Smart RFID Reader

Manage user authority for machines and equipment
Control and track access to production sites

SAVE ALL eco

IDEC CORPORATION

ø22 **KW2D** SERIES

Compact & smart design ideal for factory automation environments

Mounts on ø22mm panel cut-out

▌Front unit:
  □ 43.6 × 43.6mm
  Panel front height: 9.0mm

▌Back unit:
  □ 40.0 × 40.0mm
  Depth: 48.5mm

* Actual size

Can be used for IC cards, such as employee IDs (*1).
*1 Mifare, FeliCa, etc.

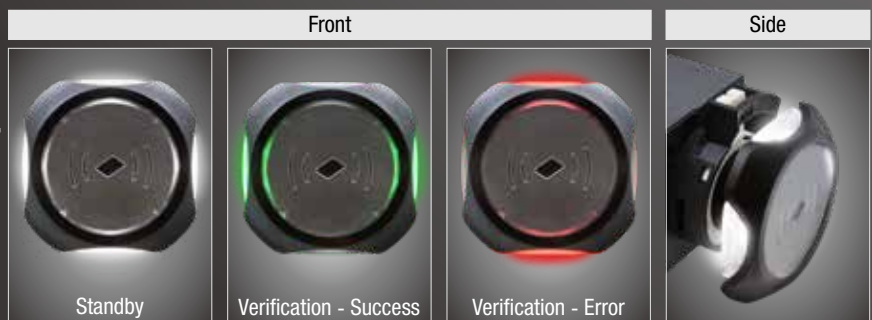**IP65/67-rated to protect from washdowns and oil spills.**

Designed to work on metal surfaces often used at factory automation sites.

Equipped with an LED easily visible from the side and an auxiliary buzzer, the RFID reader enables visible and audible feedback on operation status.

* Can be controlled from a host device (such as a touch panel or PLC).

Front			Side
Standby	Verification - Success	Verification - Error	

Holder feature available for mounting RFID tags

* 5 types are available (sold separately).

An Ethernet port enhances connection compatibility with host devices
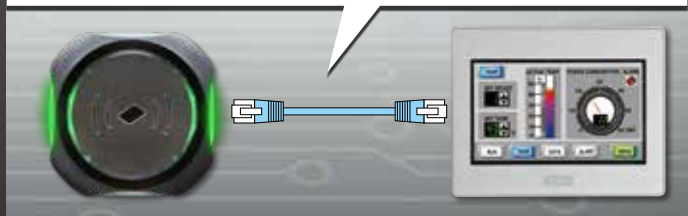
Supported protocol

Modbus TCP

EtherNet/IP®

CC-Link IE Field Basic

With a verification function inside, the verified result can be communicated to the host device as data.

* If the verification function is not used, a communication error will occur if the result is not sent back to the RFID main unit.

▮ UID
▮ Name 1, 2

▮ Verification result (Success/Error)
▮ Authority level, etc.

Restricting the use of machines and devices

BEFORE

Anyone can operate the machines.

▼

AFTER

Inadvertent operation and setting changes are prevented, reducing equipment malfunctions and failures.

Mount the RFID reader on the operation panel of a machine and register the workers in the RFID reader. ID cards can then be used to authenticate each worker.

Are you in charge of this device?

Managing access to control rooms and inside safety fences

BEFORE

Do not know if workers are left inside.

▼

AFTER

By recording entry/exit logs, workers can be prevented from being trapped or left behind in a work area.

Worker's names are linked to ID cards such as employee ID cards, and that data is sent when a card is read. Logs are recorded on the host device to track entry/exit.

Is there anyone inside?

Manage inspection history at production lines

BEFORE

Work sheets were written by hand.

▼

AFTER

The operator can record their work history by holding the employee ID card over the reader.

The time and work details can be recorded by using the RFID reader together with a touch panel or PLC to ensure digital traceability.

Are signatures still handwritten?

By connecting with devices such as touch panels and PLCs, the RFID reader can be used for wide variety of applications.

OPERATING ENVIRONMENT

Item	Details
OS	Windows10
CPU	1.0GHz or more
Memory	1GB or more
Environment	Microsoft.NET Framework4.0 or later

* The configuration tool can be downloaded from the IDEC website.

SCREEN 1

RFID Reader Configuration Screen

Intuitive operation allows settings to be configured on a single screen.

Only the IP address is required.

Click on "Communication Mode" to select a protocol.

Tag reading distance and response speed can be adjusted.

CONNECTION DIAGRAM

* Connect to a computer when configuring settings.

LAN cable
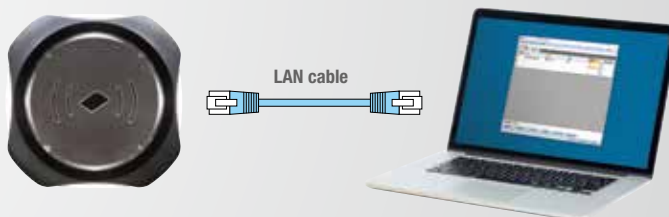
SCREEN 2

Tag List Registration Screen

Max. number of registrations **500** ITEMS

• Import and export as CSV file

The RFID reader is equipped with a verification function, enabling output of arbitrary data.

ASCII and Japanese (S-JIS) can be displayed.

RFID Reader Settings	**Tag List**					
Enable / Disable	UID	Name1	Name2	Authority (1~255)	Factory reset authority	
☑	0415BB126F5A81	John smith	IDEC	5	… ☐	
☑	041CA3126F5A81	Michael arnold	IDEC	6	… ☐	
☑	04006899DB0281	Guest 1		1	… ☐	
☐	01010412231B2504	Guest 2		2	… ☐	
☑	04553DC2CF4F80	Guest 3		3	… ☐	

Monitor function enables data to be registered directly to the tag list.

Lastly, click "Download"

Registered count(5/500)

Add | Remove | Up | Down

CSV/Text File

Import | Export

Monitor | Download(PC to RFID)

When using a supported communication protocol

UID: 123456789 0ABCDEF

KW2D series RFID Reader

Switching hub

PLC or controller

IoT

• HTTP,
• FTP,
• MQTT, etc.

IDEC Taro Idec

Employee ID card

Verification - Success

* The same configuration is also used for EtherNet/IP and CC-LINK IE FB.

External device - Inverter, motor, etc.
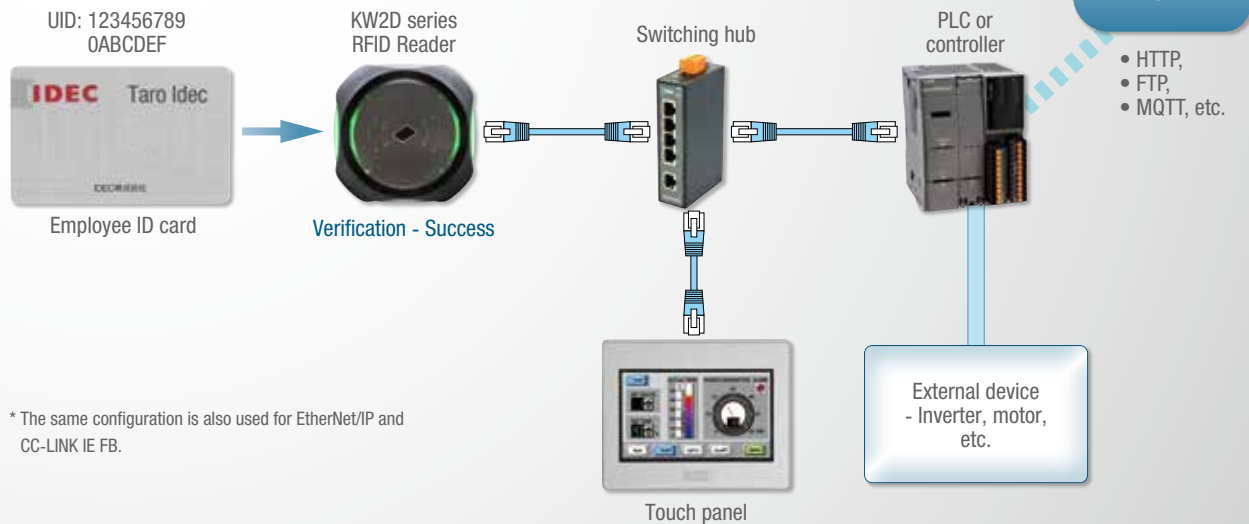
Touch panel

Communication via Ethernet with host devices such as touch panels and PLCs

The following data can be acquired via ModbusTCP communication

Authority level

• UID   Input register (300004 to 300008)

• Name 1   Input register (300012 to 300020)

• Name 2   Input register (300022 to 300030)

• Authority level   Input register (300002)

• Verification success   Input relay (100001)

• Verification error   Input relay (100002)

Next, simply enter the required data via the touch panel or PLC.

Verification success / error

UID

Name 1, 2
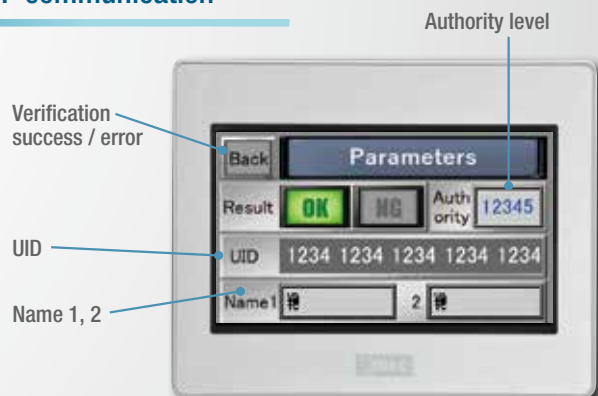
Supported character codes

UTF-8, ASCII, Japanese (Shift-JIS), Chinese (GB2312), Western Europe (ISO 8859-1)

KW2D Series ø22 Smart RFID Reader

Compact RFID reader with integrated functions for the factory automation industry

Without holder

With holder

Note: Approvals apply only to the main unit.
• For more information about certified products, see the IDEC website.

Main Unit

Package Quantity: 1

Model	Appearance	Power Supply	Communication Interface	Approval	Part No. (Ordering No.)
Without holder		24V DC	LAN	IEC/EN61131-2 2007 (Zone B) EN301-489-3 UL61010-1/CAN/CSA C22.2 No. 61010-1-12 UL 61010-2-201 EN50364	KW2D-R100Q4E
With holder					KW2D-RH100Q4E

RFID Tags

When ordering, specify the Ordering No.

Tag Type	Shape	Color	Part No. (Ordering No.)	Package Quantity
KEYFOB		Green	KW9Z-T1X1G	1
		Yellow	KW9Z-T1X2Y	1
		Red	KW9Z-T1X3R	1
		Blue	KW9Z-T1X4S	1
		Black	KW9Z-T1X5B	1
Card		N/A	KW9Z-T2X0	1

Maintenance Parts

When ordering, specify the Ordering No.

Name/Appearance	Specification/Dimension	Part No.	Ordering No.	Package Quantity	Remarks
Cover (withot holder)	For KW2D-R	KW9Z-CV	KW9Z-CV	1	
Cover (with holder)	For KW2D-RH	KW9Z-CVH	KW9Z-CVH	1	
Gasket	Rubber (black) Nitrile rubber	HW9Z-WM	HW9Z-WMPN10	10	t 0.5 $ø21.6^{\pm0.15}$ $ø28.0^{\pm0.15}$
Locking Ring	Polyamide resin (black)	CW9Z-LN	CW9Z-LNPN05	10	
Locking Ring Wrench	Metal (brass) Weigh: Approx. 150g	MW9Z-T1	MW9Z-T1	1	• Used to tighten the locking ring when mounting onto a panel. 110 ø28

General Specifications

Electrical Specifications	Rated Input Voltage	24V DC
	Power Fluctuation Range	20.4 to 28.8V DC (incl. ripples)
	Power Consumption	2.4W maximum (24V DC)
	Rated Insulation Voltage	50V DC
	Allowable Momentary Power Interruption	1ms (at rated power supply voltage)
	Withstand Voltage	500V AC, 1 minute
	Insulation Resistance	100MΩ or higher (500V DC insulation resistance tester)
	Inrush Current	25A maximum
Environmental Specifications	Operating Temperature	-25 to +55°C (no freezing)
	Storage Temperature	-40 to +80°C (no freezing)
	Operating Humidity	10 to 95% RH (no condensation)
	Storage Humidity	10 to 95% RH (no condensation)
	Degree of Protection (*1) Front Unit (*2)	IP65/67 (IEC60529)
	Degree of Protection (*1) Back Unit	IP20 (IEC60529)
	Impact Test (*1) Front Unit (*2)	5J (Equal to IK08)
	Corrosion Resistance	No corrosive gas
	Operating Environment	Indoors
Mechanical Specifications	Vibration Resistance	5 to 55Hz, amplitude 0.5mm, on 3 mutually perpendicular axes
	Shock Resistance	100m/s^2, 11ms, six directions on 3 mutually perpendicular axes
	Power Supply Terminal — Wire Pull Force	AWG24: 10N maximum AWG22: 15N maximum AWG20: 20N maximum AWG18: 30N maximum AWG16: 40N maximum
	Power Supply Terminal — Insertion/Removal Durability	25 times minimum
	Power Supply Terminal — Recommended Operation Force of Pusher	20N (40N maximum)
	Tag Holder — Insertion/Removal Durability	10,000 times minimum
	Indicators	LED colors (red: 2, green: 2 white: 4)
	Buzzer	Single tone
	PCB	FR, 94V-0
	Case Materials — Front Cover Back Cover	PBT
	Case Materials — Front Base Back Base	PA66
	Case Materials — Lens	PCT
	Weight (Approx.)	70g

*1 IP performance and IK ratings are not subject to UL certification.
*2 Front of the panel only.

Ethernet Communication Specifications

Communication		Ethernet
Electrical Characteristics		IEEE802.3 compliant
Connector	Connector	RJ45
	Pull Force	15N
	Insertion/Removal Durability	100 times minimum
Transmission Speed		10BASE-T, 100BASE-TX
Communication Functions		Modbus TCP Server
		EtherNet/IP
		CC-Link IE Field Basic
Cable		CAT.5 STP, with a maximum length of 100m

RFID Interface Specifications

|		
Supported Tag Standards		ISO/IEC14443 Type A (Type A), ISO/IEC18092 (Type F), JIS X6319-4 (Type F), ISO/IEC 15693 (Type V)
Communication Speed	Type F (Felica)	212kbps
	Type A (Mifare)	106kbps
	Type V (I-CODE)	26.5kbps
Carrier Frequency		13.56MHz (HF band)
Wireless Standards	Supported Area	Japan, United States, Canada, EU, China, Taiwan, India, Thailand
Tag Reading Distance (*1)	Card Type	0 to 15mm
	KEYFOB Type	0 to 5mm
Tag Reading Position (*2)		Center of tag stationary in center of front unit
Read Reaction Time		300 to 3000 [msec] (adjustable with [Reading Time] in the KW RFID Configurator)

*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 of the User's Manual) that IDEC has tested. The tag reading distance will vary depending on the tag that is actually used and the operating environment.
*2 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.

Mounting Hole Layout

Drill a mounting hole in the panel with the dimensions shown in the following diagram.

ø22.3 $^{+0.4}_{0}$
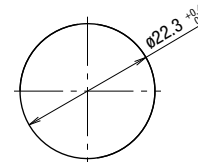
* See the manual for examples of mounting pitch.
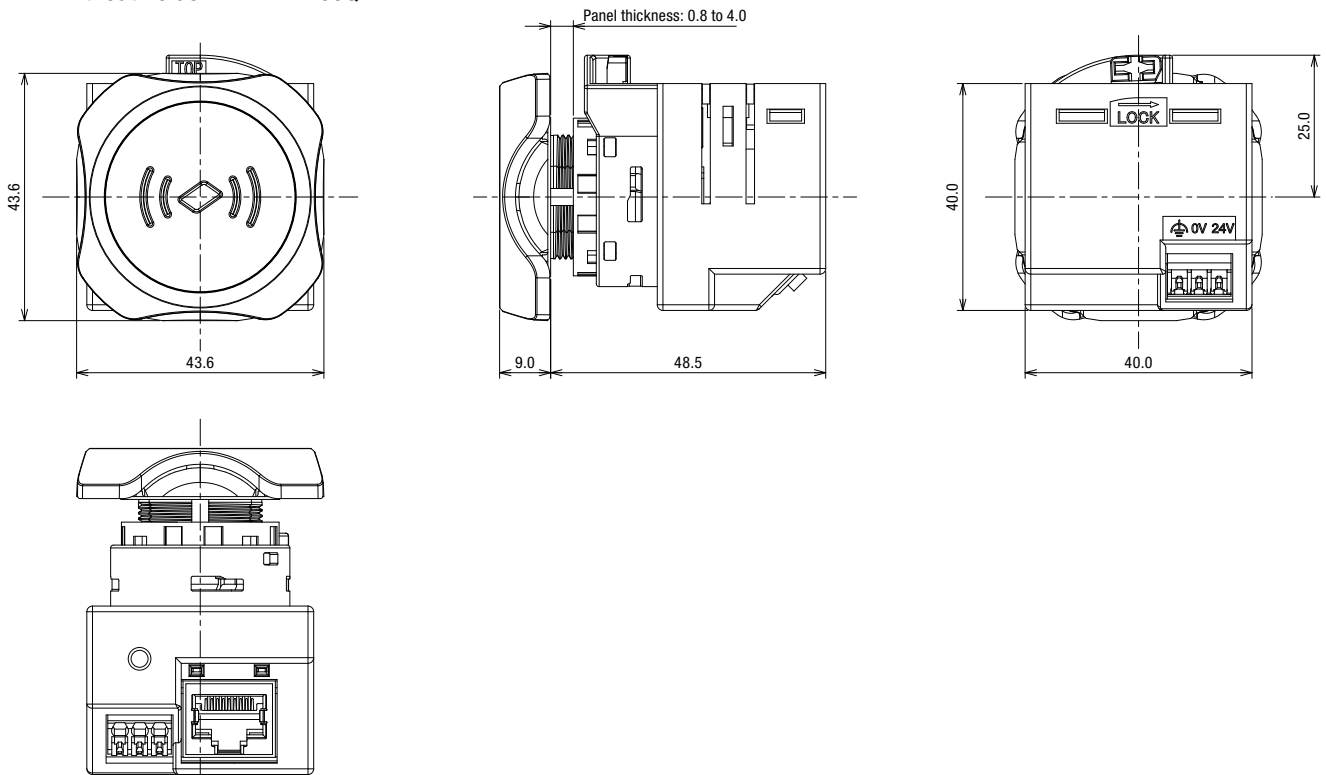* See the manual for minimum mounting pitch.

RFID Tag Specifications

Applicable Standard	Card	ISO/IEC14443 Type A
	KEYFOB	
Operating Temperature	Card	0°C to 50°C
	KEYFOB	-25°C to 55°C
Storage Temperature	Card	-20°C to 50°C
	KEYFOB	-25°C to 75°C
Operating Humidity	Card	20% RH to 90% RH or less
	KEYFOB	60% RH or less
Storage Humidity	Card	90% RH or less
	KEYFOB	60% RH or less
Reading Distance	Card	0 to 10mm
	KEYFOB	0 to 5mm
Operating Environment		Indoors

Dimensions

Main Unit

Without holder: KW2D-R100Q4E

Panel thickness: 0.8 to 4.0

43.6

43.6

9.0

48.5

40.0

25.0

40.0

With holder: KW2D-RH100Q4E

Panel thickness: 0.8 to 4.0

43.6

43.6

5.5

9.0

4.8

16.5

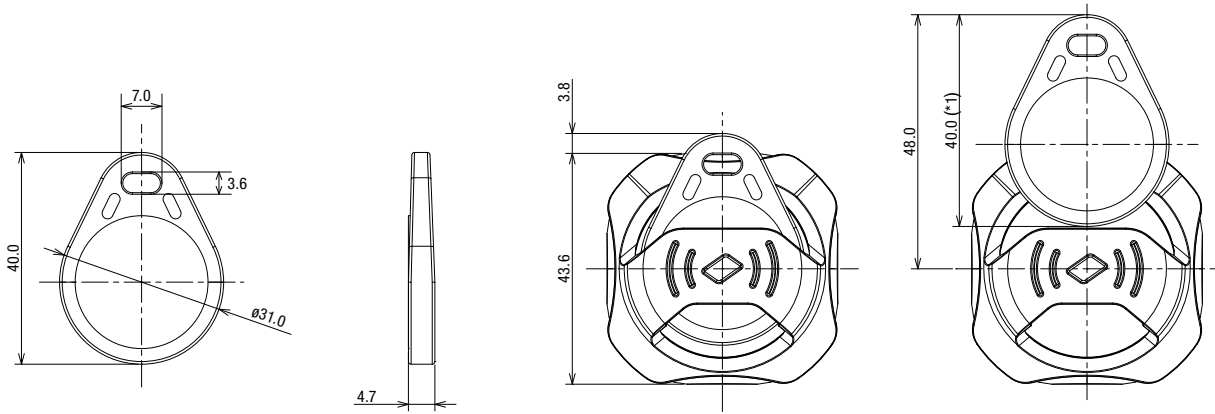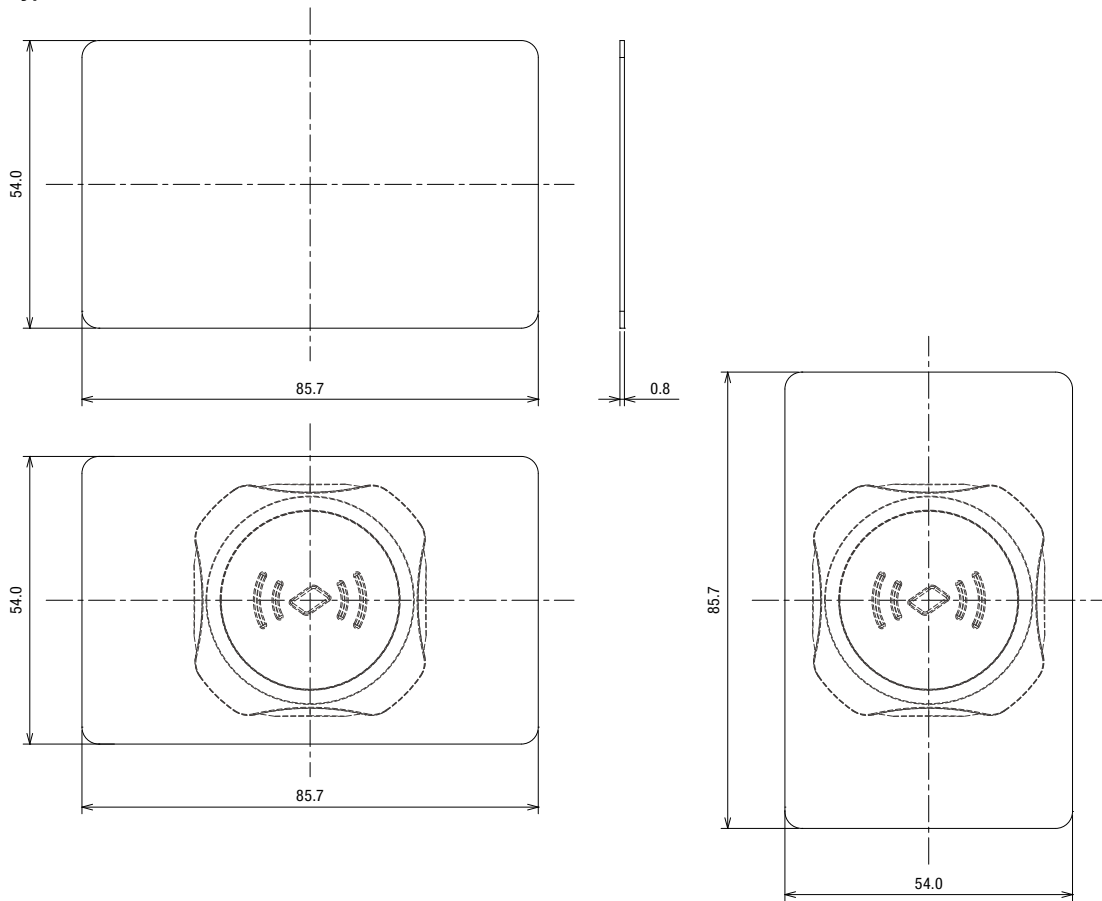48.5

40.0

25.0

40.0
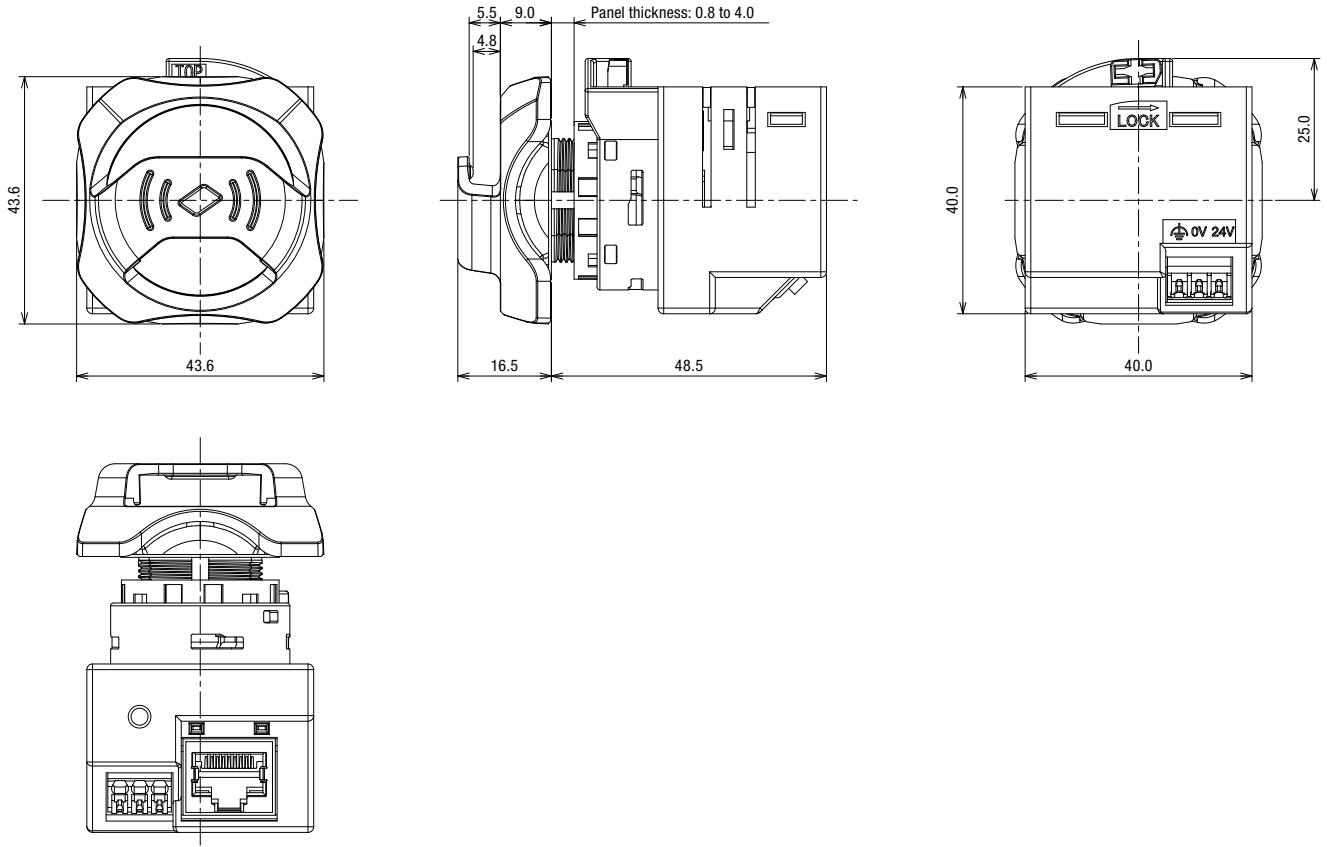
Dimensions

(Units: mm)

Tag

KEYFOB type: KW9Z-T1X1G, KW9Z-T1X2Y, KW9Z-T1X3R, KW9Z-T1X4S, KW9Z-T1X5B
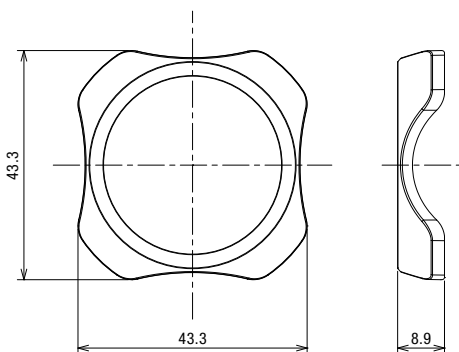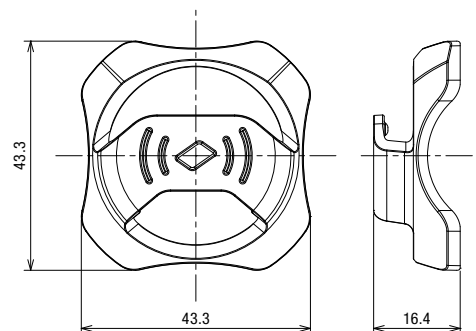
*1 Minimum size with KEYFOB attached.

Card type: KW9Z-T2X0

### Cover
KW9Z-CV

KW9Z-CVH

⚠ Safety Precautions

• Be sure to turn off the power before starting installation, removal, wiring, maintenance, and inspection work. Failure to turn power off may cause electrical shocks or fire hazard.

Precautions for Use

Installation and Wiring Precautions

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 20mm or more.

X: 20mm or more
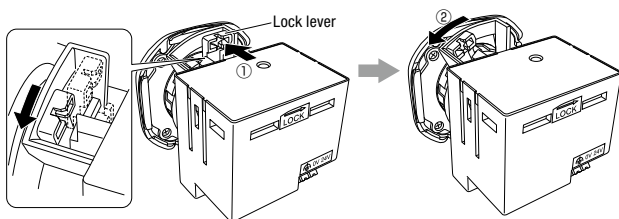(42mm or more from the center)
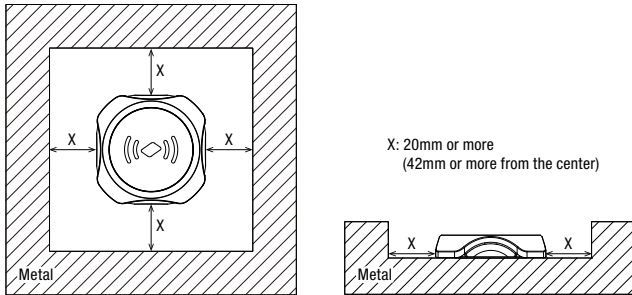
When Multiple Tags Are in the Reading Area

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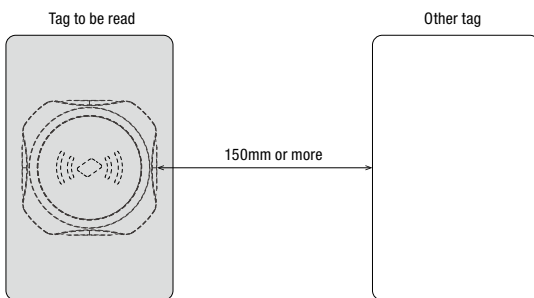

Removing the Back Unit

1) To remove the back unit from the front unit, press the lock lever (①) while turning it to the left.

2) To attach the back unit, align the TOP marks on the front unit and the back unit, and then insert the back unit into the front unit. Turn the lock lever to the right to lock it.

Panel Mounting Method

Insert the front unit into the mounting hole from the front side of the panel, and install the locking ring from the back side of the panel. Locking ring recommended tightening torque: 2.0N·m
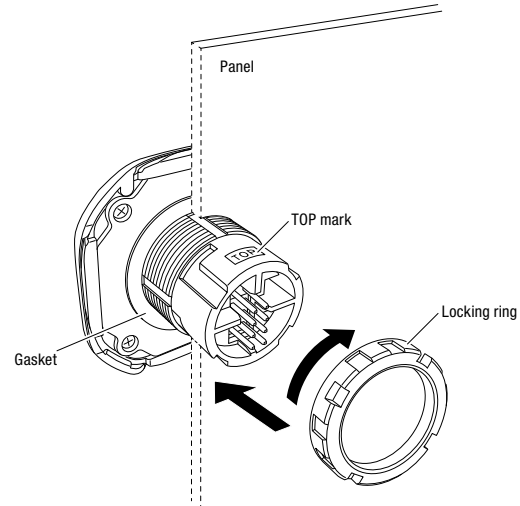
Attaching the Front Cover

1) Attach hook section B (long) of the front cover to the front unit.
2) Push hook section A (short) onto the front unit.
3) The cover (without holder) and cover (with holder) are installed in the same way.
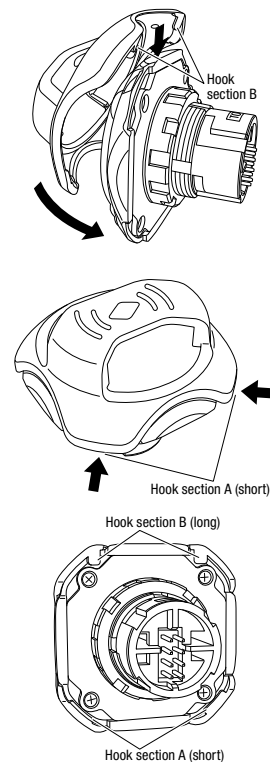
The front cover can be attached with a pitch of 90°.

Instructions

Applicable Wire

Power Supply Wiring

• The KW2D Series RFID Reader has a push-in style terminal block.

• An inrush current of 25A or lower (when input is 24V DC) flows when the power is turned on. Use a power supply with sufficient capacity.

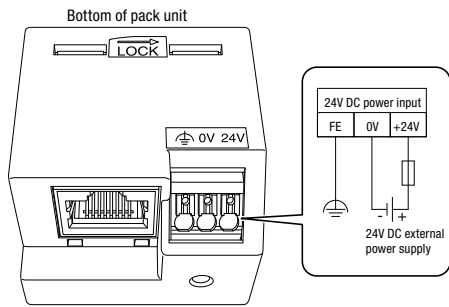• To prevent induction, keep the power line as short as possible, and as far away as possible from motor lines.

• The following table shows the signals that correspond to the signal codes. Be careful not to mistake the connections.

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

When wiring, use the applicable wires shown below.

Applicable Wire and Specifications

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

*1 For details on ferrules, see the "Wire Size and Recommended Ferrules" table below.
*2 Strip the sheath of the wire 8±1mm from the end.

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

Wire Size and Recommended Ferrules

Ferrules with insulated covers

| Applicable Wire (Stranded Wire)		Wire Strip Length	Part no. (Ordering no.)
AWG	mm^2		
24	0.25	10mm	S3TL-H025-12WJ
22	0.34	10mm	S3TL-H034-12WT
20	0.50	10mm	S3TL-H05-14WA
18	0.75	10mm	S3TL-H075-14WW

Recommended Tools (Optional)

The following recommended tools can be used.

Name	Part no. (Ordering no.)
Insulated screwdriver	S3TL-D04-25-75
Crimping tool	S3TL-CR04T
	S3TL-CR06D
Stripping tool	S3TL-ST06

Crimping of Ferrules and Wiring

• Choose an appropriate ferrule for the wire.

• 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 1mm from the ferrule sleeve.
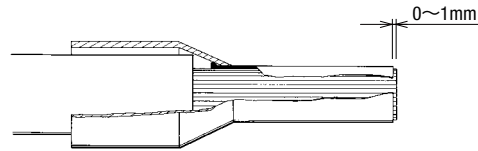
• When crimping, refer to the instructions of the crimping tool.
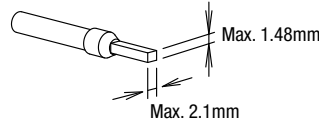
Faults which can occur during crimping:

• 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

• Single conductors pushed back by protruding from the insulated cover

• Single conductors squeezed off

• Insulation cover damaged by the crimping jaw

• Conductor insulation not pushed into the insulated cover

• Ferrule bent longitudinally after crimping

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 protruding
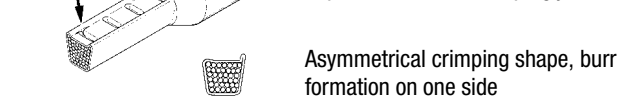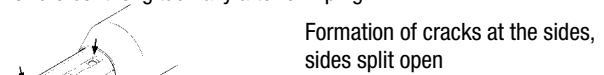
Ordering Terms and Conditions

Thank you for using IDEC Products.

By purchasing products listed in our catalogs, datasheets, and the like (hereinafter referred to as "Catalogs") you agree to be bound by these terms and conditions. Please read and agree to the terms and conditions before placing your order.

1. Notes on contents of Catalogs

(1) Rated values, performance values, and specification values of IDEC products listed in this Catalog are values acquired under respective conditions in independent testing, and do not guarantee values gained in combined conditions.
Also, durability varies depending on the usage environment and usage conditions.

(2) Reference data and reference values listed in Catalogs are for reference purposes only, and do not guarantee that the product will always operate appropriately in that range.

(3) The specifications / appearance and accessories of IDEC products listed in Catalogs are subject to change or termination of sales without notice, for improvement or other reasons.

(4) The content of Catalogs is subject to change without notice.

2. Note on applications

(1) If using IDEC products in combination with other products, confirm the applicable laws / regulations and standards.
Also, confirm that IDEC products are compatible with your systems, machines, devices, and the like by using under the actual conditions. IDEC shall bear no liability whatsoever regarding the compatibility with IDEC products.

(2) The usage examples and application examples listed in Catalogs are for reference purposes only. Therefore, when introducing a product, confirm the performance and safety of the instruments, devices, and the like before use. Furthermore, regarding these examples, IDEC does not grant license to use IDEC products to you, and IDEC offers no warranties regarding the ownership of intellectual property rights or non-infringement upon the intellectual property rights of third parties.

(3) When using IDEC products, be cautious when implementing the following.
  i.   Use of IDEC products with sufficient allowance for rating and performance
  ii.   Safety design, including redundant design and malfunction prevention design that prevents other danger and damage even in the event that an IDEC product fails
  iii.   Wiring and installation that ensures the IDEC product used in your system, machine, device, or the like can perform and function according to its specifications

(4) Continuing to use an IDEC product even after the performance has deteriorated can result in abnormal heat, smoke, fires, and the like due to insulation deterioration or the like. Perform periodic maintenance for IDEC products and the systems, machines, devices, and the like in which they are used.

(5) IDEC products are developed and manufactured as general-purpose products for general industrial products. They are not intended for use in the following applications, and in the event that you use an IDEC product for these applications, unless otherwise agreed upon between you and IDEC, IDEC shall provide no guarantees whatsoever regarding IDEC products.
  i.   Use in applications that require a high degree of safety, including nuclear power control equipment, transportation equipment (railroads / airplanes / ships / vehicles / vehicle instruments, etc.), equipment for use in outer space, elevating equipment, medical instruments, safety devices, or any other equipment, instruments, or the like that could endanger life or human health
  ii.   Use in applications that require a high degree of reliability, such as provision systems for gas / waterworks / electricity, etc., systems that operate continuously for 24 hours, and settlement systems
  iii.   Use in applications where the product may be handled or used deviating from the specifications or conditions / environment listed in the Catalogs, such as equipment used outdoors or applications in environments subject to chemical pollution or electromagnetic interference
If you would like to use IDEC products in the above applications, be sure to consult with an IDEC sales representative.

3. Inspections

We ask that you implement inspections for IDEC products you purchase without delay, as well as thoroughly keep in mind management/maintenance regarding handling of the product before and during the inspection.

4. Warranty

(1) Warranty period
The warranty period for IDEC products shall be one (1) year after purchase or delivery to the specified location. However, this shall not apply in cases where there is a different specification in the Catalogs or there is another agreement in place between you and IDEC.

(2) Warranty scope
Should a failure occur in an IDEC product during the above warranty period for reasons attributable to IDEC, then IDEC shall replace or repair that product, free of charge, at the purchase location / delivery location of the product, or an IDEC service base. However, failures caused by the following reasons shall be deemed outside the scope of this warranty.
  i.   The product was handled or used deviating from the conditions / environment listed in the Catalogs
  ii.   The failure was caused by reasons other than an IDEC product
  iii.   Modification or repair was performed by a party other than IDEC
  iv.   The failure was caused by a software program of a party other than IDEC
  v.   The product was used outside of its original purpose
  vi.   Replacement of maintenance parts, installation of accessories, or the like was not performed properly in accordance with the user's manual and Catalogs
  vii.   The failure could not have been predicted with the scientific and technical standards at the time when the product was shipped from IDEC
  viii.   The failure was due to other causes not attributable to IDEC (including cases of force majeure such as natural disasters and other disasters)
Furthermore, the warranty described here refers to a warranty on the IDEC product as a unit, and damages induced by the failure of an IDEC product are excluded from this warranty.

5. Limitation of liability

The warranty listed in this Agreement is the full and complete warranty for IDEC products, and IDEC shall bear no liability whatsoever regarding special damages, indirect damages, incidental damages, or passive damages that occurred due to an IDEC product.

6. Service scope

The prices of IDEC products do not include the cost of services, such as dispatching technicians. Therefore, separate fees are required in the following cases.
(1) Instructions for installation / adjustment and accompaniment at test operation (including creating application software and testing operation, etc.)
(2) Maintenance inspections, adjustments, and repairs
(3) Technical instructions and technical training
(4) Product tests or inspections specified by you

   The above content assumes transactions and usage within your region. Please consult with an IDEC sales representative regarding transactions and usage outside of your region. Also, IDEC provides no guarantees whatsoever regarding IDEC products sold outside your region.

For details on installation, wiring, and maintenance, see the Instruction Sheet and User's Manual from the URL below.

URL: https://product.idec.com/?product=KW2D

IDEC Products

Flush Silhouette Switches

USB/RJ45 Relay Ports

CW
ø22

Projects only 2mm from the panel. Ideal for panels that require cleanliness and safety.

PLCs/Controllers/Operator Interfaces

Ethernet Switches

SX5E

Rugged design.Suitable for a range of applications. Unmanaged Ethernet switches equipped with various features.

Smart Relays

FL1F

Equipped with convenience and high functionality. Multiple power supply variations.

PLCs/Controllers

FC6A Plus/All-in-One

FC6A Plus is ideal for controlling not only large-size machines, but also entire small-size production lines. FC6A All-in-One has high performance and easy programming features.

PLCs/Controllers/Operator Interfaces

PLC / Controllers

FT1A Touch
3.8 inch

Built-in LCD enables control and display with high visibility.

Operator Interfaces

HG

Excellent visibility by super-bright LED backlight. Withstands harsh environments.

Safety Commander™

HT3P

Easily attaches to tablets of various sizes, improving safety and operability. Rotatable grip allows both vertical and horizontal use.

*) Photo shows the product mounted on a commercially-available tablet.
*) The tablet is not included with this product and must be prepared separately by the customer

Sensor Checker

USB Powered Portable Sensor Checker

SA1P

An external USB battery can be used enabling easy device testing and continuity check for 24V DC devices without power outlets near by.

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