

Product specification

LF RFID Reader

CTS-RFID-LS21

Rev. 2

2025-01-22



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Revision history

REV.	Date	Description
R0	2024-08-24	- Deployment
R1b	2024-11-27	- RS-485 Pin map Change / RS-232C Only Model Delete
R1	2024-12-24	- Section 4.6 Change product photos and add adapter order numbers
R2	2025-01-22	- Section 4.1.1 Revise Order Code (Add Protocol and Baud rate Content) - 4.3.1 Modifying Communication Speed and Protocol Related Content Max H-field strength 삭제 - Section 5.6, Add DIP SW ID = Settings (CB Protocol ID = 0 Support) - Section 7.1.1, changing the description of ID settings

1. Safety guidelines

Recognize and comply with relevant safety regulations when using the product. As there may be dangerous situations involving the use of the product, read and familiarize yourself with the following safety information in this manual: Install and operate according to this manual only when the product is not damaged. If the product is damaged, it should be discontinued.

1.1 General Safety Guidelines

① Read instructions before installing and operating the device:

- All safety and operation instructions must be read and understood.
- These guidelines are designed specifically for trained personnel.
- This product is not intended for public use.
- Installation, operation, and error handling of the product should be performed only by specially trained personnel.

② Archive Instructions:

- This manual should be kept at any time accessible to all personnel who install, operate and error-handle the unit.

③ Compliance with warnings:

- All warnings and operating instructions in and out of the product must be followed.
- It should be installed according to the manufacturer's instructions.
- Only accessories and accessories provided by the manufacturer should be used.
- All errors except those listed in this manual must be handled by the manufacturer.

④ Beware of hearing aids:

- People who use hearing aids should remember that the wireless signals they transmit can cause a very unpleasant buzzing noise in the hearing aid.

⑤ Power Supply Caution:

- Do not connect the device to a power supply of the same kind as a home power supply.

⑥ **Cable management:**

- When disconnecting the cable, hold the housing part, not the cable itself.
- Always hold the cable's housing and avoid strong physical stress when disconnecting the cable.
- When connecting cables, make sure that the connected pins are correctly aligned.
- Do not bend or expose antenna cables to mechanical loads.

⑦ **Use replacement parts:**

- If a replacement part is required, the replacement part specified by the manufacturer must be used.
- The use of unauthorized replacements may result in fire, electric shock, or other hazards.

⑧ **Warning:**

- The installer is responsible for installing the device to comply with FCC requirements for human exposure to electromagnetic waves.
- Only recommended accessories should be used to prevent fire, electric shock, or unpleasant interference.
- When removing the housing cover, be aware that the cover is connected to the device by cable. The cover should be removed slowly to prevent damage. Do not operate the device with the cover removed.
- Do not operate the device without the appropriate antenna attached. The appropriate antenna should be manufactured using the antenna provided by the manufacturer and installed as described in the "Antenna" section.
- Make sure that the antenna is not too close or touching parts of the body when transmitting.

1.2 ESD Guidelines

Static electricity can damage electronic components inside the device. Therefore, all personnel installing or maintaining this device must be trained in electrostatic discharge (ESD) protection. ESD protection measures must always be observed when opening the device.

- **Before removing components:** power must be shut off.
- **Preventing Electrostatic Discharge:** Static electricity must be discharged before it reaches the components inside the device from the body and tools.
- **When handling electronic sensitive components:** do not **touch only the edges of the components.**

2. Abbreviations and names

LF RFID : Low Frequency RFID

OPT : optional, supported only on specifications

TBD : to be defined, supported, to be updated

3. Product Overview

3.1 Overview

This product is an RFID reader that uses frequencies in the 134.2 kHz band and can communicate with the ISO11785 standard Transponder.

It is a miniaturized product that can be installed and used in OHT and Load Port, and was developed for logistics management of semiconductor lines that can perform optimal operations in various noise environments that can occur in the installation environment.

It consists of a reader body and an antenna in one set, and the antenna has several different specifications so that it can be selected and used according to your environment.

This product is dedicated to one channel of serial communication and separately supports Ethernet-only products and 4-channel RFID reader products.

Ethernet-only 1 channel: CTS-RFID-LE21

Ethernet/serial 4-channel support: CTS-RFID-LM24

3.2 Characteristics

- **RS-232C Serial Communication Support**
- **RS-485 Serial Communication Support**
- **Sticky/square antenna available**
- **Support for a variety of protocols**
- **Can be custom-made to meet specifications**
- **Log collectible**

4.2 General Specifications

Classification	Item	Contents
Communications	RS-232C	1, Baud rate: up to 115,200 bps
	RS-485, Half Duplex	1, Baud rate: up to 115,200 bps
Input/Output Ports	Antenna Ports	1 port support
Users Interface	LED	4 (Power/Status Display/Operation Success/Operation Failure)
	a button	1개 (Short Click / Long Click)
	Switch	1개 8-DIP SW, ID set up / RS-485 termination
Environment	Storage Environment	Temperature: -25° to 70°C Humidity: 5 to 95% RH (but no condensation)
	operating environment	Temperature: -5 to 50°C Humidity: 35-85% RH (but no condensation)
Power source	current consumption	400mA @24VDC
Size (width x length x height)		78 mm × 66 mm × 38.5 mm (excluding protrusions / plates)
Weight		200g or less (main body)

4.3 Other Specifications

4.3.1 RFID communication-related matters

Classification	Details	Description
RFID Performance	Frequency	134.2kHz
	Reading Time	Within 130 ms / Page (depending on surroundings, without retries)
	Writing Time	Within 390ms / Page (depending on surroundings, without retries)
	Maximum Reading Distance	110mm or greater (depending on antenna)
	Maximum Writing Distance	Less than 60% of maximum reading distance (see operating area)
Communication Specifications	RS-232C	1ea, 1:1, Full Duplex
	RS-485	1ea, 1:N (up to 32), Half Duplex
	communication protocol	1) CanTops Protocol I / II
		2) GEM (SECS) / MODBUS (RTU)
		3) ASCII-A/H and others (see 4.1.1 Order Code)
	Communication speed (bps)	1200, 2400, 4800, 9600, 19200, 28800, 38400, 57600, 115200

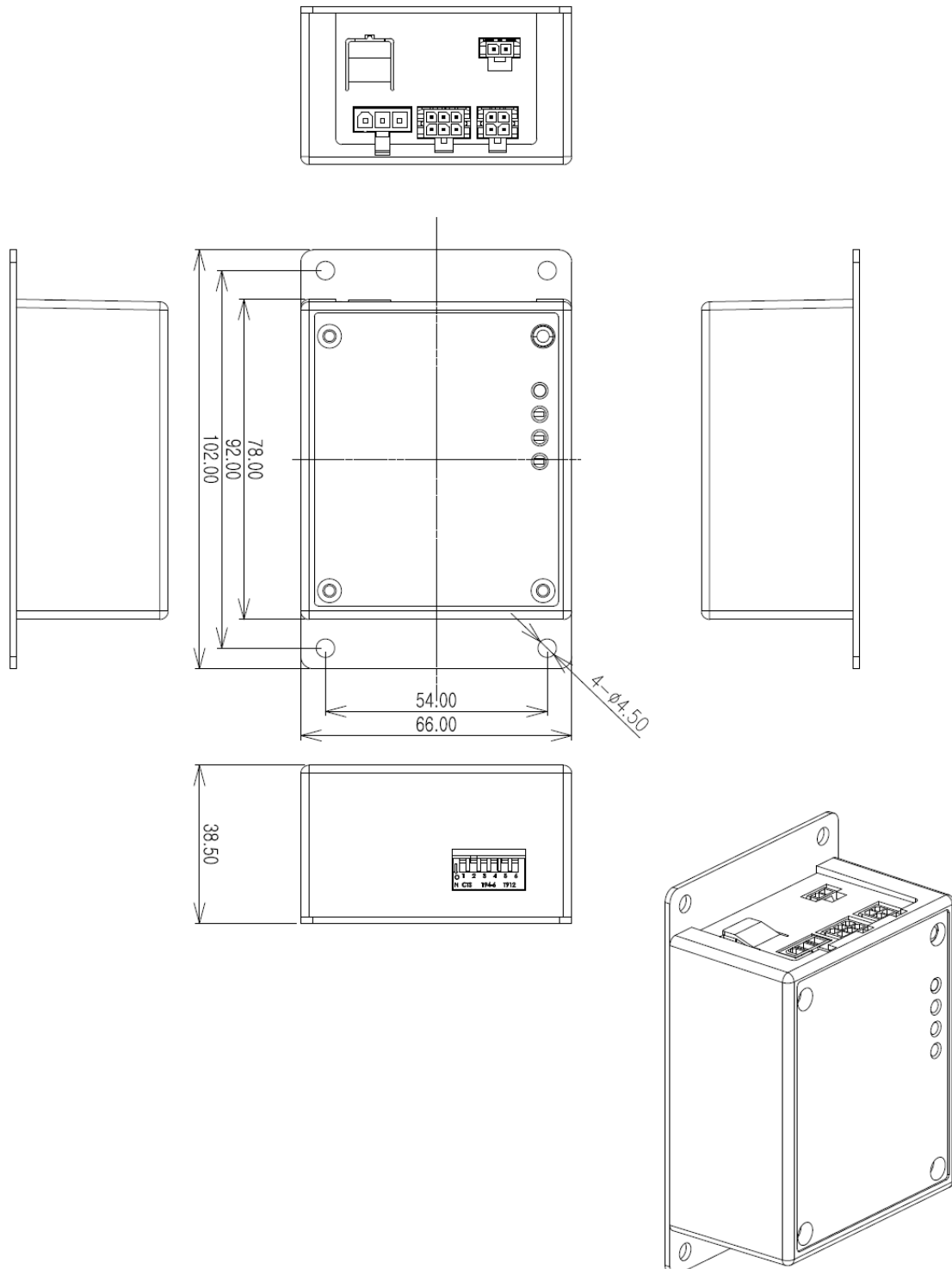
4.3.2 Antenna Basic Specifications

Details	Description
Bending Diameter	45mm
Length	1M ~ 10M
Material	PVC
stick type antenna	CTS-RFID-ACzz-xxyy CTS-RFID-ABzz-xxyy CTS-RFID-AOzz-xxyy
a square antenna	CTS-STBA-EC0/1-xxx CTS-STBA-MC0/1-xxx
Material and Color	PC, white.
Connector Standard	43650-0200 (Molex)

* Antenna is referred to a separate specification (LF RFID Specification).

4.4 Appearance Dimensions

- Unit : mm



4.5 Name of each part

- Full functionality based on RS-485 supported version

Item	What is it?	Other
①	Antenna connector	2-pins
②	RS-232C communication connector	4-pins
③	RS-485 Communication Connector	6-pins
④	24Vdc power connector	3-pins
⑤	Test Switch	Manual test key
⑥	Status Indication LED	POWER/STS/OK/ERR
⑦	DIP 스위치 (ID/Termination switch)	ID 및 RS-485 termination

4.6 Components

① reader body



②Other Accessories

Purchase separately

- Antenna/DC Adapter

Adapters



[DC 24V ADAPTER]

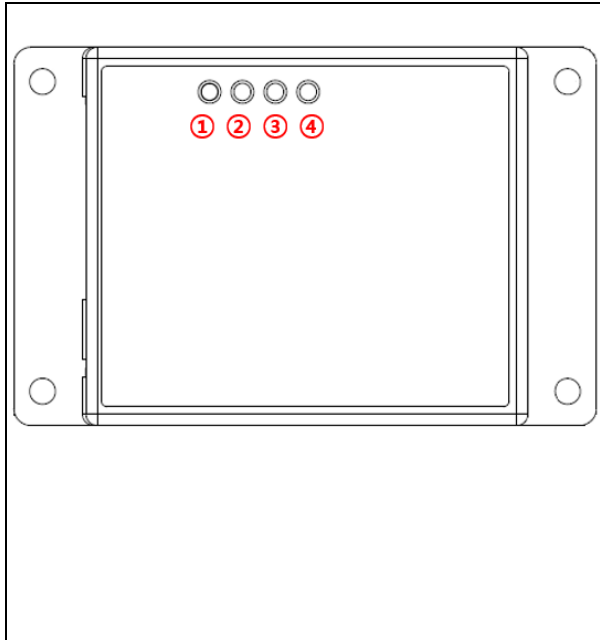
MEENWELL GST40A

ORDER CODE

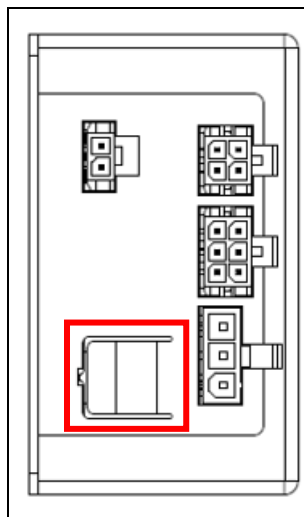
GST40A24-NC WITH 5557-03

5. function

5.1 Display LED

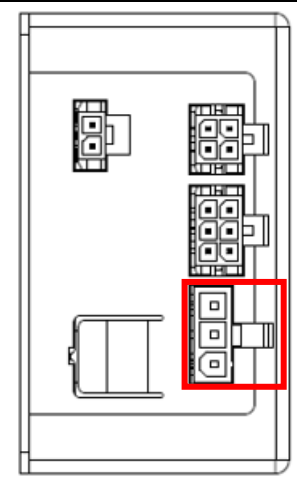
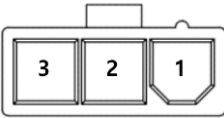
	① Power LED Turn on when power is applied ② STS LED Flashing every two seconds when operating in standby mode. Fast flashing while performing serial communication ③ OK LED TAG communication operation turned on successfully Turned off when TAG communication operation fails ④ ERR LED Turned on when TAG communication operation fails TAG communication operation turned off when successful
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5.2 Test button

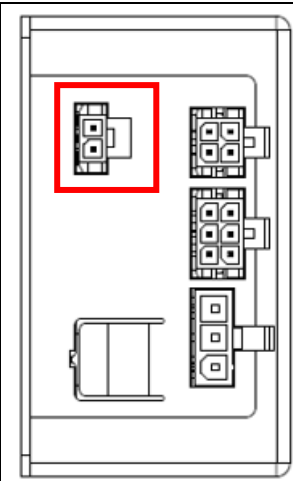
	Func 1. Enter test mode (click on boot) Test mode entry, debugging mode Automatic release of test mode after 1 minute without pre-determined with manager Func 2. Reading test (one click during standby mode) Try TAG communication after TX optimization Func 3. Continuous reading test (long click in standby mode and release) Try TAG communication continuously after one TX optimization. Unclick once again, or automatically disable upon receipt of a serial command
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5.3 Power Input

The power input is DC24V, and the connector specifications are as follows.

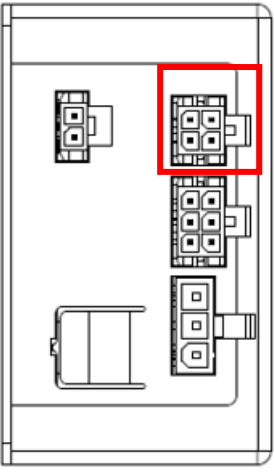
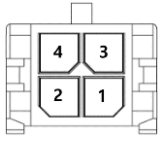
	Kinds	Product name		
	Reader connector	39-30-3035 , Molex		
	Cable Housing	Housing: 39-01-4031, Molex Terminals: 5556 series, Molex		
	Reader connector pin arrangement		1	Earth
			2	GND
			3	24V DC

5.4 Antenna connector

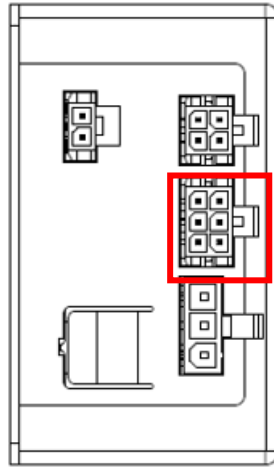
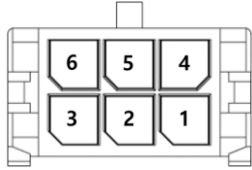
	Antenna is not compatible with third-party products Use antennas provided by us only
--	---

5.5 Serial communication connector

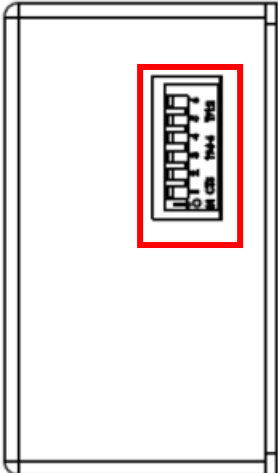
5.5.1 RS-232C connector

	Kinds	Product name		
	Reader connector	43045-0400, Molex		
	Cable Housing	Housing: 43025-0400, Molex Terminals: 43030 series, Molex		
	Reader connector pin arrangement		1	RXD
			2	TXD
			3	GND
			4	NC

5.5.2 RS-485 Connector

	Kinds	Product name		
	Reader connector	43045-0600, Molex		
	Cable Housing	Housing: 43025-0600, Molex Terminals: 43030 series, Molex		
	Reader connector pin arrangement		1	D-
			2	GND
			3	D+
			4	D-
			5	GND
			6	D+

5.6 DIP Switch



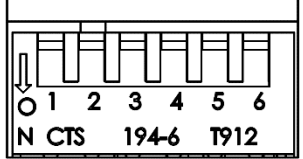
0 to 5. ID setting switch

: Test mode entry, debugging mode
Automatic release of test mode after 1 minute without pre-determined with manager

6. RS-485 terminator

: Try TAG communication after TX optimization

- **Default value: ID=1, Term=off**



ID	DIP SW				
	1	2	3	4	5
1	off	off	off	off	off
2	on	off	off	off	off
3	off	on	off	off	off
4	on	on	off	off	off
5	off	off	on	off	off
6	on	off	on	off	off
7	off	on	on	off	off
8	on	on	on	off	off
9	off	off	off	on	off
10	on	off	off	on	off
11	off	on	off	on	off
12	on	on	off	on	off
13	off	off	on	on	off
14	on	off	on	on	off
15	off	on	on	on	off
16	on	on	on	on	off

ID	DIP SW				
	1	2	3	4	5
17	off	off	off	off	on
18	on	off	off	off	on
19	off	on	off	off	on
20	on	on	off	off	on
21	off	off	on	off	on
22	on	off	on	off	on
23	off	on	on	off	on
24	on	on	on	off	on
25	off	off	off	on	on
26	on	off	off	on	on
27	off	on	off	on	on
28	on	on	off	on	on
29	off	off	on	on	on
30	on	off	on	on	on
31	off	on	on	on	on
32	on	on	on	on	on
0	on	on	on	on	on

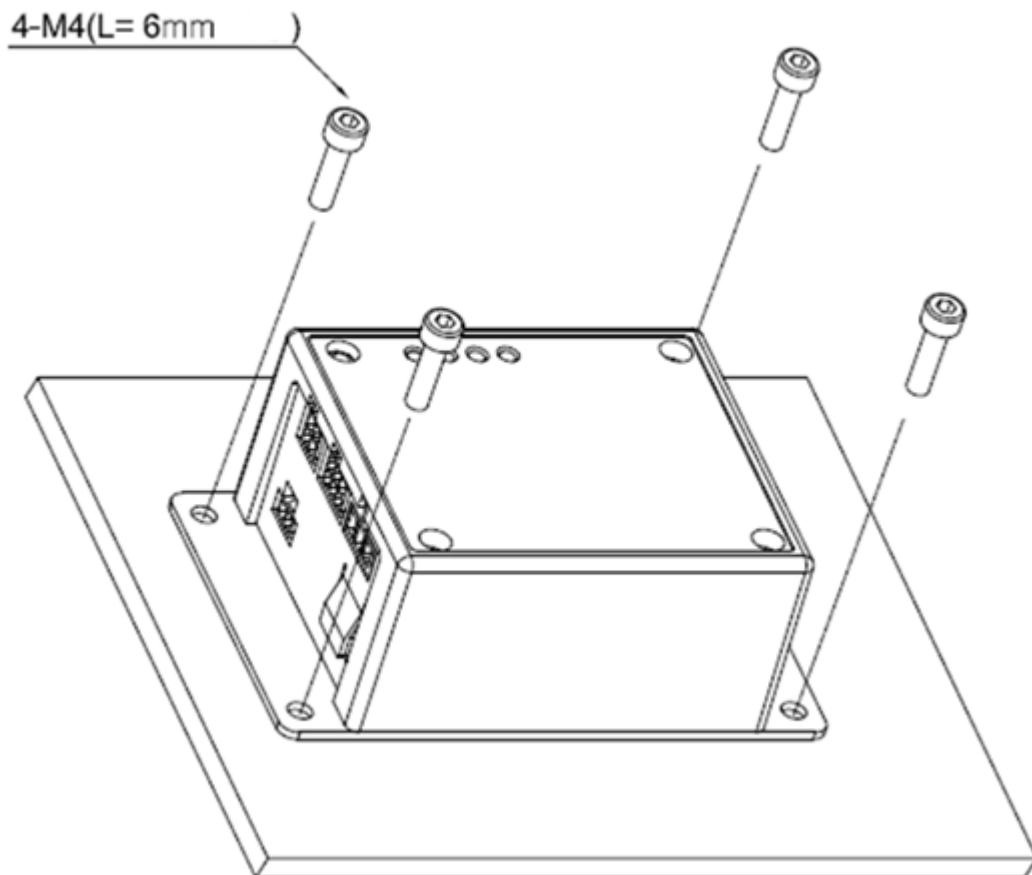
RS-485 TERM	DIP SW 6	Details
Enable	on	termination
Disable	off	not used

- For protocol "CB" and "C2", ID 32 is replaced by ID 0.

6. Product Installation

6.1 Installation Example

- Bracket minimum size = Plate size of reader
- Precautions for installation: This product does not come with fixing screws. Secure the product tightly during installation in the following manner:



7. Explanation and operation description

7.1 Serial communication supplementary explanation

7.1.1 Call ID Settings

- ID setting is a function for RS-485 and can be assigned ID by setting DIP SW. The ID setting changes not only the RS-485 but also the RS-232C.
- Because the ID setting switch can be operated externally, it can be used by changing the ID from the outside after installing several readers.
- Depending on the switch setting, 32 IDs from 1 to 32 can be used.
- For protocols "CB" and "C2", IDs support 31 IDs from 0 to 14 and 16 to 31. (ID 15 not supported)
For information on how to set up the ID, refer to the chart in "5 .6 DIP Switches". ID=32 in the default protocol works as ID =0 in the CB/C2 protocol.

7.2 test method

- There is a manual test method that uses an external test button to perform operations by delivering protocol-compliant commands to the reader using serial communication and to operate independently of protocol and other settings.
- After connecting the power/antenna, check that the STS LED on the status display LED is blinking and the PWR LED is on.
- Place the TAG and antenna in the proper position and enter the serial command to perform the TAG read.
For manual tests, click the external test button instead of entering the serial command.
- When the TAG is read, the OK LED is turned on, and if communication with the TAG fails, the ERR LED is turned on. Operations by sending serial commands must be performed with protocol and appropriate setting values, and manual testing operates with non-related default values.
- Repeat several times to find the appropriate operating area and determine the position of the antenna and TAG.

7.2.1 Antenna Operating Area

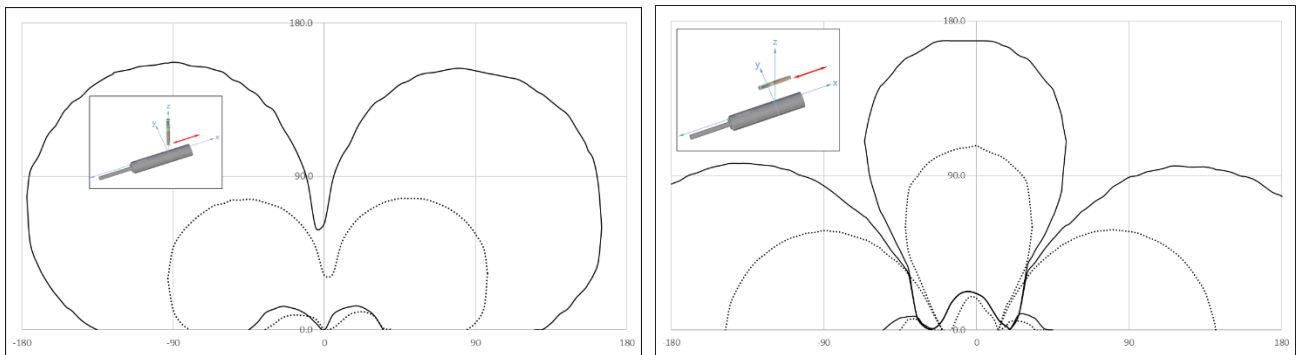
- Reading/Writing operation areas vary depending on the antenna type.

When selecting the antenna, it should be selected by contacting us in consideration of the Reading/writing area.

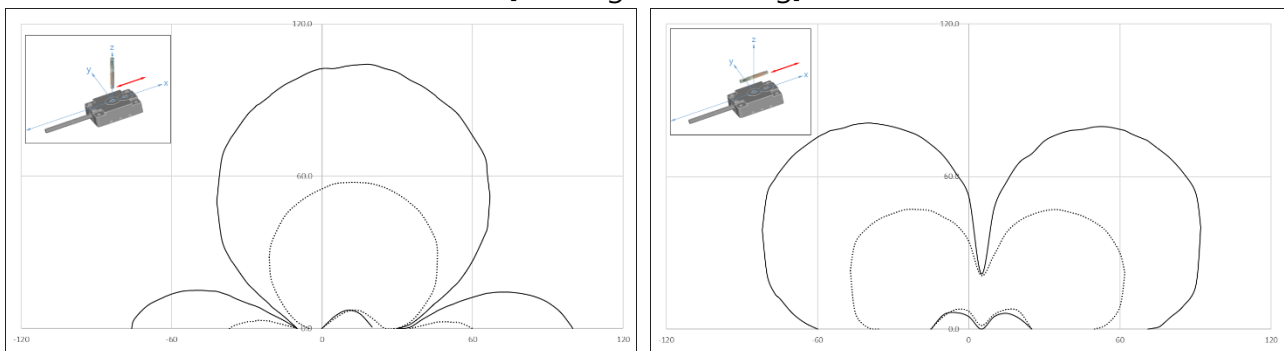
Since the communication of the magnetic induction method is greatly affected by the condition between the TAG and the antenna, the appropriate antenna should be selected and used after considering the direction with the TAG.

- The maximum reading area is 200 mm or less for AC antennas and 100 mm or less for ECO antennas.
- The figure below is a general example, and the operating area may be reduced depending on the surrounding situation.

[Reading and Writing]



[Reading and Writing]



8. Supplementary Provisions

8.1 Quality guarantee

- Warranty period: 2 years from the date of shipment / All products eligible
- Exceptions to the application: accessories and consumable parts, if there is no label (S/N) marked or attached to the product.
- A/S treatment method
 - Within the warranty period: Free warranty
 - ※ However, in the event of a quality problem due to the following reasons, it is paid for.
 - A. In the event that the product is damaged due to carelessness of the customer's management and handling.
 - B. If it is installed by an external partner that is not certified by the customer.
 - C. When the functions of the product are used for other purposes;
 - D. If the product is stored outside of the environmental conditions recommended by our company.
 - E. Failure caused by natural disasters (fire, gas damage, earthquake, etc.)
 - F. Failure due to abnormalities in used power and faulty connection equipment
 - G. Random repair without repair by our company, replace parts without our prior consent,
 - If a failure occurs due to modification or if a failure occurs due to removal
 - After the warranty period: paid after warranty period:
 - ※Paid after repair processing and cost will be conducted after consultation.
- Warranty: Repair or replacement of the product
 - ※ Product replacement service at installed location not applicable
- Shipping cost claim standard: Same as Korea/Overseas

If you are eligible for free after-sales service	If it is subject to paid after-sales service conditions
A. Repair and replacement of product: manufacturer	A. Product repair and exchange: Customer company
B. Product replacement and transportation costs: Customer company	B. Product replacement and transportation costs: Customer company

- Extended warranty period
 1. Extended warranty service: a service that guarantees long-term product protection and safety with an additional amount

- ※ Product to be serviced: New purchased product
- 2. Warranty Extension: Up to 2 years
- 3. Scope of Service: Same as our warranty (including free repair or replacement of the product)

8.2 Certification

TBD

KC Certification Information



Product name	LF RFID Reader
Model name	CTS-RFID-LS21
Manufacturer	(주)캔탑스
제조국	한국
인증번호	R-R-ca5-CTS-RFID-LS21
제조년월	2025.

User's Guide

This device has been evaluated for suitability for use in business environments, and there is a risk of radio interference when used in home environments.

CE Certificate Information

Product Information

Product Name	LF RFID Reader
Model Name	CTS-RFID-LS21
Rating	DC 24 V
Manufacturer	CanTops Co., Ltd.
Country of Manufacture	Korea



We, CanTops Co., Ltd. hereby declares that the above model complies with all technical regulations applicable to the product in accordance with Directive 2014/53/EU, Directive 2014/30/EU and Directive 2014/35/EU.

FCC Certificate Information**FCC ID : RMN-CTS-RFID-LS21****FCC Part 15.19**

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

FCC Part 15.21

Any changes or modifications (including the antennas) to this device that are not expressly approved by the manufacturer may void the user's authority to operate the equipment.

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

FCC RF Radiation Exposure Statement:

This equipment complies with FCC RF Radiation exposure limits set forth for an uncontrolled environment.

This device and its antenna must not be co-located or operating in conjunction with any other antenna or transmitter.

[The specifications of this product may be changed without notice to improve the performance of the product.]