

Easy ID/5bit system  
Read System

Reader

**Z5-EA05N-\_\_ , Z5-EA05P-\_\_**  
**Z5-EA05BKN-\_\_ , Z5-EA05BKP-\_\_**  
**Z5-EA05P-FCC-02**  
**Z5-EA05BKP-FCC-02**

Manual



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## Safety Considerations

(Please read through before use)

Before using this product, please carefully read this instruction manual, pay attention to safety, and handle it properly.

Design considerations

- ◆ This product constitutes the identification system together with the ISO 15693 compliant ID tag.  
Please do not use for other uses.
- ◆ Please design the system so that the entire system works on the safe side even if the external power supply malfunction or this product breaks down
- ◆ Please design the system carefully and not to exceed the range of the equipment specification described in this instruction manual for power supply / usage conditions.

Usage considerations

- ◆ Use a regulated power supply, e.g. switch-model type.  
There is a risk of fire or heat generation exceeds the rated voltage power is being supplied"
- ◆ "When wiring the processor, follow the chapters containing the wiring diagrams closely, and wire all connections properly.  
Incorrectly connected wiring may cause malfunction or unexpected problems."
- ◆ When installing, maintaining, troubles etc. concerning this product, be sure to turn off the power, please go.
- ◆ Do not disassemble or modify the processor.  
Which may cause failure,malfunction, injury or fire.
- ◆ To avoid malfunction caused by induction noise, cable should be kept apart from motor or other power cable.
- ◆ When disposing of the processor, treat it as industrial waste.

## 1. Description

### 1.1 Description

The 5bit system is an ID system that easily reads 5bit data without any special program.

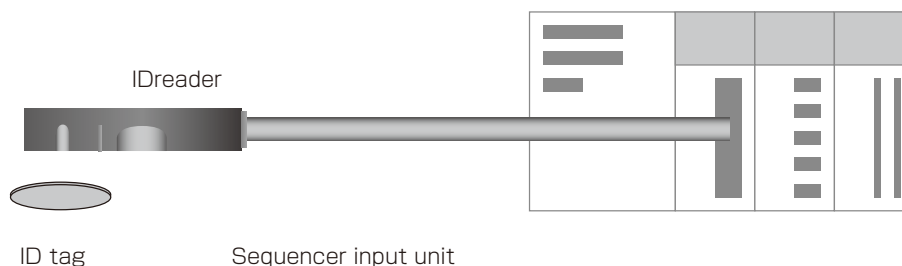
This Read-Only system needs no particular program to read data, for the Reader reads data of a Data carrier automatically

when the Data carrier come into the reading area of the reader. The 5bit system is an ID system that easily reads 5bit data without any special program.

An ID reader / writer (Z6-01-U) is available for writing data.

The 5bit system uses the ISO 15693 compliant ID tag and occupies the first 3 bytes (00, 01, 02 address) of the tag memory as the data area.

### 1.2 System Configuration



### 1.3 Each role

ID tag	Memory that stores information. Use the first 3bytes in the 5bit system.
ID Reader	A device that reads the information stored in the ID tag. (This product) When the ID tag enters the communicable area, it automatically reads the data and the read data is output as a 5-bit parallel signal.

Used frequency / 13.56MHz

### 1.4 5bit system format

ID data is stored in a format for a 5bit system.

The first 1 byte (5 bits of 00 address) is the ID data of the user,

the next 2 bytes (5 bits of 01 and 02 address) are used for data check. This format is called a 5bit system format.

When reading, the ID reader compares and processes the 5bit data stored in the above 3 addresses When the comparison result is positive,

After outputting 00 address data as read data, then turn on valid data output. If the comparison result is incorrect,

Blinks LED (low speed) as data check error. At this time the output does not change.

#### (Example)

	Data bit No.								Writing data	Check data
	7	6	5	4	3	2	1	0		
00H address	X	X	X	0	0	1	0	0	04H (*)	-
01H address	X	X	X	1	1	0	1	1	-	1BH(*)
02H address	X	X	X	1	1	0	1	1	-	1BH(*)

X : option

(\*) Describe the upper 3 bits assuming "0"

## 2. Specification

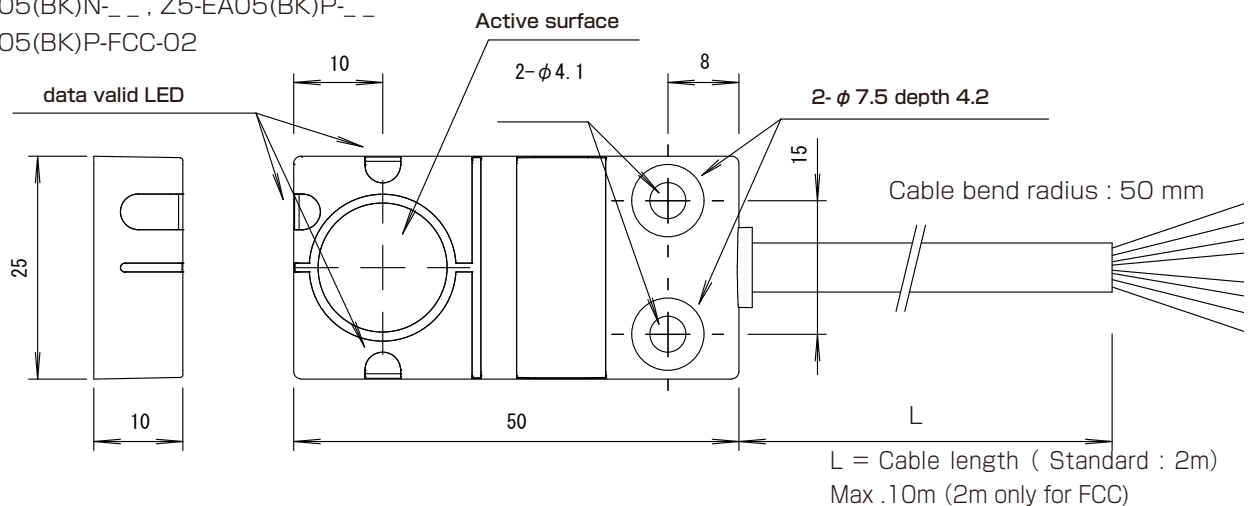
### ■ General specification

Type code	Case color (Orange)	Z5-EA05N-__	Z5-EA05P-__	Z5-EA05P-FCC-02
	Case color (Black)	Z5-EA05BKN-__	Z5-EA05BKP-__	Z5-EA05BKP-FCC-02
Output specification		NPN output	PNP output	PNP output
Supply voltage	DC24V ± 10% (Including ripple)			
Current consumption	50mA or less			
Number of output points	6 points (ID data signal: 5 points, data valid signal: 1 point)			
The output load voltage	DC30V			
Output load capacity	Up to 50 mA per output			
Output remaining voltage	1.5V or less			
Output circuit protection	Short-circuit protection			
Output leakage current	0.08mA or less			
ID tag data reading time	50 ms (automatic reading)			
Metal embedding	Impossible (installation on metal surface is acceptable)			
Operating temperature / humidity	0 ~ 50°C / 35 ~ 90%RH			
Storage temperature / humidity	0 ~ 50°C / 35 ~ 90%RH			
Data valid LED	LED (3 places) ID tag lights on when completing data reading / ID tag blinks with data check error			
Insulation resistance	50 MΩ or more (Between charging unit and case between DC 500 VM)			
Voltage endurance	AC 1000 V / 1 minute (Battery Charging Batch and Case)			
Vibration rating	10 to 55 Hz, 1.5 mm amplitude, 2 hours in each of X, Y, Z directions			
Shock rating	50 G, three in each of the X, Y, Z axial directions, 18 times in total			
Protection class	IP67			
Housing material	Case: PBT (GF 30%), back cover: aluminum			
Cable	PVC, φ 5.5, 8XAWG24			
Weight	Body20g cable 50g/m			
Mounting screw / tightening torque	M4 / 1.2N·m			
Applicable regulations	This machine has built-in high-frequency equipment that acquired the following type designation. Z5-EA05N-__ : Ministry of Foreign Affairs Designated No. AC-16019 Z5-EA05P-__ : Ministry of Foreign Affairs Designated No. AC-16020			
Compliance standard	CE		CE , FCC	

The Z5-EA05BK\* series has a black case color, but other specifications are the same as the Z5-EA05 series.

### ■ Dimension

Z5-EA05(BK)N-\_\_ , Z5-EA05(BK)P-\_\_  
Z5-EA05(BK)P-FCC-02



### ■ Cable color

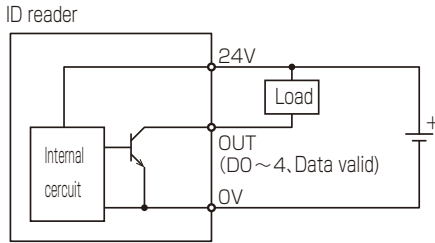
Signal name	I/O	Cable color	Meaning
Power (24V)	IN	White	Power supply input (24V)
Power supply 0V	IN	Black	Power supply input (0V)
Read data D0	Out	Brown	Output data read from Bit address [ 0 ]
Read data D1	Out	Red	Output data read from Bit address [ 1 ]
Read data D2	Out	Yellow	Output data read from Bit address [ 2 ]
Read data D3	Out	Green	Output data read from Bit address [ 3 ]
Read data D4	Out	Blue	Output data read from Bit address [ 4 ]
Data valid DV	Out	Gray	Output signal that indicates the read data is valid

■ LED display contents

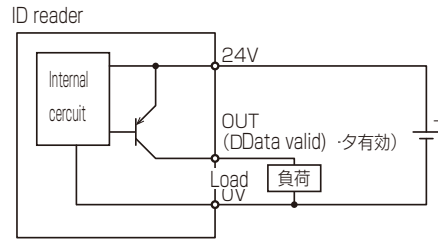
Condition	Meaning
ON	A state in which data can be correctly read from the tag and data is being output. (Keep lit for 0.5 to 0.7 seconds even if the tag is out of communication area while it is lit.)
OFF	The tag is out of the communication area. (All outputs are off.)
Blinking (Quickly)	Output over current condition. (Repeat with 50ms on and 50ms off. Over current protection works. )
Blinking (slowly)	Data check error condition. (Repeats 0.5 second lighting and 0.5 second light off.) (All outputs are off.)

■ Output Equivalent Circuit Diagram

NPN type Z5-EA05(BK)N-\_\_



PNP type : Z5-EA05(BK)P-\_\_  
Z5-EA05(BK)P-FCC-02



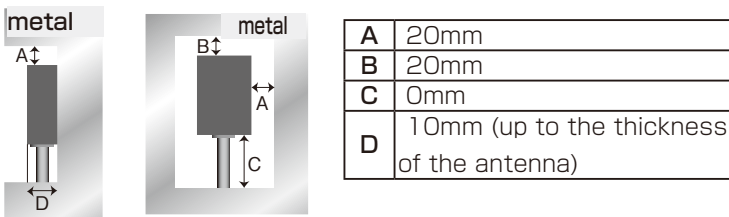
3. Installation and Wiring

■ Installation

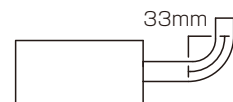
Surrounding metal

- Mounting on metal surface: Enabled
- Embedding in metal: Not permitted

Nonmetallic region when embedded in metal



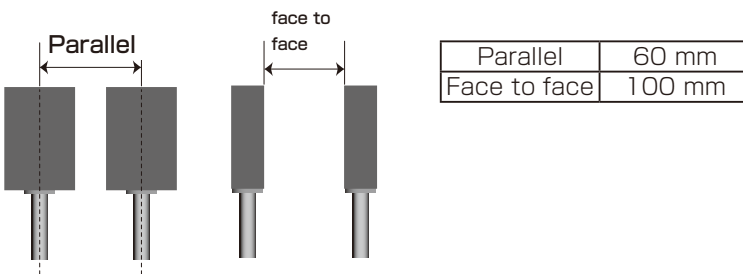
Cable bend radius



When cables are bent and wired, Please secure a bending radius of 33mm or more. Do not pull the cable with excessive force.

Mutual interference

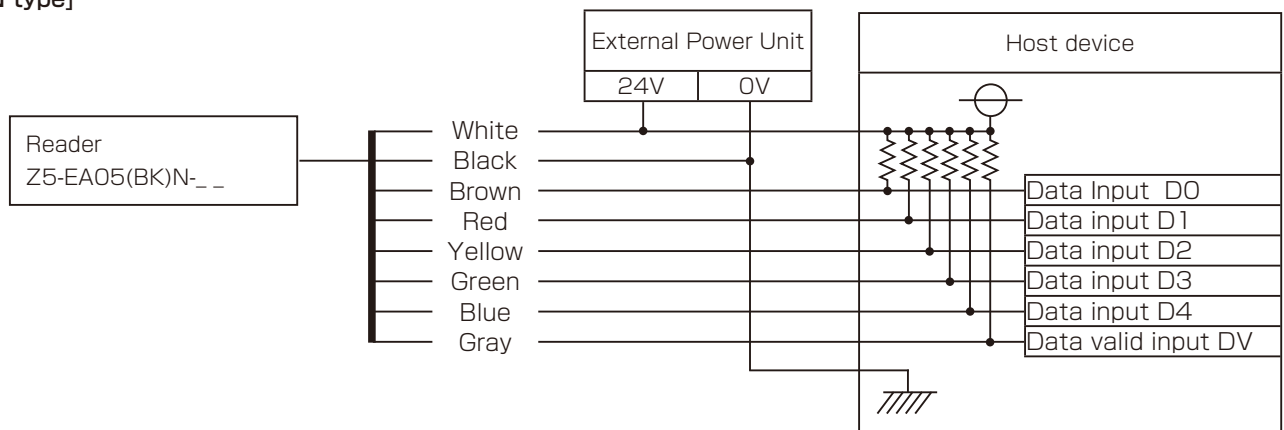
When installing the ID reader, in order to avoid mutual interference between ID readers please set it at an interval more than the value shown in the table below.



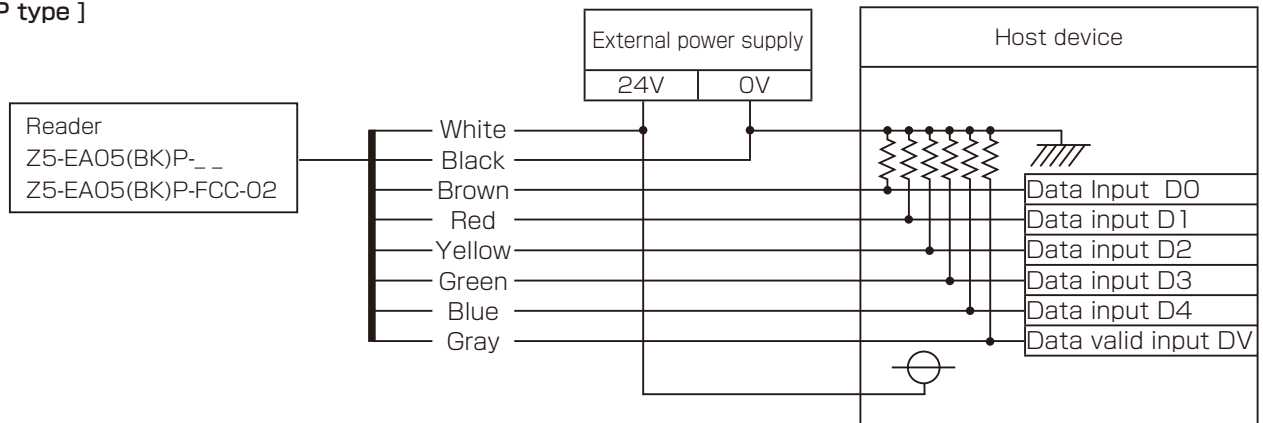
Tightening torque

1.2N · m

■ Wiring Diagram  
[NPN type]



[ PNP type ]



**Attention**

- Maximum cable length between Reader and external device is 10 m.
- Z5-EA05(BK)P-FCC-02 is FCC certified for 2m cable length only.

There is a 2m cable, but it is shorter than 2m because of the need to attach the included ferrite core. Connect the included noise filter to the end of the power supply wire (white or black).

For more information, please refer to the next page.

### ■ About FCC Certification

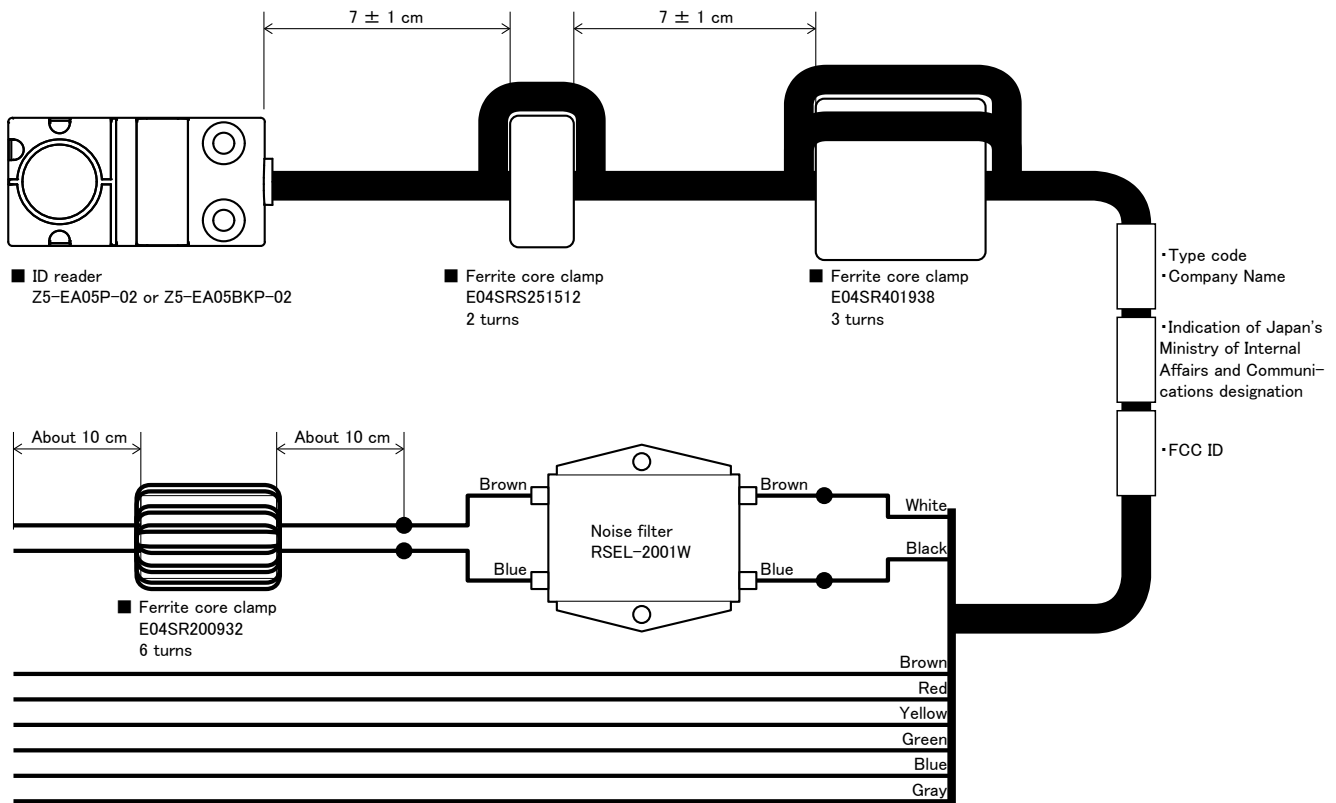
Z5-EA05P-FCC-02 and Z5-EA05BKP-FCC-02 complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:

(1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

### ■ Installation of Z5-EA05(BK)P-FCC-02

The ferrite core and the noise filter must be properly installed as follows in order to comply with the FCC

[ Installation ]



### ■ Wiring the power lines

The cable used for the wiring from the noise filter to the power supply must be prepared by the customer and wrapped around a 6T ferrite core clamp.

Recommended Cable · · · AWG24 or 26, Any color, About 70cm

### ■ CAUTION

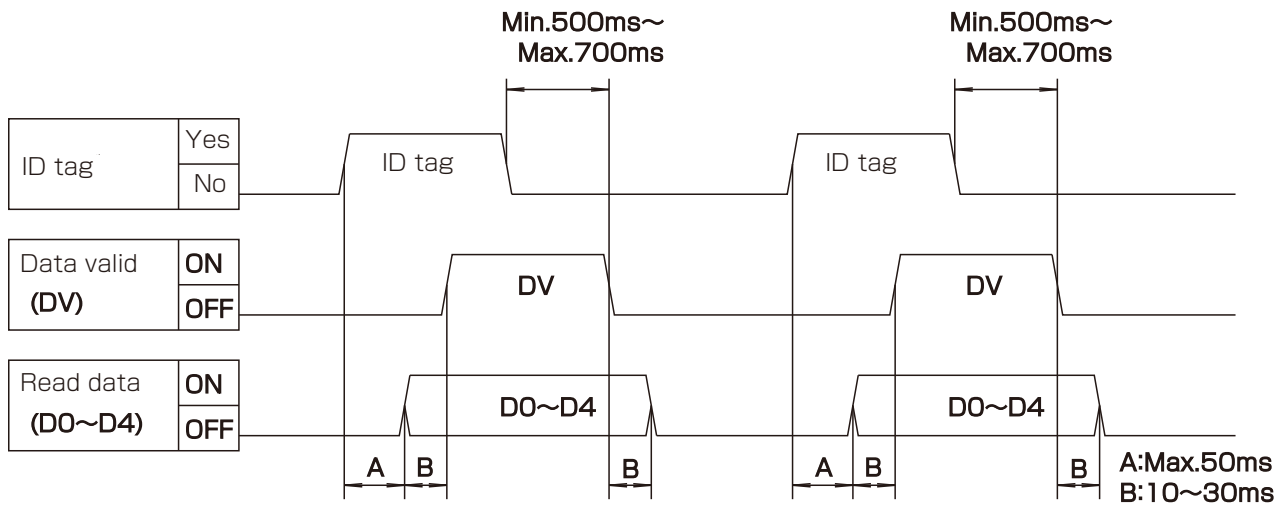
Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

#### 4. Communication with the External Unit

##### ■ Data Reading

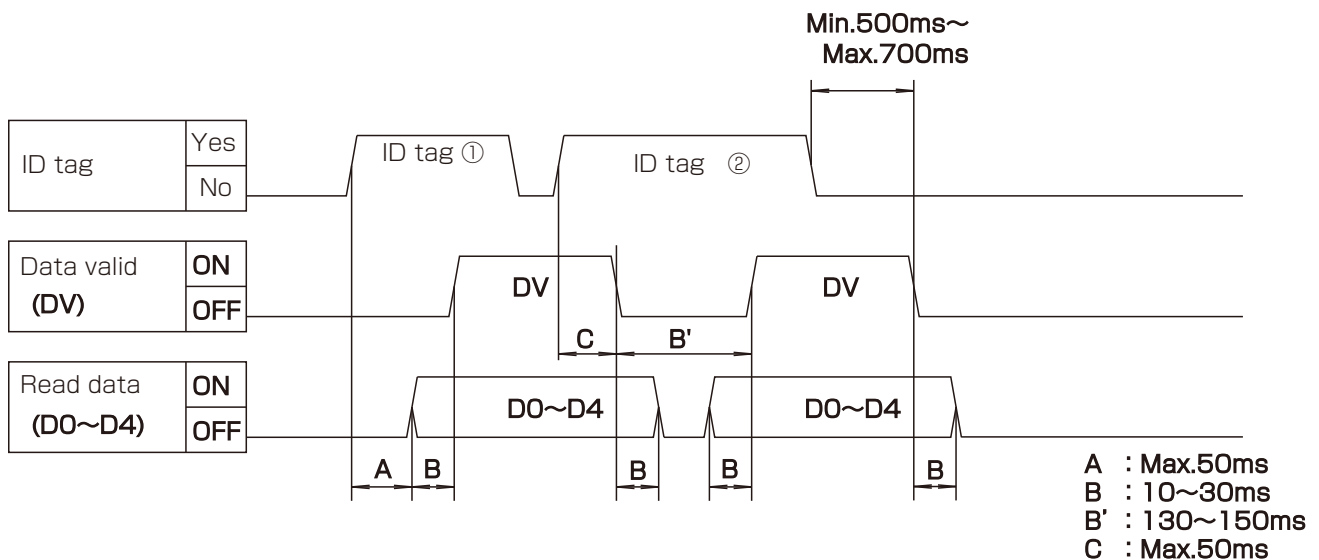
Timing Chart 1

In case of normal reading



Timing Chart 2

When the ID tag ② enters the communicable area during the output data holding period of the ID tag ①



##### [ Procedure for Communication ]

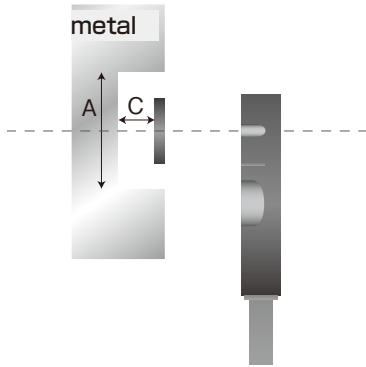
- (1) Reader reads the data of the Data carrier automatically as soon as the Data carrere comes into the communication area of the reader and set the read data.
- (2) The host computer should start reading from D0 to D7 of Reader after checking the data valid signal turns ON.

##### « Note »

- If there are multiple ID tags in the communication area, data valid (DV) will not be turned on.
- If a data check error occurs, the data valid (DV) remains OFF and the read data is not output. In this case, the LED flashes (0.5 second lights on, 0.5 second off).



5. Available ID tag and reading distance



**Applicable Data carrier**

Z1-AA04-02K, Z1-B011-128

A distance of 200 mm or more is required between the tag and its surrounding A. (See below)


· Metal attachment refers to a state where it is installed directly on a metal (C:0 mm).  
Nonmetallic attachment refers to a state in which the metal and the tag are installed with securing a certain distance (C) or more on the back side. · Communication distance and axis deviation values are all reference values.

**Type code : Z1-CB16-112**  
Size :  $\phi$  16 x 0.76 mm




		Non-metallic area(A : 56mm)	
Mounting		Metal mounting(C:0mm)	Non metal mounting(C:20mm)
Communication distance (mm)		impossible	0...12
Center offset (mm)	Distance 0mm	—	$\pm 7$
	3mm	—	$\pm 8$
	6mm	—	$\pm 8$
	9mm	—	$\pm 7$
	12mm	—	$\pm 4$

**Type code : Z1-CB27-112**  
Size :  $\phi$  27 x 0.76 mm




		Non-metallic area(A : 70mm)	
Mounting		Metal mounting (C:0mm)	Non metal mounting(C:20mm)
Communication distance (mm)		impossible	0...20
Center offset (mm)	Distance 0mm	—	$\pm 11$
	4mm	—	$\pm 11$
	8mm	—	$\pm 11$
	12mm	—	$\pm 11$
	16mm	—	$\pm 9$
	20mm	—	$\pm 3$

**Type code : Z1-CB45-112**  
Size :  $\phi$  45 x 0.76 mm




		Non-metallic area(A : 85mm)	
Mounting		Metal mounting(C:0mm)	Non metal mounting(C:20mm)
Communication distance (mm)		impossible	0...25
Center offset (mm)	Distance 0mm	—	$\pm 15$
	5mm	—	$\pm 15$
	10mm	—	$\pm 15$
	15mm	—	$\pm 13$
	20mm	—	$\pm 11$
	25mm	—	$\pm 7$

**Type code : Z1-BB10-112**  
Size :  $\phi$  10 x 0.76 mm




		Non-metallic area(A : 70mm)	
Mounting		Metal mounting(C:0mm)	Non metal mounting(C:20 mm)
Communication distance (mm)		0...4	0...6
Center offset (mm)	Distance 0mm	$\pm 5$	$\pm 5$
	2mm	$\pm 4$	$\pm 5$
	4mm	$\pm 3$	$\pm 4$
	6mm	—	$\pm 3$

**Type code : Z1-AA04-02K**  
Size : 30 x 30 x 6 mm



		Non-metallic area(A : 70mm)	
Mounting		Metal mounting (C: 0mm )	Non metal mounting (C: 20mm )
Communication distance(mm)		0...10	0...12
Center offset (mm)	Distance 0mm	$\pm 5$	$\pm 6$
	4mm	$\pm 5$	$\pm 7$
	8mm	$\pm 4$	$\pm 7$
	10mm	$\pm 0$	$\pm 6$
	12mm	—	$\pm 0$

**Type code : Z1-B011-128**  
Size :  $\phi$  50 x 8.3 mm



		Non-metallic area (A : 70mm)			
Mounting		Metal mounting (C: 0mm )		Non metal mounting (C: 20mm )	
Moving direction of Data carrier.		Width-ways	Length-ways	Width-ways	Length-ways
Communication distance (mm)		0 ~ 12		0 ~ 12	
Center offset (mm)	Distance 0mm	$\pm 15$	$\pm 7$	$\pm 15$	$\pm 7$
	5mm	$\pm 15$	$\pm 8$	$\pm 15$	$\pm 8$
	10mm	$\pm 10$	$\pm 5$	$\pm 10$	$\pm 5$
	12mm	$\pm 0$	$\pm 0$	$\pm 0$	$\pm 0$

Z1-B011-128 has different offset depending on the moving direction of Data carrier. When it's installed as described below, up and down movement means vertical direction, left and right movement means lateral direction.

