

User's Manual

CCR-900

U-IT Co., Ltd.

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FCC NOTE: THE MANUFACTURER IS NOT RESPONSIBLE FOR ANY RADIO OR TV INTERFERENCE CAUSED BY UNAUTHORIZED MODIFICATIONS TO THIS EQUIPMENT. SUCH MODIFICATIONS COULD VOID THE USER'S AUTHORITY TO OPERATE THE EQUIPMENT.

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.

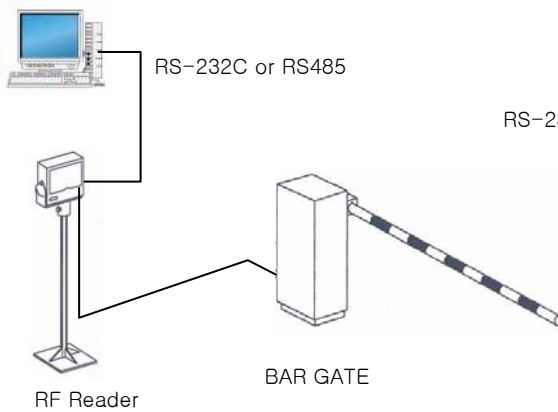
1. General

This RF Reader uses 900MHz range of radio frequency to read the RFID TAG attached to the car. TAG's ID data is then transmitted to the Host Computer or Access controller through this RFID reader in Real time to allow the control over the regularly parking authorized cars.

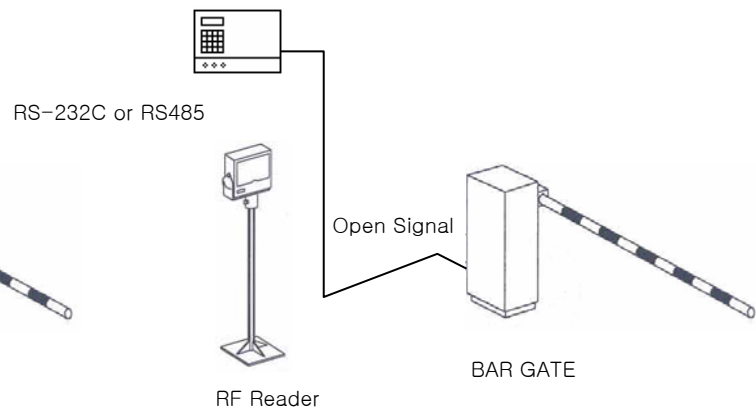
The reader is capable of reading the passive type of RFID TAG from 0.2m to 6m if RFID TAG is positioned directly at the front of it. However, it does not read or detect the RFID TAG that is position behind it.

Also, RF Reader provides a relay output that can be connected to the bar gate control open the bar gate.

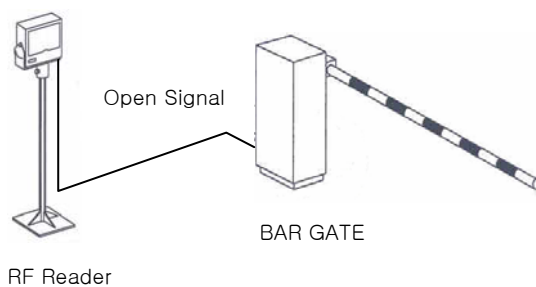
In order to operate as Standalone device, the reader also contains memory buffer which can store valid ID. Registration of Valid ID can be handled directly from the reader.



<Picture 1-1.Host Computer linked Operation>



<Picture 1-2. Controller linked Operation>



<Picture 1-3. Stand alone operation>

2. Product Specification


2.1.RF Reader Specification

Section	Case	Detail
Reader	Power / Current	DC 12V / 3.5A
	Current Drain	800mA, MAX 1.5A
	Frequency	903.6 ~ 913.4Mhz Frequency Hopping Spread Spectrum (FHSS)
	Transmission Output	1 Watt (+30dBm) / based on antenna input point
	Channel intervals	200KHz
	Channel Bandwidth	200KHz
	Communication Speed	40Kbps
	Modulation	DSB-ASK
	Transmission Spectrum Mask	ISO-18000-6 compliance
	Spurious Transmission	RFID Technology Standards compliance
	Receive Gain	-25dBm ~ -70dBm
	Accuracy of frequency	10ppm
	Reading Distance	0.5m ~ 6m
	Protocol	ISO18000-6B, ISO18000-6C
	Multi-tag Read	5 Tags per Second (Protocol dependent)
Polarization	Circular Polarization, Optional-Vertical or Horizontal	
Host Communication	RS-232C, RS-485	
Interface	Input	1 loop line input Port, Bar Gate S/W Input, Firmware upgrade Pin
	Output(Dry contact Relay)	2 Bargate open output
Environmental Condition	Operating Temperature	-30 ~ +85 °C
	Operating Humidity	0-95%, Non-Condensing

2.2.RF Tag Specification

Section	Detail
Standard Application	ISO 18000-6B
Operating Frequency	860~960MHz
Reading Distance	0.2m ~ 6 m
Data	64bit Unique ID
Programmable data	8192 bit
Bit rate	40kbps
Anti-collision	Random number delay
Power Source	Beam Powered
Error Detection	Preamble & 16bit CRC
Modulation Type	Load Modulation
Material	ABS
Operating Temperature	-40 °C ~ +75 °C
Size	85.60 x 53.98 x 3.00±0.08mm

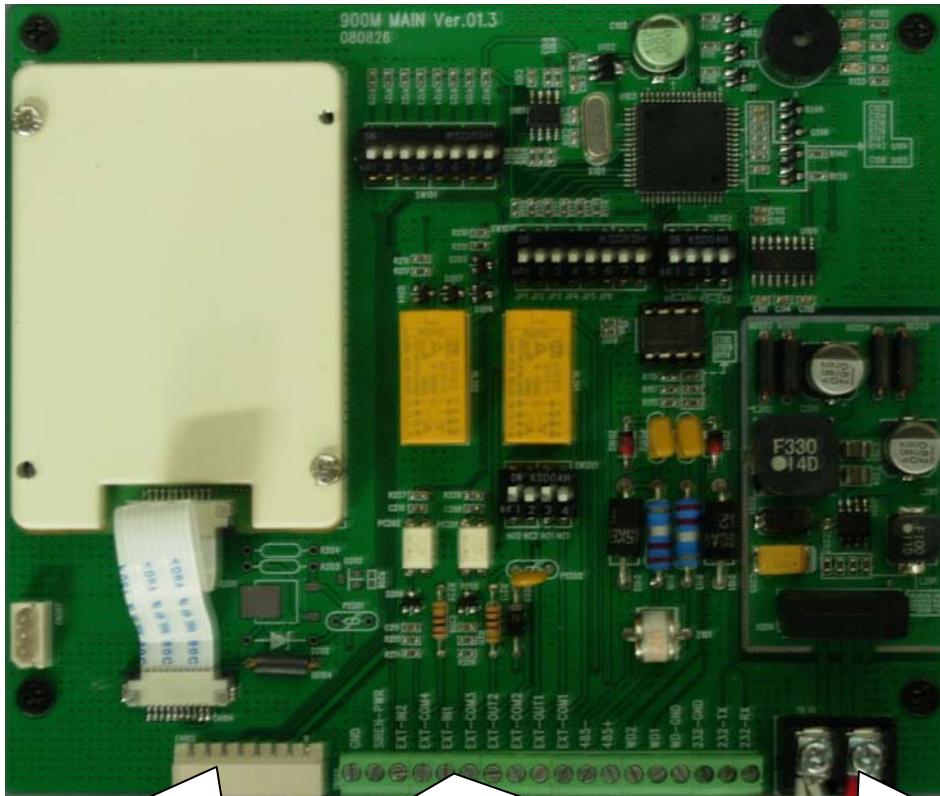
2.3. Communication Specification

Type	Detail
Interface	RS-232C or RS-485 (refer to DIP switch setting)
Communication Method	Half – Duplex communication method
Asynchronous communication method /Transmission bit order L:LSB (Least Significant bit) M:MSB(Most Significant bit) MARK(1) 	
Protocol	ID Transmission immediately after decoding the Tag data (Check Circuit condition before RS485 setting) Request / Response format
Bits per Second	9600 bps (Fixed)
Data Bit	8 Bit (Fixed)
Parity Bit	None (Fixed)
Stop Bit	1 Bit (Fixed)
Error Detection Method	Longitudinal Redundancy Check (LRC)
Transmission CODE	ASCII CODE (Standards)
Circuit Control	Standard DATA transmission based upon order of the event transaction
RS control	ON only at the transmission
Circuit Communication Status Display	Mark
Address	Address 1 ~ 31 can be setup using DIP Switch (Refer to DIP Switch Setup)
Terminal Resistance	Terminal Resistance can be applied or removed if RS-485 is used. (using Jumper Switch or Switch)

3. Features

Section	Detail
Operation Mode	<p>1).Stand Alone Mode: Contains memory space (Independent database) to register Tag ID. When registered Tag ID is scanned, Relay is triggered.</p> <p>2).Coupled Mode: When RF ID Tag has been read, Tag ID is transmitted to the host and the reader receives and processes the command which has been sent by the host. (Reader's Database is not used)</p> <p>3).Test Mode: It runs series of tests on reader's ability including the decoding read range. Relay output points and other things. (When RF ID Tag is decoded, a relay output is triggered and the data is sent in as standalone mode)</p>
Buzzer	<p>Sound can be disabled to prevent loud noise caused by buzzer occurring in the middle of the night.(Buzzer is disabled)</p> <p>1). When RFID Tag's decoding mode or management mode has been changed, the reader will makes a short beep.</p> <p>2). During the test mode, if RFID Tag is present within the read range, the reader will continuously beep.</p>
LED(2 Colors)	<p>Normal mode LED which is red continuously flickers in 1 second interval during the transaction to show that the reader is in operation.</p> <p>1). Green LED light flickers when RFID Tag is read.</p> <p>2). Green LED light flickers when command is transmitted.</p> <p>3). Green LED light continuously flickers in 1 second interval while executing the test mode.</p>
Reading Method	<p>1). normal reading mode</p> <p>2). Vehicle Detection hold input reading mode</p>
Reading mode	<p>1). Same RFID Tag is continuously verified</p> <p style="padding-left: 40px;">For the same RFID Tag that exists within the decoding read range, Tag ID is verified within the predefined time frame and then transmitted to the Host.</p> <p>2). Same RFID Tag is scanned only once.</p> <p style="padding-left: 40px;">For the Same RFID Tag that exists within the decoding read range, Tag ID is read only once and then it is sent to the host..</p> <p style="padding-left: 40px;">(Therefore, If same RFID Tag is to be read and verified, RFID Tag needs to go outside the decoding read range then enter back into the decoding read range.)</p>
Reading Time Interval	<p>Decoding time interval is only valid when reading mode is configured as continuous reading mode and decoding time interval for the same ID Tag scanned at the reader is set for 5 seconds fixed.</p>
Reading Distance Setup	<p>Capable maximum read range is always set on maximum range.</p>
Relay output configuration	<p>1). Relay is triggered by the command sent by the host(Command) or relay is triggered by decision made by reader's own Database.</p> <p>2).Relay is always triggered whenever RFID Tag is read.</p>

4. Interface and Connection



CN103

TAG Registration port

TB202

communication, IN/OUT cable connector

TB101

Power Connector

Section	Type	Detail		Remark	
Interface	Host Communication	RS-232C	TX		
			RX		
			GND		
		RS-485	TRX+		
			TRX-		
			GND		
	Input	Input1	Terminal 1	Bargate Loop detection wire Input(A Point of contact)	
			Terminal 2		
		Input2	Terminal 1	Tag ID Registration input Button Switch Input	
			Terminal 2		
Output (Relay connection point)	Relay 1	NO	Bargate Output for opening		
		NC			
		COM			
	Relay 2	NO	Bargate Output for closing or others		
		NC			
		COM			
Etc...	DC Power	DC Power	DC+	DC power line	12V 5A
		GND			

4.1.TB201(DC Power Cable)

1	2
+12V	GND

4.2.TB202(Host Mode, IN/OUT Cable)

1	2	3	4	5	6	7	8	9
GND	SIREN	EXT	EXT	EXT	EXT	EXT	EXT	EXT
	PWR	IN2	COM4	IN1	COM3	OUT2	COM2	OUT1
10	11	12	13	14	15	16	17	18
EXT	485(-)	485(+)	WD2	WD1	WD	232	232	232
COM1					GND	GND	TX	RX

4.3.CN103(TAG Register / Program Upgrade)

1	2	3	4	5	6	7	8
Program Upgrade					TAG ID Register		

4.4.Input Port

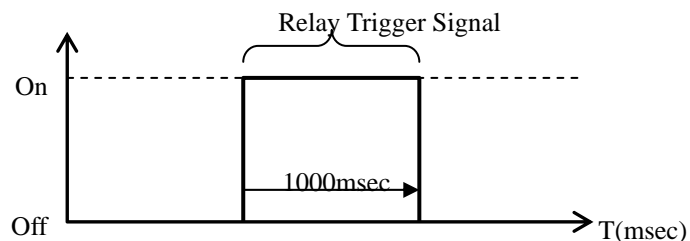
Input1: Dry Contact Input is received directly from the vehicle detection loop sensor. When the vehicle is detected, dry contact input becomes ON mode from OFF mode.

Input2: When the operation mode is set in Stand alone mode, RF Reader's Database is used to store the TAG ID Number. TAG ID number can be stored by reading the TAG while the switch is pressed ON.

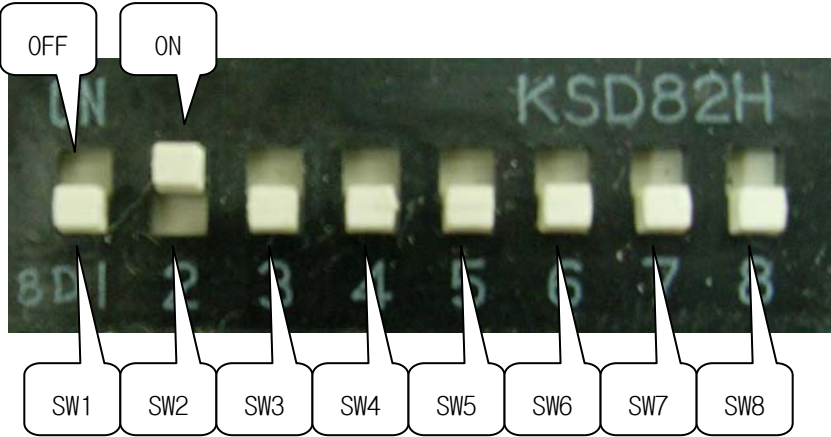
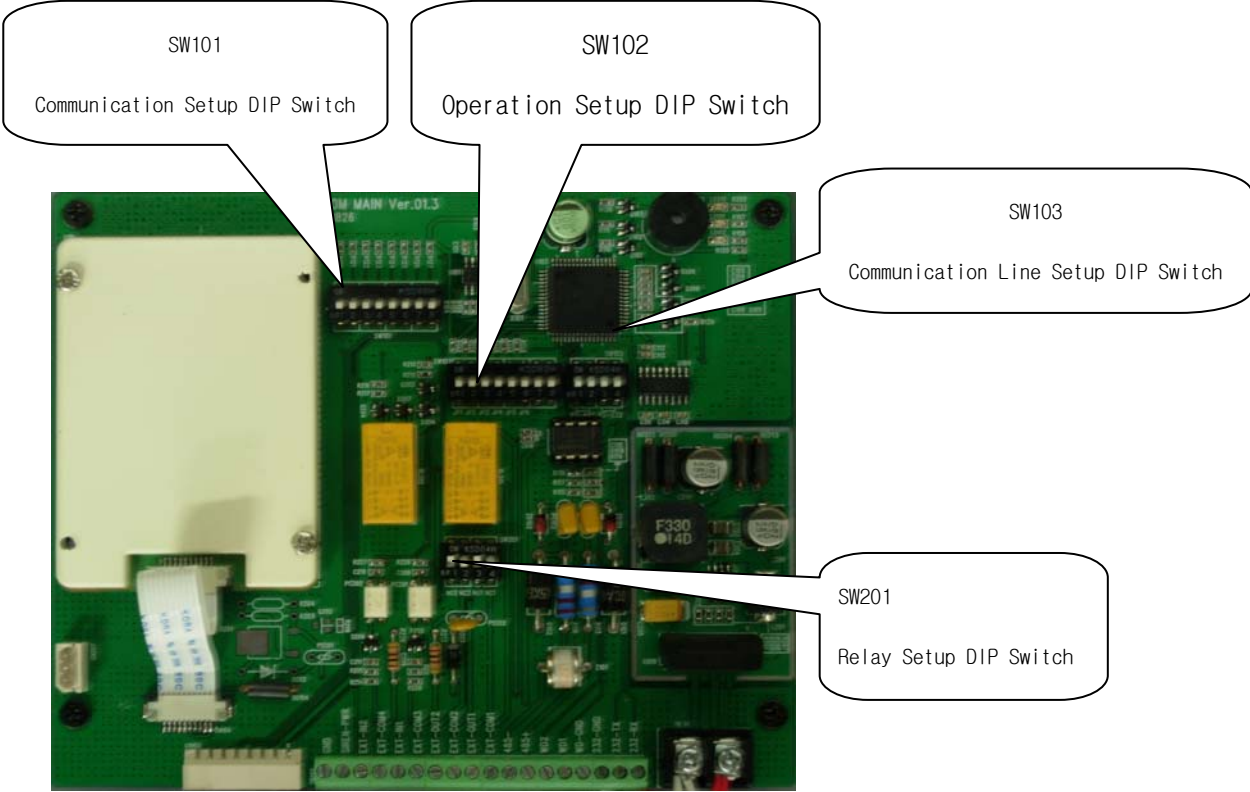
4.5.Output(A point of contact Relay) Port:

Relay output uses a point of contact trigger signal to open and close bargate..

Relay Trigger Signal:



5. DIP Switch Setup



※ Follow the above settings for Pin 8, Pin 4 of the DIP Switch.

5.1. Communication Setup DIP Switch(SW101)

Address Setup(Default 1)						TAG Type Setup		Mode Setup			
Address (Value)	Sw 1 (1)	Sw 2 (2)	Sw 3 (4)	Sw 4 (8)	Sw 5 (16)	Sw 6		Sw 7	Sw 8	Mode	
1	On	Off	Off	Off	Off	Off	ISO 6B	Off	On	Stand Alone	
2	Off	On	Off	Off	Off	On	ISO 6C	On	Off	Coupled	
3	On	On	Off	Off	Off			Off	Off	Test Mode	
4	Off	Off	On	Off	Off			On	On		
5	On	Off	On	Off	Off						
6	Off	On	On	Off	Off						
7	On	On	On	Off	Off						
8	Off	Off	Off	On	Off						
9	On	Off	Off	On	Off						
10	Off	On	Off	On	Off						
11	On	On	Off	On	Off						
12	Off	Off	On	On	Off						
:	:	:	:	:	:						
29	On	Off	Off	Off	On						
30	Off	On	On	On	On						
31	On	On	On	On	On						

5.2. Communication line setup DIP Switch(SW103)

	SW1	SW2	SW3	SW4
RS-232 communication	OFF	OFF	ON	ON
RS-485 communication	ON	ON	OFF	OFF

5.3.Operation Setup DIP Switch(SW102)

SW	Setup Category	Switch mode	Setup Detail
SW1	TAG recognition method	Off	RFID Tag reading at Normal mode
		On	RFID Tag reading when vehicle present loop sensor input is provided
SW2	Setup for the verification	Off	One time reading mode (If Same RFID Tag is presented, it will recognize it in every 5 seconds.)
		On	Continuous reading mode
SW3	Relay Setup	Off	Operation based on its own memory
		On	Relay operation based on the commands received by the host unit.
SW4	Communication Setup	Off	RS-232
		On	RS-485

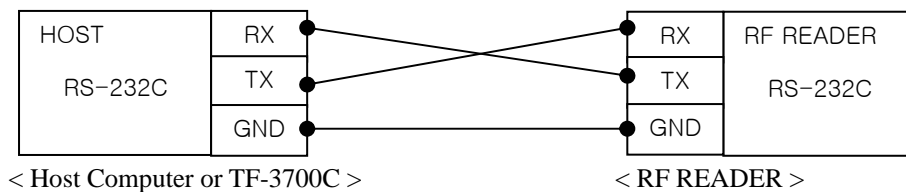
● In coupled mode, DATA is transmitted regardless of RFID Tag registration

5.4.Relay Setup DIP Switch(SW201)

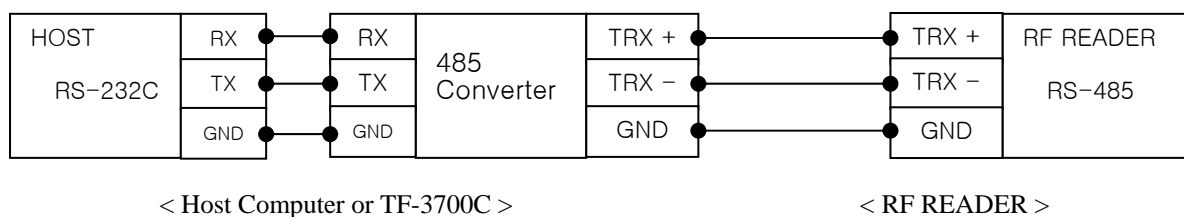
	NO1	NC1	NO2	NC2
NO TYPE	ON	OFF	ON	OFF
NC TYPE	OFF	ON	OFF	ON

6. Communication Connection Method

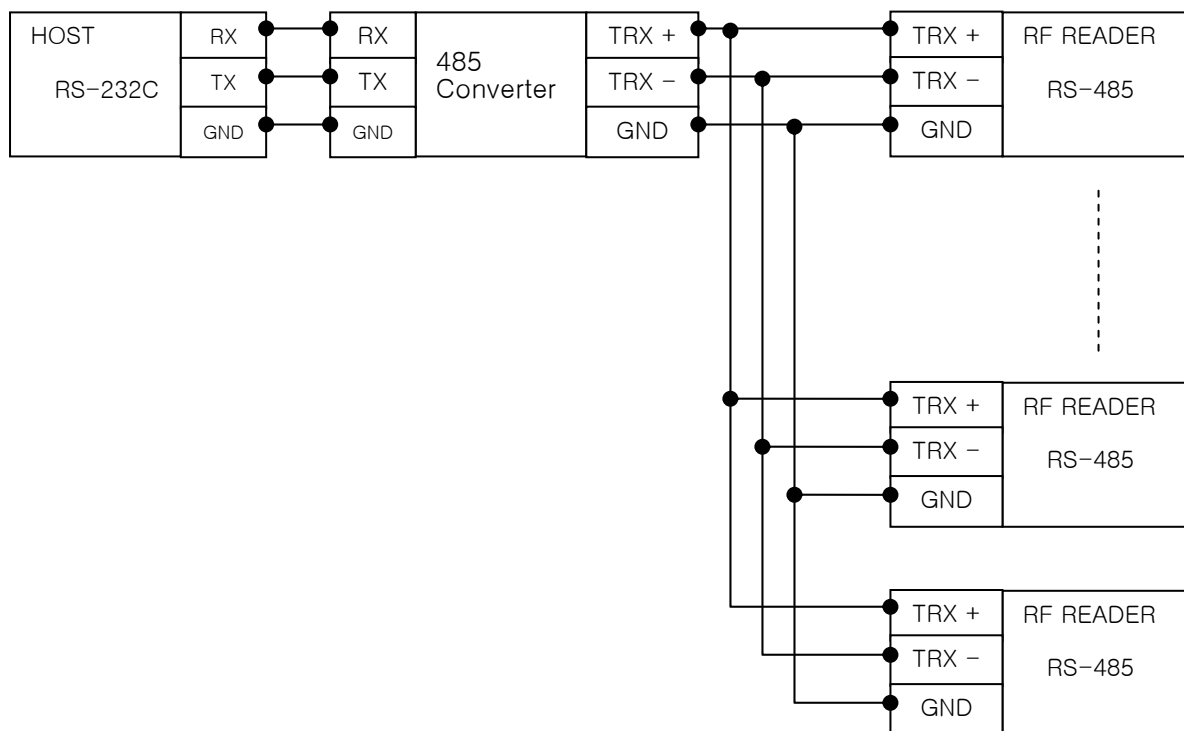
6.1. Host Computer or TF-3700C Controller and RS-232C connection



6.2. Host Computer or TF-3700C Controller and RS-485 connection (1:1)



6.3. Host Computer or RS-485 Connection (1:N)



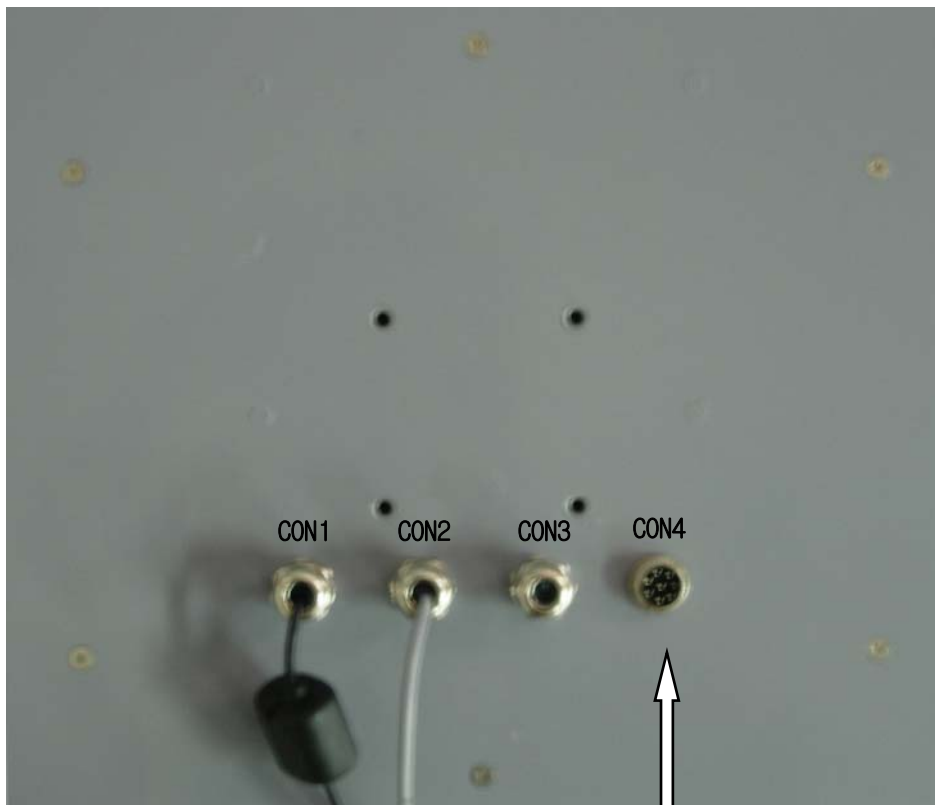
7. Product Application

7.1. Stand Alone Mode

Contains memory space (Independent database) to register Tag ID. When registered Tag ID is scanned, Relay is triggered.

7.1.1. RFID TAG Registration

When TAG Registration CAP is connected at CON4 located at the back of the reader, RFID TAG scanned at the reader is being registered.



TAG Registration CAP

7.1.2. Communication Setup DIP Switch (SW101) Setup

SW1~SW5 is set as OFF (Default)

SW6 is set as OFF when ISO 6B Tag is being used, ON when ISO 6C Tag is being used.

SW7 is set as OFF, SW8 is set as ON

7.1.3. Operation Setup DIP Switch (SW102) Setup

SW1 is set as ON when Vehicle Detection Loop signal is present. Otherwise, Set as OFF

SW2 is set as ON when verified every 5 seconds. Set as OFF is verified continuously.

SW3 is set as OFF (Independent Database)

SW4 is set as OFF (Default)

7.1.4. Relay Setup DIP Switch (SW201) Setup

Setup which falls under a given condition (refer to section 5.4 on page 8)

7.2. Coupled Mode

Tag ID is sent to the superior position (Host) when RFID Tag is read and Command received from the Host is then executed. (Reader's own Datable is not used)

Compatible communication method is selected for the communication between the reader and the host.

7.2.1. Communication Setup DIP Switch (SW101) Setup

Set SW1~SW5 compatible for specified ID

SW6 is set as OFF when ISO 6B Tag is being used, ON when ISO 6C Tag is being used.

SW7 is set as ON, SW8 is set as OFF

7.2.2. Operation Setup DIP Switch (SW102) Setup

SW1 is set as ON when Vehicle Detection Loop signal is present. Otherwise, Set as OFF

SW2 is set as ON when verified every 5 seconds. Set as OFF is verified continuously.

SW3 is set as ON (Independent Database not used)

SW4 is set as OFF when RS-232 communication method is being used, OFF when RS-485 communication method is being used.

7.2.3. Communication Line Setup DIP Switch (SW103) Setup

Communication Setup which falls under a given condition (refer to section 5.2 on page 8)

7.2.4. Relay Setup DIP Switch (SW201) Setup

Setup which falls under a given condition (refer to section 5.4 on page 8)

7.3. Test Mode

, reader can be inspected and tested on output relays, and other modes at the installation site by using reader's decoding read range test.

7.3.1. Communication Setup DIP Switch (SW101) Setup

SW1~SW5 is set as OFF (Default)

SW6 is set as OFF when ISO 6B Tag is being used, ON when ISO 6C Tag is being used.

SW7 and SW8 are set as OFF.

SW7 and SW8 are set as OFF

7.3.2. Operation Setup DIP Switch (SW102) Setup

SW1 is set as ON when Vehicle Detection Loop signal is present. Otherwise, Set as OFF

SW2 is set as ON when verified every 5 seconds. Set as OFF is verified continuously.

SW3 is set as OFF when the reader operates under its own memory, ON when the reader operates under the Host command.

SW4 is set as OFF when RS-232 communication method is being used, OFF when RS-485

7.3.3. Communication Line DIP Switch (SW103) Setup

Communication Setup which falls under a given condition (refer to section 5.2 ON PAGE 8)

7.3.4. Relay Setup DIP Switch (SW201) Setup

Setup which falls under a given condition (refer to section 5.4 ON PAGE 8)

7.3.5. Test List

Test Category	Detail
RFID Tag Reading Test	Red and Green LED lights flicker at the same time when RFID Tag is presented within the read range. Lights also flicker when same type of RFID Tag is presented within the read range.
Relay 1 Test (Bargate trigger output)	Relay is triggered when RFID Tag has been read.(1 Second)
Relay 2 Test (Bargate trigger output)	Relay is triggered when RFID Tag has been read. (1 Second).
Communication PORT Test	When RFID TAG is recognized, Data is sent to the host using specified communication format and protocol.
Sensor Test	Red and Green LED lights flicker when sensor input has been detected.

8. Communication Protocol

PC는 회선(Circuit)이 접속된 RF Reader를 순차적(In ascending order) 또는 독립적으로 단말번호(어드레스)가 부여된(Granted) 명령(Command) 프레임(Frame)을 하고 단말번호(어드레스)에 의해 지정된 RF READER만 응답한다

If there is an error occurred in Command frame, RF Reader sends the negative response to the 응답 frame, command frame is then retransmitted.

But, Link is Lost at Time Out (1 Second).

8.1. Transmission Control Code

Symbol	Code	Detail
SOH	01H	Start Of Heading
STX	02H	Start Of Text
ETX	03H	End of Text
EOT	04H	End Of Transmission
ENQ	05H	Enquiry
ACK	16H	Acknowledge
NAK	15H	Negative Acknowledge
DLE	10H	Circuit 절환

8.2. RFID TAG Reading Transmission Frame

When the RFID Tag is decoded, it is transmitted to the host using following transmission format.

(But, Host does not respond to the reader based upon RFID transmission)

If the communication setting dip switch 1 through 5 is all set to off position, number setting can not be done therefore address is not assigned under the transmission frame.

S		E	B
T	TAG ID(Decimal Scale)	T	C
X		X	C
1	8	1	1

BCC Calculation limit

When the address for the communication setup is configured using the dip switch, the address is added into the transmission frame.

S	(Address)	TAG ID(Decimal Scale)	E	B
T			T	C
X			X	C
1	2	8	1	1

BCC Calculation limit

BCC Calculation limit: From STX to ETX -> XOR

8.3. Command Request Frame (Host → Reader)

S	(Address)	(Command)	Data	E	B
T				T	C
X				X	C
1	2	2	1 ~ 128	1	1

BCC Calculation limit

1).Reader Address: Reader address which has been set by the DIP switch(01 ~ 31)

2).Command and Data :

Command	Detail	Data	Remark
“01”	ID Register(1 case)	ID 16Byte(Decimal number display)	
“02”	ID Register(16 cases)	ID 16Byte * 16 = 256Byte (Decimal number display)	Empty space is filled up with “0” to make 256 byte when number count is below 16.
“03”	ID Delete(1 case)	ID 16Byte(Decimal number display)	
“04”	ID Delete All	None	
“10”	Relay 1 Relay output	None	
“11”	Relay 2 Relay output	None	

- command “02” will be updated in near future.

3). BCC Calculation limit: From STX to ETX -> XOR

8.4. Response Frame (Reader → Host)

S			E	B
T	(Address)	Result	T	C
X			X	C
1	2	2	1	1

Reader Address: Reader address which has been set by the DIP switch(01 ~ 31)

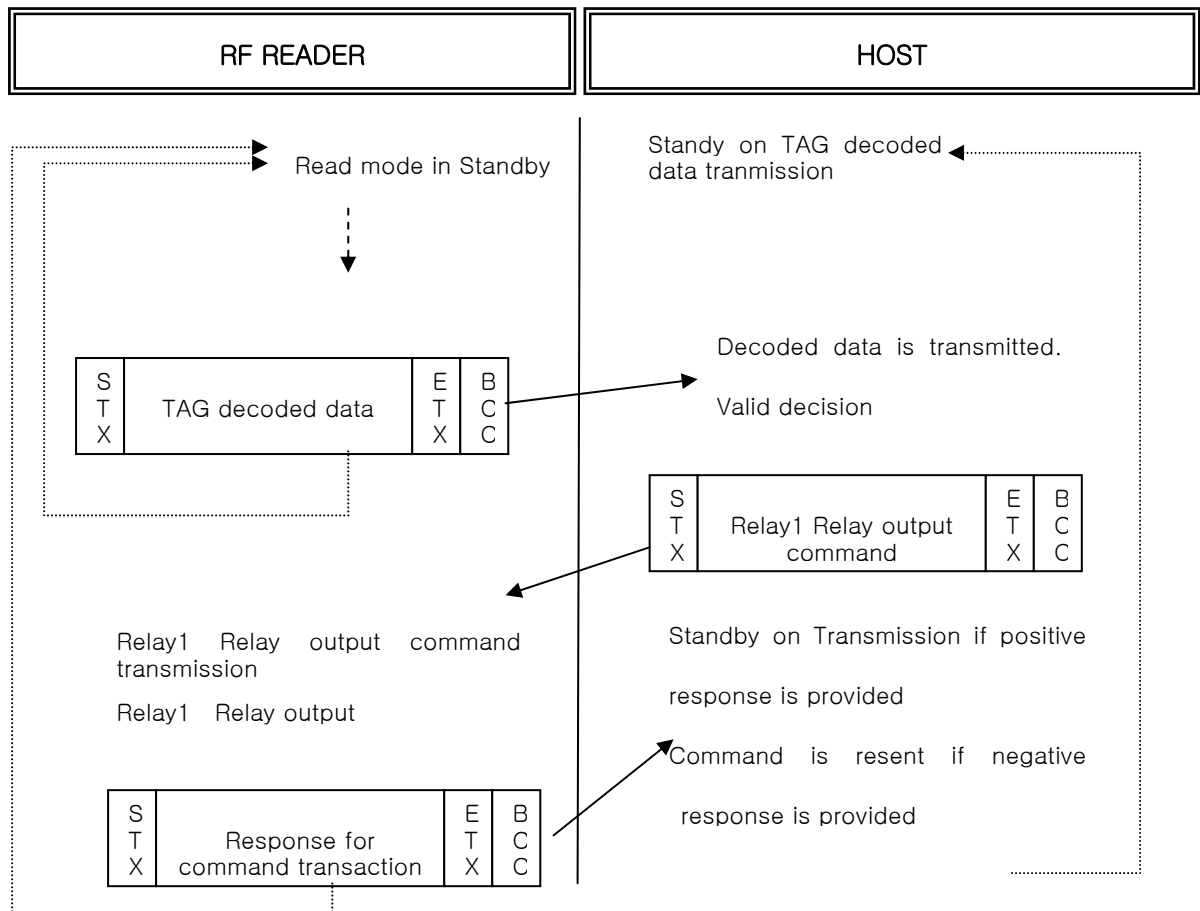
Result : Handling the result for Command Request

“16”: Acknowledge

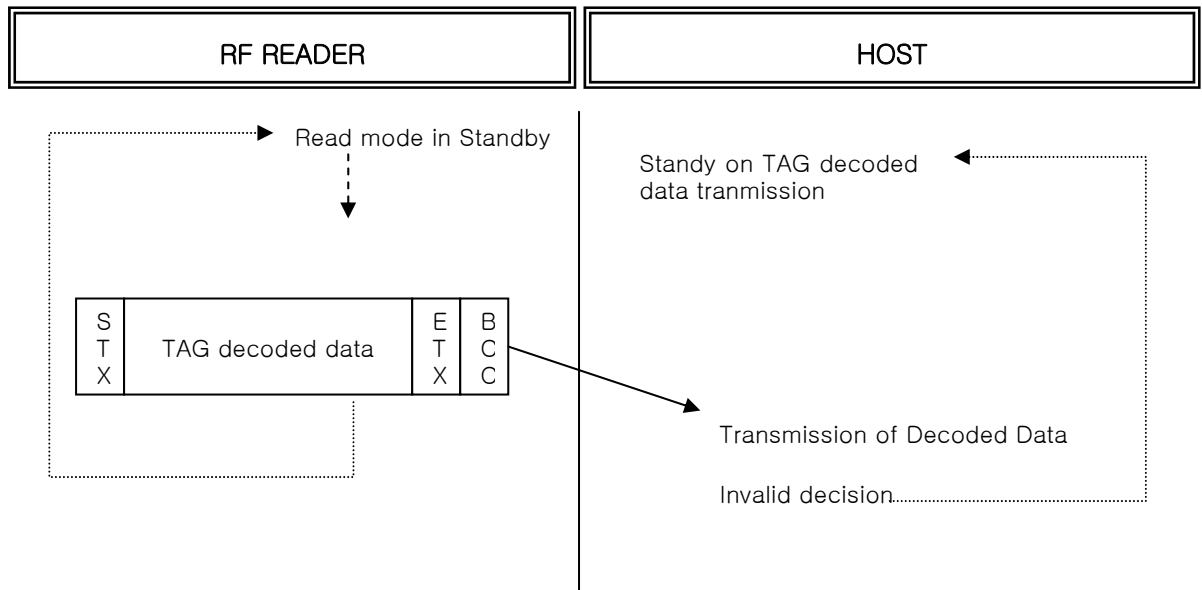
“15”: Negative Acknowledge

8.5. Transmission Order

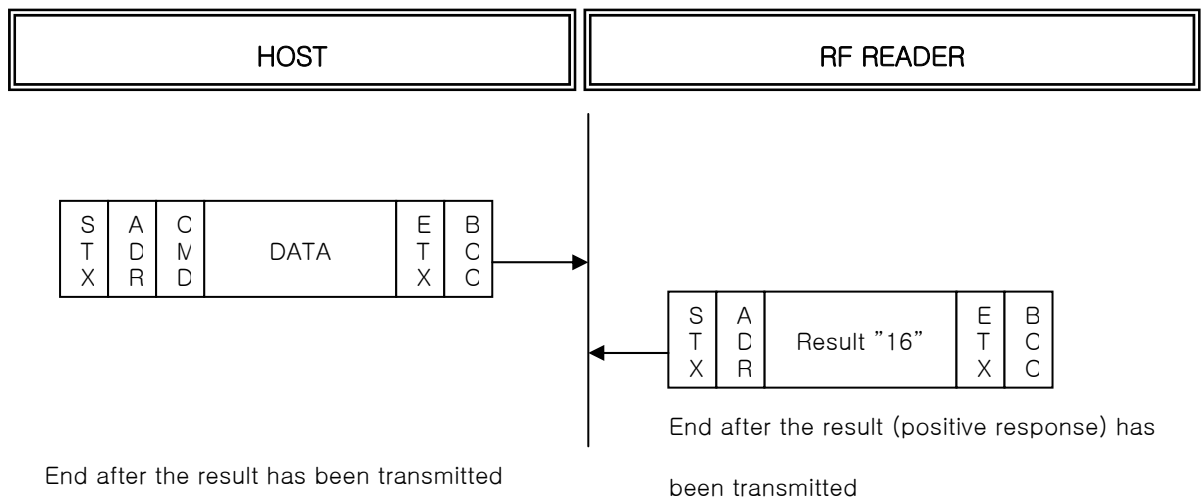
8.5.1. Normal Operation: TAG is read during the TAG Reading Standby Mode, Transmitted Valid TAG ID to the HOST



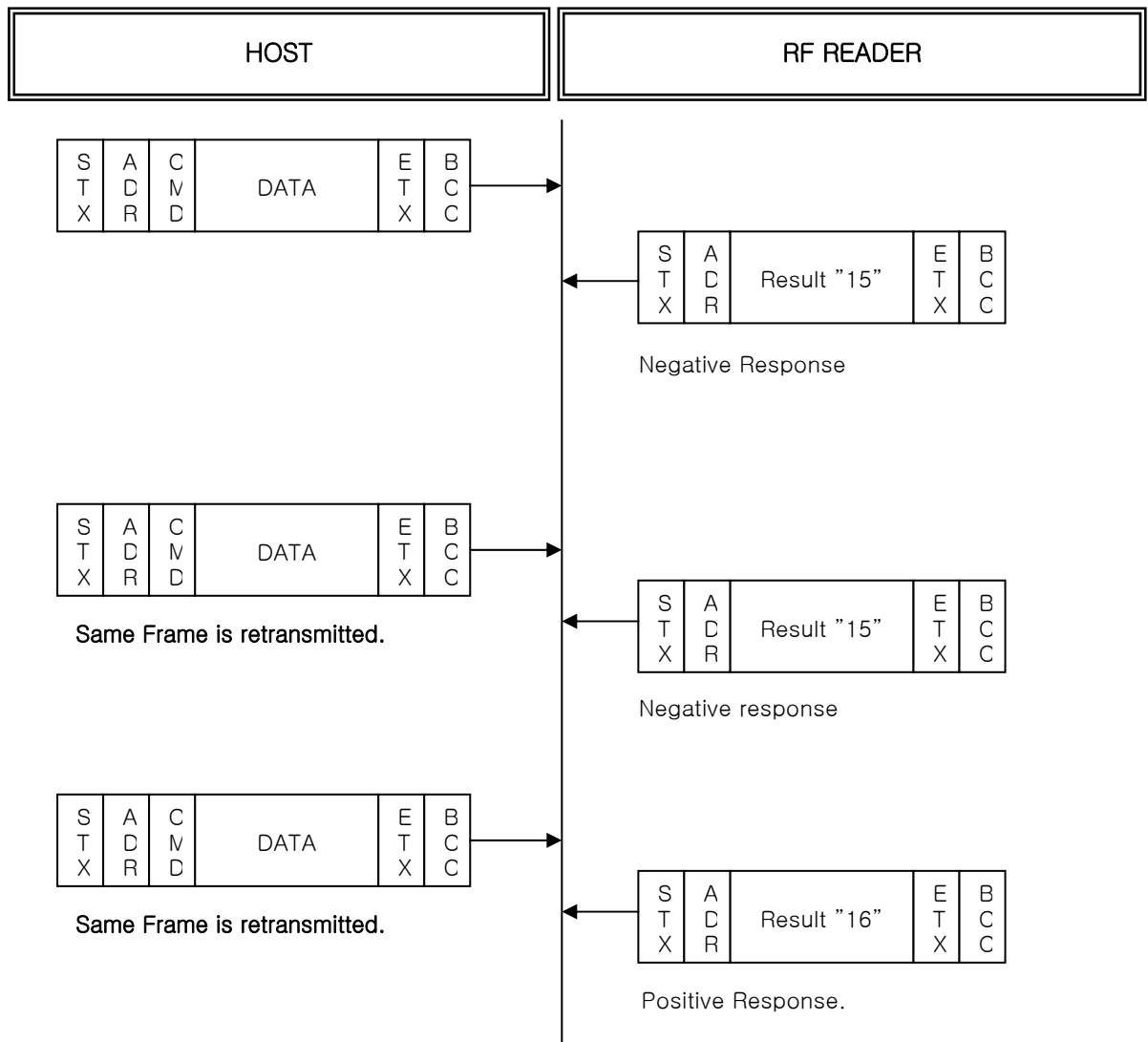
8.5.2. Normal Operation: TAG is read during the TAG Reading Standby Mode, Transmitted Invalid TAG ID to the HOST



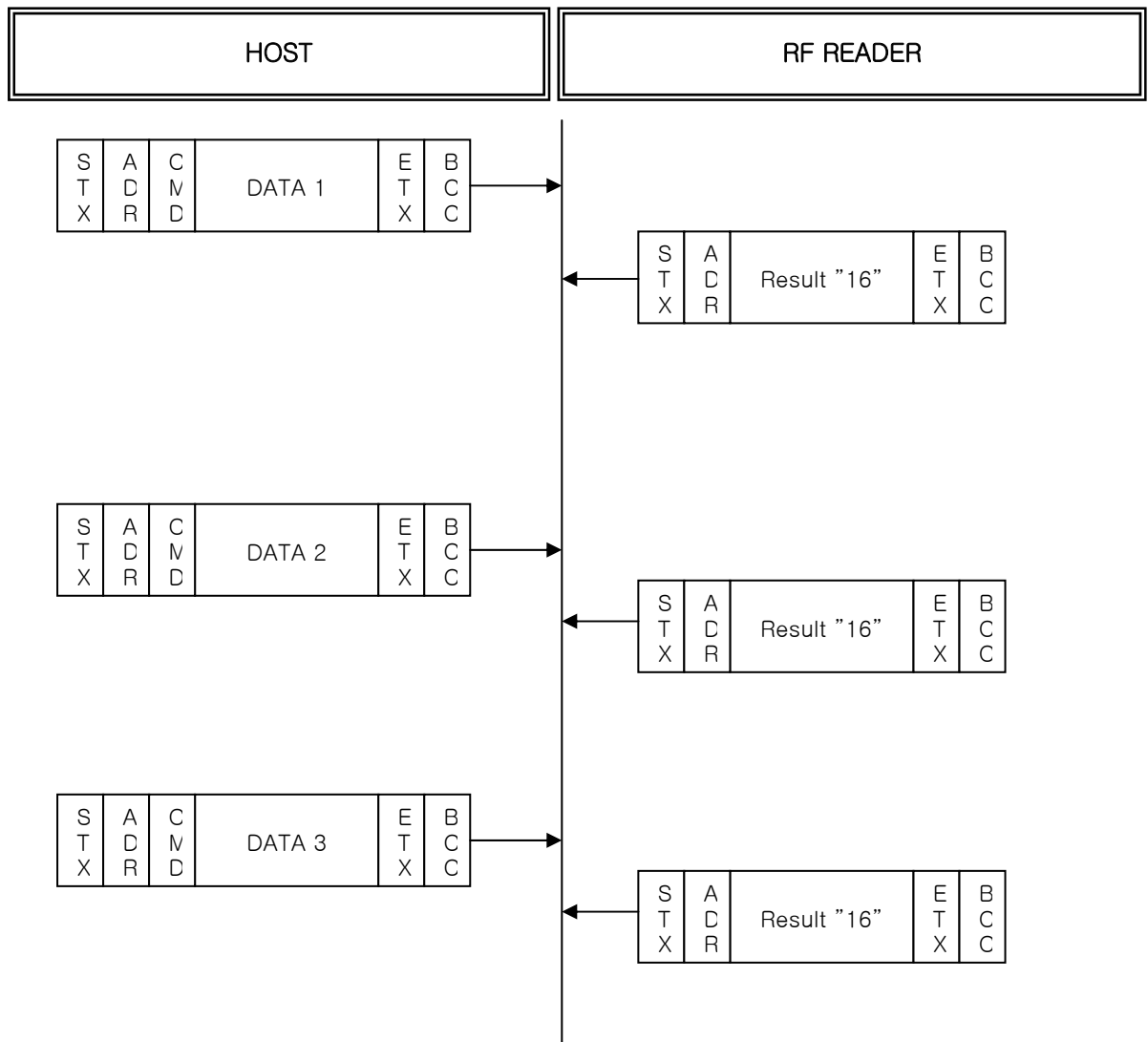
8.5.3. Positive Response after one Command Request Frame has been transmitted



8.5.4. Negative Response after one Command Request Frame has been transmitted

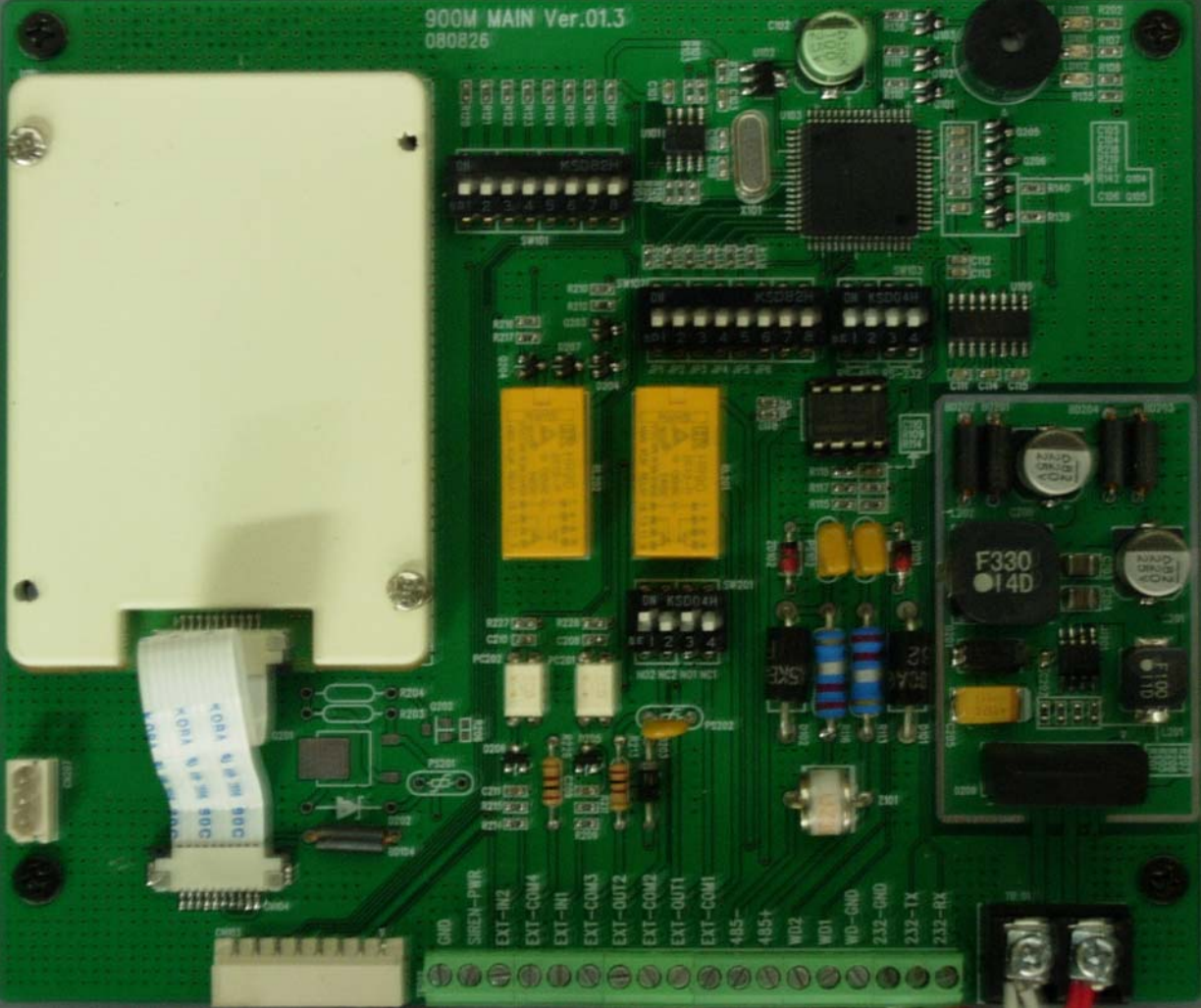


8.5.5. When many numbers of Command Request Frame have been transmitted



8.6.Product Image

8.6.1. MAIN PCB

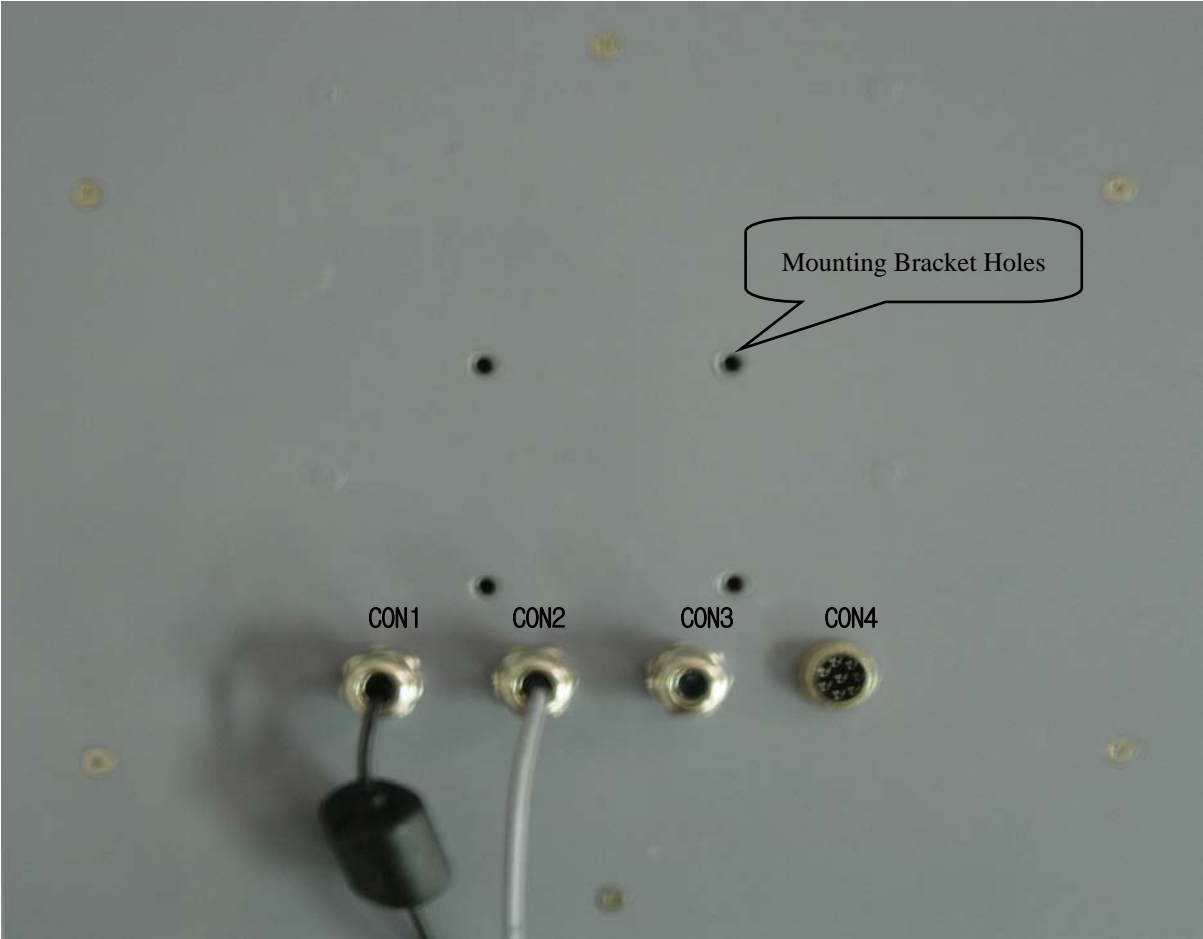


8.6.2. Frontal View



LED Display Screen
Normal : RED
TAG Scan: BLUE

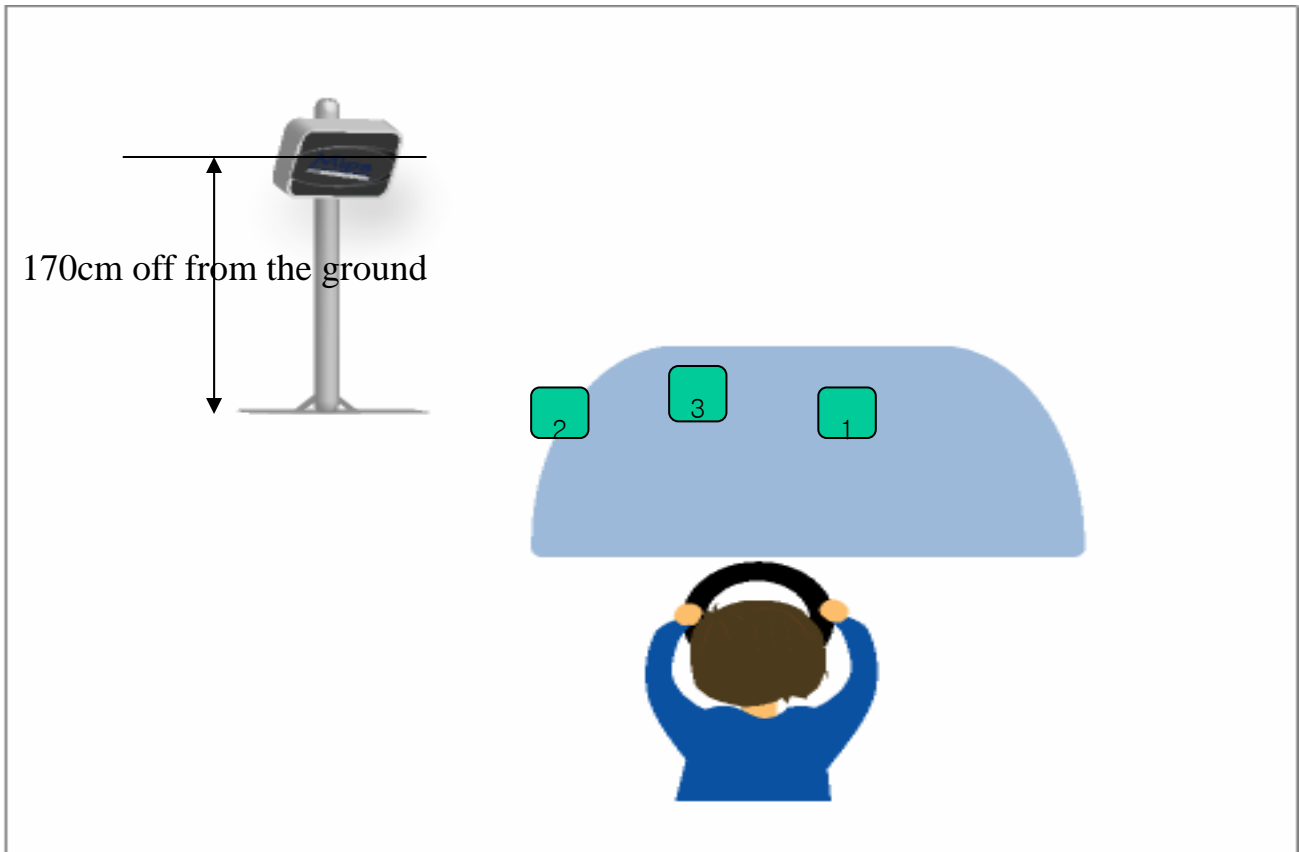
8.6.3. Rear View



9. Product Installation

9.1. RFID TAG Positioning Area for the Vehicle

Vehicle RFID TAG Positioning Areas



Based on RFID TAGs manufactured since Feb. 2006 (Vehicle model type is not related)

1. RF - Reader positioned in left side of the vehicle: Place RFID TAG at position 1.
2. RF - Reader positioned in right side of the vehicle: Place RFID TAG at position 2.
3. Reader positions are mixed as some left and some right based upon the entrance and the exit: Place RFID TAG at position 3

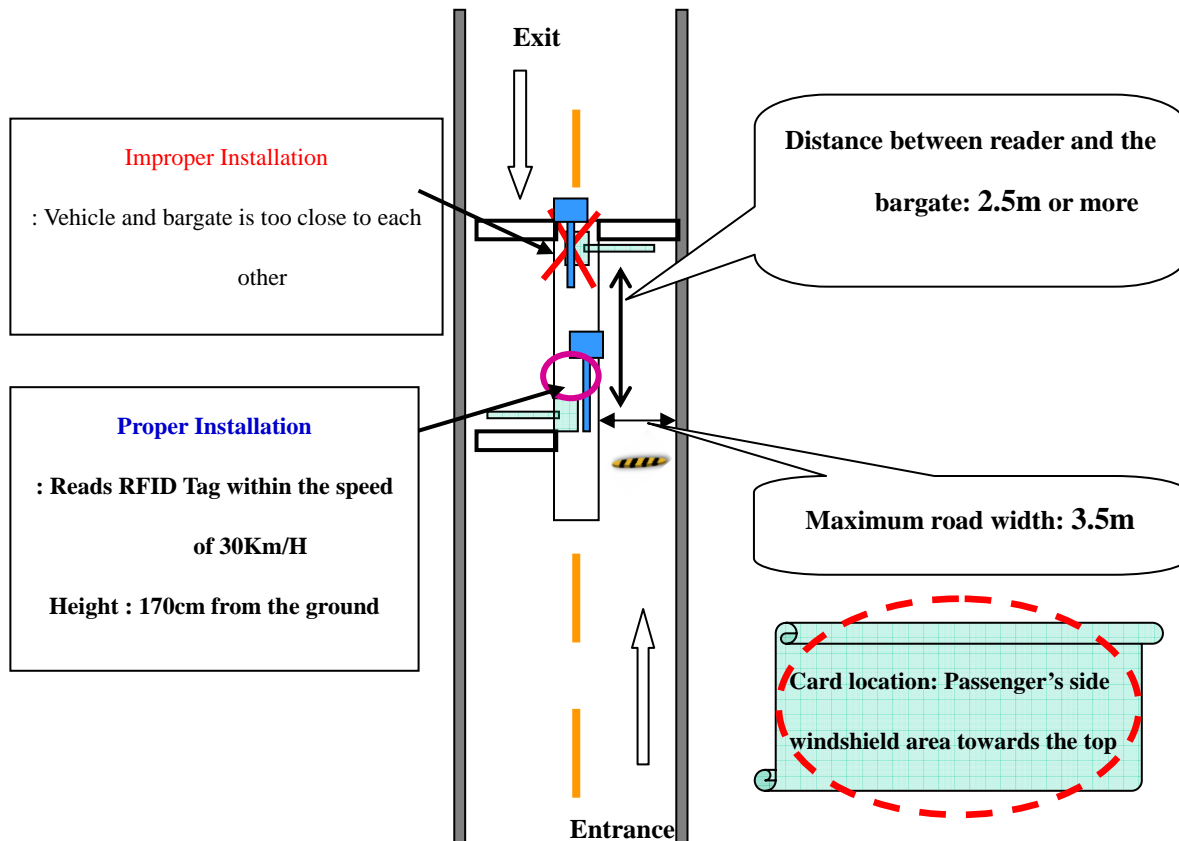
(If the reading site is wide open area, position the card in vertical format at the opposite side (position 1 or 2) of where the reader is positioned, or the mid position 3

Caution when positioning the RFID TAG

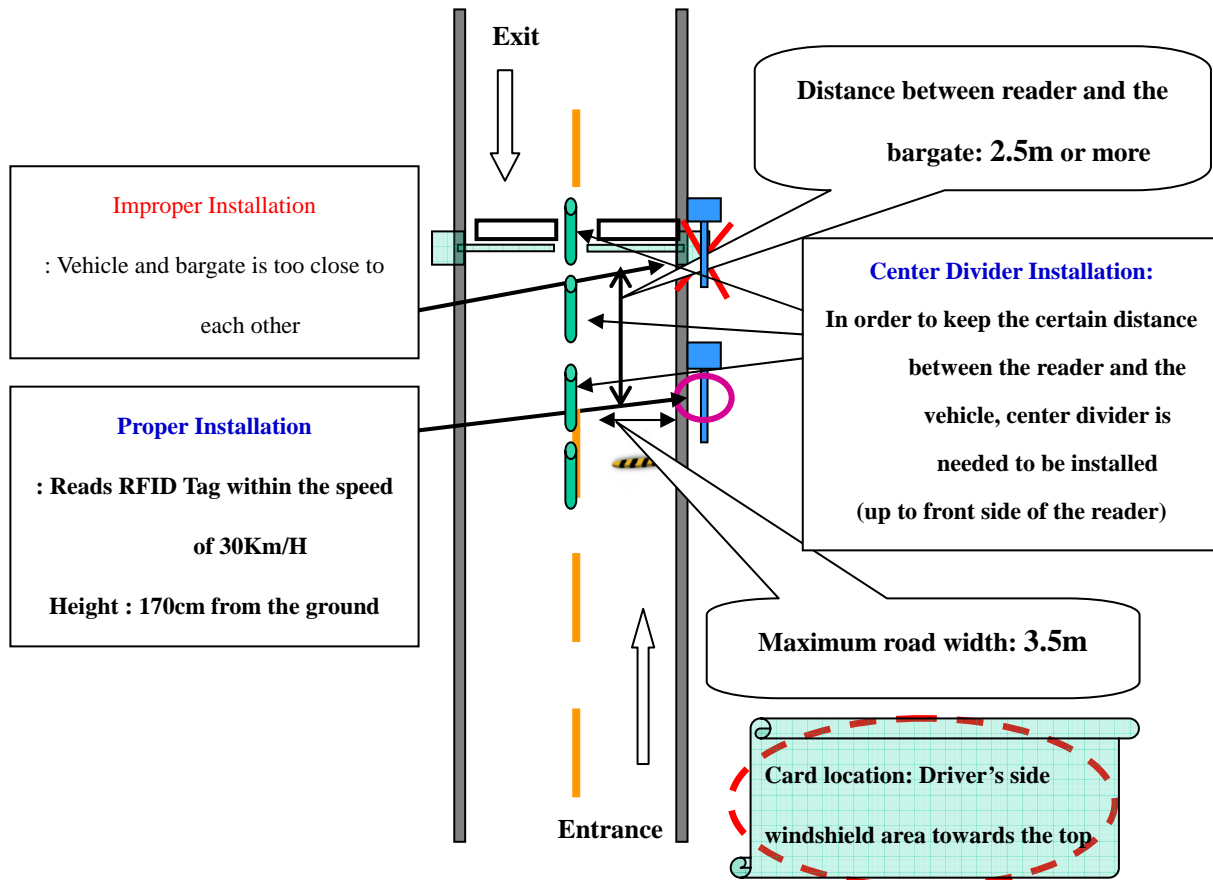
- RFID TAG must be 5cm away at both horizontally and vertically away from the vehicle metal frame..
- If top windshield area is tinted, do not position the RFID TAG to be in contact with more than 50% of the tint area.
- Place RFID TAG at the opposite side of where the reader is positioned.

9.2. Product Installation Location

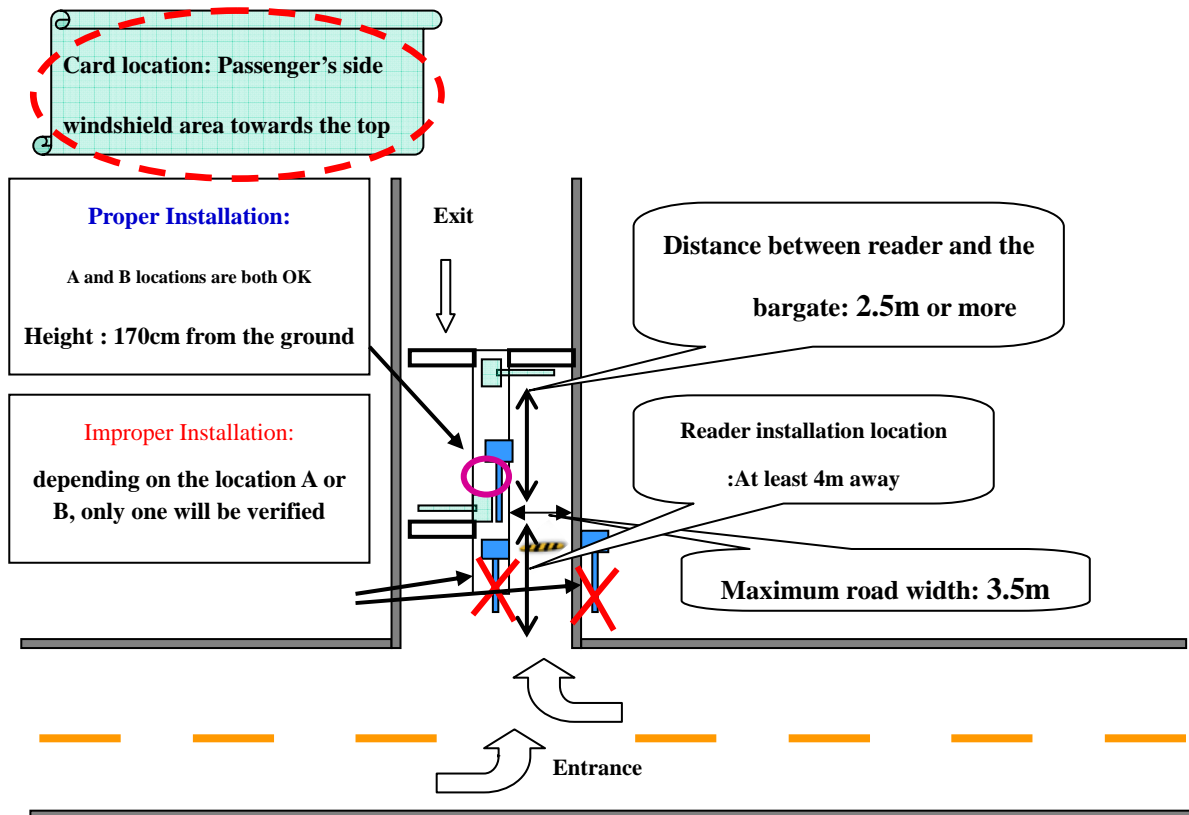
9.2.1. Installation location at the two lanes road with a center divider being present



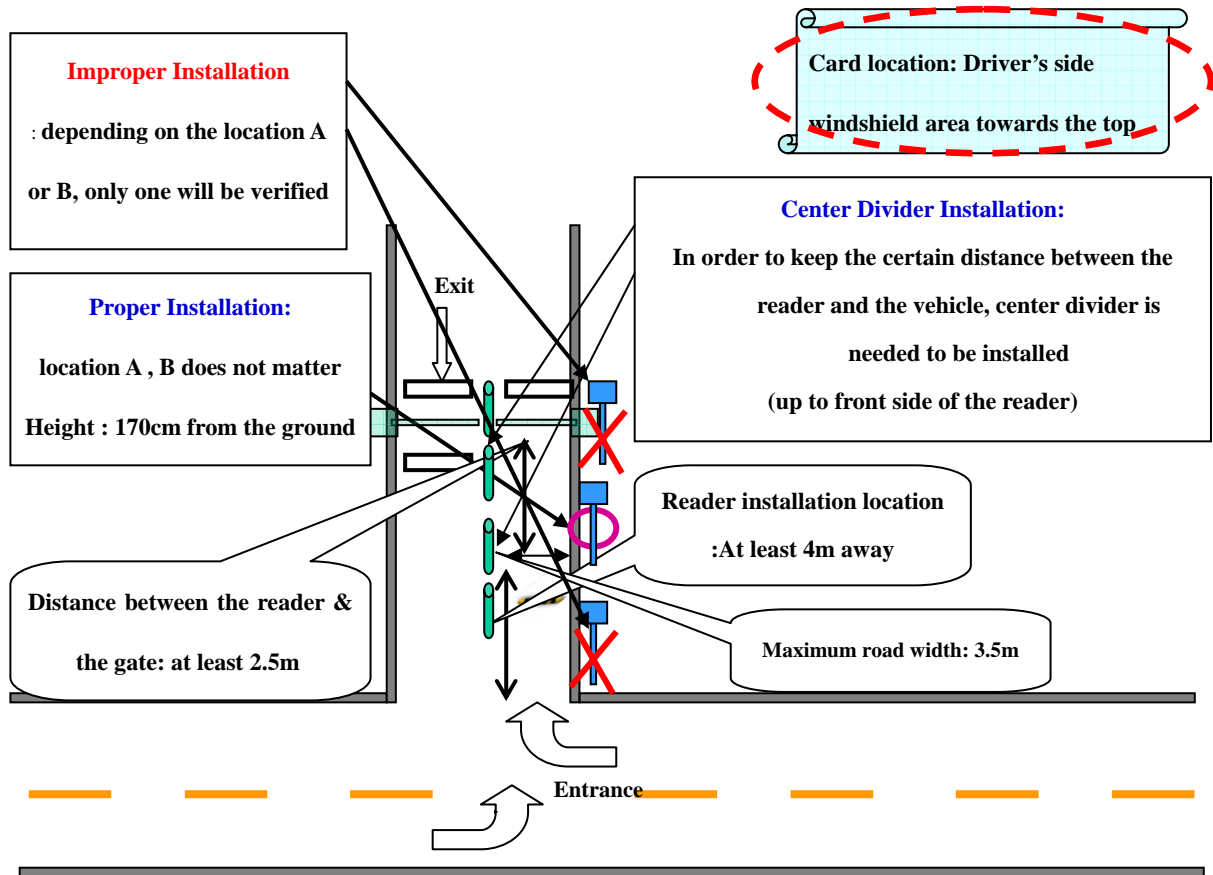
9.2.2. Installation location at the two lanes road without a center divider being present



9.2.3. Installation location at the T type intersection where a center divider is located at the entrance



9.2.4. Installation location at the T type intersection without a center diviers being present



9.2.5. General Installation tip for all the other cases

For all other cases, please verify the installation area prior to setup.

