HRD0800F
USER’S MANUAL

V8.10.09

October 2018

■ Revision History

Version	Date	Revision Page	Revision Description
V8.10.09	2018-10-09		First Draft

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1. Overview and System block diagram

1.1 Overview

HRD0800F is UHF Fixed Reader with embedded Circular Polarized Antenna. HRD0800F uses RS232 and Ethernet Interface and it can be converted to RS422 or RS 485 Interface using IDRO900RC.

And It supports Power Over Ethernet (POE) function which makes the installation easier, makes the costs lower and saves the time.

It supports EPC CIG2, ISO 18000-6C and can read up to 5 to 10 meters for a passive tag.

1.2 Features

⊙ Supports EPCglobal Class 1, Gen2와 ISO/IEC 18000-6C protocol.

⊙ Low power hardware design

- Power over Ethernet (PoE) : IEEE 802.af supported

⊙ Smart design

- Environment-friendly with its compact size and smart-design.

⊙ High reading speed

- Can read up to 100 tags per second.

⊙ High temperature range

- Ideal to use in outdoor condition

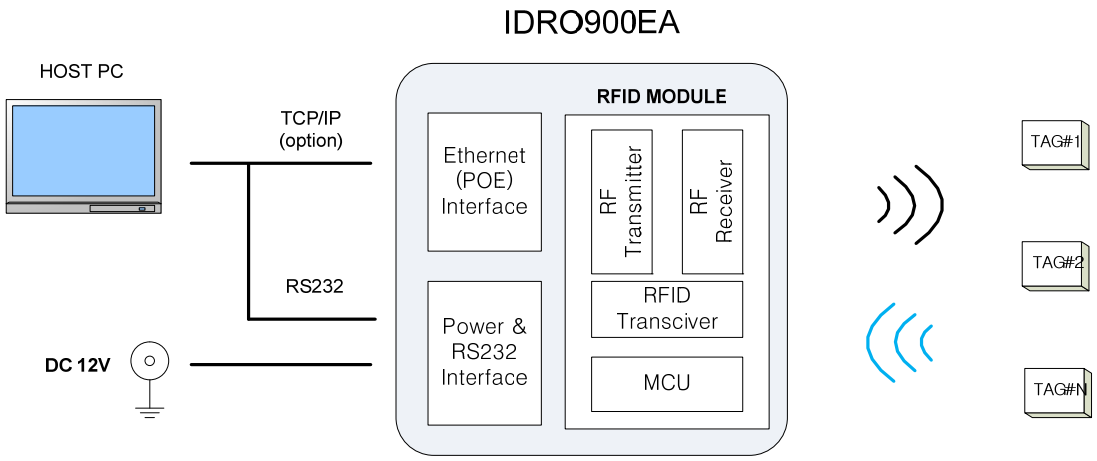
⊙ Easy to upgrade the firmware

- It is possible to upgrade to newest version for performance improvements.

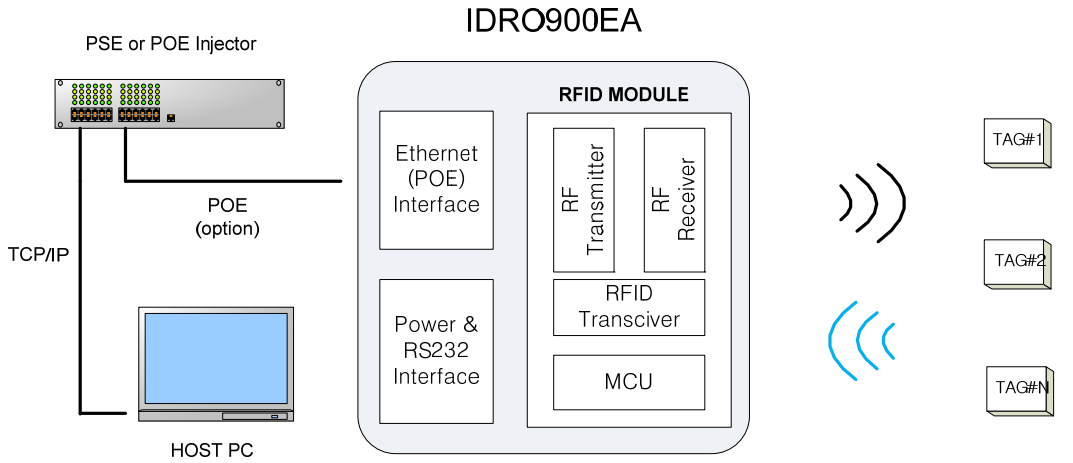
⊙ System interface

- RS 232 or Ethernet

1.3 System Block Diagram



< Use of Power Adaptor>



< Use of PoE>

√ NOTE Basically, only RS232 interface is provided, If you want to use TCP/IP interface or PoE(Power-over-Ethernet), Please contact IDRO. CO., Ltd.

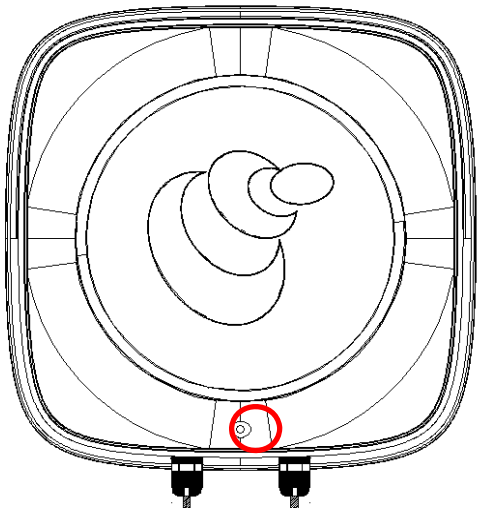
2. Components

Integrated RFID Reader	
DC 12V/3.33A Adaptor (option)	
RS-232 Cable & Ethernet Cable (option)	
Interface Board (option)	

Controller (optional)	
Reader Software & User Document	

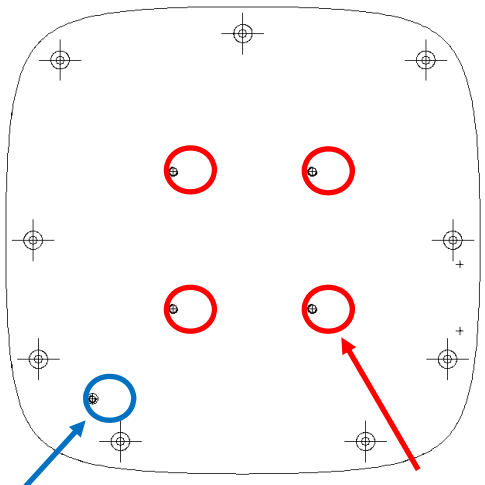
3. Names and description of the product

Status LED



RED LED	BLUE LED	Reader status
OFF	OFF	Power OFF
ON	OFF	Power ON, Reader Inventory Operating
ON	Bnlinking	Reading tag(s)

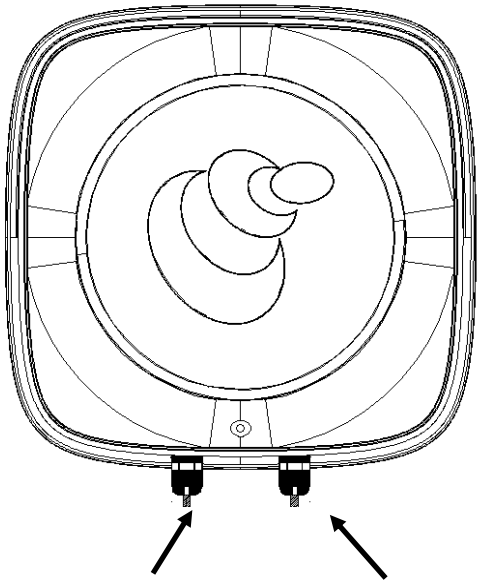
Reader Fixing & Grounding parts



Reader Grounding bolt

Reader Fixing bolt
To place brackets for reader (4pcs)

Interface



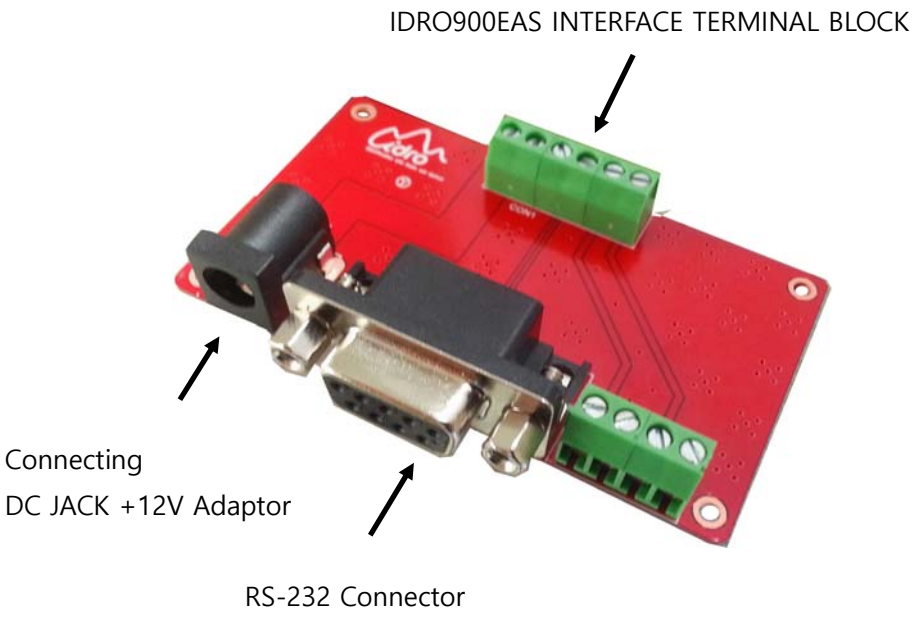
Options : 10/100 base-T Ethernet (Power-over-Ethernet)

Power & RS232 & GPIO

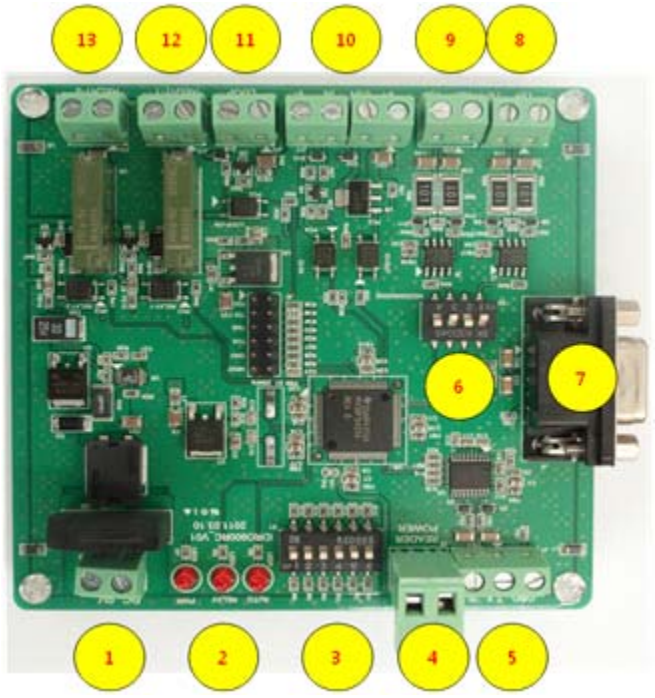
Pin assignment of the connecting cable

1. **Black – VCC(+/-), Nonpolar**
2. **Red – VCC(+/-) ,Nonpolar**
3. **Yellow – GND(RS-232)**
4. **Green – TXD (RS-232)**
5. **White – RXD (RS-232)**
6. **Blue – GPIO_IN or GPIO_OUT**
7. **Orange – V+ (GPIO)**
8. **Brown – V-(GPIO)**

Interface Board (Option for test)



Controller (Option)



	포트 명
1	Power input port for controller
2	LED Status
3	Control Switch
4	Reader Power output port
5	Reader Serial Port
6	PC Serial Switch (RS-232/RS-422)
7	PC RS-232 Port
8	PC RS-422 Tx Port
9	PC RS-422 Rx Port
10	GPIO Port
11	LOOP IN Port
12	Relay 1 Port
13	Relay 2 Port

 # Please refer to " Controller User's manual" for detailed information about Controller Operation.

4. Reader Specification

4.1 Reader Performance

Description	Value
MODEL	HRD0800F
Architecture	UHF RFID Reader embedded Antenna
Protocol	EPC Gen2(ISO 18000-6C),
Frequency	917.3MHz to 920.3MHz(Korea) 902MHz to 928MHz(USA) 865MHz to 868MHz(Europe) 840MHz to 960MHz (Customizable)
Max Tx Power(Peak)	30dBm (1W)
Power control	5dBm to 30dBm (1dB step)
Hopping Channels	6 (Korea),50(USA),4(Europe)
Channel Spacing	600KHz (Korea, Europe), 500KHz(USA)
Channel Dwell time	< 0.4 seconds
Modulation Method	PR-ASK
Supply voltage	12Vdc or POE(IEEE 802.3af)
Max Current (max power)	< 600mA
Tag Read Distance(Max.)	>10m
Operating Temperature	-20℃ to +50℃
LED Indicators	Power, Data
Signaling	RS-232 : Baud rate(9600bps, 115200bps) 10/100 BaseT Ethernet(RJ45) w/POE support
GPIO	1 output or 1 input, optically isolated
Compliance Certification	

4.2 Interface

Interface Cable : 22AWG x 8C	RED	VCC+/-(non polarity)
	BLACK	VCC+/-(non polarity)
	GREEN	TXD (RS-232)
	WHITE	RXD (RS-232)
	YELLOW	GND (RS-232)
	BLUE	GPIO_OUT(default), GPIO_IN (option)
	Orange	V+(VCC for GPIO)
	Brown	V-(GND for GPIO)

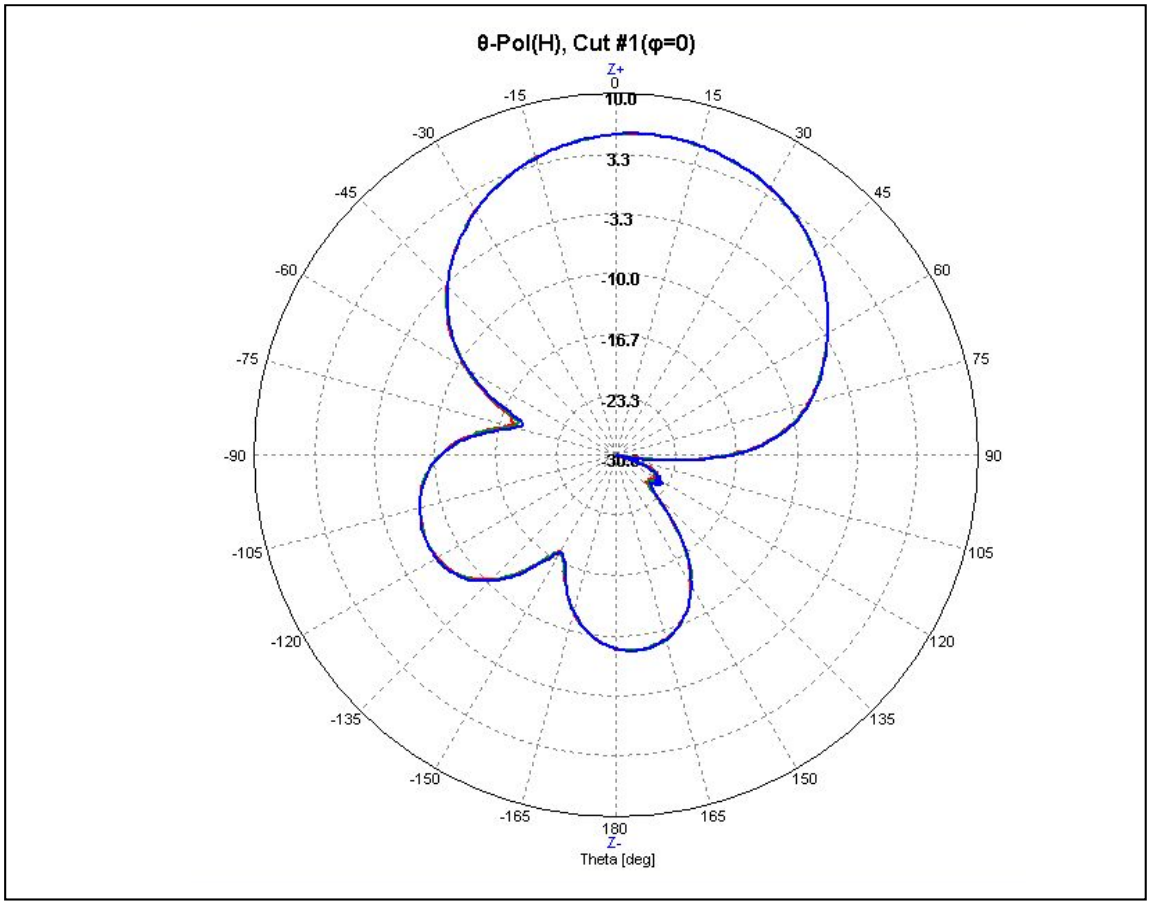
4.3 Physical Dimension

SIZE	261mm × 261mm × 42mm
Weight	852g

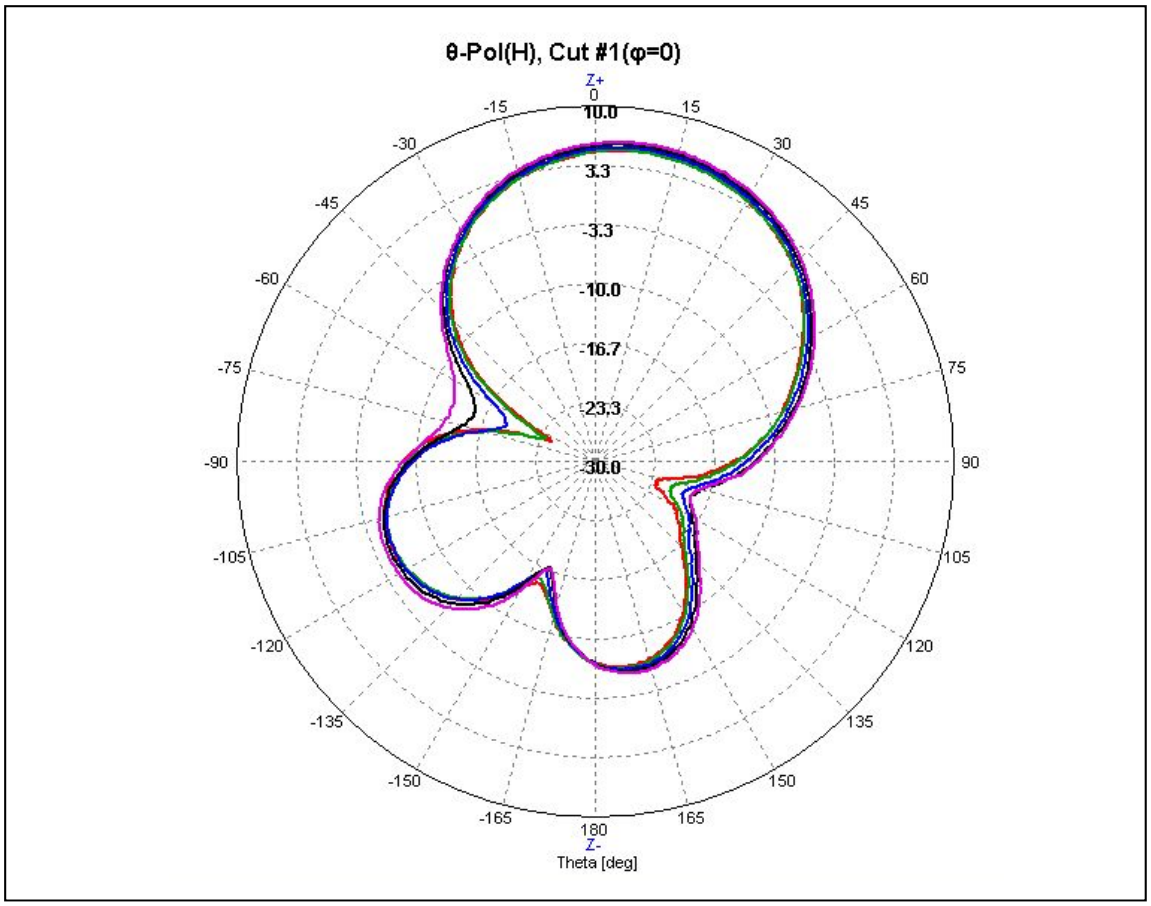
4.4 Antenna Specification

ETSI	
Material	Al-free
Frequency band	865~867MHz
Gain(Max.)	5.89dBiL
Polarization	RHCP
VSWR(Max.)	2 : 1
Impedance	50 ohm
3dB Beam Width	61 degrees(typ.)

- H-Pol.

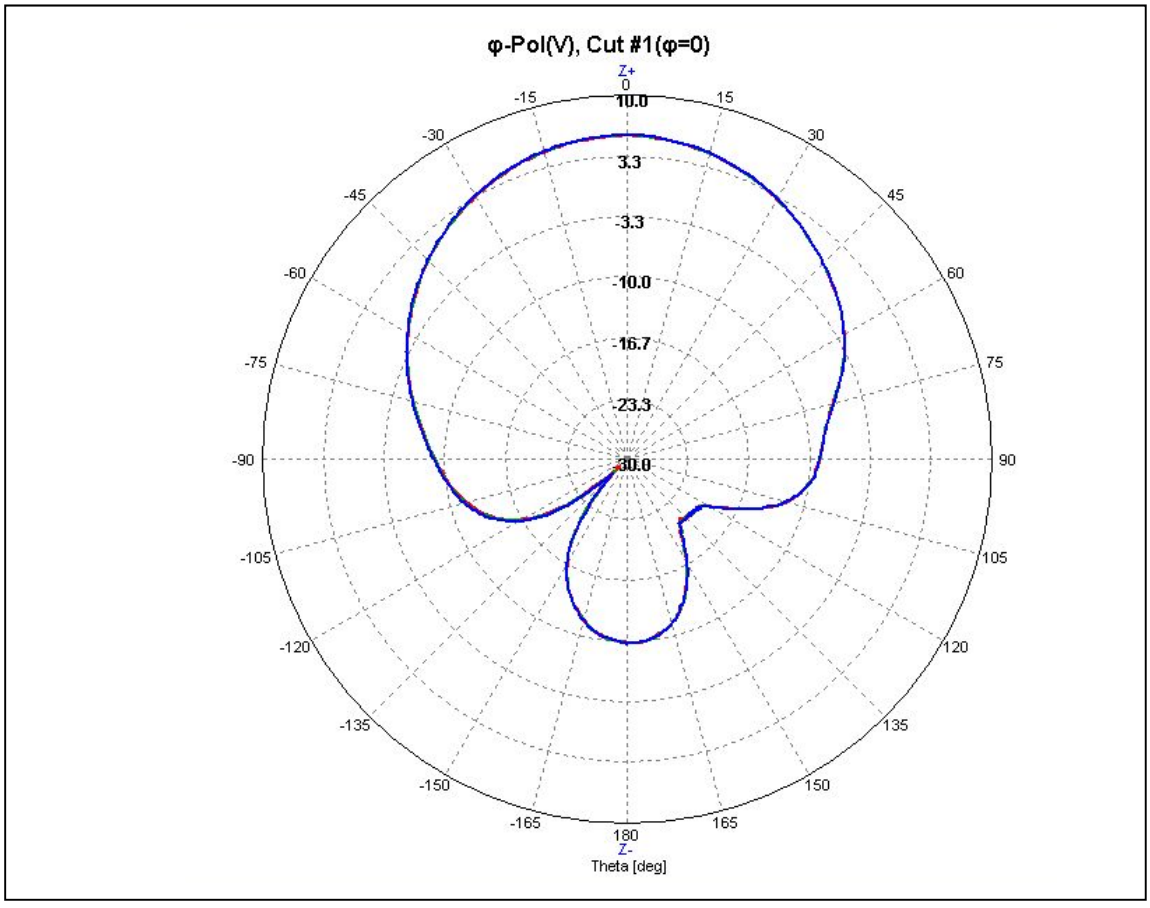


- V-Pol.

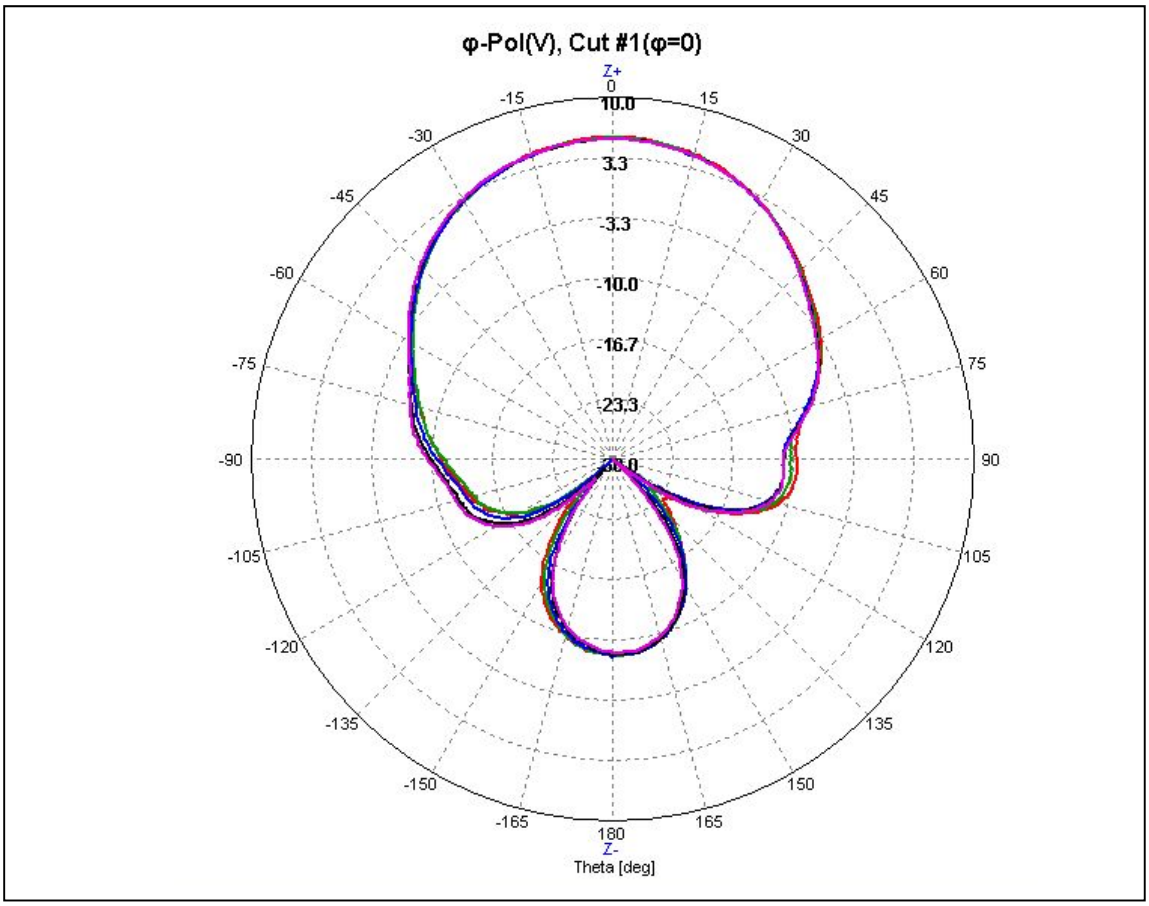

θ-Pol(H), Cut #1(φ=0)
Z+
0
15
30
45
60
75
90
105
120
135
150
165
180
Z-
-15
-30
-45
-60
-75
-90
-105
-120
-135
-150
-165
10.0
3.3
-3.3
-10.0
-16.7
-23.3
-30.0
Theta [deg]

FCC, KC	
Material	Al-free
Frequency band	902~928MHz
Gain(Max.)	6dBiL
Polarization	RHCP
VSWR(Max.)	2 : 1
Impedance	50 ohm
3dB Beam Width	59degrees(typ.)

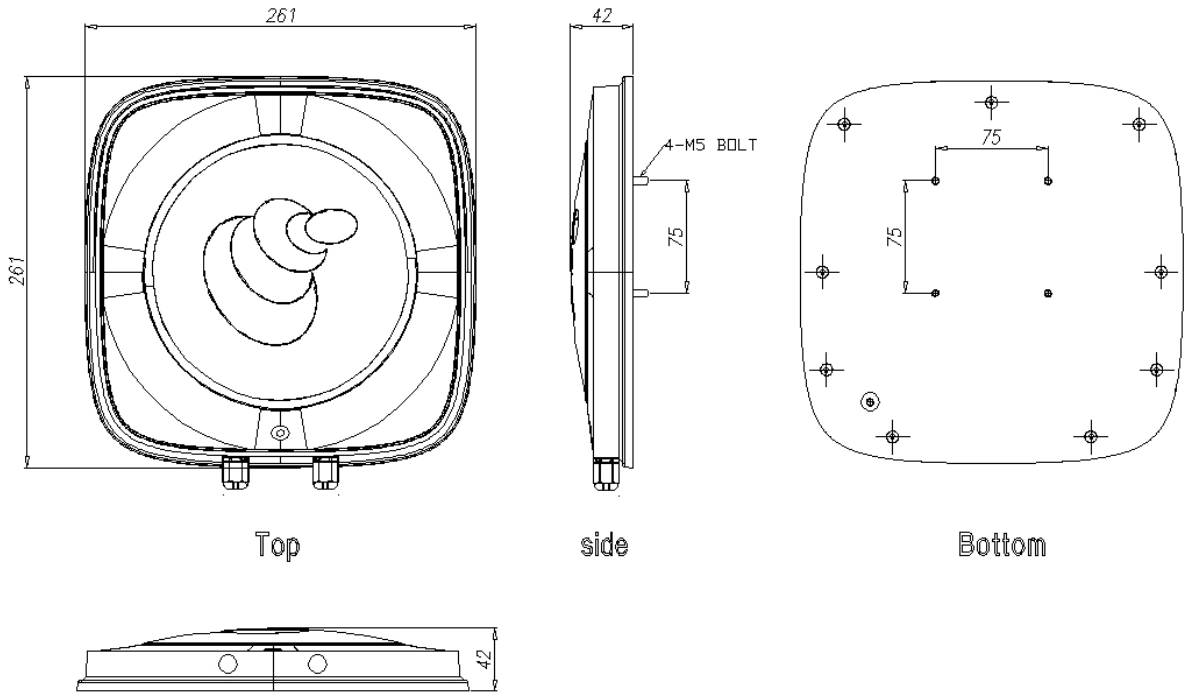
- H-Pol.



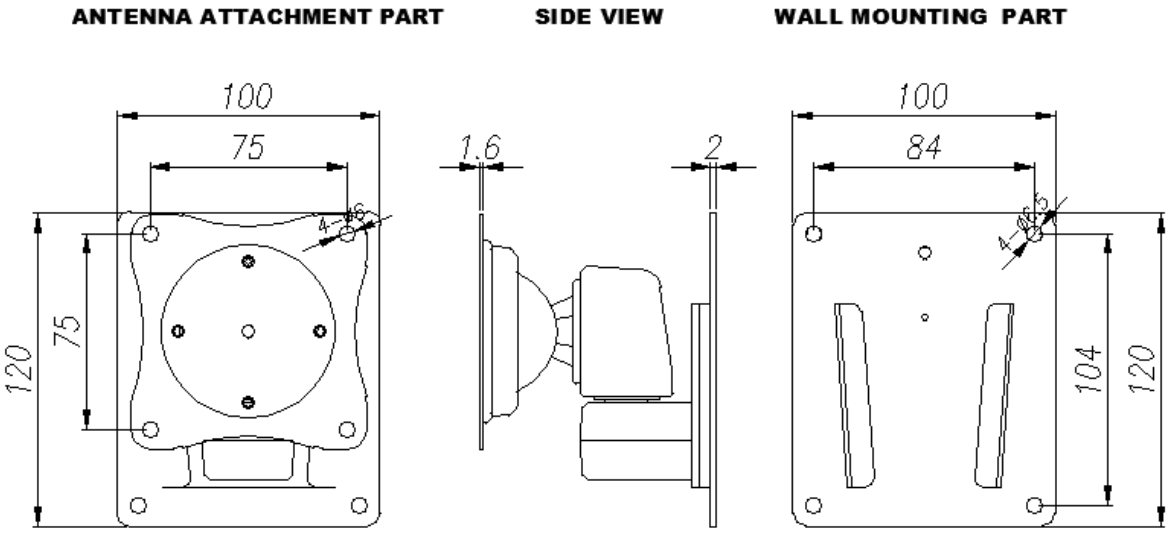
- V-Pol.


φ-Pol(V), Cut #1(φ=0)
Z+
0
15
30
45
60
75
90
105
120
135
150
180
Z-
-15
-30
-45
-60
-75
-90
-105
-120
-135
-150
-165
165
10.0
3.3
-3.3
-10.0
-16.7
-23.3
Theta [deg]

4.5 Mechanical Dimension

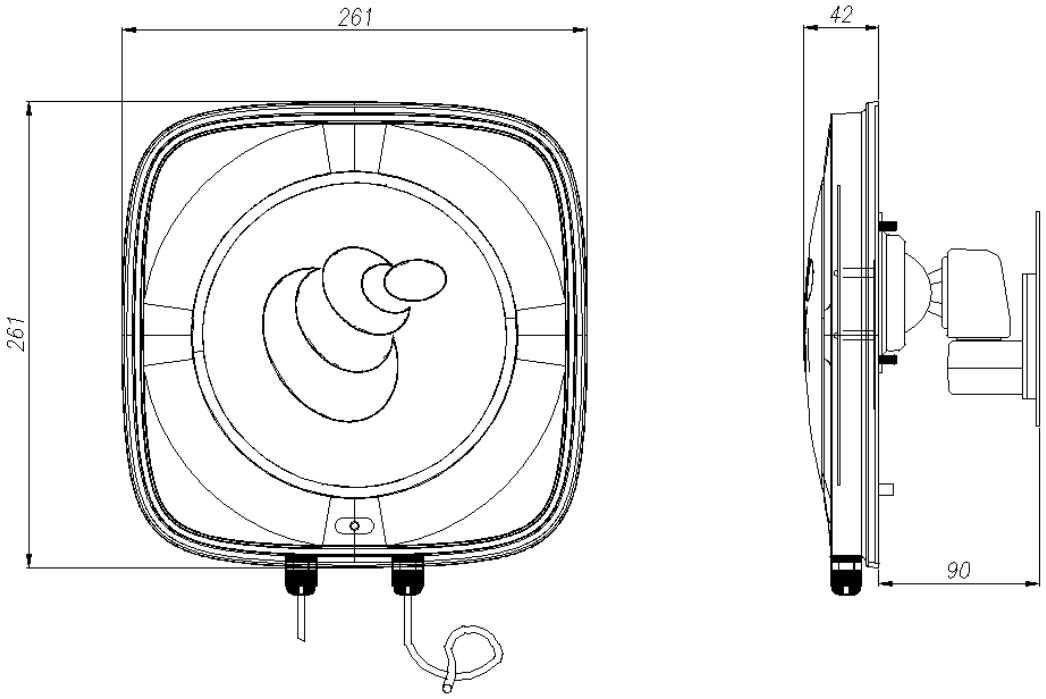


4.6 Option : Antenna Attachment Bracket



UNIT : mm

ANTENNA ATTACHMENT BRACKET



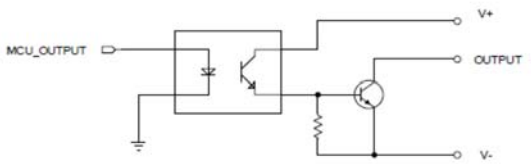
ANTENNA & BRACKET Ass'y

5. I/O Interface

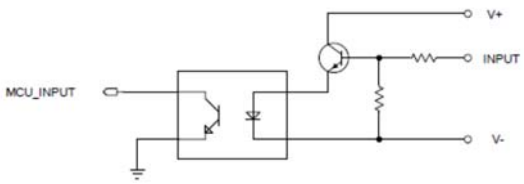
5.1 GPIO

I/O Port of HRD0800F supports one Input or one output. Basically output port is used as indicator.

Cable Color	Description
Orange	V+ (3.3 ~ 24VDC)
Blue (default)	Output 1 (1A max.)
Blue (default : NC)	Input 1 (3.3 ~ 24VDC)
Brown	V-



<Output circuits>



<Input Circuits>

Note

Only one among input and output of GPIO is supported, for default setting, GPIO_output is supported. If GPIO input will be used, it must be said when ordering.

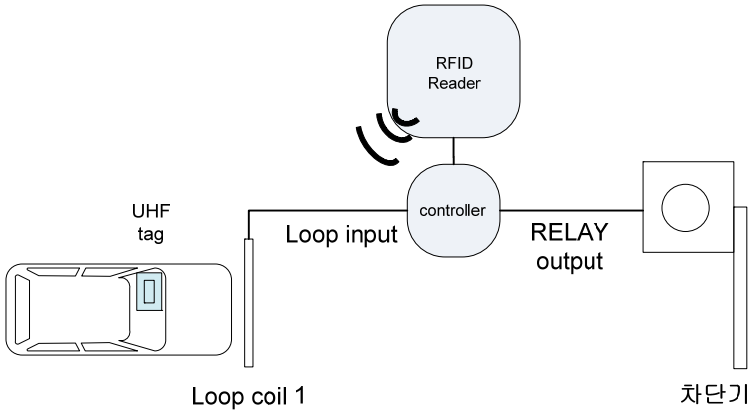
5.2 Controller

I/O Port of IDRO900RC provides one input and one output. Also, it offers 2 Relay Ports and 1 Loop Port which is very useful for Parking Access control system.

	Port name	Specification
1	Controller power input port	DC 9V ~ 15V (typ. DC12V), Nonpolar
2	LED Status	PWR
		RELAY
		AUTO
3	Control Switch	Please refer to "IDRO900RC Manual"
4	Reader Power output port	DC 10.5V (@DC 12V input)
5	Reader Serial Port	RX : Connect with TX of reader
		TX : Connect with RX of reader
		GND : Connect with GND of reader
6	PC Serial Switch (RS-232/RS-422)	RS-232 (2nd, 4th ON) RS-422 (1st, 3rd ON)
7	PC RS-232 port	Connect to PC's RS-232 port
8	PC RS-422 Tx port	Connect to PC's RS-422 Rx port
9	PC RS-422 Rx port	Connect to PC's RS-422 Tx port
10	GPIO port	V+ : GPIO VCC(3.3 ~ 24VDC)
		OUT : GPIO Output (1.5A max.)
		IN : GPIO Input (3.3 ~ 24VDC)
		V- : GPIO GND
11	LOOP IN port	Enter LOOP Coil Contact
12	Relay 1 port	RELAY Contact output port (5A 250VAC, 5A 30VDC)
13	Relay 2 port	RELAY Contact output port (5A 250VAC, 5A 30VDC)

*** For more information about specification of Controller, please refer to "Controller User's Manual"**

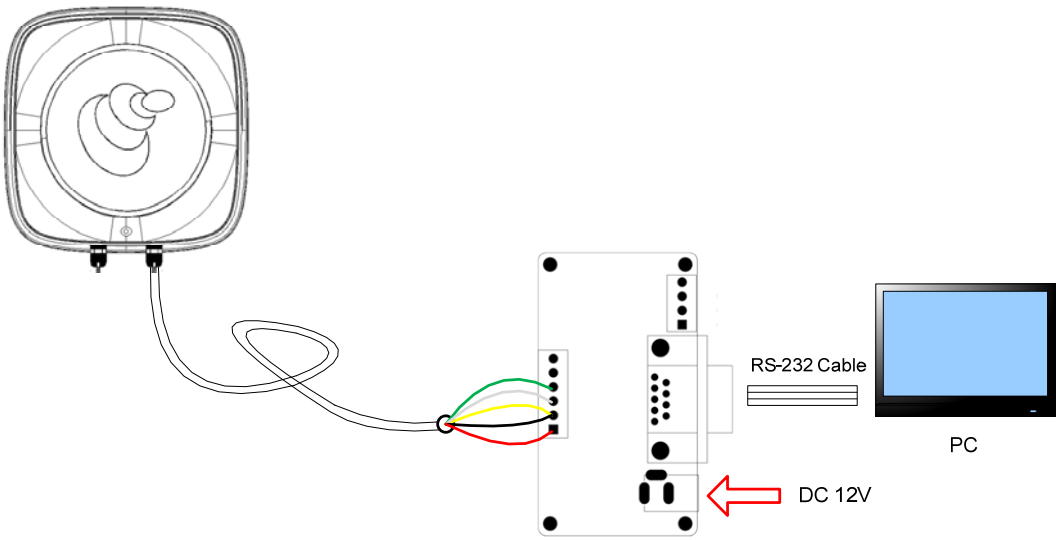
< Example of using Controller for Car parking System >



① Loop coil 1 detects the vehicle
② Loop input port of Controller authorized the signal
③ Reader ON
④ Recognizes UHF tag of the car
⑤ Signal outputs the RELAY output terminal of the Controller
⑥ Breaker opens.

6. System Assembly and Installation

6.1 Interface Board



① Like the picture above, Please connect Interface board and reader accordance with the color of terminal Block.

② Connect RS-232 Cable to Female DB-9 RS-232 Port of Interface board.

③ Connect RS-232 Cable to the serial port of PC.

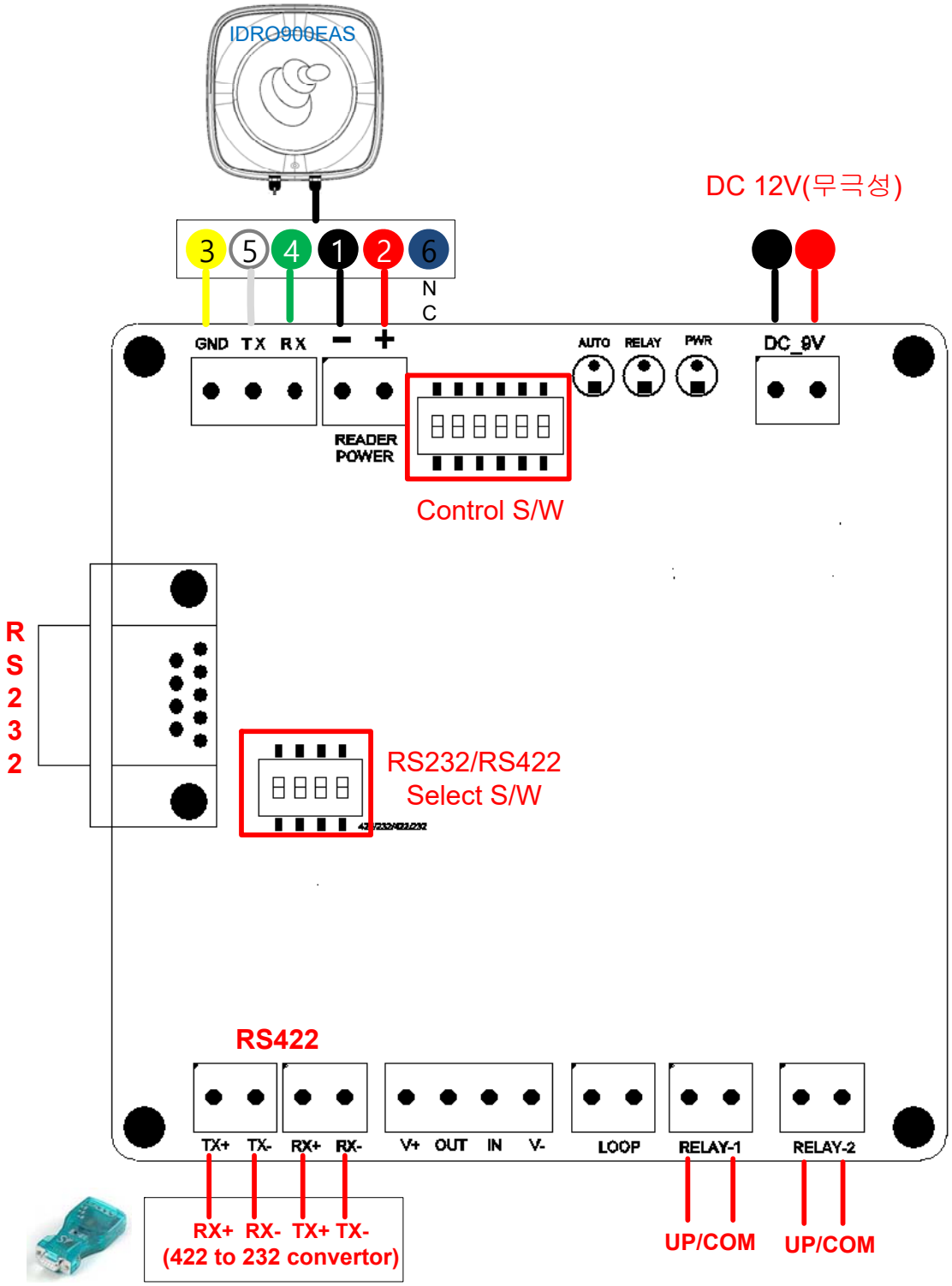
④ Set the HyperTerminal of PC as - Bit/sec(B) : 9600, Data bit(D) : 8, Parity(P) : None, Stop Bit(S) : 1, Flow Control (F) : None

④ Connect with the Adapter(DC12V,3.33A) to DC-JACk of Interface board

⑤ Check the reader operating..

⑥ When reading TAG, check if Blue LED light of reader is working and Tag Data of PC is showing perfectly.

6.2 Controller



● PC Mode (6th Control S/W ON)

① Like the picture above, connect the reader with the controller accordance with the color of terminal block and select which S/W (RS232/RS42 Select S/W) to connect with PC

② When selecting RS-232, connect RS-232 cable with Female DB-9 RS-232 port of controller. (For RS-422, Connect 422 to 232 converter with RS-422 Port of Controller)

③ Connect RS-232 cable to PC's serial port.

④ Set the HyperTerminal of PC as - Bit/sec(B) : 9600, Data bit(D) : 8, Parity(P) : None, Stop Bit(S) : 1, Flow Control (F) : None

⑤ Connect with the Adapter(DC9V,3.33A) to DC-JACK of Interface board

⑤ Check the reader operating..

⑥ When reading TAG, check if Blue LED light of reader and Tag Data of PC is working perfectly.

● AUTO Mode (6th Control S/W OFF)

- It provides ID Check mode, ID NO Check Mode, ID Save Mode, ID Delete Mode, and without PC, it is possible to Encode and Delete TAG ID and Check TAG ID by controlling the Control S/W power.

For more information, Please refer to "Controller User's Manual"

7. Reader Operating Method

①. Place reader above the table.

②. Connect the reader to PC with RS-232 or Ethernet cable.

- PC setting values when using RS-232 Cable

- Baud rate : 9600bits per second, Data : 8bit, parity : none, Stop : 1bit, Flow control : none

- PC setting values when using Ethernet Cable

- IP Address : 192.168.9.100

- Subnet Mask : 255.255.255.0

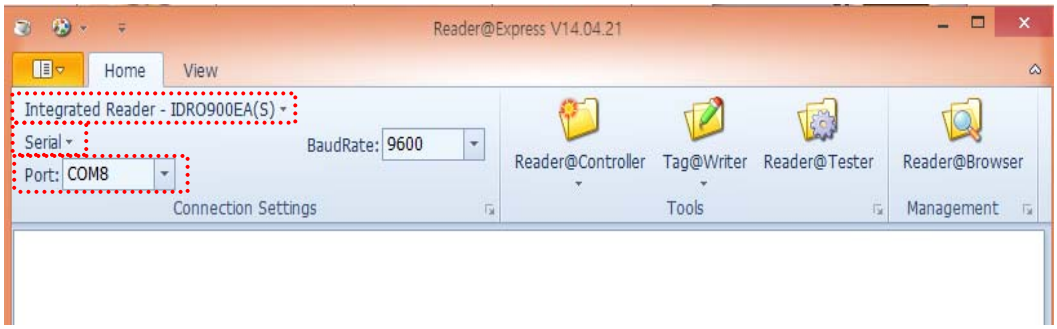
③. Supply DC 12V to reader.

④. Run the test program(Reader@Express.exe) provided by IDRO Co., Ltd .(Windows XP, 7,8)

⑤ First, check the setting of Reader@Express..

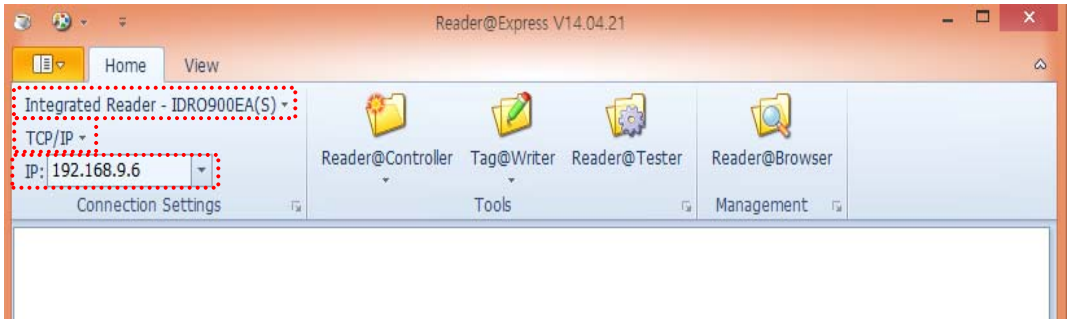
- If using RS-232 cable, make sure that the setting of Reader@Express as below;

- Integrated Reader-IDRO900EA(S), Serial, Port : COM?



- If using Ethernet cable, make sure that the setting of Reader@Express as below;

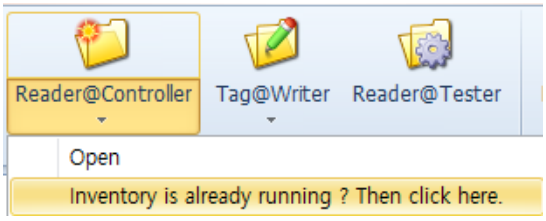
- Integrated Reader-IDRO900EA(S), TCP/IP, IP : 192.168.9.6



√ NOTE HRD0800F and IDRO900EA(S) are the same model, so you can set it to IDRO900EA(S).

⑥. Click the icon of Reader@Controller. → and Click "Inventory is already running? Then click here."

- If nothing shows up in Reader@Express display or it reader does not stop working after clicking "Stop operation", please recheck the Setting value of PC, COM port number and IP Address.



Appendix

● Channel number & Frequency table

CHANNEL NO.	KOREA	USA	EUROPE	CHANNEL NO.	KOREA	USA	EUROPE
0	917.3	902.75	865.7	25		915.25	
1	917.9	903.25	866.3	26		915.75	
2	918.5	903.75	866.9	27		916.25	
3	919.1	904.25	867.5	28		916.75	
4	919.7	904.75		29		917.25	
5	920.3	905.25		30		917.75	
6		905.75		31		918.25	
7		906.25		32		918.75	
8		906.75		33		919.25	
9		907.25		34		919.75	
10		907.75		35		920.25	
11		908.25		36		920.75	
12		908.75		37		921.25	
13		909.25		38		921.75	
14		909.75		39		922.25	
15		910.25		40		922.75	
16		910.75		41		923.25	
17		911.25		42		923.75	
18		911.75		43		924.25	
19		912.25		44		924.75	
20		912.75		45		925.25	
21		913.25		46		925.75	
22		913.75		47		926.25	
23		914.25		48		926.75	
24		914.75		49		927.25	

● Product Warranty and Customer Service

Product Warranty

- Product name : CARINA
- Model Name : HRD0800F
- Certificate no. : 20068-CARINA0800F
- Manufacturer : IDRO CO., Ltd / Republic of Korea
- Day of manufacture : YYYY/MM/DD

IDRO Co., Ltd offers one(1) year limited warranty to this product from date of purchase and Warranty agreement as follows.

Warranty Agreement

1. Product : HRD0800F
2. Warranty Period : 1 year limited warranty since purchase date. (If Purchase date is not recognizable, then 15 months from date of manufacture .
3. Gratuitous Service
   - When the product has defects within A/S period.
4. Onerous service
   - When the product has defects after A/S period.
   - When the product is damaged by natural disasters such as fire, flood and lightening.
   - and other problems due to any intentional act or gross negligence by customers
5. Case impossible for A/S
   - When the Void Label is broken
6. AS Shipping Process
   - The product must directly be sent to IDRO.
   - For any of service within A/S Period, inbound shipping fee is charged to customer and outbound shipping fee is on us.
   - For any of service after A/S Period, both inbound and outbound shipping fee is charged to customer.
   - If the product has no defects, both inbound and outbound shipping fee is charged to customer.

IDRO Co., Ltd (Stamp skipped)

Customer Service : +82-31-225-7883
Customer Service Webpage : http://www.idro.co.kr <Product Inquiry>
Weekdays : 10:00 ~18:00 Webpage Inquiry or telephone service(Lunch : 12:00~13:00)
Saturday/Sunday : Closed

FCC information to User

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.

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.

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

This device should be installed and operated with minimum 20 cm between the radiator and your body.

IC information to User

This device complies with Industry Canada license-exempt RSS standard(s).
Operation is subject to the following two conditions:
(1) this device may not cause interference, and
(2) this device must accept any interference, including interference that may cause undesired operation of the device.
Le present appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisee aux deux conditions suivantes :
(1) l'appareil ne doit pas produire de brouillage, et.
(2) l'utilisateur de l'appareil doit accepter tout brouillage radio electrique subi, meme si le brouillage est susceptible d'en compromettre le fonctionnement.

This device should be installed and operated with minimum 20 cm between the radiator and your body.
Cet appareil doit être installé et utilisé avec un minimum de 20 cm entre le radiateur et votre corps.