped" status by using the coil relay. For details, see "Setup from the Host Device Using Coil Relays" on page 5-14.

### Running

This section describes the "running" status.

"Running" is the status for when the KW2D Series RFID Reader can read RFID tags.

LEDs (white) flash slowly. RFID tag reading is executed periodically according to [IC Tag Standard] specified on the [RFID Reader Settings] tab in the KW RFID Configurator.



Status	LED Indicator	Buzzer Sound	Description
Running	LEDs (white) slow flashing	None	RFID tags can be read
Communication error	LEDs (red) rapid flashing	None	Communication to the Modbus TCP server (port number: 502) was lost for 10 sec or longer.
Updating data	LEDs (green) flashing LEDs (red) flashing	None	System downloading or project downloading

-  • RFID tags are not detected while updating data.
-  • The RFID reader is "reset" and restarted after the system or project is downloaded.

## Detection Mode

This section describes the operations in "detection mode".

"Detection mode" has the following statuses: "RFID tag detection", "verification", "waiting for verification result communication (reading)", "waiting for result command from host device", and "detection result".

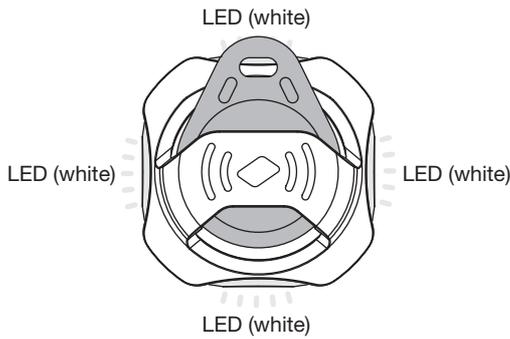
In "detection mode", a transition is first made to "RFID tag detection". For operations after "RFID tag detection", see "When a Tag List Is Registered" on page 5-5 and "When a Tag List Is Not Registered" on page 5-6.

### RFID Tag Detection

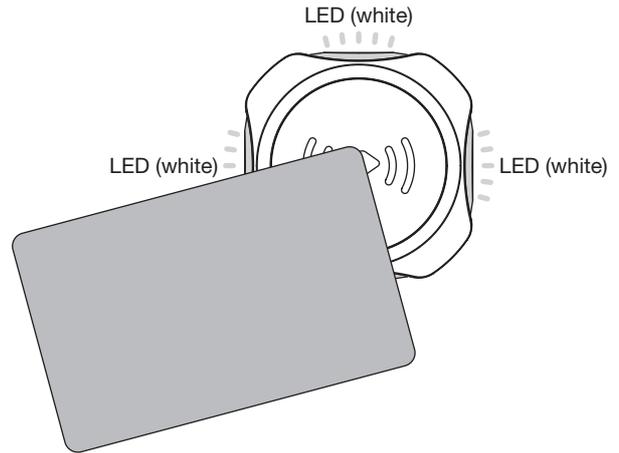
This section describes the "RFID tag detection" status.

"RFID tag detection" is the status for when the KW2D Series RFID Reader has detected an RFID tag. The LEDs (white) flash rapidly.

#### KEYFOB type



#### Card type



Status	LED Indicator	Buzzer Sound	Condition
RFID tag detection	LEDs (white) rapid flashing	None	RFID tag is detected



- A transition may be made to the "detection result" immediately depending on the communication status.
- RFID tags are not detected if two or more tags are held up to the RFID reader.
- The illustration of the card type above is an example of the LED indicators when the RFID tag is detected. This illustration does not provide any guarantees as to the detection position of the RFID tag.

• **When a Tag List Is Registered**

This section describes the operations in "detection mode" when a tag list is registered. When a tag list is registered, "verification" is first performed with the tag list after "RFID tag detection". Next, a transition is made to "verification result communication (reading)" on the host device side. Then a transition is made to "detection result". "Verification result communication (reading)" is executed in the Modbus TCP server (Port number: 502).

**Verification**

This section describes "verification". "Verification" is the operation that verifies the UID of the "RFID tag read" in RFID tag detection against the tag list and then stores the verified result in shared memory. The LEDs (white) flash rapidly during "verification". After "verification", a transition is made to "waiting for verification result communication (reading)" on the host device side.

**Waiting for Verification Result Communication (Reading)**

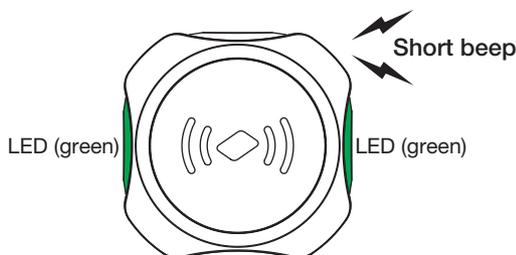
This section describes the "waiting for verification result communication (reading)" status. "Waiting for verification result communication (reading)" is the status for when the RFID reader is waiting for the host device to read the verification result. The waiting time is 3 sec maximum. The LEDs (white) flash rapidly during "waiting for verification result communication (reading)".

**Detection Result**

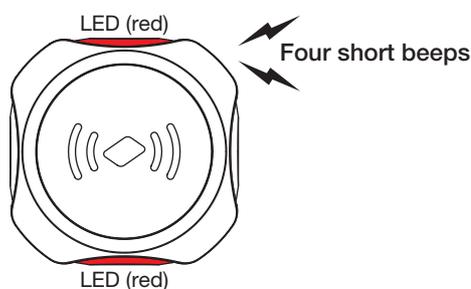
This section describes the "detection result" status when a tag list is registered. "Detection result" is the status that provides notification of the RFID tag reading result with the LED indicators and buzzer. The KW2D Series RFID Reader exhibits the operation for normal, verification error, or host communication error according to the combination of the result of "verification" and the communication status with the host device. A host communication error occurs if there is no "verification result communication (reading)" in the Modbus TCP server (Port number: 502) during the 3 sec while "waiting for verification result communication (reading)", regardless whether verification is a match or mismatch.

Status	LED Indicator	Buzzer Sound	Description
Normal	LEDs (green) on	One short beep	Verification match and verification result read from host device
Verification error	LEDs (red) on	Four short beeps	Verification mismatch and verification result read from host device
Host communication error	LEDs (red) rapid flashing	Three long beeps	Verification result not read from host device

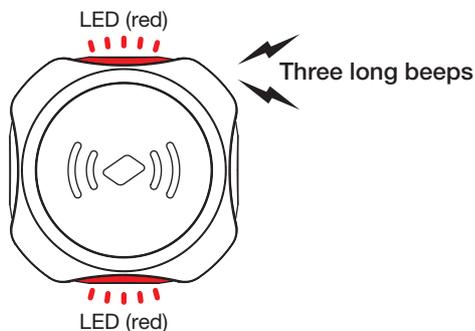
**Normal**



**Verification error**



**Host communication error**



- If a tag list is registered, a "verification" error or host communication error occurs if verification does not match.
- When the host device reads the result, the buzzer makes one short beep. Next, the verification result (UID) is held for 1.5 sec, and then the initial value is written to the result and a transition is made to "running".

### • When a Tag List Is Not Registered

This section describes the operations in "detection mode" when a tag list is not registered.

When a tag list is not registered, the "verification result" (UID information of the detected RFID tag) is stored in shared memory after RFID tag detection, and then a transition is made to "waiting for result command from host device". Next, a transition is made to "detection result".

#### Waiting for Result Command from Host Device

This section describes the "waiting for result command from host device" status.

"Waiting for result command from host device" is the status for when the KW2D Series RFID Reader is waiting for the OK command or failure command from the host device. The waiting time is 3 sec maximum. The LEDs (white) flash rapidly during the "waiting for result command from host device status".

#### Detection Result

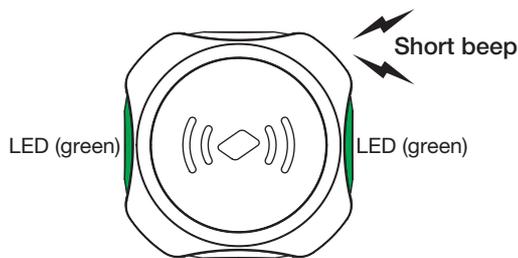
This section describes the "detection result" status when a tag list is not registered.

"Detection result" is the status that provides notification of the RFID tag reading result with the LED indicators and buzzer.

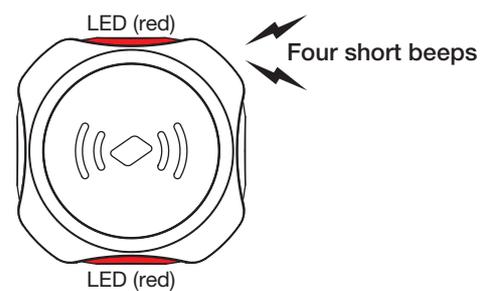
The KW2D Series RFID Reader exhibits the operation for the OK command, failure command, or no command according to the command from the host device. The command is no command if there is no OK command or failure command from the host device after 3 sec or longer elapses from RFID detection. The host device gives the OK command or failure command by turning the coil relays on and off. For details, see "Setup from the Host Device Using Coil Relays" on page 5-14.

Status	LED Indicator	Buzzer Sound	Description
OK command	LEDs (green) on	One short beep	OK command from host device
Failure command	LEDs (red) on	Four short beeps	Failure command from host device
No command	LEDs (red) rapid flashing	Three long beeps	No command from host device

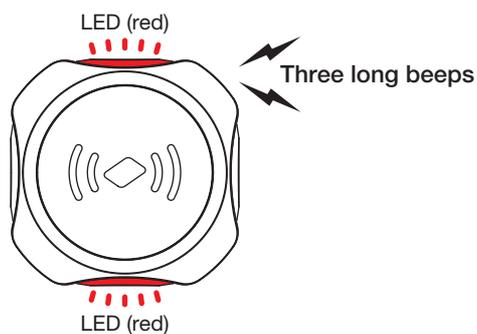
#### OK command



#### Failure command



#### No command



- The KW2D Series RFID Reader holds the verification result for 1.5 sec after "detection mode". If a tag is not detected during this time, the verification result is set to the initial value and a transition is made to "running".
- When "detection mode" is normal or OK command, a transition is made to "lock mode" if an RFID tag is held up to the reader for longer than 1.5 sec after "detection mode".
- The KW2D Series RFID Reader transitions from "detection mode" to "lock mode" in the following cases.
  - When the [Keep ON state for a certain time after reading] check box is selected on the [RFID Reader Settings] tab and the "detection mode result" is normal or OK command.
  - When the [Keep ON state for a certain time after reading] check box is cleared on the [RFID Reader Settings] tab, the "detection result" is normal or OK command, and the RFID tag continues being held up to the RFID reader for longer than 1.5 sec after the "detection result".

In cases other than those described above, the RFID reader transitions from "detection mode" to "operation mode". When the RFID reader transitions to operation mode, the verification result is set to the initial value. For details on "lock mode", see "Lock Mode" on page 5-8.

- For the verification result, see "Verification Result References" on page 5-7.

## • Verification Result References

The KW2D Series RFID Reader determines that the verification result was read when the host device reads the input relay or input register value in the Modbus TCP server (Port number: 502).

The verification result is held for a maximum of 3 sec after "RFID tag verification". Read the verification result with the host device during this time. When the RFID reader transitions to "operation mode", the verification result is set to the initial value. The input relays and input registers for the verification result are as follows.

### Input Relay

Input Relay (10****)	Description	Explanation	R/W	Initial Value
0001	Verification result OK	When a tag list is registered: This input relay is turned on if the verification result is a match. When a tag list is not registered: This input relay is turned on if an RFID tag is detected.	R	0
0002	Verification result failure	This input relay is turned on if the RFID tag verification result is failure.	R	0
0009 to 0016	Authority	Authority of the detected RFID tag, 1 to 255: Authority	R	0

### Input Register

Input Register (30****)	Description	Explanation	R/W	Initial Value
0002	Authority (judgment result)	0: Mismatch, 1 to 255: Authority, 65535: Reading	R	65535
0003	UID data length	Number of bytes (1 to 10, 0 is UID not stored)	R	0
0004	UID	Stored in order of upper byte (1st byte) and lower byte (2nd byte)	R	0
0005	UID	Stored in order of upper byte (3rd byte) and lower byte (4th byte)	R	0
0006	UID	Stored in order of upper byte (5th byte) and lower byte (6th byte)	R	0
0007	UID	Stored in order of upper byte (7th byte) and lower byte (8th byte)	R	0
0008	UID	Stored in order of upper byte (9th byte) and lower byte (10th byte)	R	0
0009 to 0011	Reserved	0 (fixed)	R	0
0012	Name1	Stored in order of upper byte (1st character) and lower byte (2nd character)	R	0
0013	Name1	Stored in order of upper byte (3rd character) and lower byte (4th character)	R	0
0014	Name1	Stored in order of upper byte (5th character) and lower byte (6th character)	R	0
0015	Name1	Stored in order of upper byte (7th character) and lower byte (8th character)	R	0
0016	Name1	Stored in order of upper byte (9th character) and lower byte (10th character)	R	0
0017	Name1	Stored in order of upper byte (11th character) and lower byte (12th character)	R	0
0018	Name1	Stored in order of upper byte (13th character) and lower byte (14th character)	R	0
0019	Name1	Stored in order of upper byte (15th character) and lower byte (16th character)	R	0
0020	Name1	Stored in order of upper byte (17th character) and lower byte (18th character)	R	0
0021	Reserved	0 (fixed)	R	0
0022	Name2	Stored in order of upper byte (1st character) and lower byte (2nd character)	R	0
0023	Name2	Stored in order of upper byte (3rd character) and lower byte (4th character)	R	0
0024	Name2	Stored in order of upper byte (5th character) and lower byte (6th character)	R	0
0025	Name2	Stored in order of upper byte (7th character) and lower byte (8th character)	R	0
0026	Name2	Stored in order of upper byte (9th character) and lower byte (10th character)	R	0
0027	Name2	Stored in order of upper byte (11th character) and lower byte (12th character)	R	0
0028	Name2	Stored in order of upper byte (13th character) and lower byte (14th character)	R	0
0029	Name2	Stored in order of upper byte (15th character) and lower byte (16th character)	R	0
0030	Name2	Stored in order of upper byte (17th character) and lower byte (18th character)	R	0



The used character encoding is the character encoding set in KW RFID Configurator.  
For the character encoding, see "(4) Character Code of Tag List" on page 4-6.

## Lock Mode

This section describes "lock mode".

"Lock mode" has the following statuses: "lock" and "cancel lock".

"Lock mode" is set on the [RFID Reader Settings] tab in the KW RFID Configurator.

For details, see "When the Reading Mode Is Not Set" on page 5-9 and "When the Reading Mode Is Set" on page 5-11.

### Lock

This section describes the "lock" status.

"Lock" is the status when the KW2D Series RFID Reader holds the verification result.

A transition is made from "detection mode" to the "lock" status under the following conditions. For details, see "KW2D Series RFID Reader Statuses and Operations" on page 5-2.

- When the [Keep ON state for a certain time after reading] check box is selected on the [RFID Reader Settings] tab and "detection mode" is normal or OK command.
- When the [Keep ON state for a certain time after reading] check box is cleared on the [RFID Reader Settings] tab, the "detection result" is normal or OK command, and the RFID tag continues being held up to the RFID reader for longer than 1.5 sec after the "detection result".

### Cancel Lock

This section describes the "cancel lock" status.

When the lock is canceled, the KW2D Series RFID Reader sets the verification result to the initial value and transitions to "running". The "cancel lock" methods are as follows.

#### KW RFID Configurator Setting and "Cancel Lock" Methods

KW RFID Configurator Setting	Cancel Lock Method	Reference
Clear the [Keep ON state for a certain time after reading] check box	Cancel with tag (remove tag)	Page 5-9
Select the [Keep ON state for a certain time after reading] check box	Forcibly cancel lock with tag (hold up tag again)	Page 5-11
	Cancel with lock time	Page 5-11
	Turn on coil relay to forcibly cancel lock	Page 5-14

### Pausing the Lock

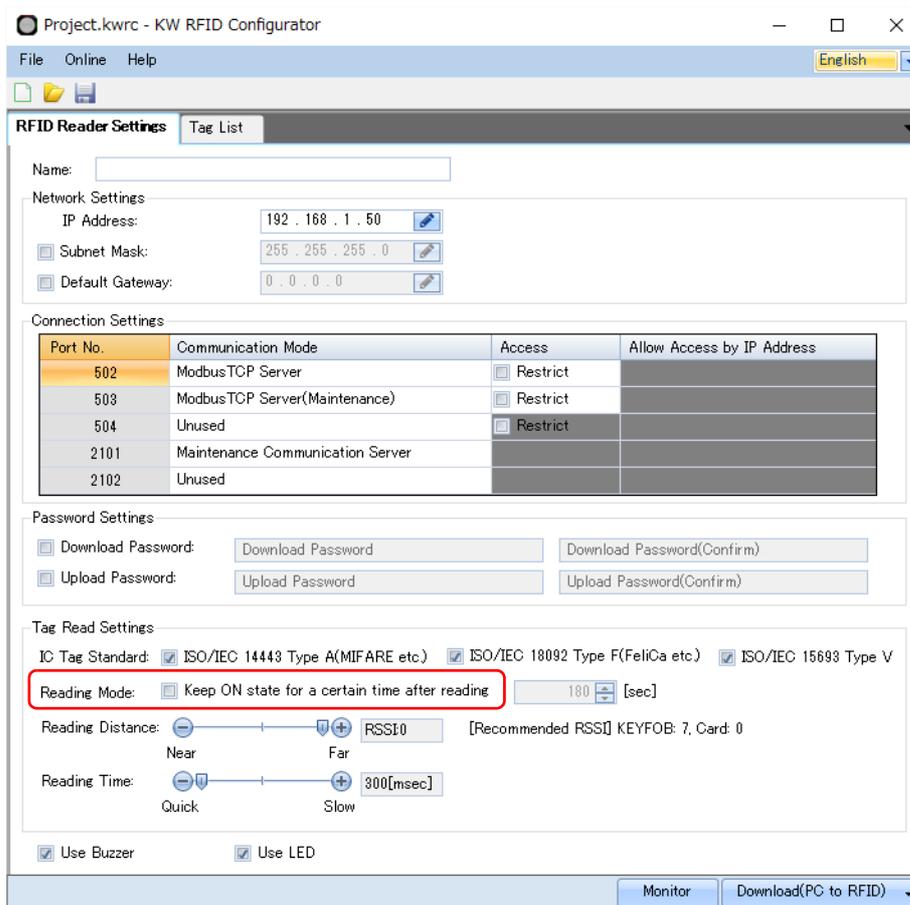
You can pause the timer that counts the lock time to continue the "lock" status. "Pause the lock" using the coil relay. For details, see "Setup from the Host Device Using Coil Relays" on page 5-14.

• When the Reading Mode Is Not Set

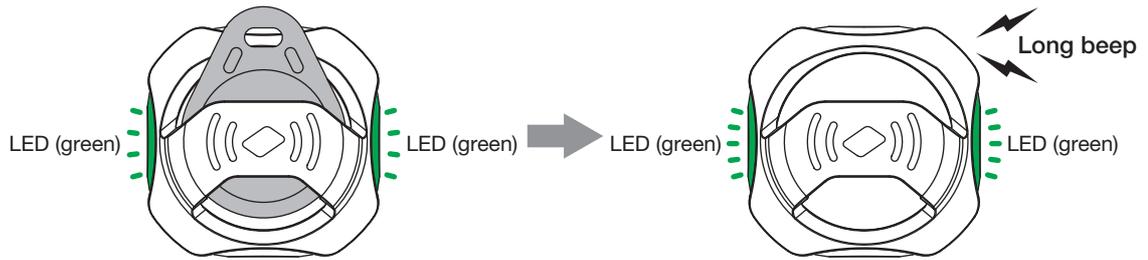
This section describes the operation of the KW2D Series RFID Reader when the reading mode is not set.

When the [Keep ON state for a certain time after reading] check box is cleared on the [RFID Reader Settings] tab, the KW2D Series RFID Reader holds (locks) the verification result while the RFID tag is set in the tag holder or the RFID tag is held up to the RFID reader.

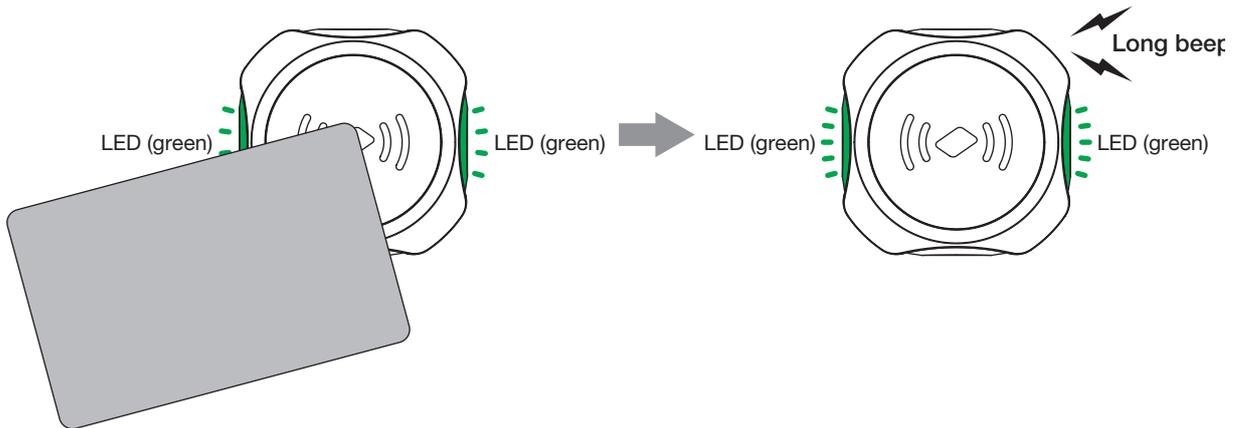
When the RFID tag is removed, the lock is canceled, the verification result is set to the initial value, and the RFID reader resumes "running".



- When an RFID tag is set in the tag holder



- When an RFID tag is held up to the KW2D Series RFID Reader



Status	LED Indicator	Buzzer Sound	Description
Lock operation	LEDs (green) flashing	None	During lock operation
Cancel lock	LEDs (green) rapid flashing	One long beep	Canceling lock operation



- If an RFID tag is held up to the RFID reader and locked and then another RFID tag is held up to the RFID reader, the RFID tag cannot be detected for 2 sec or longer and the lock is canceled.  
Do not hold two or more RFID tags up to the RFID reader.
- The illustration of the card type above is an example of the LED indicators when the RFID tag is detected. This illustration does not provide any guarantees as to the detection position of the RFID tag.

## • When the Reading Mode Is Set

This section describes the operation of the KW2D Series RFID Reader when the reading mode is set.

When the [Keep ON state for a certain time after reading] check box is selected on the [RFID Reader Settings] tab, the KW2D Series RFID Reader holds (locks) the verification result when the RFID tag is held up to the RFID reader. To transition to the "cancel lock" status, there is a method to forcibly cancel the lock using the same RFID tag and a method that involves waiting until the lock time has elapsed.

When the RFID reader transitions from the "cancel lock" status to "running", the verification result is set to the initial value.

### Method to Forcibly Cancel Lock

This section describes the method to forcibly cancel the lock.

First, when an RFID tag is held up to the KW2D Series RFID Reader, it holds (locks) the verification result. When the same RFID tag is held up again, the lock is canceled, the verification result is set to the initial value, and a transition is made to "running".

### Method to Cancel Lock with Lock Time

This section describes the method to cancel the lock with the lock time.

The lock time is set in [Reading Mode]. When the lock time has elapsed, the KW2D Series RFID Reader automatically transitions from the "lock" status to the "cancel lock" status. Additionally, the verification result is set to the initial value and a transition is made to "running".

The lock time can be set between 1 and 28800 sec in increments of 1 sec.

The screenshot shows the 'Project.kwrc - KW RFID Configurator' window. The 'RFID Reader Settings' tab is selected. The 'Tag Read Settings' section is highlighted with a red box. It contains the following settings:

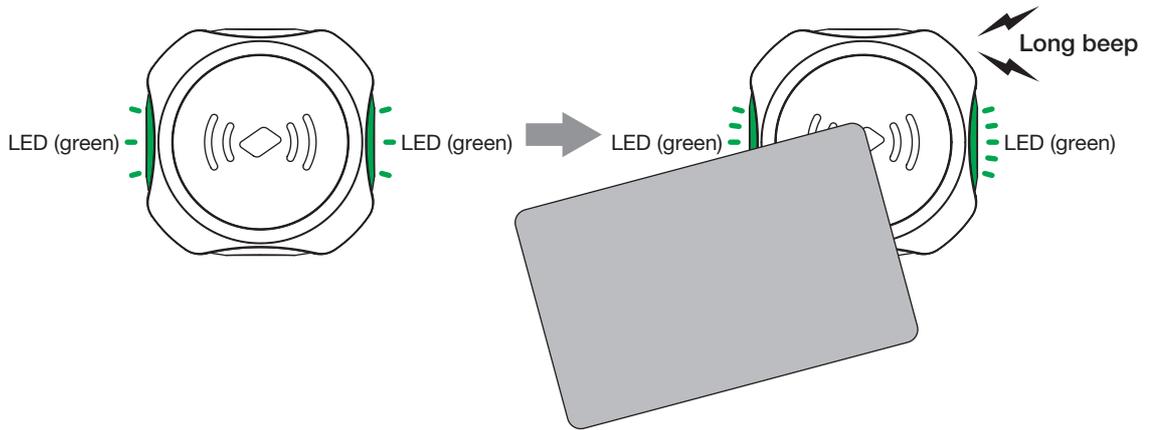
- IC Tag Standard:  ISO/IEC 14443 Type A(MIFARE etc.)  ISO/IEC 18092 Type F(FeliCa etc.)  ISO/IEC 15693 Type V
- Reading Mode:  Keep ON state for a certain time after reading [180] [sec]
- Reading Distance: Near to Far slider, RSSI0 [Recommended RSSI] KEYFOB: 7, Card: 0
- Reading Time: Quick to Slow slider, 300[msec]
- Use Buzzer  Use LED

At the bottom of the window, there are buttons for 'Monitor' and 'Download(PC to RFID)'.

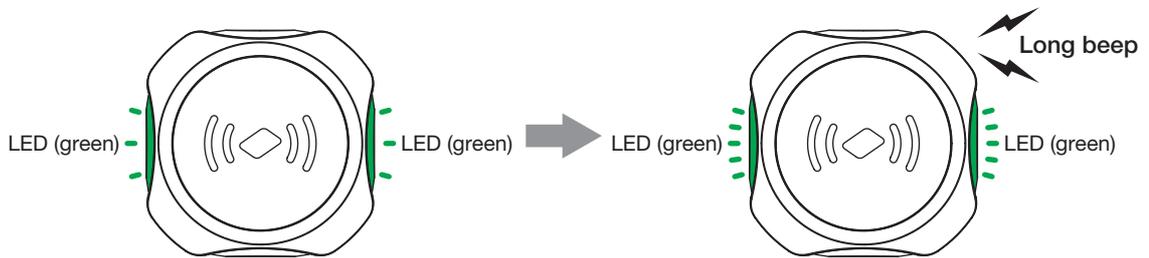


The lock time starts counting down when the RFID tag is removed from the KW2D Series RFID Reader after it was held up to the RFID reader and locked.

- When the RFID tag is held up again and the lock is forcibly canceled



- When the lock is canceled due to exceeding the lock time



Status	LED Indicator	Buzzer Sound	Description
Cancel lock (Forced cancellation)	LEDs (green) rapid flashing	One long beep	Lock is forcibly canceled due to holding up RFID tag, etc.
Cancel lock (Time exceeded)	LEDs (green) rapid flashing	One long beep	Lock is canceled due to exceeding time

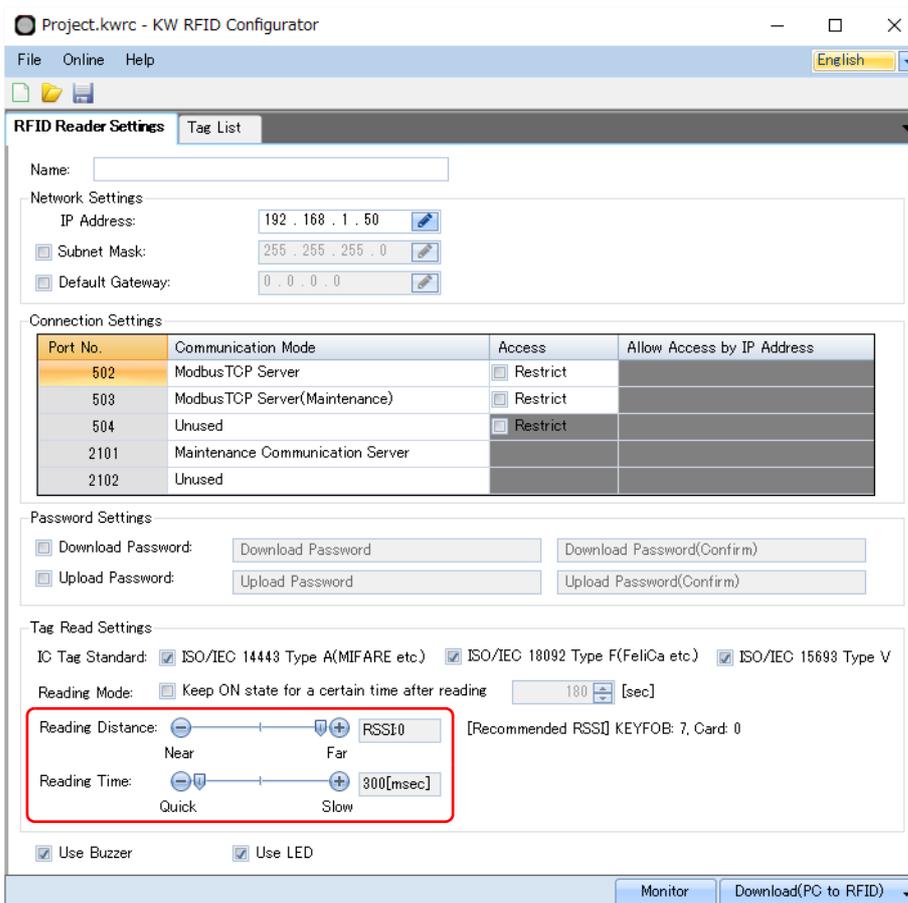


- If the lock time is set and a RFID tag is locked, the RFID reader will remain locked and not respond when other RFID tags are held up to it.
- When forcibly canceling the lock by holding up the RFID tag again, wait at least 2 sec or longer before holding up the RFID tag. If the RFID tag is held up too soon, the lock may not be canceled.
- The illustration of the card type above is an example of the LED indicators when the RFID tag is detected. This illustration does not provide any guarantees as to the detection position of the RFID tag.

## Adjusting the RFID Tag Detection Sensitivity

This section describes how to adjust the RFID tag detection sensitivity.

Set the reading distance and reading time for RFID tags with [Reading Distance] and [Reading Time] on the [RFID Reader Settings] tab in the KW RFID Configurator.



- For [Reading Distance], specify the distance from the RFID tag to the KW2D Series RFID Reader as a value between 7 (near) and 0 (far). This distance is shown as the RSSI (received signal strength) value in eight steps.
- For [Reading Time], specify the response time from when the RFID tag is held up to the KW2D Series RFID Reader as a value between 300 msec (quick) and 3000 msec (slow). The value can be set in 10 steps in increments of 300 msec. The response time has a margin of error of -300 msec. This means the response time is detected between 300 to 600 msec when 600 msec is specified. Increase the response time to prevent detection of RFID tags when they mistakenly touch the KW2D Series RFID Reader.



When using a KW2D Series RFID Reader with a tag holder, the tag may be detected before the tag is placed in the holder. Set the reading distance to RSSI value: 6 or 7 (near) to prevent detection of the tag before it is placed in the holder.

## Setup from the Host Device Using Coil Relays

This section describes the method to execute operations on the KW2D Series RFID Reader by setting coil relays from the host device.

### • Method to Set the Detection Mode Commands

When a tag list is not registered, use the coil relays for the OK command and failure command.

The coil relays and setting details are as follows.

Coil Relay (00****)	Description	Explanation	R/W	Initial Value
0007	OK command*1	ON: Turn on OK command, OFF: No command	R/W	0
0008	Failure command*1	ON: Turn on failure command, OFF: No command	R/W	0

\*1 The failure command has priority when both commands are turned on at the same time.

### • Method to Set Cancel Lock and Pause Lock

This section describes how to change the "lock mode" with coil relays.

If you turn on coil relay 0002, the KW2D Series RFID Reader forcibly cancels the lock. If you turn on coil relay 0003, the timer that counts the lock time is paused and the lock status continues. You can check the lock time with input register 0032 while the timer is running.

The coil relays, input relays, and setting details are as follows.

#### Coil Relay

Coil Relay (00****)	Description	Explanation	R/W	Initial Value
0002	Forcibly cancel lock command	Cancel lock 0: No cancel lock command, 1: Turn on cancel lock command	R/W	0
0003	Forcibly stop timer for lock time command	Stops the timer for the lock time 0: No command, 1: Turn on stop timer for lock time command	R/W	0

#### Input Register

Input Register (30****)	Description	Explanation	R/W	Initial Value
0032	Lock time	Lock time (counts down)	R	0

### • Method to Set the Stopped Status

This section describes how to set the "stopped" status with coil relays.

When the "stopped" status is set, the KW2D Series RFID Reader turns off all LEDs and stops RFID tag detection processing.

The "operation status" of the KW2D Series RFID Reader can be checked with input relay 0008.

The coil relays, input relays, and setting details are as follows.

#### Coil Relay

Coil Relay (00****)	Description	Explanation	R/W	Initial Value
0001	Stop RFID command	Stops KW2D Series RFID Reader detection processing of RFID tags. Restores original operation when canceled. 0: Cancel stop command, 1: Stop command	R/W	0

#### Input Relay

Input Relay (10****)	Description	Explanation	R/W	Initial Value
0008	RFID operation mode	Operation mode of the KW2D Series RFID Reader 0: Running, 1: Stopped	R	0



The buzzer and LEDs can be remotely controlled from the host device even when the KW2D Series RFID Reader is set to the "stopped" status by enabling manual control of the buzzer and LEDs. For manual control of the LEDs and buzzer, see "Remote Control of Buzzer and LEDs" on page 5-15.

- **Remote Control of Buzzer and LEDs**

The buzzer and LED indicators can be controlled from the host device using coil relays. Even when using the buzzer and LEDs in the standard IDEC specifications by selecting the [Use Buzzer] and [Use LED] check boxes on the [RFID Reader Settings] tab in the KW RFID Configurator, the buzzer and LEDs can also be controlled by enabling the manual controls.

#### Coil Relays

Coil Relay (00****)	Description	Explanation	R/W	Initial Value
0009	Enable manual control of buzzer	Controls the buzzer. 0: Follow setting, 1: Enable manual control of buzzer	R/W	0
0010	Control buzzer	Turns the buzzer on/off. 0: Turn off buzzer, 1: Turn on buzzer	R/W	0
0011	Enable manual control of LEDs (red)	Controls the LEDs (red). 0: Follow setting, 1: Enable manual control of LEDs (red)	R/W	0
0012	Control LEDs (red)	Turns the LEDs (red) on/off. 0: Turn off LEDs (red), 1: Turn on LEDs (red)	R/W	0
0013	Enable manual control of LEDs (white)	Controls the LEDs (white). 0: Follow setting, 1: Enable manual control of LEDs (white)	R/W	0
0014	Control LEDs (white)	Turns the LEDs (white) on/off. 0: Turn off LEDs (white), 1: Turn on LEDs (white)	R/W	0
0015	Enable manual control of LEDs (green)	Controls the LEDs (green). 0: Follow setting, 1: Enable manual control of LEDs (green)	R/W	0
0016	Control LEDs (green)	Turns the LEDs (green) on/off. 0: Turn off LEDs (green), 1: Turn on LEDs (green)	R/W	0

## KW2D Series RFID Reader Functions

### Read UID Function

The KW2D Series RFID Reader is equipped with an antenna (13.56 MHz band) to read the UIDs of RFID tags. The following three types of IC tag standards are supported.

ISO/IEC 1443A (TYPE-A)

ISO/IEC 18092 (TYPE-F)

ISO/IEC 15693 (TYPE-V)

With the factory settings, the RFID reader detects RFID tags that support the three types of IC tag standards. On the [RFID Reader Settings] tab, you can change the IC tag standards that are detected.

Project.kwrc - KW RFID Configurator

File Online Help English

RFID Reader Settings Tag List

Name:

Network Settings

IP Address:

Subnet Mask:

Default Gateway:

Connection Settings

Port No.	Communication Mode	Access	Allow Access by IP Address
502	ModbusTCP Server	<input type="checkbox"/> Restrict	
503	ModbusTCP Server(Maintenance)	<input type="checkbox"/> Restrict	
504	Unused	<input type="checkbox"/> Restrict	
2101	Maintenance Communication Server		
2102	Unused		

Password Settings

Download Password:

Upload Password:

Tag Read Settings

IC Tag Standard:  ISO/IEC 14443 Type A(MIFARE etc.)  ISO/IEC 18092 Type F(FeliCa etc.)  ISO/IEC 15693 Type V

Reading Mode:  Keep ON state for a certain time after reading  [sec]

Reading Distance:   [Recommended RSSI] KEYFOB: 7, Card: 0

Reading Time:   [msec]

Use Buzzer  Use LED

Monitor Download(PC to RFID)

## UID Verification Function

This function verifies the UID in the RFID tag against UIDs that were registered in advance. UIDs are registered on the [Tag List] tab in KW RFID Configurator. For the UIDs that are registered, a 1-byte authority (1 to 255) can be specified for each UID, which allows 255 authorities to be divided by UID differences. A maximum of 500 items of tag information can be registered.

In this manual, tag information includes the UID, authority, Name1, and Name2.

The tag information obtained in verification can be read by the host device and used to restrict the operation of equipment and to manage a usage history.

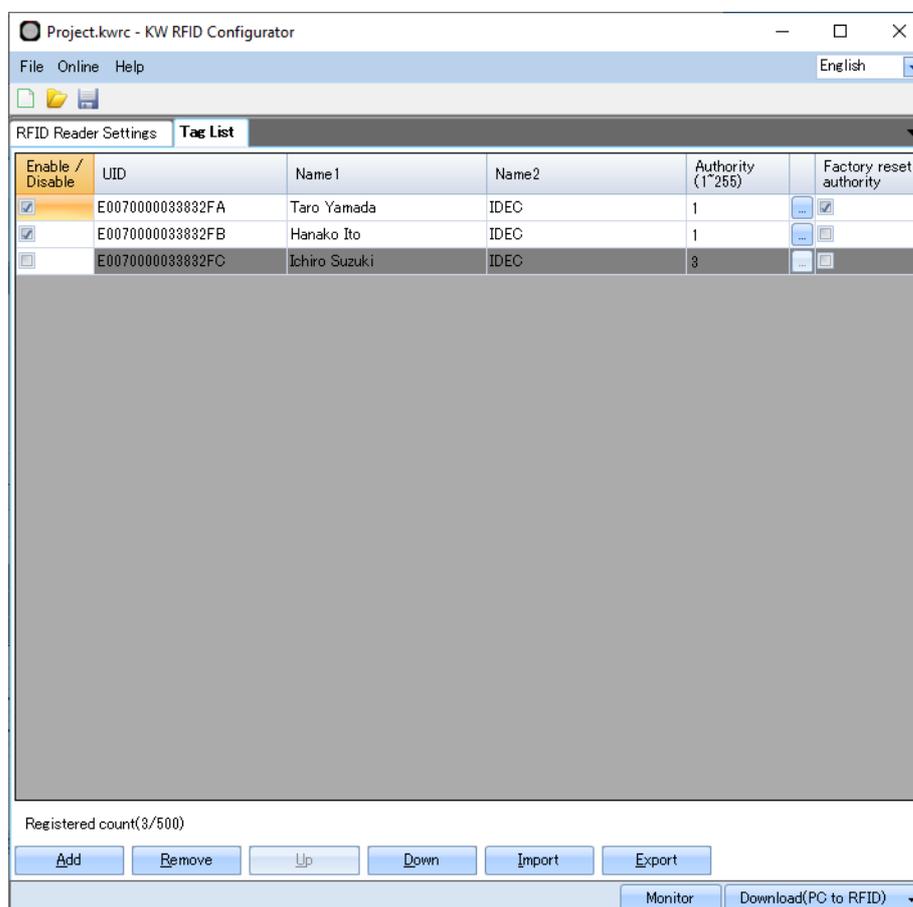
When creating the tag list, you can monitor the UIDs read with the KW2D Series RFID Reader and register those to the tag list.

### Tag Information Contents

Tag Information	Description	Explanation
UID	Maximum 10 bytes of data	In verification, any match other than a complete match of the UID is a failure.
Name1	Maximum 18 bytes	Used to explain the UID. This information is not used by the KW2D Series RFID Reader.
Name2	Maximum 18 bytes	
Authority	1 byte (1 to 255)	If an unregistered UID is read, the authority is read as 0.

### [Tag List] Tab

For details, see "Chapter 4 [Tag List] Tab" on page 4-20.



## Ethernet Communication Function

### • Network Settings

The KW2D Series RFID Reader is equipped with one Ethernet port and can communicate with Ethernet communication-compatible host devices such as computers and PLCs. The factory setting of the IP address for the KW2D Series RFID Reader Ethernet port is 192.168.1.50. This setting can be changed on the [RFID Reader Settings] tab in the KW RFID Configurator.

Project.kwrc - KW RFID Configurator

File Online Help English

RFID Reader Settings Tag List

Name:

Network Settings

IP Address:

Subnet Mask:

Default Gateway:

Connection Settings

Port No.	Communication Mode	Access	Allow Access by IP Address
502	ModbusTCP Server	<input type="checkbox"/> Restrict	
503	ModbusTCP Server(Maintenance)	<input type="checkbox"/> Restrict	
504	Unused	<input type="checkbox"/> Restrict	
2101	Maintenance Communication Server		
2102	Unused		

Password Settings

Download Password:

Upload Password:

Tag Read Settings

IC Tag Standard:  ISO/IEC 14443 Type A(MIFARE etc.)  ISO/IEC 18092 Type F(FeliCa etc.)  ISO/IEC 15693 Type V

Reading Mode:  Keep ON state for a certain time after reading  [Sec]

Reading Distance:   RSSI0 [Recommended RSSI] KEYFOB: 7, Card: 0

Reading Time:  [msec]

Use Buzzer  Use LED

Monitor Download(PC to RFID)



- When the KW2D Series RFID Reader is connected to the internet, adequate security measures for the network are required, such as those to prevent invalid access. Always consult with your network administrator and internet service provider. IDEC Corporation bears no responsibility for damages and problems in security that occur in communication over the internet.
- As a security measure, always use a firewall or another tool and block accessible IP addresses and ports.

• **Connection Settings**

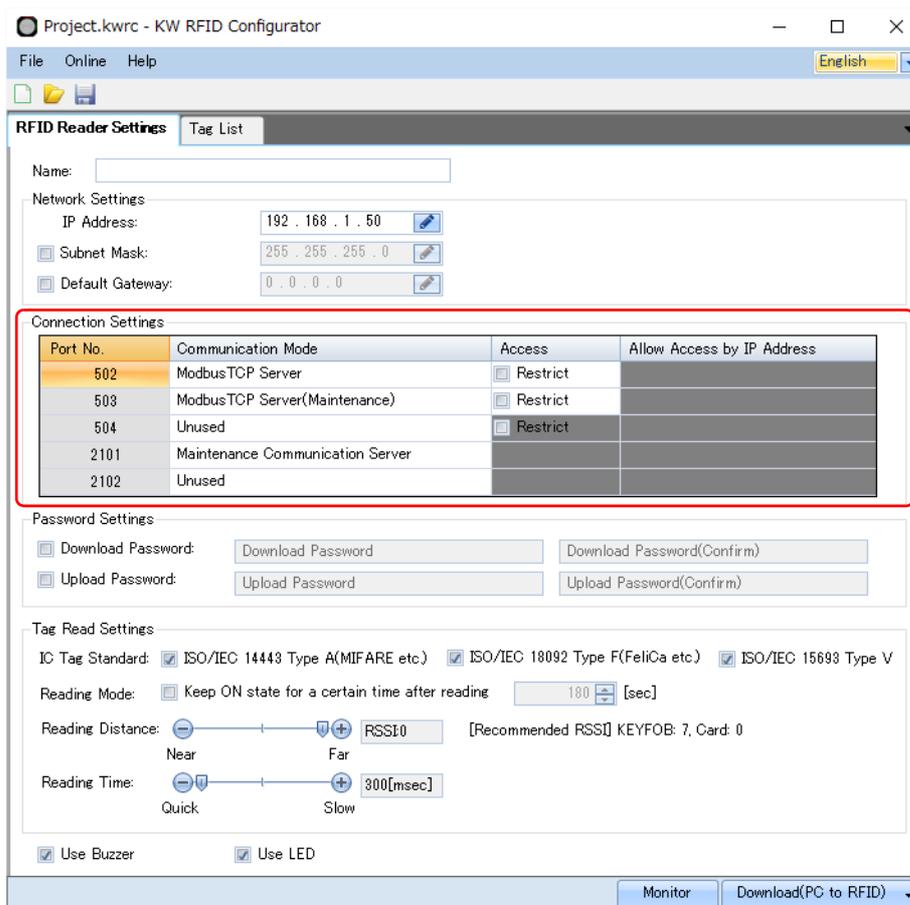
A maximum of three Modbus TCP server connections and a maximum of two maintenance communication server connections are supported for communication modes.

- Modbus TCP server (port number: 502, 503, and 504)
- Maintenance communication server (port number: 2101 and 2102)

Modbus TCP server (port number: 502) is the communication mode for reading the verification result of RFID tags. If communication is lost for 10 seconds or longer, the red LEDs on the KW2D Series RFID Reader flash.

To monitor the status of the KW2D Series RFID Reader with another device, you can use Modbus TCP server (port number: 503 and 504). If Modbus TCP server (port number: 504) will not be used, select "Unused".

The client that accesses the Modbus TCP server port can be restricted by selecting the [Restrict] check box in the [Access] column. Maintenance communication server (port number: 2101 and 2102) is the communication mode for a connection to the KW RFID Configurator.



## Projects

Use KW RFID Configurator to configure KW2D Series RFID Reader settings and create a tag list. A project is the general term for the created KW2D Series RFID Reader settings and tag list to which UIDs and authorities are registered. You can password protect the project when downloading the project to the KW2D Series RFID Reader and when uploading the project from the KW2D Series RFID Reader by setting the following passwords in the project.

The screenshot shows the 'KW RFID Configurator' software interface. The 'RFID Reader Settings' tab is active, and the 'Password Settings' section is highlighted with a red box. The interface includes a menu bar (File, Online, Help), a language dropdown (English), and a toolbar. The main settings area is divided into several sections:

- Name:** A text input field.
- Network Settings:**
  - IP Address: 192 . 168 . 1 . 50
  - Subnet Mask: 255 . 255 . 255 . 0
  - Default Gateway: 0 . 0 . 0 . 0
- Connection Settings:** A table with columns: Port No., Communication Mode, Access, and Allow Access by IP Address.
 

Port No.	Communication Mode	Access	Allow Access by IP Address
502	ModbusTCP Server	<input type="checkbox"/> Restrict	
503	ModbusTCP Server(Maintenance)	<input type="checkbox"/> Restrict	
504	Unused	<input type="checkbox"/> Restrict	
2101	Maintenance Communication Server		
2102	Unused		
- Password Settings:** (Highlighted with a red box)
  - Download Password:  Download Password (text field) Download Password(Confirm) (text field)
  - Upload Password:  Upload Password (text field) Upload Password(Confirm) (text field)
- Tag Read Settings:**
  - IC Tag Standard:  ISO/IEC 14443 Type A(MIFARE etc.)  ISO/IEC 18092 Type F(FeliCa etc.)  ISO/IEC 15693 Type V
  - Reading Mode:  Keep ON state for a certain time after reading 180 [sec]
  - Reading Distance: Slider from Near to Far, RSSI0 [Recommended RSSI] KEYFOB: 7, Card: 0
  - Reading Time: Slider from Quick to Slow, 300[msec]
  - Use Buzzer  Use LED

At the bottom right, there are buttons for 'Monitor' and 'Download(PC to RFID)'.

## Modbus TCP Server

### Communication Specifications

Item	Specifications
Supported protocol	Modbus TCP server
Maximum number of simultaneous clients	1 client per port
Port No.	502, 503, and 504 (fixed) You can select to use or not use port 504.
Unit ID (station number)	Unused (If a station number must be specified on the Modbus TCP client side, specify 1.)
Access control	One IP address can be specified per port. (Set in KW RFID Configurator)
Supported function codes	01: Read coil status (000001 to 000016) 02: Read input relay status (100001 to 100032) 03: Read holding register status (400001 to 400032) 04: Read input register status (300001 to 300032) 05: Change one coil status (000001 to 000016) 06: Write one holding register (400001 to 400032) 15: Change N coil statuses (000001 to 000016) 16: Write N holding registers (400001 to 400032)
Function	<ul style="list-style-type: none"> <li>• Read tag information</li> <li>• Read status information</li> <li>• Control LEDs and buzzer</li> </ul>

## Shared Memory

Shared memory is memory accessed from a Modbus TCP client. The contents of shared memory are set to the initial values by turning on the power supply or resetting the product. The contents of shared memory are not retained when the power supply is turned off or when the product is reset.

### Input Relays (100001 to 100032)

Input relays can be read in bit units.

02: Read input relay status (100001 to 100032)

Input Relay (10****)	Description	Explanation	R/W	Initial Value
0001 <sup>*1</sup>	Verification result OK	When a tag list is registered: Turns on if the verification result is a match. When a tag list is not registered: Turns on if an RFID tag is detected.	R	0
0002 <sup>*1</sup>	Verification result failure	Turns on if the RFID tag verification result is failure.	R	0
0003	Port 502 communication status	Indicates the communication status of the Modbus TCP server (port number: 502). 0: Communicating, 1: Not communicating	R	0
0004	RFID reader settings status	Indicates whether the KW2D Series RFID Reader has basic settings (project). 0: Has settings, 1: No settings	R	0
0005	Tag list status	Indicates whether the KW2D Series RFID Reader has a tag list. 0: Has a tag list, 1: No tag list	R	0
0006 to 0007	Reserved		R	-
0008	RFID operation status	Indicates the operation status of the KW2D Series RFID Reader. 0: Running, 1: Stopped	R	0
0009 <sup>*1, *2</sup>	Authority D1	Indicates the authority of the detected RFID tag. 1 to 255: Authority	R	0
0010 <sup>*1, *2</sup>	Authority D2			
0011 <sup>*1, *2</sup>	Authority D3			
0012 <sup>*1, *2</sup>	Authority D4			
0013 <sup>*1, *2</sup>	Authority D5			
0014 <sup>*1, *2</sup>	Authority D6			
0015 <sup>*1, *2</sup>	Authority D7			
0016 <sup>*1, *2</sup>	Authority D8			
0017 <sup>*1</sup>	KW2D Series special tag detection	0: KW2D Series special tag not detected, 1: KW2D Series special tag detected	R	0
0018 to 0032	Reserved		R	-

\*1 The verification result is held for a maximum of 3 sec after the RFID tag is detected. Then it is set with the initial value.

\*2 Authority

When a tag list is registered : The UID is verified against the tag list. If OK, the authority registered in the tag list is read. For a KW2D special tag, if authority 1 to 254 is specified in the tag list, the authority registered in the tag list is read. If 255 is specified in the tag list, the authority added to the tag is read.

When a tag list is not registered : For a KW2D special tag, the authority held in the tag is read. For other tags, 0 is read.

**Coil Relays (000001 to 000016)**

Coil relays can be read and written in bit units.

01: Read coil status (000001 to 000016)

05: Change one coil status (000001 to 000016)

15: Change N coil statuses (000001 to 000016)

Coil Relay (00****)	Description	Explanation	R/W	Initial Value
0001	Stop RFID command	Stops KW2D Series RFID Reader detection processing of RFID tags. Restores original operation when canceled. 0: Cancel stop command, 1: Stop command	R/W	0
0002	Forcibly cancel lock command	Cancels the lock operation. 0: No cancel lock operation command, 1: Turn on cancel lock operation command	R/W	0
0003	Forcibly stop timer for lock time command	Stops the timer for the lock time. 0: No command, 1: Turn on stop timer for lock time command	R/W	0
0004 to 0006	Reserved		R/W	-
0007	OK command	ON: Turn on OK command, OFF: No command	R/W	0
0008	Failure command	ON: Turn on failure command, OFF: No command	R/W	0
0009	Enable manual control of buzzer	Controls the buzzer. 0: Follow setting, 1: Enable manual control of buzzer	R/W	0
0010	Control buzzer	Turns the buzzer on/off. 0: Turn off buzzer, 1: Turn on buzzer	R/W	0
0011	Enable manual control of LEDs (red)	Controls the LEDs (red). 0: Follow setting, 1: Enable manual control of LEDs (red)	R/W	0
0012	Control LEDs (red)	Turns the LEDs (red) on/off. 0: Turn off LEDs (red), 1: Turn on LEDs (red)	R/W	0
0013	Enable manual control of LEDs (white)	Controls the LEDs (white). 0: Follow setting, 1: Enable manual control of LEDs (white)	R/W	0
0014	Control LEDs (white)	Turns the LEDs (white) on/off. 0: Turn off LEDs (white), 1: Turn on LEDs (white)	R/W	0
0015	Enable manual control of LEDs (green)	Controls the LEDs (green). 0: Follow setting, 1: Enable manual control of LEDs (green)	R/W	0
0016	Control LEDs (green)	Turns the LEDs (green) on/off. 0: Turn off LEDs (green), 1: Turn on LEDs (green)	R/W	0

### Input Registers (300001 to 300032)

Input registers can be read in word units.

04: Read input register status (300001 to 300032)

Input Register (30****)	Description	Explanation	R/W	Initial Value
0001	Reserved		R	-
0002*1, *2	Authority (judgment result)	0: Mismatch, 1 to 255: Authority, 65535: Reading	R	65535
0003*1	UID data length	Number of bytes (1 to 10, 0 is UID not stored)	R	0
0004*1	UID	Stored in order of upper byte (1st byte) and lower byte (2nd byte)	R	0
0005*1	UID	Stored in order of upper byte (3rd byte) and lower byte (4th byte)	R	0
0006*1	UID	Stored in order of upper byte (5th byte) and lower byte (6th byte)	R	0
0007*1	UID	Stored in order of upper byte (7th byte) and lower byte (8th byte)	R	0
0008*1	UID	Stored in order of upper byte (9th byte) and lower byte (10th byte)	R	0
0009 to 0011*1	Reserved		R	-
0012*1	Name1	Stored in order of upper byte (1st character) and lower byte (2nd character)	R	0
0013*1	Name1	Stored in order of upper byte (3rd character) and lower byte (4th character)	R	0
0014*1	Name1	Stored in order of upper byte (5th character) and lower byte (6th character)	R	0
0015*1	Name1	Stored in order of upper byte (7th character) and lower byte (8th character)	R	0
0016*1	Name1	Stored in order of upper byte (9th character) and lower byte (10th character)	R	0
0017*1	Name1	Stored in order of upper byte (11th character) and lower byte (12th character)	R	0
0018*1	Name1	Stored in order of upper byte (13th character) and lower byte (14th character)	R	0
0019*1	Name1	Stored in order of upper byte (15th character) and lower byte (16th character)	R	0
0020*1	Name1	Stored in order of upper byte (17th character) and lower byte (18th character)	R	0
0021*1	Reserved		R	-
0022*1	Name2	Stored in order of upper byte (1st character) and lower byte (2nd character)	R	0
0023*1	Name2	Stored in order of upper byte (3rd character) and lower byte (4th character)	R	0
0024*1	Name2	Stored in order of upper byte (5th character) and lower byte (6th character)	R	0
0025*1	Name2	Stored in order of upper byte (7th character) and lower byte (8th character)	R	0
0026*1	Name2	Stored in order of upper byte (9th character) and lower byte (10th character)	R	0
0027*1	Name2	Stored in order of upper byte (11th character) and lower byte (12th character)	R	0
0028*1	Name2	Stored in order of upper byte (13th character) and lower byte (14th character)	R	0
0029*1	Name2	Stored in order of upper byte (15th character) and lower byte (16th character)	R	0
0030*1	Name2	Stored in order of upper byte (17th character) and lower byte (18th character)	R	0
0031	Reserved		R	-
0032	Lock time	Lock time (counts down)	R	0

\*1 The verification result is held for a maximum of 3 sec after the RFID tag is detected. Then it is set with the initial value.

\*2 Authority

When a tag list is registered : The UID is verified against the tag list. If OK, the authority registered in the tag list is read. For a KW2D special tag, if authority 1 to 254 is specified in the tag list, the authority registered in the tag list is read. If 255 is specified in the tag list, the authority added to the tag is read.

When a tag list is not registered : For a KW2D special tag, the authority held in the tag is read. For other tags, 0 is read.

### Holding Registers (400001 to 400032)

Holding registers can be read and written in word units.

03: Read holding register status (400001 to 400032)

06: Write one holding register (400001 to 400032)

16: Write N holding registers (400001 to 400032)

Holding Register (40****)	Description	Explanation	R/W	Initial Value
0001 to 0032	Reserved		R/W	-

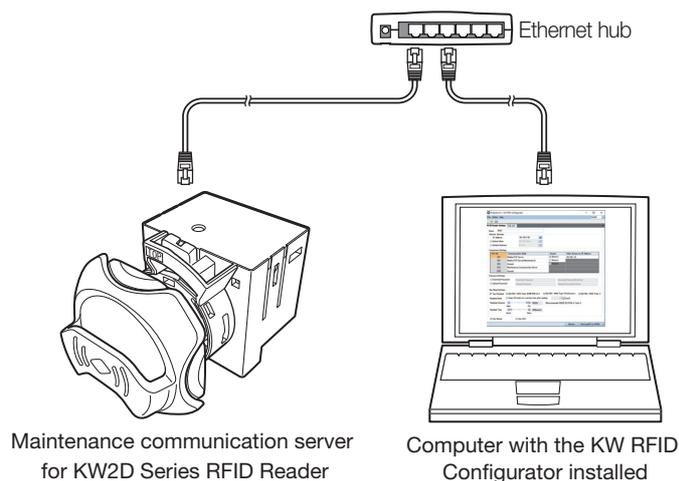
## Maintenance Communication Server

Maintenance communication server is the communication mode for communication with the KW RFID Configurator. A maximum of two maintenance communication server ports can be used.

The following functions can be executed using a KW2D Series RFID Reader.

- Read/write KW2D Series RFID Reader settings and tag list
- Read UIDs detected by the KW2D Series RFID Reader and monitor status
- Find KW2D Series RFID Readers
- Update KW2D Series RFID Reader System Software

### System Configuration Image



## Communication Specifications

Item	Specifications
Supported protocol	Maintenance communication server
Maximum number of simultaneous clients	1 client per port
Port No.	2101 and 2102 (fixed) * You can select to use or not use port 2102.
Allow access by IP address	None
Function	<ul style="list-style-type: none"> <li>• Read/write RFID reader settings and tag list</li> <li>• Monitor UIDs detected by the KW2D Series RFID Reader</li> <li>• Find KW2D Series RFID Readers</li> <li>• Update KW2D Series RFID Reader System Software</li> </ul>

## Functions

### Read/Write RFID Reader Settings and Tag List

You can access a KW2D Series RFID Reader and read/write the KW2D Series RFID Reader communication settings and tag list that contains the tag information for RFID tags to verify. You can also protect KW2D Series RFID Reader settings and tag list with the download password and upload password. See the following sections.

#### Settings

- Configure the KW2D Series RFID Reader settings : Page 4-17
- Create tag list : Page 4-20

#### Download

- Write KW2D Series RFID Reader settings and tag list : Page 4-8
- Write tag list : Page 4-9

#### Upload

- Read KW2D Series RFID Reader settings and tag list : Page 4-10

### **Monitor UID Information Detected by KW2D Series RFID Reader**

You can monitor the tag information detected by a KW2D Series RFID Reader. You can also add the monitored UID information to the tag list.

For how to monitor UID information, see "Chapter 4 [RFID Reader Monitor] Dialog Box" on page 4-11.

### **Find KW2D Series RFID Readers**

If you do not know the IP address of a KW2D Series RFID Reader, you can search for its IP address with the search function.

For how to search for KW2D Series RFID Readers, see "Chapter 4 [RFID Reader List] Dialog Box" on page 4-14.

### **Update KW2D Series RFID Reader System Software**

You can update the System Software on a KW2D Series RFID Reader. Always using the KW2D Series RFID Reader with the latest System Software is recommended. For how to update the System Software, see "Chapter 4 [Download(PC to RFID)] Dialog Box" on page 4-8.

# Chapter 6 Troubleshooting

This chapter describes how to investigate and resolve errors and problems that occur on the KW2D Series RFID Reader.

## Errors

Errors on the KW2D Series RFID Reader can be checked with the LEDs (red) and input relays.

### Checking Errors with the LED Indicator Colors

The error status can be checked with the LEDs (red). The status of the other LEDs in relation to the LEDs (red) and the status of the KW2D Series RFID Reader is as follows.

LED (red)	LED (white)	LED (green)	Description
Off	Off	Off	Stopped
	Flashing (1 sec)	Off	Running
	Flashing (100 msec)	Off	RFID tag detection
	Off	On	Result OK
	Off	Flashing (250 msec)	During UID hold operation
	Off	Flashing (100 msec)	Canceling UID hold
On	Off	On	Initializing
	Off	Off	Result failure (verification error)
Flashing (100 msec)	Off	Off	Modbus TCP server (port number: 502) communication error If communication is lost for 10 seconds or longer
Flashing (500 msec)	Off	Flashing (500 msec)	Downloading project

### Checking Errors with the Input Relays

Input Relay	Description	Explanation
0001	Verification result OK	Turns on if the RFID tag verification result is OK.
0002	Verification result failure	Turns on if the RFID tag verification result is failure.
0003	Port 502 communication status	Indicates the communication status of the Modbus TCP server (port number: 502). 0: Communicating, 1: Not communicating
0004	RFID reader settings status	Indicates whether the KW2D Series RFID Reader has basic settings (project). 0: Has settings, 1: No settings
0005	Tag list status	Indicates whether the KW2D Series RFID Reader has a tag list. 0: Has a tag list, 1: No tag list

## Troubleshooting

This section describes how to investigate and resolve problems that occur when using the KW2D Series RFID Reader.

Problem	Cause	Action
The LEDs do not turn on or flash.	The [Use LED] check box on [RFID Reader Settings] tab is cleared.	If the [Use LED] check box on [RFID Reader Settings] tab is cleared, select the check box.
		If the [Use LED] check box on [RFID Reader Settings] tab is selected, but the LEDs do not turn on or flash, check the following. Turn on coil relays 0011 to 0016 (enable manual control of LEDs) over Modbus TCP server communication. If the LEDs turn on, there is no problem with the LEDs.
The buzzer does not operate.	The [Use Buzzer] check box on [RFID Reader Settings] tab is cleared.	If the [Use Buzzer] check box on [RFID Reader Settings] tab is cleared, select the check box.
		If the [Use Buzzer] check box on [RFID Reader Settings] tab is selected, but the buzzer does not operate, check the following. Turn on coil relays 0009 and 0010 (enable manual control of buzzer) over Modbus TCP server communication. If the buzzer operates, there is no problem with the buzzer.
Cannot communicate with KW RFID Configurator.	The IP address you are trying to access from the computer does not match the IP address of the KW2D Series RFID Reader.	Directly connect the computer and KW2D Series RFID Reader with an Ethernet cable. Use the search function in KW RFID Configurator to find the KW2D Series RFID Reader. Finally, communicate with the RFID reader using the IP address that was detected.
	After the IP address of the KW2D Series RFID Reader is changed, the computer may not recognize the KW2D Series RFID Reader or it may take some time until it is recognized.	Wait before reconnecting or disconnect and then reconnect the Ethernet cable connected to the computer.
The IP address of the RFID reader was forgotten.	-	Directly connect the computer and KW2D Series RFID Reader with an Ethernet cable. Use the search function in KW RFID Configurator to find the KW2D Series RFID Reader. Finally, communicate with the RFID reader using the IP address that was detected.
Cannot communicate over Modbus TCP.	[Communication Mode] is set to "Unused" for the port number you are trying to access under [Connection Settings] on the [RFID Reader Settings] tab.	Select "ModbusTCP Server(Maintenance)" and check communication.
	The [Restrict] check box is selected for the port number you are trying to access under [Connection Settings] on the [RFID Reader Settings] tab.	Clear the [Restrict] check box under [Access] and check communication.
The LEDs (red) are flashing.	Communication over Modbus TCP server (port number: 502) was lost for 10 sec or longer.	Check if a communication error occurred on the Modbus TCP client side.
The upload password set on the RFID reader was forgotten.	-	No method to learn the upload password of the KW2D Series RFID Reader is provided.
The download password set on the RFID reader was forgotten.	-	No method to learn the download password of the KW2D Series RFID Reader is provided. The KW2D Series RFID Reader can be reset to the factory settings, but the project saved in the KW2D Series RFID Reader will be deleted. For details, see "Chapter 4 [Reset RFID Reader to factory settings] Dialog Box" on page 4-13.

Problem	Cause	Action
RFID tags cannot be detected.	The IC tag standard of the RFID tag is not supported.	RFID tags with unsupported IC tag standards cannot be used.
	IC tag standards are restricted.	Check if the [IC Tag Standard] check boxes to read with the KW2D Series RFID Reader are cleared under [Tag Read Settings] on the [RFID Reader Settings] tab.
	The RFID tag signal strength is weak.	Click  for [Reading Distance] under [Tag Read Settings] on the [RFID Reader Settings] tab and set the RSSI value to 0 (far). Also make adjustments to [Reading Time]. For details, see "Chapter 4 (5) Tag Read Settings" on page 4-19.
	RFID tags are overlapping or multiple tags are near the front unit.	Keep tags that should not be read 15 cm or more from the front unit.
	There is a device nearby causing electromagnetic interference.	Do not install the KW2D Series RFID Reader near devices that cause electromagnetic interference (examples include electric motors, magnetic valves, and solenoids).
	Metal or a metallic film sticker is applied to RFID tag.	Check if foreign objects are attached to the RFID tag.
An error occurs in RFID tag verification.	The RFID tag is not registered.	Connect to the KW2D Series RFID Reader with the monitor function and check the authority of the RFID tag. For details, see "Chapter 4 (7) [Save unregistered UID to Tag List] button" on page 4-12.
Input relay address 0004 is on.	Basic settings (project) were not written to the KW2D Series RFID Reader.	Download the basic settings (project) to the KW2D Series RFID Reader. For details, see "Chapter 4 [Download(PC to RFID)] Dialog Box" on page 4-8.
Input relay address 0005 is on.	A tag list was not written to the KW2D Series RFID Reader.	Download a tag list when performing verification with the KW2D Series RFID Reader. For details, see "Chapter 4 [Tag List Download (PC to RFID)] Dialog Box" on page 4-9.
The password for the project file created in KW RFID Configurator was forgotten.	-	No method to learn the password set for the project file is provided. Manage the password appropriately so that third parties do not know it.
KW RFID Configurator does not start.	The computer does not satisfy the specifications for the operating environment.	KW RFID Configurator can be used on Windows 10.
The characters in the tag list of a CSV file (.csv) imported with KW RFID Configurator are garbled.	The character encoding of the imported tag list is different from the character encoding of the operating system.	A tag list exported with KW RFID Configurator is encoded using the character encoding of the version of Windows that is used. To import the file, use a computer with the same language settings as the computer that exported the file. To export and import tag lists between operating systems with different languages, select Unicode text (.txt) when exporting the tag list.

# INDEX

## A

- Adjusting the RFID Tag Detection Sensitivity ..... 5-13
- Applicable Wire and Specifications ..... 3-14
- Attaching the Back Unit ..... 3-3
- Attaching the Front Cover ..... 3-5

## C

- Cancel Lock ..... 5-8
- Checking the KW RFID Configurator  
Version Number ..... 4-2
- Communication Functions ..... 1-7
- Communication Interface ..... 1-7
- [Communication Settings] Dialog Box ..... 4-12
- Configuration of the KW RFID Configurator ..... 4-3
- Connecting the wire ..... 3-11
- Connection Settings ..... 5-19

## D

- Detection Mode ..... 5-4
- Detection Result
  - When a Tag List Is Not Registered ..... 5-6
  - When a Tag List Is Registered ..... 5-5
- Dimensions ..... 2-7
- [Download(PC to RFID)] Dialog Box ..... 4-8
- Drilling the Mounting Hole ..... 3-9

## E

- Errors ..... 6-1
- Ethernet Communication Function ..... 5-18
- Exiting the KW RFID Configurator ..... 4-1

## F

- File ..... 4-5

## H

- Help ..... 4-15

## I

- Installation and Wiring Precautions ..... 3-1
- Installation Space ..... 3-1
- Installing the Software ..... 4-1
- Introduction to the KW RFID Configurator ..... 1-6
- Introduction to the KW2D Series RFID Reader ..... 1-1

## K

- KW2D Series RFID Reader Features ..... 1-3
- KW2D Series RFID Reader Functions ..... 1-4
- KW2D Series RFID Reader Statuses and  
Operations ..... 5-2
- KW2D Special Tag Specifications ..... 2-3

## L

- Lock ..... 5-8
- Lock Mode ..... 5-8
  - When the Reading Mode Is Not Set ..... 5-9
  - When the Reading Mode Is Set ..... 5-11

## M

- Maintenance Communication Server ..... 5-25
- Menu Bar Commands ..... 4-4
- Method to Cancel Lock with Lock Time ..... 5-11
- Method to Forcibly Cancel Lock ..... 5-11
- Method to Set Cancel Lock and Pause Lock ..... 5-14
- Method to Set the Detection Mode Commands ..... 5-14
- Method to Set the Stopped Status ..... 5-14
- Modbus TCP Server ..... 5-21

## N

- Network Settings ..... 5-18

## O

- Online ..... 4-7
- Operating Environment ..... 4-1
- Operation Mode ..... 5-2
- Overview of the KW RFID Configurator ..... 4-1

## P

- Panel Mounting Method ..... 3-7
- Part Names and Functions ..... 2-5
- Pausing the Lock ..... 5-8
- Power Start ..... 5-2
- Power Supply and Power Supply Wiring ..... 3-10
- Precautions When Crimping Wires ..... 3-13
- Precautions When Inserting Wires ..... 3-12
- Product Specifications ..... 2-1
- Projects ..... 5-20

## R

- Read UID Function ..... 5-16
- Recommended Tools ..... 3-15
- Remote Control of Buzzer and LEDs ..... 5-15
- Removing the Back Unit ..... 3-2
- Removing the Front Cover ..... 3-4
- Removing the Wire ..... 3-11
- Reset ..... 5-2
  - [Reset RFID Reader to factory settings]  
Dialog Box ..... 4-13
  - [RFID Reader List] Dialog Box ..... 4-14
  - [RFID Reader Monitor] Dialog Box ..... 4-11
  - [RFID Reader Settings] Tab ..... 4-17

RFID Tag Detection ..... 5-4  
 Running ..... 5-3

**S**

Setup from the Host Device Using Coil Relays ..... 5-14  
 Setup Using the KW RFID Configurator ..... 5-1  
 Shared Memory ..... 5-22  
 Starting and Exiting the Software ..... 4-1  
 Starting the KW RFID Configurator ..... 4-1  
 Stopped ..... 5-2  
 System Configuration ..... 1-5

**T**

[Tag List Download(PC to RFID)] Dialog Box ..... 4-9  
 [Tag List] Tab ..... 4-20  
 Terminals ..... 3-12  
 Toolbar ..... 4-16  
 Troubleshooting ..... 6-2  
 Type Numbers ..... 1-1  
 Type Numbers and Functions List ..... 1-2

**U**

UID Verification Function ..... 5-17  
 Uninstalling the Software ..... 4-1  
 [Upload(RFID to PC)] Dialog Box ..... 4-10

**V**

Verification ..... 5-5  
 Verification Result References ..... 5-7

**W**

Waiting for Result Command from Host Device ..... 5-6  
 Waiting for Verification Result Communication  
 (Reading) ..... 5-5  
 Wire Size and Recommended Ferrules ..... 3-14  
 Wiring Directions and Panel Indicators ..... 3-16

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