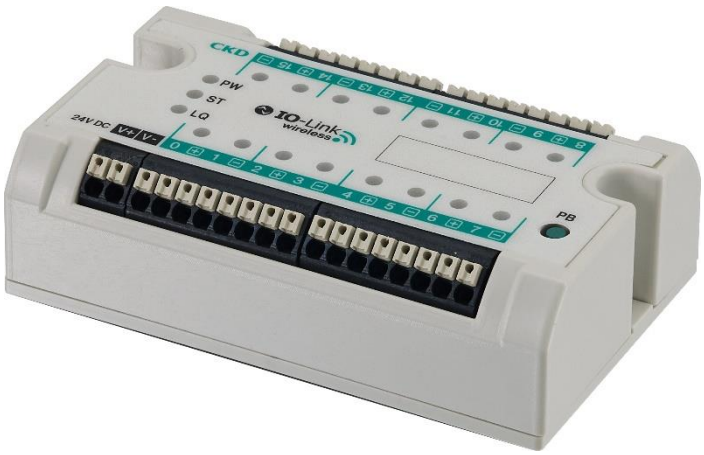
CKD

WD SERIES DIGITAL INPUT UNIT

(IO-Link Wireless Compatible)

Instruction Manual

Read this Instruction Manual before using the product.
Read the safety notes carefully.
Keep this Instruction Manual in a safe and convenient place for future reference.



2024-07-31 SM-A88882/1

PREFACE

Thank you for purchasing WD Series Input Unit (IO-Link Wireless compatible).

This Instruction Manual contains basic matters related to the operation of this product in order to ensure optimal performance of the product. Please read this Instruction Manual thoroughly and use the product properly.
Keep this Instruction Manual in a safe place and be careful not to lose it.

- This Instruction Manual is intended for the engineer installing and setting up the product.
  The product is intended to be handled by a person who has extensive knowledge and experience in the following:
  - Electrical (electrician or equivalent)
  - Industrial network communications used
  - FA system in general
  - Each system that uses sensor, FA networks, etc.

  CKD shall not be responsible for accidents caused by persons who selected or used the product without knowledge or sufficient training.
- Product specifications and appearances in this Instruction Manual are subject to change without notice.
- Since there are a wide variety of customer applications, it is impossible for CKD to be aware of all of them.
  Depending on the application or usage, the product may not be able to exercise its full performance or an accident may occur.
  It is the responsibility of the customer to check the product specifications and decide how to use the product in accordance with the application and usage.

SAFETY INFORMATION

When designing and manufacturing any device incorporating the product, the manufacturer has an obligation to ensure that the device is safe. To that end, make sure that the safety of the machine mechanism of the device and the electric system that controls such mechanism is ensured. To ensure the safety of device design and control, observe organization standards, relevant laws and regulations, which include the following:
In order to use our products safely, it is important to select, use, handle, and maintain the products properly.
Observe the warnings and precautions described in this Instruction Manual to ensure device safety.
Although various safety measures have been adopted in the product, handling that is not described in this Instruction Manual may lead to an accident. Thoroughly read and understand this Instruction Manual before using the product.

To explicitly indicate the severity and likelihood of a potential harm or damage, precautions are classified into three categories: "DANGER", "WARNING", and "CAUTION".

 **DANGER**	Indicates an imminent hazard. Improper handling will cause death or serious injury to people.
 **WARNING**	Indicates a potential hazard. Improper handling may cause death or serious injury to people.
 **CAUTION**	Indicates a potential hazard. Improper handling may cause injury to people or damage to property.

Some statements classified as "CAUTION" may still lead to serious results depending on the situation.
All statements that follow these labels are important and must be observed.

<Types of warning symbols>

	A general mark indicating a prohibited (not permitted) action.		A mark prohibiting people from touching objects or equipment.
	A mark prohibiting people from putting their fingers into openings.		A general mark warning people of dangers such as electric shock and burns.
	A mark warning people of dangers that occur when starting an automatic equipment.		A general mark indicating that a specific course of action must be taken.
	A mark indicating that an instruction manual must be read carefully.		A mark indicating that the earth terminal must be connected to the ground.

Other general precautions, tips on using the product, or technical information and terminology are indicated by the following icon.

- Contains useful information such as general precautions, supplementary information, and reference information.

DANGER

Do not use the product for the following purposes:

- Medical equipment for maintaining, caring for, etc., human life and the body
- Mechanisms and mechanical devices for the purpose of moving and transporting people
- Critical safety parts for mechanical devices

WARNING

Do not modify the product or perform additional work on the product.

- Modification or additional work may not only pose a risk of fire or electric shock, but it may also cause the product to fail to meet the specifications described in this Instruction Manual.

Do not handle the product or mounting and removing devices until confirming safety.

- Inspect and service the machine and devices after confirming the safety of the entire system related to the product. Also, be careful not to get an electric shock by turning OFF the power to the equipment or applicable equipment.
- Since there may be hot or live parts even after operation has stopped, use extreme care when handling the product or mounting and removing devices.

Customers using implantable medical devices should not come close to the product until it's confirmed to be safe.

- Radio waves emitted by the product may adversely affect implantable medical devices such as implantable cardiac pacemakers and implantable defibrillators.
  Customers using implantable medical devices should contact the manufacturer of the medical device before using the product.

The product must be handled by a qualified person who has extensive knowledge and experience.

- The product is designed and manufactured as a device or part for general industrial machinery and should be handled with care.

Use the product within the specifications.

- The product must not be used beyond its specifications.
- The product is intended for use as a device or part for general industrial machinery. It is not intended for use under the conditions or in environments listed below. Exception is made if the customer consults with CKD prior to use and understands the specifications of the product. However, even in that case, safety measures must be taken to avoid danger in case of a possible failure.
  - ◎ For use under the conditions or in environments other than those specified or outdoors.
  - ◎ In applications for nuclear power, railroad system, aviation, ship, vehicle, medical equipment, and equipment that directly touches beverage or food.

WARNING

◎ For special applications that require safety including amusement equipment, emergency shut-off circuit, press machine, brake circuit, and safety measures.

◎ For applications where life or properties may be adversely affected and special safety measures are required.

- Because the product communicates via radio waves, communication may be temporarily interrupted due to the surrounding environment and how the product is used. CKD is not responsible for any secondary failure that may result in human injury or damage to other devices or equipment.

Precautions on Radio Act

<Important matters on wireless device>

The product has obtained a certification of construction type **Note 1** as a wireless device based on the Radio Act.
The following statements must be observed when using the product.

Note 1: There is no need for customers to apply for a license, etc. to use the product.

- Do not disassemble or modify. Disassembly and modification are prohibited by law.
- The product complies with the Radio Act of Japan.
  When using it outside of Japan, please contact us separately.
  For the latest information, check the catalog on the following website.
  URL: https://www.ckd.co.jp

This product complies with Part 15 of the FCC Rules.
The following two conditions must be followed in order for this device to operate.

(1) It must not cause harmful interference.
(2) It must be capable of withstanding any interference, including interference that may cause undesired operation.

The FCCID of this product is as follows.

「Contains FCC ID：2ATSM-TGRFCM1」

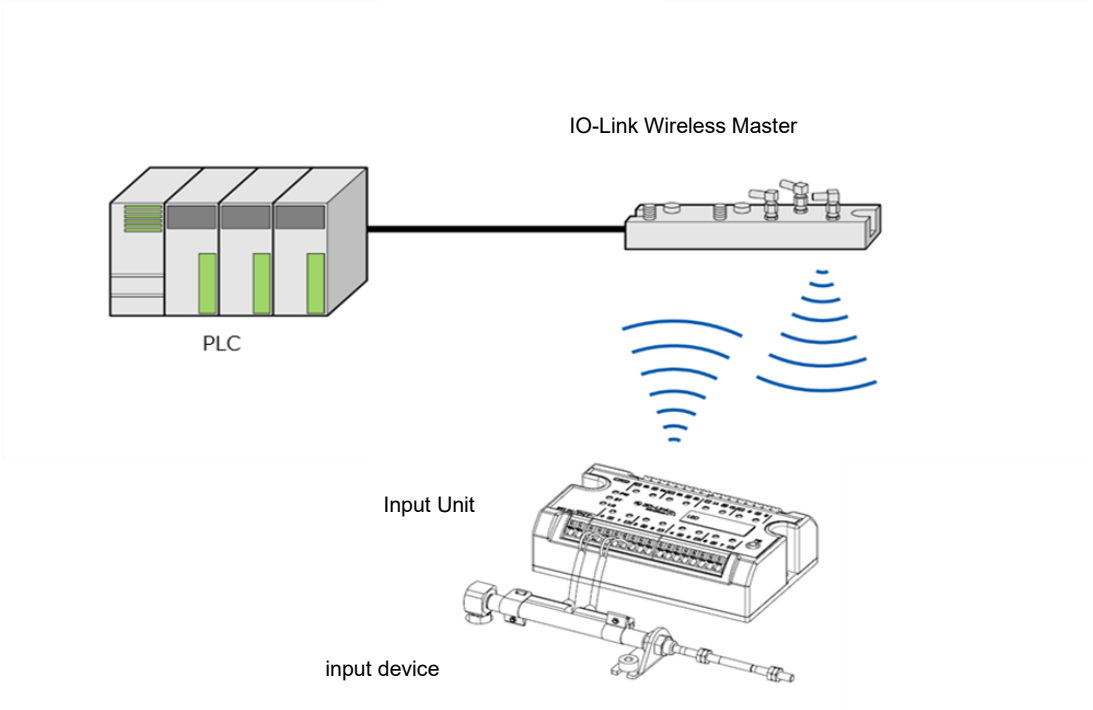
CONTENTS

1. PRODUCT OVERVIEW

1.1. System Structure

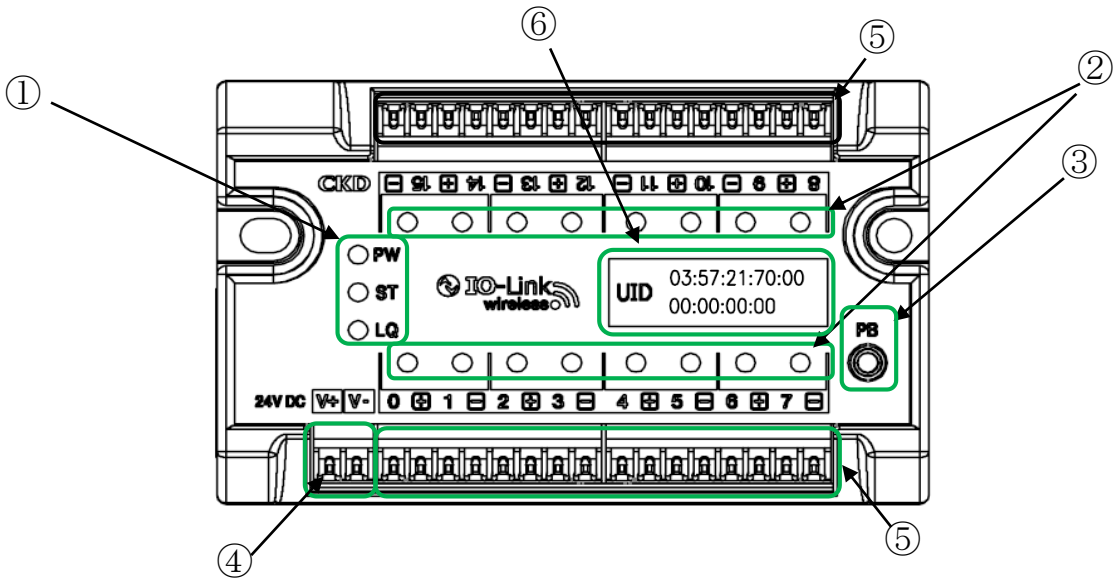
<The WD Series Digital Input Unit (IO-Link Wireless Compatible)>
It captures digital signals from input devices such as sensors and switches, and wirelessly transmits the signals to the IO-Link Wireless master through the industrial network IO-Link Wireless.

- Company names and product names mentioned herein are trademarks or registered trademarks of each company.



＜System configuration＞

1.2. Name of Each Part



No.	Name	Description
①	Network status LED	Indicates the status of the product and the network with PW, ST, and LQ.
②	Input status LED	Indicates the input status.
③	Pairing button	Performs pairing with the master and restarting of the product.
④	Unit power supply connector	Used to connect the power supply to the unit.
⑤	Input connector	Used to connect input devices.
⑥	Unique ID	This is the number used by the master to identify the product.

1.2.1. LED

There are four types of LED indicators: PW, ST, LQ, and DI.
Refer to the following table for details.

<LED indicator>

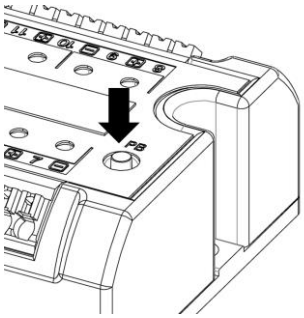
Item	LED	Status
PW	Green off	This product is powered off
	Green blinking	Status of wireless communication being established
	Green on	This product is powered on
ST	Red off	Normal status
	Red blinking	Maintenance required **Note 1**
	Red on	Error detection **Note 1**
LQ	Off	The power of this product is OFF or wireless communication has not been established
	Green on	Communication quality “Good”
	Orange on	Communication quality “Normal”
	Red on	Detection of communication errors in wireless communications
DI (0～15)	Off	Target digital input is OFF or Input device is not connected
	Green on	Digital input of input subject is ON
	Red on	Detection of errors in the sensor supply power or sensor input circuit

Note 1: If both happen at once, “Red on" is prioritized and indicated.

1.2.2 Pairing button

Hold down the pairing button to pair with the master or restart the product.

<Pairing button>

Appearance	Press time (s)	Operation
	0 < .... ≦ 3	Does not operate
	3 < .... ≦ 10	Requests pairing to master
	10 < .... ≦ 30	Does not operate
	30 <	Restarting

<When conducting pairing>

After putting the master in the receiving state for pairing, hold down the pairing button on the product to request pairing.
For the operation method of the master, refer to the Instruction Manual for the master.

1.2.3. Connector

The interface connecting the power supply of the product and the input device.

<Connector>

Name	Indication	Specifications	Notes
Unit power supply connector	V+	Unit supply power (24 V)	Supply DC 24 V.
	V-	Unit supply power (0 V)	
Input connector	0～15	Sensor input 0 to 15	Each of two inputs is one block, with + (24 V) and - (0 V) available for each. Also, + (24 V) and - (0 V) are connected to 24 V and 0 V of the power supply, respectively.
	+	Sensor supply power (24 V)	
	−	Sensor supply power (0 V)	

- Refer to 2.3 Wiring for wiring to the connectors.

1.3. Input Specifications

	WD-ADGC16A	WD-ADGC16B
Number of input points	16 points	
Connection method	Push-in terminal block	
Connection terminal	Ferrule terminal	
Input type	PNP	NPN
Input ON voltage	16 V or more Between input terminal and +	16 V or more Between input terminal and −
Input OFF voltage	5 V or less Between input terminal and +	5 V or less Between input terminal and −
Input OFF current	1 mA or less	
Simulated input	Input values can be set regardless of the actual input	
Maximum sensor supply current	200 mA/connector, 1600 mA/unit	
Input current	5.1mA typ	
Sampling period	2ms	
Input filtering time	10/20/50/100 (ms)	
Input hold time	20/100/200 (ms)	
Sensor supply power	DC24V ※ (Power supply voltage -1.2 V) or more	

2. INSTALLATION

This section describes the precautions to be taken in the installation environment and method in order to use the product correctly.

DANGER

Do not use the product in the presence of hazardous materials such as ignitable, flammable, and explosive things.
- It may cause fire, other things to catch fire, or an explosion.

Do not work with wet hands.
- There is a risk of electric shock.

Prevent water or oil from splashing onto the product.

When mounting the product, secure the workpiece while steadily holding the product and the workpiece.
- Tipping, falling, or abnormal operation of the product may result in injury.

For the power, use a regulated DC power supply (DC 24 V ±10%).
- Connecting directly to an AC power supply may cause fire, rupture, or damage.

In accordance with "JIS B 9960-1:2019 (IEC 60204-1:2016) Safety of machinery - Electrical equipment of machines - Part 1: General requirements," an overcurrent protection device (such as a circuit breaker for wiring or a circuit protector) should be installed on the primary power supply of wiring.

Reference: Excerpt from JIS B 9960-1:2019 "7.2.1 General Information"
Overcurrent protection shall be provided where the circuit current may exceed the rated value of the component or the allowable current of the conductor, whichever is smaller. Details of the rated value or set value that is selected are provided in section 7.2.10.

WARNING

Do not mount the product to combustible materials.
- Mounting to or near combustible materials may cause fire.

Do not place or insert heavy objects on the cable.
- If the cable sheath is torn or excessive stress is applied to it, it may cause poor conduction and insulation deterioration.

Do not use nor store it in the presence of strong electromagnetic waves or radiation.
- It may cause malfunction or failure.

Do not tip over, vibrate, or apply shock while transporting because precision devices are built in it.
- It may cause damage to parts.

Do not disassemble or modify the products other than those specified in this manual.
- This may not only pose a risk of injury, malfunction or failure, but also cause the product to fail to meet the specifications such as this Instruction Manual.

If the machine stops in the event of system abnormality such as an emergency stop and power outage, design safety circuits or safety devices to prevent damage to equipment, personal injury, etc.

The wiring of the product should be checked in this Instruction Manual or in the relevant instruction manual to ensure that there are no wiring errors or loose cables.
- There is a risk of abnormal operation and overcurrent flow. Excessive current may cause abnormal operation, damage, or fire.

Check that the wiring is insulated.
- There is a risk of abnormal operation and overcurrent flow. Excessive current may cause abnormal operation, damage, or fire.

Make sure there is no contact with other lines, earth faults, or insulation failure between terminals.
- There is a risk of abnormal operation and overcurrent flow. Excessive current may cause abnormal operation, damage, or fire.

Mount in a dry area indoors.
- Damp areas can cause electrical leakage or fire.

CAUTION

Do not use it in environments where ferromagnetic fields are generated.
- It may cause malfunction.

Do not perform voltage resistance tests or insulation resistance tests on the device to which the product is mounted.
- In terms of circuit design, the product will be damaged if voltage resistance tests and insulation resistance tests are performed on the equipment to which the product is mounted. If voltage resistance tests or insulation resistance tests are required as a device, remove the product before performing it.

Do not save nor store it in atmospheres exposed to ultraviolet rays, corrosive gases, salts, etc.
- It may cause performance deterioration and deterioration of strength due to rust.

Do not install it in a location where large vibration or shock is transmitted.
- Transmission of large vibration or shock may cause malfunction.

Do not use in places where condensation occurs due to sudden changes in ambient temperature.
- It may cause malfunction or deteriorate its strength.

Do not hold any moving parts or cables of the product during transportation or mounting.
- It may cause injury or disconnection.

Do not bend the fixing cable repeatedly.
- Use movable cables for repeated bending.

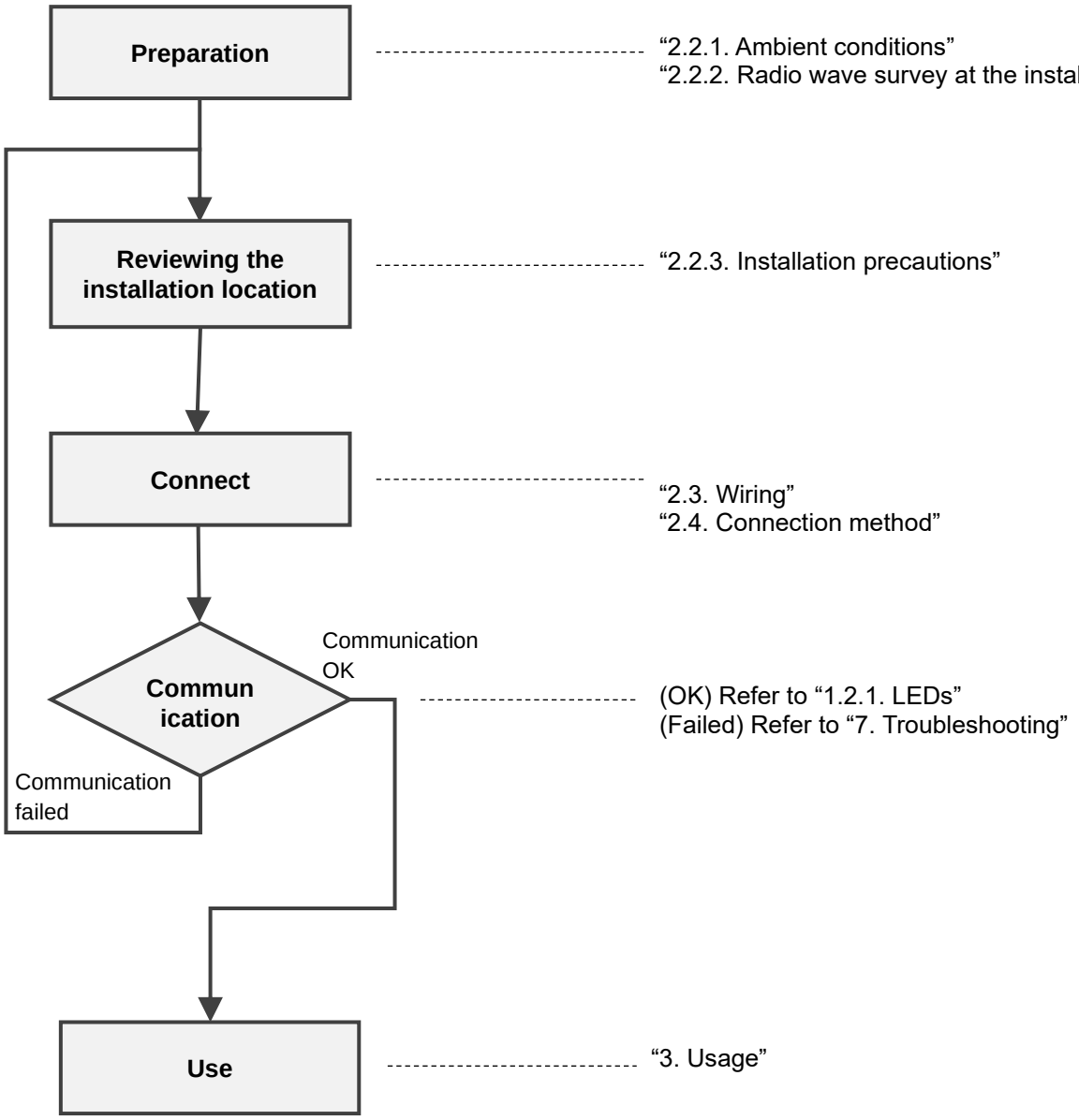
Make sure that no inductive noise is applied to the wiring.
- Avoid places where high currents and ferromagnetic fields are generated.
- Do not use the same piping/wiring (by multicore cable) with large motor power lines other than the product.
- Do not use the same piping/wiring with the inverter power and wiring parts used for robots, etc. Apply frame ground to the power.

Secure space necessary for maintenance and inspection.
- If not secured, maintenance and inspection will not be possible, and it may cause the equipment to stop or result in it getting damaged, or cause injury.

It is the responsibility of the customer to confirm compatibility of the product with any system, machinery, or device used by the customer.
- If the power is shared, surge currents may be applied to the output parts and may cause damage.
  If it is not possible to use a separate power supply, connect the surge absorbing element directly in parallel to all inductive loads.

2.1. Procedure for Implementing Wireless Devices

Complete the following procedures to implement the product:

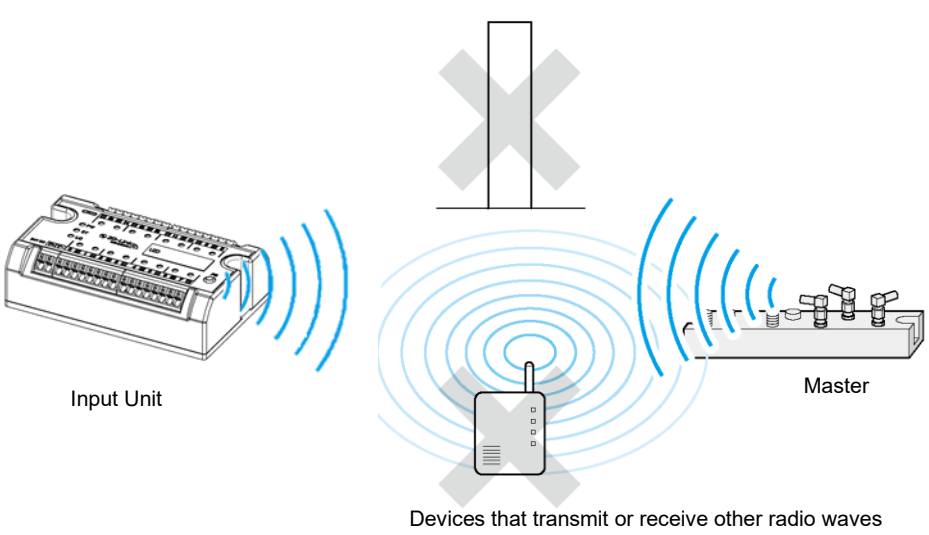


2.2. Environment

2.2.1. Ambient conditions

Install the product in a location that meets the following requirements:

- Install the product in the place where no radio wave interference object is present nearby or at the location not surrounded by radio wave interference object.
  If there is a radio wave interference object between the product and the master, the communication distance will be reduced.
  <Major radio wave interference objects>Metal plate, metal piping, metal shelves, reinforced concrete, people, water, etc.
- A location where there are no devices transmitting or receiving radio waves nearby, such as transceivers



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2.2.2. Radio wave survey at the installation location

■ Survey of other radio systems

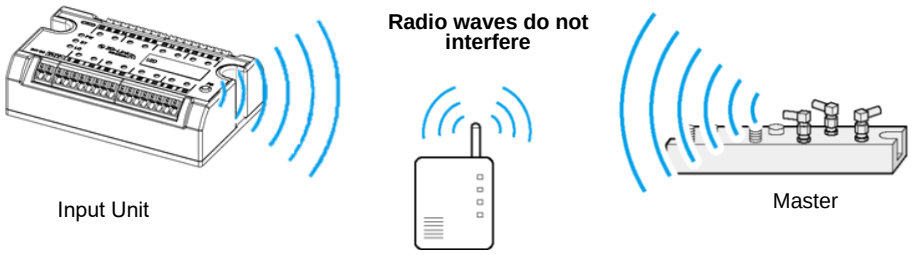
Check that there are no other radio systems using a 2.4 GHz band at the installation location of the product.
If another radio system is installed, check the communication channel, communication frequency, etc. to ensure that it can coexist with the product.

<Example of other radio systems>
Wireless LAN, Bluetooth, ZigBee, etc.

■ Confirmation when using multiple radio systems

<Construction method of multiple radio systems>

- Use the blacklisting function to separate communication channels.
  For details, refer to the Instruction Manual of the master.
- Use it at a distance of at least 10 meters from other radio systems.

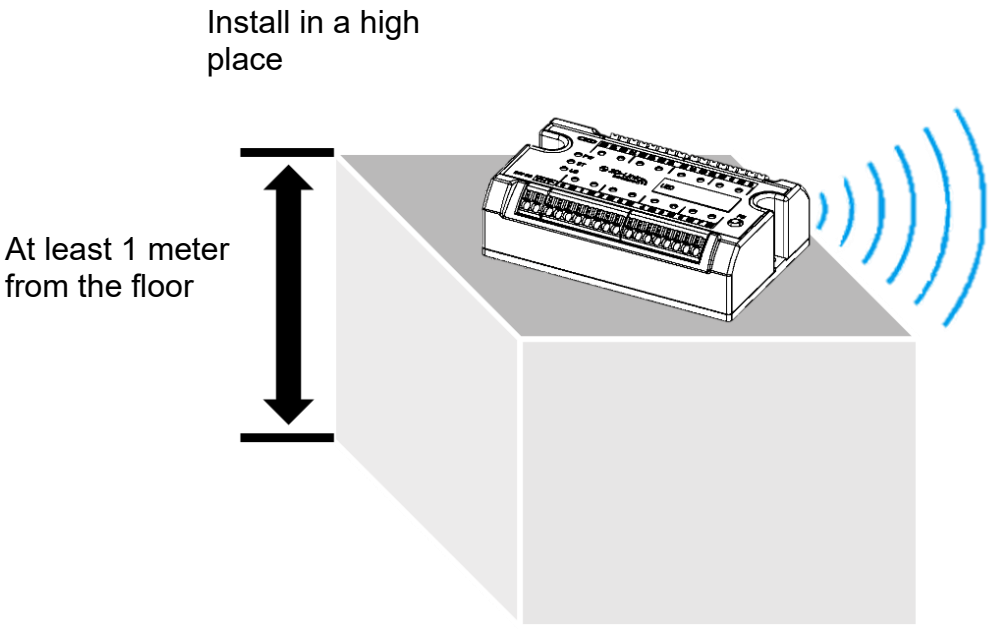


Devices that transmit or receive other radio waves

2.2.3. Precautions on installation

To maximize the wireless performance of the product, install the product under the following conditions:

- **Install the product in a position where the antenna of the master can be seen**
  It is difficult for radio waves to wraparound where the antenna cannot be seen.
- **Install the product in a high place**
- Install the product away from the floor to send radio waves farther.
  (It is recommended to separate it at least 1 meter.)
-



2.3. Wiring

WARNING

Do not touch the charging part with your bare hands.

- There is a risk of electric shock.

Wire the power cables after the device has been mounted.
- It may cause electric shock.

Wire the power cables after the power supply to be connected is off.
- An electric shock may occur by touching the electrical wiring connection.

The wiring must be done by professional engineers.

Thoroughly read and understand this Instruction Manual before working on electrical wiring.

CAUTION

Secure a sufficient bending radius for the power cable and do not bend it by force.

Take measures against lightning surges on the equipment side.
- The product has no resistance to lightning surges.
- AC voltage models must be used in an installation category II environment.

Insert the cable correctly to prevent the connecting of the power cable from becoming loose or disconnected.
- It may cause fire, electric shock accidents, or malfunction of the devices.

Check the working voltage and polarity before wiring.
- Incorrect wiring may cause a failure.

Calculate the current consumption to select the power cable.
- Heat may be generated or damaged during operation.

Do not apply tension or shock to the power cable.
- If the wiring is long, the cable weight or shock may cause an unexpected force and result in damage to the connector or device. Take appropriate measures such as securing the wiring to the machine or equipment midway.

CAUTION

When wiring, be careful of the following points to prevent problems caused by noise.

- If noise can have an effect, prepare power for each input unit and wire independently.
- Do not make the power cable unnecessarily long. Wire it as short as possible.
- Separate the power wiring of the product from the wiring of devices that generate noise such as the inverter motor.
- Wire the power cable away from other power lines as much as possible.

Wire the power cable properly within its specifications.

- Incorrect wiring may cause damage or malfunction of the product.

Take measures to secure the specified power supply voltage if voltage drop cannot be avoided.

- For example, wire the power cables in multiple systems or install another power supplies to ensure the specified power supply voltage.

2.3.1. External wiring

Follow the procedures below when connecting the power cable to the product:

CAUTION

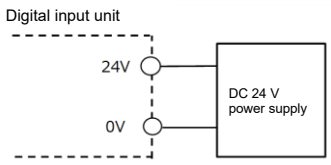
- Connecting the power cable with the power supply ON may cause the system to operate suddenly.

1. Power OFF

Switch the power supply OFF.

2. Wiring to the unit power supply connector

Wire 24 V to V+ and 0 V to V- of the unit power supply connector, respectively, as shown in the table below.

Pin wiring diagram	Pin	Function
	V+	For unit power (24 V)
	V-	For unit power (0 V)

- The following ferrule terminals are recommended for connection.
  Made by Weidmüller

Item	Model number	Applicable wire (mm²)
H0,25/12 HBL	9025760000	0.25
H0,34/12 TK	9025770000	0.34
H0,5/14 OR	0690700000	0.5
H0,75/14T HBL	9021040000	0.75

Item	Model number	Applicable wire (mm²)
H0,34/14 ZH TK	1139070000	0.34
H0,5/14 ZH OR	9037200000	0.5
H0,75/16 ZH W	9037240000	0.75

2.3.2. Connecting input device

Follow the procedures below when connecting input devices to the product:

CAUTION

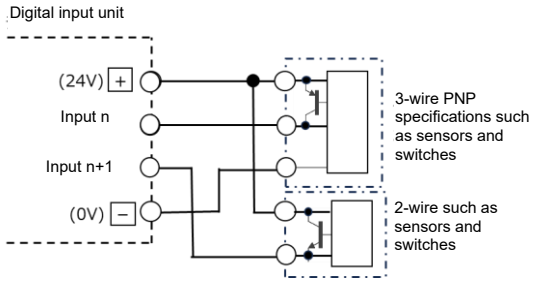
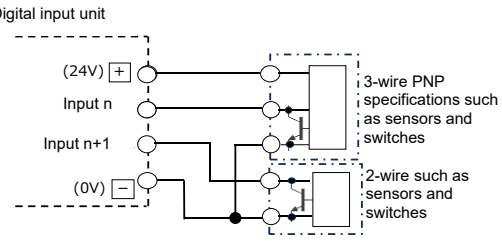
- Connecting input devices while the power is on may cause the system to operate suddenly.

1. Power OFF

Switch the power supply OFF.

2. Wiring to the input connector

Wire to input connectors 0 to 15, +, and - as shown in the table below.

Pin wiring diagram	Pin	Function
WD-ADGC16A (PNP input)  WD-ADGC16B (NPN input) 	0～15	Sensor input (0 to 15)
	+	Sensor power supply (24 V)
	−	Input power supply Sensor power supply (24 V)

- Each block is two inputs, with + (24 V) and - (0 V) prepared for each. Also, + (24 V) and - (0 V) are connected to 24 V and 0 V of the input power supply, respectively.
- The input n is even and can take the values 0, 2, 4, 6, 8, 10, 12, and 14.
- The following ferrule terminals are recommended for connection.

Made by Weidmüller

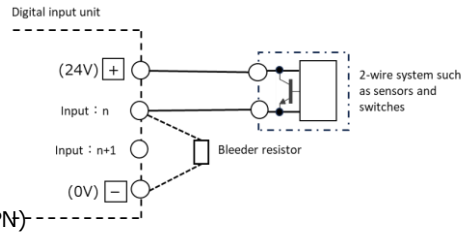
Item	Model number	cross-sectionalarea(mm²)
H0,25/12 HBL	9025760000	0.25
H0,34/12 TK	9025770000	0.34
H0,5/14 OR	0690700000	0.5
H0,75/14T HBL	9021040000	0.75

Item	Model number	cross-sectional area(mm²)
H0,34/14 ZH TK	1139070000	0.34
H0,5/14 ZH OR	9037200000	0.5
H0,75/16 ZH W	9037240000	0.75

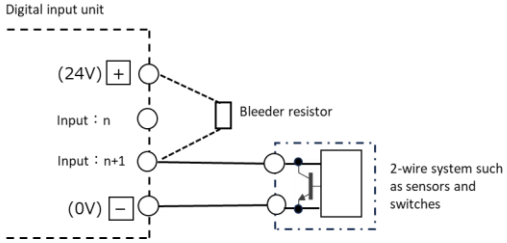
- When using a sensor whose lower limit of load current exceeds the product's specification of input current, increase the sensor's load current by connecting a bleeder resistor. 12kΩ (1/10 W or more) bleeder resistor will increase the load current for approximately 2 mA.

Pin wiring diagram

WD-ADGC16A (PNP)



WD-ADGC16B (NPN)



2.4. Connection Method

2.4.1. Connecting with the pairing button

The product and the master can be connected easily with the pairing button.
For the press time and operation details, refer to **1.2.2. Pairing button**.

1. Master power ON

Turn the master power ON.

2. Turn the power of the product ON

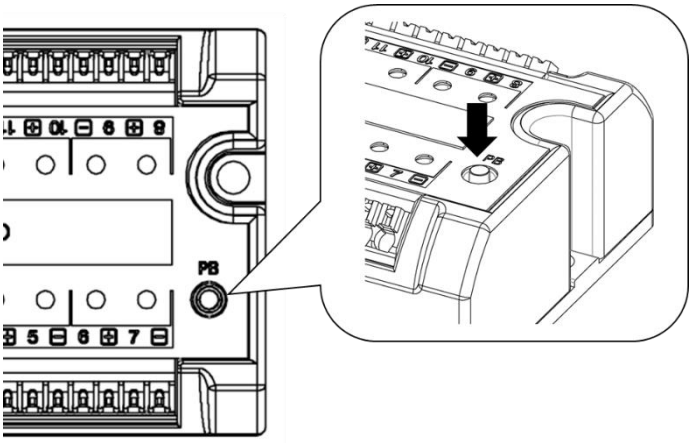
Turn the power of the product ON.

3. Start pairing the master

Put the master in the receiving status.
For the pairing button of the master, refer to the Instruction Manual of the master.

4. Start pairing the product

Long-press the pairing button on the product for at least 3 seconds to pair with the master.



- Do not hold it down for more than 30 seconds because the product will restart.
- The amount of time it takes until the pairing button must be pressed on the product from when the master is ready to be paired is different depending on the specifications of the master.

5. Connection completed

The connection between the product and the master is completed.

2.4.2. Connecting by master tool

Conduct pairing using the master setting tool.
For details on how to connect using setting tools, refer to the Instruction Manual of the master.

1. Start the tool

Start the tool you use.

2. Set with the tool

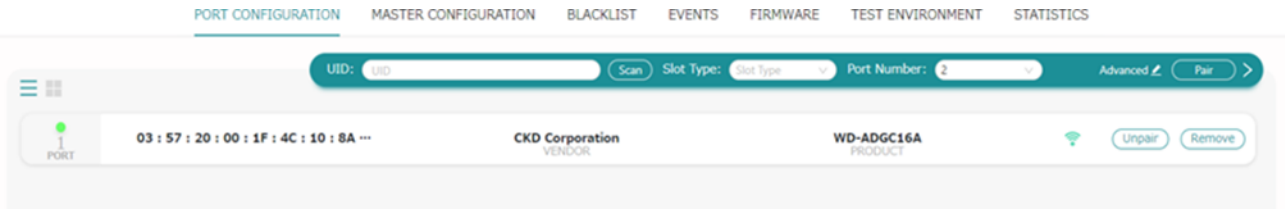
Input the necessary information and change the settings with the tool.

3. Turn the power of the product ON

Turn the power of the product ON.

4. Connect to the master

Use the tool to pair the master with the product.



5. Connection completed

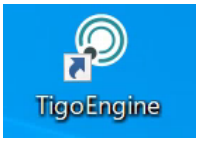
The connection between the product and the master is completed.

- It is also possible to set and connect the UniqueID from the PLC. For details, refer to the Instruction Manual of the master.

An example is shown with TigoEngine from CoreTigo.
For details, refer to the Instruction Manual of TigoEngine.

1. Start TigoEngine

Start the tool.



2. Set with the tool

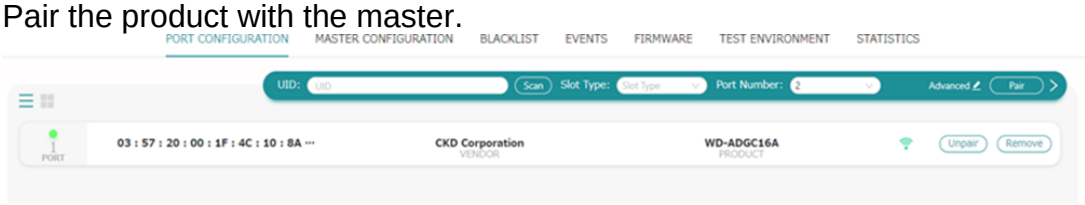
Input the necessary information and change the settings with the tool.

3. Turn the power of the product ON

Turn the power of the product ON.

4. Connect to the master

Pair the product with the master.



5. Connection completed

The connection between the product and the master is completed.

3. USAGE

WARNING

Consult CKD about the specifications before using the product outside the designated specifications or for a special application.

CAUTION

Thoroughly read and understand the instruction manual for the network system to be used before using the product.

Be careful of the surroundings and ensure safety before turning the power on or off.

- The system may operate suddenly.

Before touching the device, discharge static electricity from your body.

- Static electricity may cause damage to the product.

3.1. When Using PLC

The product can be operated with the PLC.
The master tool can also read and write the parameters of the product. (Refer to 3.2 “Reading and Writing Parameters using the Master Tool”)

The procedures for use are as in the table below.

No.	Procedure	Reference
①	Connecting the PLC and the master	3.1.1 Setting network, 3.1.2 Setting Input/Output
②	Setting PLC	3.1.3 Creating global variables
③	Process data registration	3.1.4 Registering process data

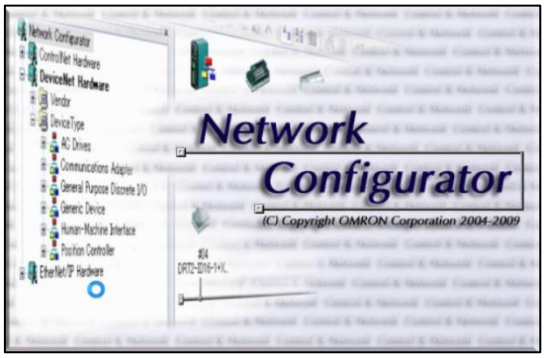
This Instruction Manual describes specific procedures using OMRON PLC compatible with Ethernet/IP.

3.1.1. Setting network

An example is shown with OMRON NJ Series. It is only required when the setting is integrated online.
When adding to an existing network, be careful not to delete the existing settings.

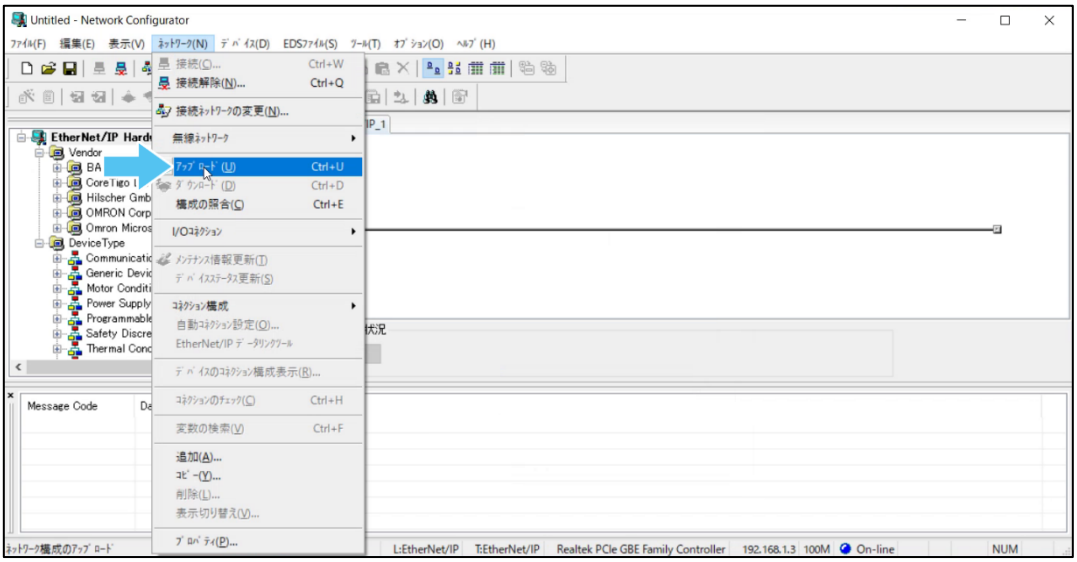
1. Start Network Configurator software

Start the software.



2. Uploading network

Upload the network.



3. Checking connection

Check that the settings have been integrated correctly and that they are completed.

3.1.2. Setting Input/Output

Set Input/Output tags.

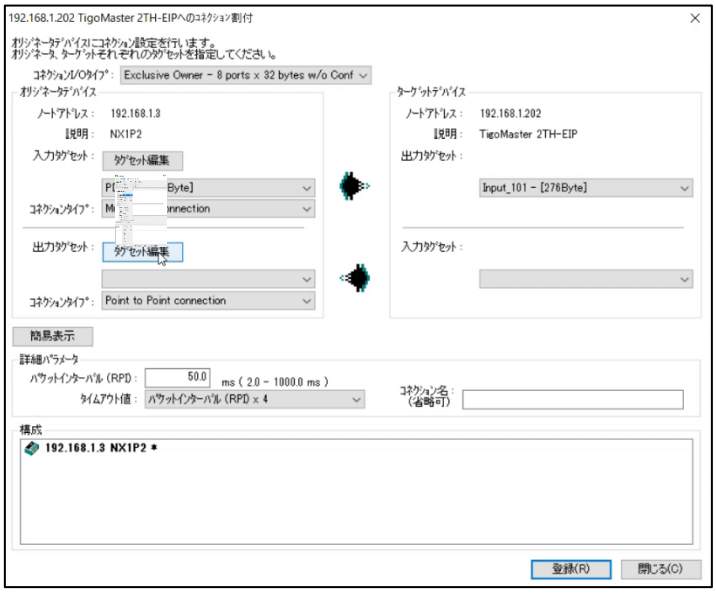
1. Set input tag

Set each item in the connection's allocation window and click [Register].
When registered, click [Close] to close the window.

Item	Content
Tag name	Please enter a tag name of your choice
Size	Please enter the applicable size

2. Setting output tag

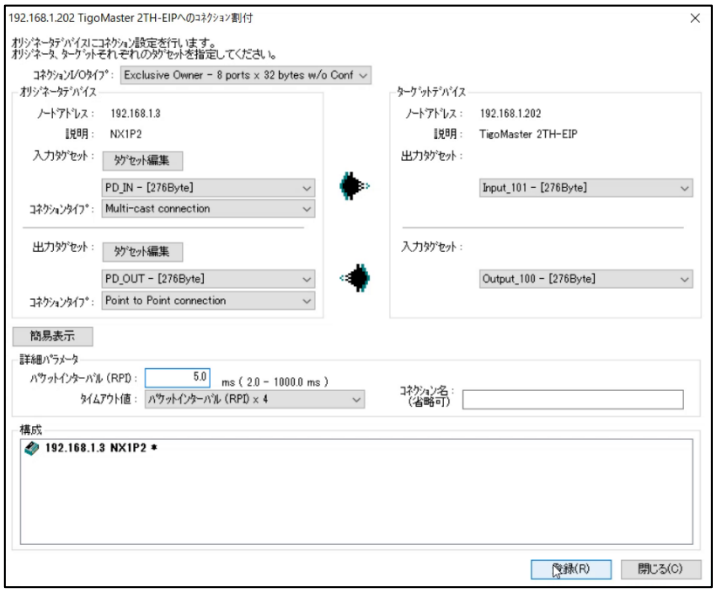
Set the output tags as in procedure 1.



Item	Content
Tag name	Please enter a tag name of your choice
Size	Please enter the applicable size

3. Allocating connections

Set each item in the connection's allocation window and click [Register].
When registered, click [Close] to close the window.



4. Transferring setting data to PLC

Transfer setting data to PLC.

- Depending on the settings on [Connection I/O Type], pairing is required again when the power of the product is on again.

3.1.3. Creating global variables

Use Sysmac Studio software to set Input/Output data areas.

1. Starting Sysmac Studio software

Start Sysmac Studio software and select a project.

2. Displaying global variables window

Click "Global Variables" in the side menu.

3. Inputting global variable (input)

Click Global Variables window and input the global variable.

Item	Content
Name	PD_IN
Data type	ARRAY[0..275] OF BYTE (Align the size with the ones set as the tag.)
Network release	Input
Comment	PDinput

4. Inputting global variable (output)

Click Global Variables window and input the global variable.

Item	Content
Name	PD_OUT
Data type	ARRAY[0..275] OF BYTE (Align the size with the ones set as the tag.)
Network release	Output
Comment	PDoutput

3.1.4. Registering process data

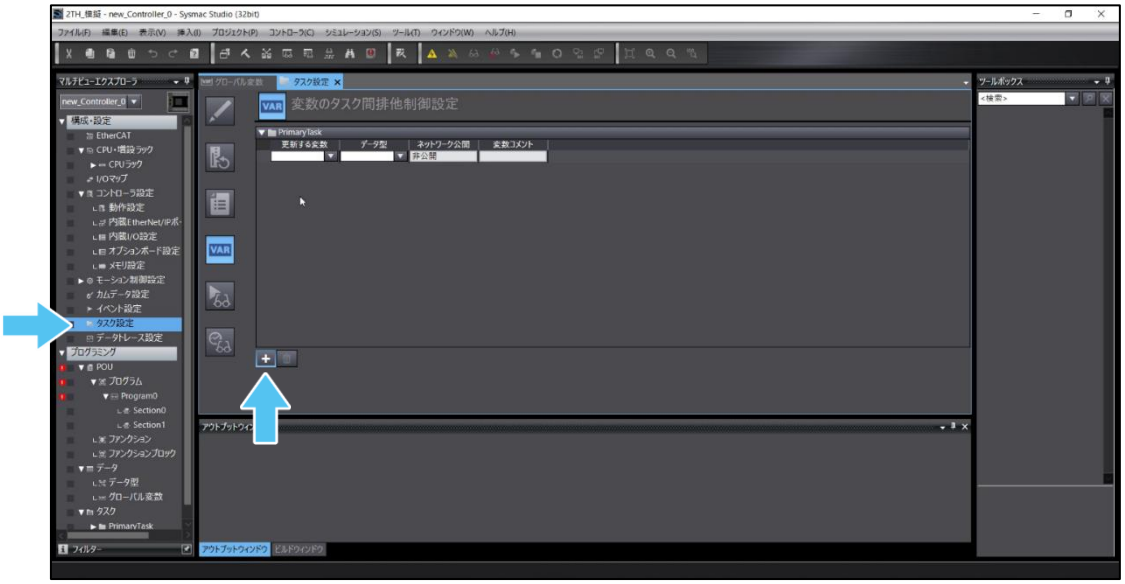
Register process data.

1. Displaying task settings window

Click “Task Settings” in the side menu.

2. Adding process data

Click [+] to add.



3. Setting process data (input)

Click “Variables to update” and select “PD_IN” to set it.

4. Setting process data (output)

Set “PD_OUT” as in procedure 3.

- When setting the process data, be careful to match the size and the tag name created in 3.1.2 “Input/Output Settings.”

3.2. Reading and Writing Data Using Master Tool

The master tool can also read and write the data (parameters) of the product.
For details on the operation method, refer to the Instruction Manual of the master.

1. Start the tool

Start the tool you use.

2. Connect to the master

Connect to the master.

3. Reading out or writing in parameters of the product

Read out or write in the data necessary.

An example is shown with TigoEngine of CoreTigo.
For details, refer to the Instruction Manual of TigoEngine.

1. Start TigoEngine

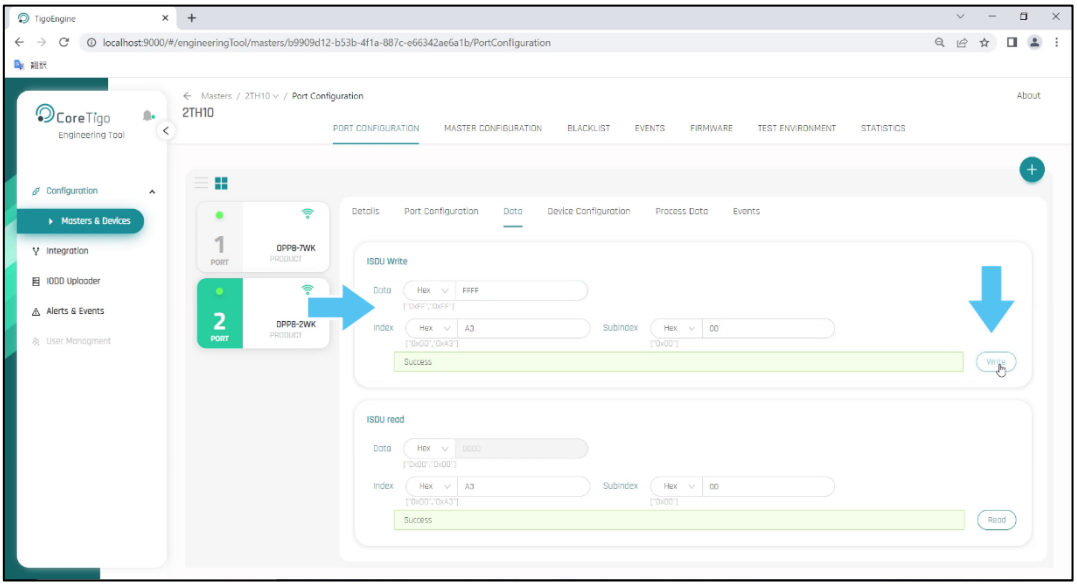
Start the tool.

2. Connect to the master

Input the master information in the Master Connection window.
After inputting the information, click [Connect].

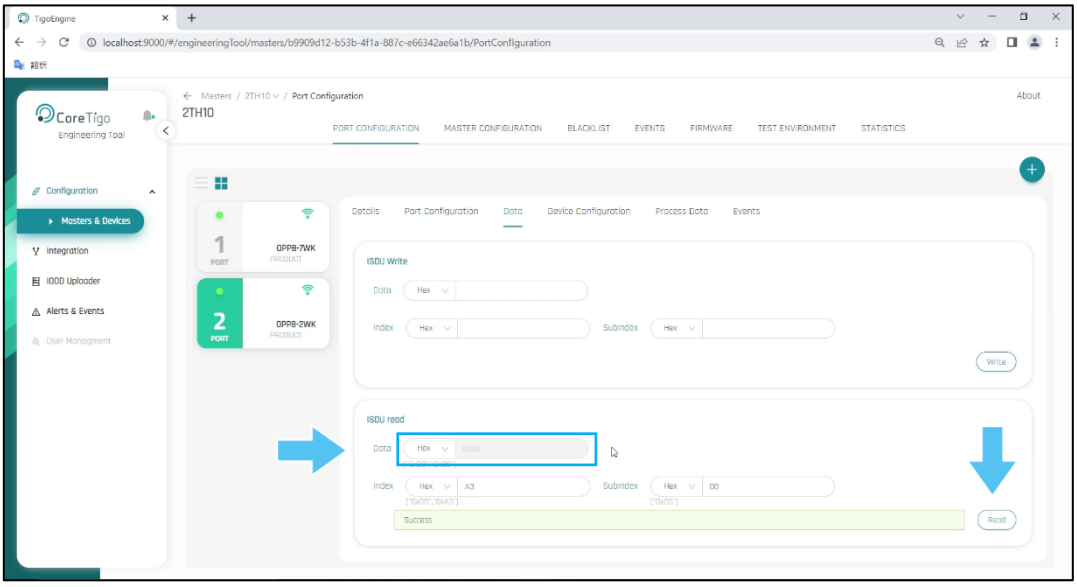
3. Writing in parameters

Enter [Date], [Index], and [Subindex] in the ISDU Write and click [Write].
If the writing in is successful, [Success] is displayed in the message field.



4. Reading out parameters

Enter [Index]「 and [Subindex] in the ISDU read and click [Read].
If read out is successful, the Date registered in procedure 3 is displayed in [Date].



4. IO-LINK WIRELESS COMMUNICATION DATA

The product responds to messages from the master through communication.

<Communication data>

Data	Period	Content
ProcessData	Periodic	Cyclic data Send input signals of the product to the master (ProcessDataIn)
On-Request Data (Service data)	Nonperiodic	Read and write the product parameters
On-Request Data (Event)		Indicate errors, warnings, and notifications

4.1. IODD File

4.1.1. Obtaining IODD file

This file describes the communication specifications for the IO-Link device.

For information on the method to install the IODD file, refer to the instruction manual of the master manufacturer.
Use the latest IODD file to configure a suitable network.

Please download the IODD file from the CKD website (https://www.ckd.co.jp/kiki/jp/).

4.1.2. IODD file name

Refer to the following table for IODD files.

<List of model number>

Number of points	Output type	Product model number	IODD file name
Input 16 points	PNP	WD-ADGC16A	CKD-WD-ADGC16A
	NPN	WD-ADGC16B	CKD-WD-ADGC16B

※ "-yyyymmdd-IODDvvv" is indicated at the end of each IODD file name.
yyyy: Year
mm: Month
dd: Day
vvv: IO-Link version (currently 1.1)

4.2. Process Data

The ProcessDataInput of this product is shown.

■ WD-ADGC16A / WD-ADGC16B

<Number of input points: 16 points input (ProcessDataInput)>

The process data can be changed between little-endian and big-endian by setting “Process Data Endian（Index=0x00EA)”.

0: Little-endian

1: Big-endian

Refer to page 47 for parameters and 3.2 Reading and Writing Data Using Master Tool for setting method.

Little-endian（ Index=0x00EA is “0”）

ProcessDataIn																
Data	**[0]**								**[1]**							
Bit	0	1	2	3	4	5	6	7	0	1	2	3	4	5	6	7
Data name	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
	Input 0 to 15															
Data range	0x0000～0xFFFF															
Format	Boolean															
Data	**[2]**								**[3]**							
Bit	0	1	2	3	4	5	6	7	0	1	2	3	4	5	6	7
Data name	–	–	–	–	–	I	N	E	–							
	1: Occurrence, 0: Terminated (none) E: Error (other than input error) (Event code 0x5000 has occurred) N: Notification (Event code 0x1831 or 0x1832 occurred) I: Input error (Event code 0x1837 or 0x1838 occurred) *Please refer to 4.4 On-Request Data for details on each event code.								Reserve							
Data range	0x00～0xE0								0x00							
Format	Boolean								–							

Big-endian （ Index=0x00EA is “1”）

ProcessDataInput																
Data	[0]								[1]							
Bit	0	1	2	3	4	5	6	7	0	1	2	3	4	5	6	7
Data name	–								–	–	–	–	–	–	Z	E
	Reserve								1: Occurrence, 0: Terminated (none) E: Error (other than input error) (Event code 0x5000 has occurred) N: Notification (Event code 0x1831 or 0x1832 occurred) I: Input error (Event code 0x1837 or 0x1838 occurred) *Please refer to 4.4 On-Request Data for details on each event code.							
Data range	0x0000								0x00～0xE0							
Format	–								Boolean							
Data	[2]								[3]							
Bit	0	1	2	3	4	5	6	7	0	1	2	3	4	5	6	7
Data name	8	9	10	11	12	13	14	15	0	1	2	3	4	5	6	7
	Input 0 to 15															
Data range	0x0000～0xFFFF															
Format	Boolean															

4.3. On-Request Data (Service data)

Refer to the following table for details on the parameters used for On-Request Data.

<List of parameter commands>

Index (dec)	Item	Access	Data length	Format	Data	DS
0x0000	DirectParameter Page1	R	**Note 1**	RecordT	**Note 1**	
0x0002	SystemCommand	W	1octet	UIntegerT	—	
0x0003	DataStorage	R/W	variable	RecordT	—	
0x0010(16)	VendorName	R	max. 64octets	StringT	CKD Corporation	
0x0011(17)	VendorText	R	max. 64octets	StringT	https://www.ckd.co.jp/kiki/jp/	
0x0012(18)	ProductName	R	max. 64octets	StringT	**Note 2**	
0x0013(19)	ProductID	R	max. 64octets	StringT	**Note 2**	
0x0014(20)	ProductText	R	max. 64octets	StringT	**Note 2**	
0x0015(21)	SerialNumber	R	max. 64octets	StringT	—	
0x0016(22)	HardwareRevision	R	max. 64octets	StringT	1.0	
0x0017(23)	FirmwareRevision	R	max. 64octets	StringT	0.00	
0x0018(24)	ApplicationSpecific Tag	R/W	Min.16, max. 32octets	StringT	**********	○
0x0020(32)	ErrorCount	R	1octet	UIntegerT	—	
0x0024(36)	DeviceStatus	R	2octets	UIntegerT	—	
0x0025(37)	DetailedDevice Status	R	60octets	Array of 3 Octetstring	All octets 0x00: Error/Warning No Octet 1: EventQualifier Octet 2,3: EventCode	
0x0028(40)	ProcessData Input	R	PD length	Device specific	—	
0x0029(41)	ProcessData Output	R	PD length	Device specific	—	

Note 1: The format of the values for each item is according the provisions of IO-Link.
Note 2: Refer to P44 for Product Name, Product ID, and Product Text.
Note 3: DS is an abbreviation for "Data storage".

<SystemCommand>

Command	Command Name
0x80(128)	Device Reset
0x81(129)	Application Reset
0x82(130)	Restore factory settings
0x83(131)	Back to box

Product Name	Product ID	Product Text
WD-ADGC16A	WD-ADGC16A	DI16 PNP Wireless
WD-ADGC16B	WD-ADGC16B	DI16 NPN Wireless

<Input> (Hereinafter, data length is in bits)

Index (dec)	Item	Data length	Access	Sub Index	Number of bits	SubIndex Name	Data	Content	DS
0x00D7 (215)	Input Off_On Cycles	512	R/W	1	32	Input Off_On Cycles 0	0～4294967295	Input Off_On cycle sensor 0	—
				2	32	Input Off_On Cycles 1	0～4294967295	Input Off_On cycle sensor 1	—
				3	32	Input Off_On Cycles 2	0～4294967295	Input Off_On cycle sensor 2	—
				4	32	Input Off_On Cycles 3	0～4294967295	Input Off_On cycle sensor 3	—
				5	32	Input Off_On Cycles 4	0～4294967295	Input Off_On cycle sensor 4	—
				6	32	Input Off_On Cycles 5	0～4294967295	Input Off_On cycle sensor 5	—
				7	32	Input Off_On Cycles 6	0～4294967295	Input Off_On cycle sensor 6	—
				8	32	Input Off_On Cycles 7	0～4294967295	Input Off_On cycle sensor 7	—
				9	32	Input Off_On Cycles 8	0～4294967295	Input Off_On cycle sensor 8	—
				10	32	Input Off_On Cycles 9	0～4294967295	Input Off_On cycle sensor 9	

Index (dec)	Item	Data length	Access	Sub Index	Number of bits	SubIndex Name	Data	Content	DS
0x00D7 (215) (Continued)				11	32	Input Off_On Cycles 10	0～4294967295	Input Off_On cycle sensor 10	
				12	32	Input Off_On Cycles 11	0～4294967295	Input Off_On cycle sensor 11	
				13	32	Input Off_On Cycles 12	0～4294967295	Input Off_On cycle sensor 12	
				14	32	Input Off_On Cycles 13	0～4294967295	Input Off_On cycle sensor 13	
				15	32	Input Off_On Cycles 14	0～4294967295	Input Off_On cycle sensor 14	
				16	32	Input Off_On Cycles 15	0～4294967295	Input Off_On cycle sensor 15	
0x00D8 (216)	Input Off_On Cycles Maintenance Threshold	32	R/W	–	–	–	0～4294967295	Input Off_On cycle maintenance threshold value	○
0x00D0 (208)	Cycle Input Data	16	R	–	–	–	0:OFF 1:ON	Sensor input data monitor	
0x00D1 (209)	Forced Input Setting	16	R/W	–	–	–	0: Simulated input data disabled 1: Simulated input data enabled	Simulated input settings	
0x00D2 (210)	Forced Input Data	16	R/W	–	–	–	0:OFF 1:ON	Simulated input data	
0x00D3 (211)	Input Off_On Cycles Maintenance Setting	16	R/W	–	–	–	0: Maintenance monitoring stop 1: Maintenance monitoring execute	Input Off_On cycle maintenance settings	○
0x00D4 (212)	Input Off_On Cycles Maintenance Monitor	16	R	–	–	–	0: No maintenance required 1: Maintenance required	Input Off_On cycle maintenance monitor	
0x00D9 (217)	Sensor Name	1024	R/W	1	64	Sensor Name 0	8 characters (ASCII)	Sensor name 0	○
				2	64	Sensor Name 1	8 characters (ASCII)	Sensor name 1	○
0x00D9 (217) (Continued)	Sensor Name	1024	R/W	3	64	Sensor Name 2	8 characters (ASCII)	Sensor name 2	○
				4	64	Sensor Name 3	8 characters (ASCII)	Sensor name 3	○

Index (dec)	Item	Data length	Access	Sub Index	Number of bits	SubIndex Name	Data	Content	DS
				5	64	Sensor Name 4	8 characters (ASCII)	Sensor name 4	○
				6	64	Sensor Name 5	8 characters (ASCII)	Sensor name 5	○
				7	64	Sensor Name 6	8 characters (ASCII)	Sensor name 6	○
				8	64	Sensor Name 7	8 characters (ASCII)	Sensor name 7	○
				9	64	Sensor Name 8	8 characters (ASCII)	Sensor name 8	○
				10	64	Sensor Name 9	8 characters (ASCII)	Sensor name 9	○
				11	64	Sensor Name 10	8 characters (ASCII)	Sensor name 10	○
				12	64	Sensor Name 11	8 characters (ASCII)	Sensor name 11	○
				13	64	Sensor Name 12	8 characters (ASCII)	Sensor name 12	○
				14	64	Sensor Name 13	8 characters (ASCII)	Sensor name 13	○
				15	64	Sensor Name 14	8 characters (ASCII)	Sensor name 14	○
				16	64	Sensor Name 15	8 characters (ASCII)	Sensor name 15	○
0x00DB (219)	Input On Filtering Setting	16	R/W	–	–	–	0: Input ON filtering function disabled 1: Input ON filtering function enabled	Input ON Filtering settings	○
0x00DC (220)	Input Filtering Time Setting	8	R/W	–	–	–	0: 10 ms, 1: 20 ms, 2: 50 ms, 3: 100 ms	Input filtering time settings	○
0x00DD (221)	Input Off Filtering Setting	16	R/W	–	–	–	0: Input OFF filtering function disabled 1: Input OFF filtering function enabled	Input OFF Filtering settings	○
0x00E3 (227)	Input On Hold Setting	16	R/W	–	–	–	0: Input ON holding function disabled 1: Input ON holding function enabled	Input ON Holding settings	○
0x00E4 (228)	Input Hold Time Setting	8	R/W	–	–	–	0: 20 ms, 1: 100 ms, 2: 200 ms	Input holding time settings	○

Index (dec)	Item	Data length	Access	Sub Index	Number of bits	SubIndex Name	Data	Content	DS
0x00E5 (229)	Input Off Hold Setting	16	R/W	–	–	–	0: Input OFF holding function disabled 1: Input OFF holding function enabled	Input OFF holding settings	○
0x00E9 (233)	Sensor Status Monitor	16	R	–	–	–	0: Normal 1: Error	Sensor input status monitor	
0x00EA (234)	Process Data Endian	8	R/W	–	–	–	0: Little Endian, 1: Big Endian	Dataset order for process data	○

<Maintenance>

Index (dec)	Item	Data length	Access	Sub Index	Number of bits	SubIndex Name	Data	Content	DS
0x00A2 (162)	Input Data Monitor 0-15	16	R	–	–	–	0:OFF 1:ON	Input data monitor 0 to 15	
0x00A3 (163)	Maintenance Setting	16	R/W	–	–	–	0: Disabled 1: Enabled	Maintenance settings	○
0x00A4 (164)	Maintenance Monitor	16	R	–	–	–	0: No maintenance required 1: Maintenance required	Maintenance monitor	
0x00A5 (165)	Energizing Time Monitor	32	R	–	–	–	0～4294967295	Unit energizing time monitor	
0x00A6 (166)	Energizing Time Maintenance Threshold	32	R/W	–	–	–	0～4294967295	Unit energizing time maintenance threshold value	○

<List of IO-Link Wireless specific parameter command>

(hereinafter, data length is in bytes)

Index (dec)	Item	Data length	Access	Sub Index	Number of	SubIndex Name	Data	Data Format	Input/ Output	DS
0x5001 (20481)	**Note 1**	9	**Note 1**	0x00	-	-	**Note 1**	**Note 1**	-	
	UniqueID	9	R	0x01	-	-	**Note 2**	OctetStringT9	-	
0x5002 (20482)	**Note 1**	4	**Note 1**	0x00	-	-	**Note 1**	**Note 1**	-	
	IMATime (TimeBase)	2	R/W	0x01	-	-	**Note 2**	UIntegerT8	-	
	IMATime (Multiplier)	2	R/W	0x02	-	-	**Note 2**	UIntegerT8	-	
	MaxRetry	1	R/W	0x03	-	-	**Note 2**	UIntegerT8	-	
	TxPower	1	R/W	0x04	-	-	**Note 2**	UIntegerT8	-	
0x5003 (20483)	**Note 1**	2	**Note 1**	0x00	-	-	**Note 1**	**Note 1**	-	
	LQI_D	1	R	0x01	-	-	**Note 2**	UIntegerT8	-	
	RSSI_D	1	R	0x02	-	-	**Note 2**	IntegerT8	-	
0x5005 (20485)	**Note 1**	12	**Note 1**	0x00	-	-	**Note 1**	**Note 1**	-	
	RadioVendor ID	2	R	0x01	-	-	similar to VendorID	OctetStringT2	-	
	RadioModule ID	2	R	0x02	-	-	vendor specific similar to DeviceID	OctetStringT2	-	
	RadioHW Revision	4	R	0x03	-	-	vendor specific	OctetStringT4	-	
	RadioSW Revision	4	R	0x04	-	-	vendor specific	OctetStringT4	-	

Note 1: Provides access to all indices
Note 2: The format of the values for each item is according to the provisions of IO-Link.

4.4. On-Request Data (Event)

There are three types of events:

<Event type>

Event type	Risk level	Meaning
Error	High	Error
Warning	Medium	Warning
Notification	Low	Notifications

<Event details>

Event code	Item	Type	Content
0x1831	Input Off_On cycle exceeded	Notification	Input Off_On cycle exceeds the input Off_On cycle threshold value
0x1832	Energizing time exceeded	Notification	Unit energizing time exceeds the threshold value
0x1837	Sensor supply power error	Error	Error such as a short circuit has occurred in the sensor supply power line
0x1838	Input capture error	Error	Sensor input circuit error has occurred
0x5000	Hardware malfunction	Error	Loss of non-volatile memory, etc. occurred

5. FUNCTION

This chapter describes the various functions and the settings of the product.

5.1. Input Function

5.1.1. Monitor function

<Input monitor>

Index(dec)	Item	Data	Content
0x00A2(162)	Input data monitor	0:OFF 1:ON	Monitors the input signals sent by the product to a higher-level device (ProcessDataInput data)
0x00D0(208)	Sensor input data monitor	0:OFF 1:ON	Monitors input signals from input devices
0x00E9(233)	Sensor input status	0: Normal 1: Error	Monitors errors such as a short circuit in the sensor supply power line

5.1.2. Simulated input function

Input signals from a higher-level device to the product can be turned ON or OFF in a simulated manner.

<Monitor and settings related to the simulated input function>

Index(dec)	Item	Data	Content
0x00D1(209)	Simulated input settings (0-15)	0: Simulated input data disabled 1: Simulated input data enable	Sets whether the simulated input function is to be used
0x00D2(210)	Simulated input data (0 to 15)	0:OFF 1:ON	Set the simulated input ON or OFF

<Example of simulated input function>

	Data																Hexadecimal
Sensor input No.	**15**	**14**	**13**	**12**	**11**	**10**	**9**	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**0**	
Sensor input data monitor	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0xFF00
Simulated input settings	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0x5555
Simulated input data	1	1	1	1	0	0	0	0	0	0	0	0	1	1	1	1	0xF00F
Input data monitor	1	1	1	1	1	0	1	0	0	0	0	0	0	1	0	1	0xFA05

5.1.3. InputOff_On cycle function

The number of times the input signal is turned OFF→ON is counted.

<Monitor and settings related to the input Off_On cycle function>

Index(dec)	Item	Data	Content
0x00D3(211)	Input Off_On cycle maintenance settings	0: Maintenance monitoring stop 1: Maintenance monitoring execute	Compare the sensor input Off_On cycle and the input Off_On cycle maintenance threshold value, and set whether the input Off_On cycle maintenance monitor reflects the result
0x00D4(212)	Input Off_On cycle maintenance monitor	0: No maintenance required 1: Maintenance required.	If the following three points are met, set the bit of the corresponding sensor to “1” • Maintenance setting (Index=0x00A3 bit6) is “1” • When the input Off_On cycle maintenance setting is “1” • If the “Sensor input Off_On cycle” is larger than or equal to the “Input Off_On cycle maintenance threshold value”
0x00D7(215)	Sensor input Off_On cycle	0～4294967295	Monitor the Off_On cycle of the input device
0x00D8(216)	Input Off_On cycle maintenance threshold value	0～4294967295	Set the threshold value for the sensor input Off_On cycle When the set value is 0, no comparison is made between the threshold value and the sensor input Off_On cycle

<Method to clear input Off_On cycle count value>

To clear the input Off_On cycle count value, write "0" for each point of the input device and leave it for 3 minutes, then the cycle save process is executed and the number of times data is saved in the non-volatile memory area.

- Clear each point on the input device.
  After writing "0" to the corresponding point area, wait at least 3 minutes before powering off to ensure the data is saved in the non-volatile memory area.

5.1.4. Input filtering / holding function

<Input filtering function>

This function allows the user to set the time until the input signal of the product is determined to be on or off.

<Input filtering function settings>

Index(dec)	Item	Data	Content
0x00DB(219)	Input ON filtering function settings	0: Input ON filtering function disabled 1: Input ON filtering function enabled	Set whether the input ON filtering function is used
0x00DC(220)	Input filtering time settings	0: 10 ms, 1: 20 ms, 2: 50 ms, 3: 100 ms	Set the input filtering time (This is the common setting for the input ON filtering function and the input OFF filtering function)
0x00DD(221)	Input OFF filtering function settings	0: Input OFF filtering function disabled 1: Input OFF filtering function enabled	Sets whether the input OFF filtering function is used

<Input holding function>

This function allows the user to set the minimum holding time once the input signal of the product is determined to be on or off.

<Input holding function settings>

Index(dec)	Item	Data	Content
0x00E3(227)	Input On Hold Setting	0: Input ON holding function disabled 1: Input ON holding function enabled	Input ON Holding settings
0x00E4(228)	Input Hold Time Setting	0: 20 ms, 1: 100 ms, 2: 200 ms	Input holding time settings (This is the common setting for the input and the input OFF)
0x00E5(229)	Input Off Hold Setting	0: Input OFF holding function disabled 1: Input OFF holding function enabled	Input OFF holding settings

5.2. Power Monitoring Monitor

5.2.1. Unit energizing time monitoring

Monitors the energizing time of the product.

<Unit energizing time monitoring monitor and settings>

Index(dec)	Item	Data	Content
0x00A5(165)	Unit energizing time monitor	Count range: 0 to 4294967295	Counts up the energizing time of the unit in 1-second increments
0x00A6(166)	Unit energizing time threshold value	Setting range: 0 to 4294967295	Sets the threshold value for the unit energizing time If 0, no comparison is made with the unit energizing time monitor

5.3. Maintenance

5.3.1. Maintenance settings

<Maintenance settings>

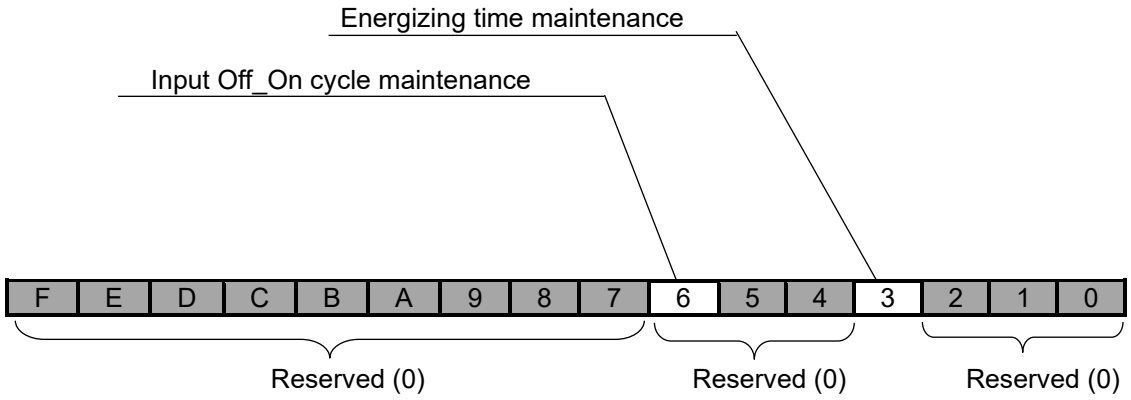
Index(dec)	Bit	Item	Data	Content
0x00A3(163)	3	Energizing time maintenance	0: Disabled 1: Enabled	Sets the unit energizing time monitoring
	6	Input Off_On cycle maintenance	0: Disabled 1: Enabled	Sets the input Off_On cycle monitoring

<Maintenance monitor>

Index(dec)	Bit	Item	Data	Content
0x00A4(164)	3	Energizing time maintenance monitor	0: No maintenance required 1: Maintenance required	bit3 is 1 if the unit energizing time monitor is above or equal to the unit energizing time maintenance threshold value.
	6	Input Off_On cycle maintenance monitor	0: No maintenance required 1: Maintenance required	bit6 is 1 if there are devices where input Off_On cycle is larger than or equal to the threshold value.

■ Maintenance settings data

The maintenance settings and the maintenance monitor consist of 2-byte data.
Changes the bit of the maintenance item to be used from “0” disabled → “1” enabled.



5.4. Settings

5.4.1. Sensor name settings

Each point of the product can be named so that the application of the input device can be identified on the monitor.

<Setting items on sensor name>

Index(dec)	Item	Data	Notes
0x00D9(217)	Name of sensor 0 to 15	8bytes	-

<Sensor name conditions>

Function	Item	Content
Sensor name	Number of characters	8 characters
	Type of character	Since the character codes are stored as they are, the type of character depends on the display unit or the rendering tool.
	Change	Write in/read out possible
	Initial value	“********” (8 asterisks)

6. MAINTENANCE/INSPECTION

WARNING

Do not disassemble or modify the products other than those specified in this Instruction Manual.
- This may not only pose a risk of injury, malfunction or failure, but also cause the product to fail to meet the specifications such as this Instruction Manual.

Do not remove or attach wiring or cables while the power is turned on.
- It may cause malfunction, failure, or electric shock.

Do not work with wet hands.
- There is a risk of electric shock.

Do the wiring after the product has been mounted.
- It may cause electric shock.

Turn off the power beforehand.
Check the voltage with a tester, etc. when at least 5 minutes have passed after the power has been turned off.
- It may cause injury or accident.
- It may cause electric shock.

CAUTION

When performing maintenance, inspection, or repair, make sure that the people around you know to make sure that the power is not turned on by a third person.

Wiring and inspection must be done by professional engineers.
Use a power cable that is sufficiently capable of maximum instantaneous current.
- Heat may be generated or damaged during operation.

Perform a periodic inspection (1 to 2 times per year) to confirm normal operation.
If there are signs of an abnormal amount of heat, smoking, abnormal odors, abnormal noises or vibrations coming from this product, turn off the power immediately.
- Damage to the product or a fire may occur.

Perform routine and periodic inspections in a routinely to ensure that maintenance management is carried out correctly.
- If maintenance management is not done sufficiently, the function of the product will deteriorate significantly, leading to short life, damage, malfunction, and accidents.

Do not drop or apply excessive vibrations or shock to the product.
- These may cause damage because parts inside the product are made to precise specifications.

6.1. Periodic Inspection

This section describes methods of cleaning, inspection, and handling when replacing the product as the daily maintenance of devices. In order to use the product under optimum conditions, perform periodic cleaning and inspection.

6.1.1. Cleaning method

- For daily cleaning, wipe the product with a dry, soft cloth.
- When stains cannot be removed by wiping with a dry cloth, moisten the cloth with diluted neutral detergent (2%), wring it, and wipe the stains again.
- Remove any stains on the product during cleaning.

- Objects such as rubber, vinyl, or tape may stain the product if they are left in contact with the product for a long period.
- Using benzene, thinner, etc. may damage the surface or cause the display to disappear.

6.1.2. Inspection method

Perform inspection once or twice a year.
However, if the product is used in extremely hot, humid or dusty environments, shorten the inspection interval.

<Inspection items>

Inspect the following items to make sure that each item meets the criteria.
If any item does not meet the criteria, improve the surrounding environment or adjust the unit.

Inspection item	Inspection content	Judgment criteria	Inspection method
Environment	Is the surrounding and in-panel temperature appropriate?	Refer to “9.1.1 Basic specifications”	Thermometer
	Is there any accumulated dust?	There is no dust	Visual inspection
Mounting status	Is the product fixed securely?	There is no looseness	Hexagonal wrench
	Is the power cable, input device cable fully inserted?	There is no looseness	Visual inspection
	Check if the power cable, input device cable is cut or not	Check that there is no visual abnormality	Visual inspection
Power/voltage	Check the power system and ensure it is used within the specified power and specified voltage	Refer to “9.1.1 Basic specifications”	Tester

6.2. Mounting Method

CAUTION

Before handling the product, touch a grounded metal part to discharge static electricity from your body.

- Static electricity may cause damage to the product.

Do not apply tension or shock to the power cable.

- If the wiring is long, the cable weight or shock may cause an unexpected force and result in damage to the connector or device. Take appropriate measures; for example, secure the wiring to the machine or equipment midway.

When wiring, be careful of the following points to prevent problems caused by noise.

- If noise could have an effect, prepare power for each input unit and wire independently.
- Do not make the power cable unnecessarily long. Wire the power cable as short as possible.
- Separate the power wiring of the product from the wiring of the devices that generate noise such as inverter motor.
- Wire the power cable separated from other power lines as much as possible.

Wire the power cable properly within its specifications.

- Incorrect wiring may cause damage or malfunction of the product.

Do not remove or attach cables while the power is turned on.

- These may cause failure or malfunction.

Make sure that all connection cables are securely installed before energizing.

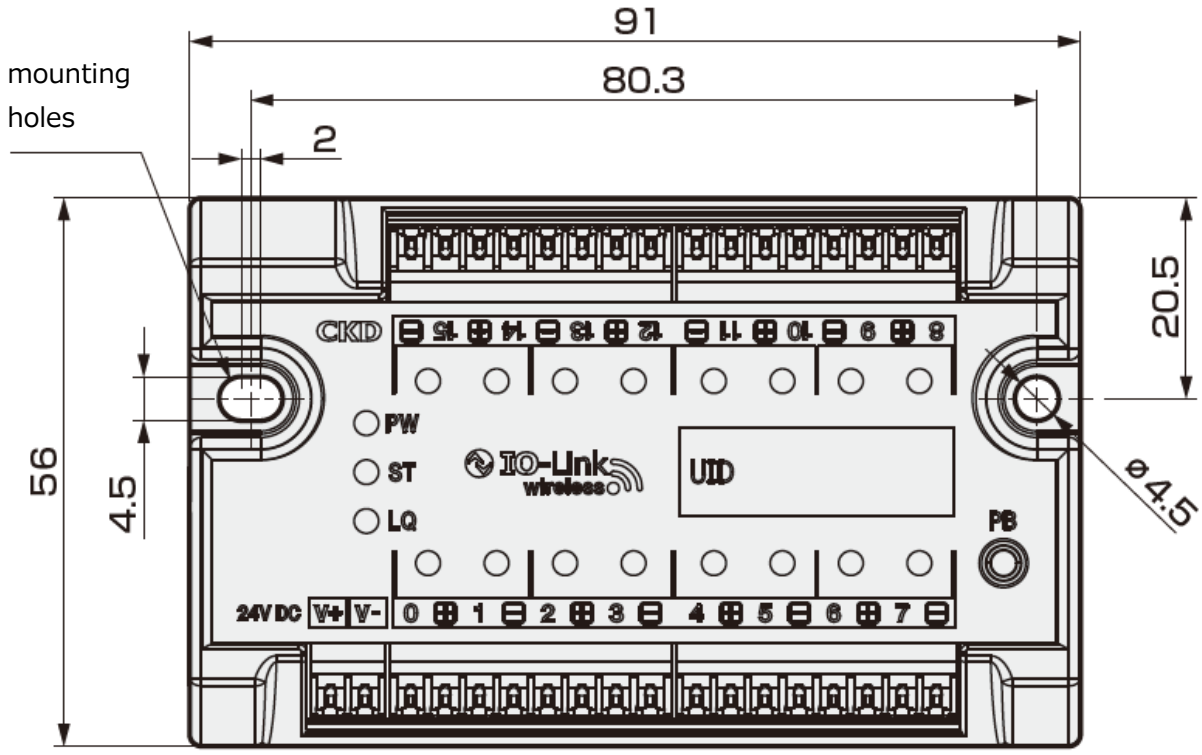
6.2.1. Mounting Method

CAUTION

- To prevent damage to parts, apply the recommended tightening torque value when mounting.
- Make sure to use two screws for mounting.

1. Mounting the product

Tighten with M4 screws into the mounting holes of the product.
(Recommended tightening torque 1.0 N·m ±10%)



6.3. Precautions on Product Disposal

CAUTION

When disposing of the product, comply with local laws and regulations pertaining to disposal and cleaning of waste and have an industrial waste disposal company dispose of the product.

7. TROUBLESHOOTING

If the product does not operate as intended, check the table below for a possible solution.

<LED>

LED	Operation	Factors	Corrective actions
PW	Off	Low unit supply power voltage	Power voltage is low. Check the power cable connections to ensure they are not disconnected.
			Check that the supply power voltage is within the specified range.
ST	Red on	Communication error	Communication with the master is unstable. Review the master and the product environment again. Refer to “2.2. Environment”
		Device failure	Replace the product if there is no change even after turning the power on and off. Contact CKD if the problem is not resolved even after replacing it.
		Input error	There is an error in the sensor supply power or sensor input circuit. Check the connections of the input devices to ensure they are not faulty.
	Red Blinking	Maintenance factors present	The item you are setting for maintenance has reached a threshold value.
LQ	Off	Communication not established	Execute pairing.
	Red on	Communication error	Communication with the master is unstable. Review the master and the product environment again. Refer to “2.2. Environment”
All lamps	All off	Low unit supply power voltage	Power voltage is low. Check the power cable connections to ensure they are not disconnected.
			Check that the supply power voltage is within the specified range.

※ If the problem is not resolved even after conducting inspections and taking corrective actions, contact your nearest CKD sales office or distributor.

<Operation>

Failure	Cause	Corrective actions
Input signal not received by the master	Low unit supply power voltage	Check that the PW LED is green. If off, refer to 7. Troubleshooting <LED>.
	Communication error	Check that the ST LED is green or orange. If red or off, refer to 7. Troubleshooting <LED>.
	Connection error	Check the connection between the input device and the product. Refer to 2.3.2 Connecting input device
	Device failure	Replace the product.
	Input device failure	Replace the input device.
	Master failure	Replace the master.
	Program error	Check the PLC. Check the ladder program.
Cannot operate on PLC	Configuration error	Check that the master and PLC is connected.
	Communication error	Check that LQ LED is green or yellow. If red or off, refer to 7. Troubleshooting <LED>.
	Error lamp program error (PLC)	Check the communication cable between the PLC and the master.
		Check the PLC settings and power.
		Check the ladder program.
An unintended input signal remains on or off and does not change	Connection error	Check the input device connection.
	Program error	Check the PLC. Check the ladder program.
	Setting error	Check if the input signal is turned on or off by the simulated input function.

※ If the problem is not resolved even after conducting inspections and taking corrective actions, contact your nearest CKD sales office or distributor.

<Wireless communication>

Failure	Cause	Corrective actions
Pairing cannot be executed	Low unit supply power voltage	Check that the PW LED is green. If off, refer to “7. Troubleshooting <LED>.”
	Device error	Turn on/off the power of the product and the master and execute pairing again.
	Environment	The environment may not be appropriate (e.g., there may be a long distance between the product and the master), so review the environment. Refer to “2.2. Environment”
	The button is not pressed long enough Button failure	Check if the button can perform another function. Try another way to check pairing.
Communication is interrupted	Communication error	Turn on/off the power of the product and the master and execute pairing again.
		The environment may not be appropriate, such as a long distance between the product and the master, so review the environment. Refer to “2.2. Environment”

※ If the problem is not resolved even after conducting inspections and taking corrective actions, contact your nearest CKD sales office or distributor.

8. WARRANTY PROVISIONS

8.1. Warranty Conditions

■ Warranty coverage

If the product specified herein fails for reasons attributable to CKD within the warranty period specified below, CKD will promptly provide a replacement for the faulty product or a part thereof or repair the faulty product at one of CKD's facilities free of charge. However, the following failures are excluded from this warranty:

- Failure caused by handling or use of the product under conditions and in environments not conforming to those stated in the catalog, the Specifications, or the Instruction Manual
- Failure not caused by the product
- Failure caused by use not intended for the product
- Failure caused by modifications/alterations or repairs not carried out by CKD
- Failure caused by reasons unforeseen at the level of technology available at the time of delivery.
- Failure caused by nature and disasters beyond control of CKD.
- Failure caused by incorrect use such as careless handling or improper management
- Failure that could have been avoided if the customer's machinery or device, into which the product is incorporated, had functions and structures generally provided in the industry.
-

The warranty stated herein covers only the delivered product itself. Any loss or damage induced by failure of the delivered product is excluded from this warranty.

■ Confirmation of product compatibility

It is the responsibility of the customer to confirm compatibility of the product with any system, machinery, or device used by the customer.

■ Others

The terms and conditions of this warranty stipulate basic matters.
When the terms and conditions of the warranty described in individual specification drawings or the Specifications are different from those of this warranty, the specification drawings or the Specifications shall have a higher priority.

8.2. Warranty Period

The product specified herein is warranted for one (1) year from the date of delivery to the location specified by the customer.

9. REFERENCE INFORMATION

9.1. Specifications

9.1.1. Basic specifications

Item	Content	
Model number	WD-ADGC16A	WD-ADGC16B
Unit power voltage	DC 21.6 to 26.4 V (DC 24 V ±10%)	
Unit power current consumption (without sensor supply current)	130 mA or less	
Unit power current consumption (Including sensor supply current)	1.73 A or less	
Input type	PNP	NPN
Number of input points	16	
Protection structure	IP20	
Insulation resistance	Between external terminals and the case: 30 MΩ or more, DC 500 V	
Withstand voltage	Between external terminals and the case: AC 500 V, 1 minute	
Shock resistance	294.0 m/s^2, 3 directions, 3 times	
Storage ambient temperature	-20°C to 70°C (no freezing)	
Storage ambient humidity	10% to 85% RH (no dew condensation)	
Operating ambient temperature	-10°C to 55°C (no freezing)	
Operating ambient humidity	10% to 85% RH (no dew condensation)	
Atmosphere	No corrosive gases, no large amount of dust	
Operation display	LED indicator (power supply, communication quality, product status, input status)	
Vibration resistance	10 Hz to 150 Hz to 10 Hz, 1 octave/MIN, 20 sweeps each in directions X, Y, and Z with 0.75 mm half-amplitude or 98.0 m/s^2, whichever is smaller	
Overvoltage category	Category I	
Pollution	3	
altitude	2000m or less	

※ For delay time, refer to the Instruction Manual of the master.
The transmission delay of the system varies depending on the PLC scan time and other devices connected to the same network.

9.1.2. Communication specifications

Item	Content
Communication protocol	IO-Link Wireless
Communication protocol version	V1.1
Minimum cycle time	5 ms
Process Data In data length Note 1	4 bytes
Process Data Out data length Note 1	0 bytes
Data storage	Maximum 2k bytes
Vendor Note 2	855 (decimal) / 0x357 (hexadecimal)
Communication distance	Max 20 m

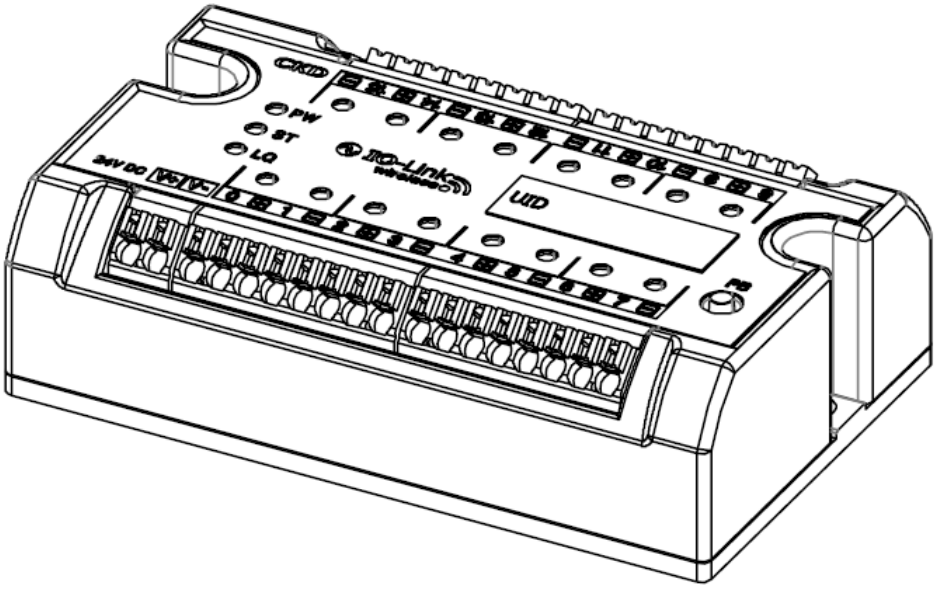
Note 1: When setting data in the master (PLC), if it is not possible to set the table with the data length shown here, map the data table so that it is larger than this data length in general.
Note 2: This is a unique identifier for CKD.

Item	Model number	Content
Device ID Note 1	WD-ADGC16A	0x217000 (hexadecimal)
	WD-ADGC16B	0x217001 (hexadecimal)

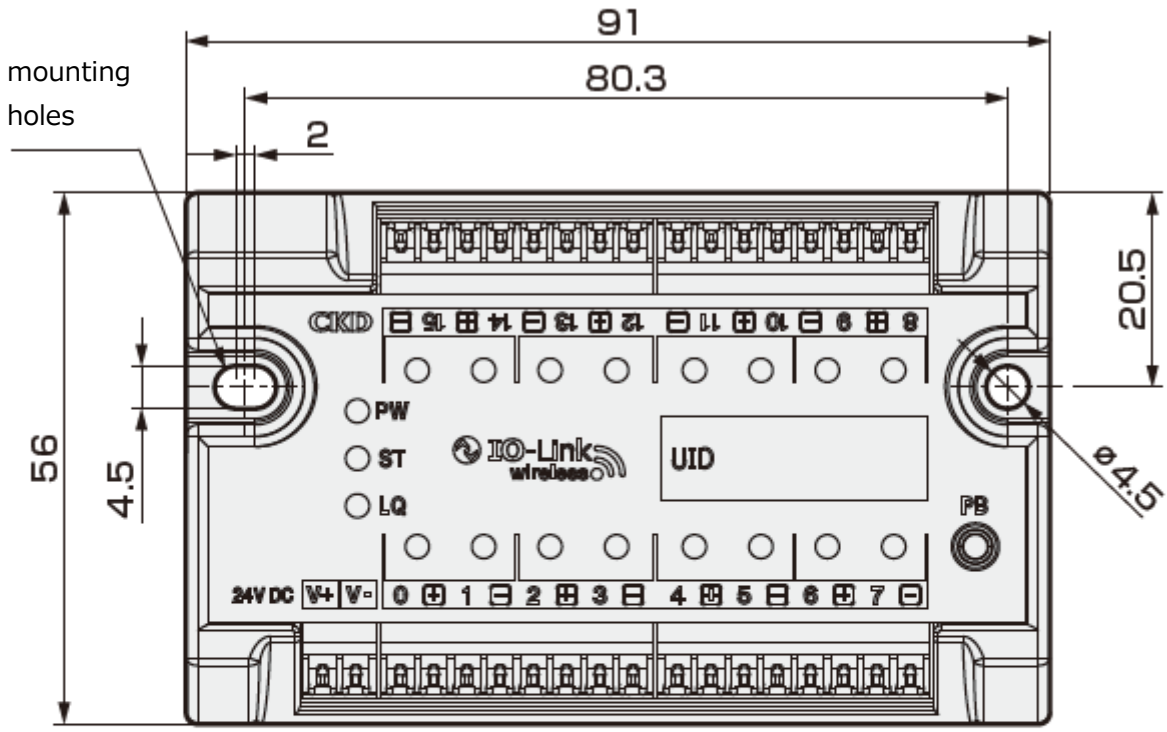
Note 1: Indicates the product.

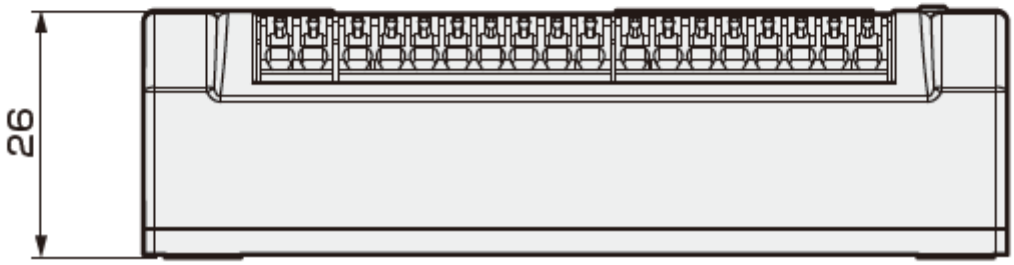
9.2. Appearance

WD Series Input Unit appearance



9.3. Appearance Dimensions





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