HF RFID User manual

AIS-HR-Y302S

AIS-HR-Y303S

AIS-PHR-Y302W

AIS-PHR-Y306

AIS-PHR-Y308

Instructions

This manual is designed to explain the functions, dimensions, interfaces, DEMO system construction and engineering installation precautions of the high frequency series products of Aynettek Intelligent Technology Company. The manual provides the complete hardware shape parameters, general electrical parameters, necessary circuit schematics and the hardware construction of the DEMO system for the high-frequency series reader. DEMO system construction only explains the hardware connection and DEMO connection, please refer to our DEMO manual for specific use. The general installation specification stipulates some precautions for on-site installation. Please select and install according to the actual situation of the site combined with these specifications to cope with the application of different industrial sites.

The contents of the manual mainly include:

- Reader function description
- Reader interface definition, shape and general electric parameters
- Adapter interface definition
- Hardware connection for the DEMO system
- Usage Considerations

If the information provided in the manual is unclear or does not correspond to the actual situation, please contact us.

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The form used in the manual

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1. Reader function introduction

Reader function introduction

Aynettek high frequency series reader is a series of universal high frequency RFID reader suitable for various industrial occasions. The series includes one-piece and split RFID reader products, as well as supporting antennas, tags, cables and other products. The products of various shape sizes can be applied to various applications in 3C, home appliances, automobiles, new energy, equipment and other industries after combination and matching.

The functions of the reader are:

- Tag read and write operation

Tag read and write operations

The Aynettek high frequency series products support all the mandatory functions and some optional functions defined by ISO-15963 protocol, and can read and write the ISO-15963 protocol electronic tag.

The main features of the high frequency series reader are as follows:

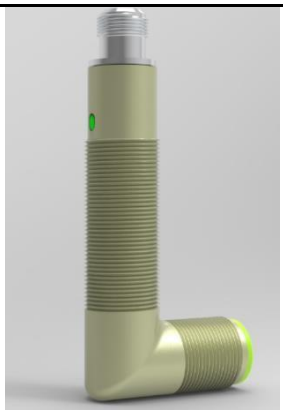
- The working frequency is 13.56MHz, in line with the IS0-15693 standard;
- It supports RS-485 (Modbus RTU) communication mode, which is convenient for large-scale enterprise networking applications.
- Industrial standard EMC design, effectively resist all kinds of interference in industrial field;
- Compact structure design, easy installation;
- IP67 protection is suitable for various installation environments.

2. Hardware Interface Description

Reader port description

The Aynettek HF Series reader has 1 485& power external interface. Connect to the corresponding external device via a custom cable connected through the interface. The following table is the interface description of the full series of products.

Table 1 1High-frequency reader interface models

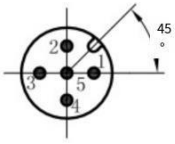
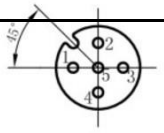
Product images	Product model number	Port type
	AIS-HR-Y302S	① M12 5-pin 485& power port
	AIS-HR-Y303S	① M12 5-pin 485& power port
	AIS-PHR-Y302W	① Model M12 5 pin 485& power port
	AIS-PHR-Y306	① M12 5-pin 485& power port
	AIS-PHR-Y308	①M12 5-pin 485&power port

Reader interface pin definition

External connection cable M12 terminal definition, connect the loose cable in strict accordance with the following terminal definition table connection. If our company supplies

If you have standard injection molded cable products, please give priority to our finished cable products. It is not recommended to assemble the cable by yourself. If the length of the cable is not enough, you can match the extension cord or negotiate with our company to customize the cable.

Table2 Power Interface Terminal Definition Table

Serial number	Definition	Reader/writer	External 485& power cord		
		 M12 Acode male head outer screw inner pin	 M12 Acode female head inner whorl inner hole	Loose thread	Color
1	24V+	1	1	1	brown.
2	RS485_A	2	2	2	white.
3	24 -	3	3	3	blue.
4	RS485_B	4	4	4	black.
5	NC	5	5	5	Gray

Reader working indicator light definition

Table3 Blue and Green indicator Type Indicator Definition

No.	Description
green.	Constant light, power supply is normal
	Off, there is a label in the reading area, and the blue light is always on
	Flashing, data interaction with the reader
blue.	Constant light with labels inside the reading area

3. General specifications of the reader

Electrical parameters

Table 4 Reader electrical parameters4

Name	Parameters
Wireless protocol	IS0-15693
Operating frequency	13.56 MHz
Support area	SRRC China, FCC North America, ETSI Europe
Output power	200mW
Wireless rate	26.5 kbit/S
Read distance	Related to model
Communication interface	RS-485
Serialcommunication rate	115.2kbit/s (configurable)
Supply voltage	DC 24V+/-10% (RS-485)
Average current	<0.05A (24V)

Application environmental parameters

Table 5 Reader location and interface function definition5

Operating temperature	-40℃ ~ +70℃
Storage temperature	-40℃ ~ +85℃
Operating humidity	5%～95%RH（Drop experiment）
Waterproof anddustproof grade	IP67
Drop experiment	GB/T2423.8-1995

Shape parameters

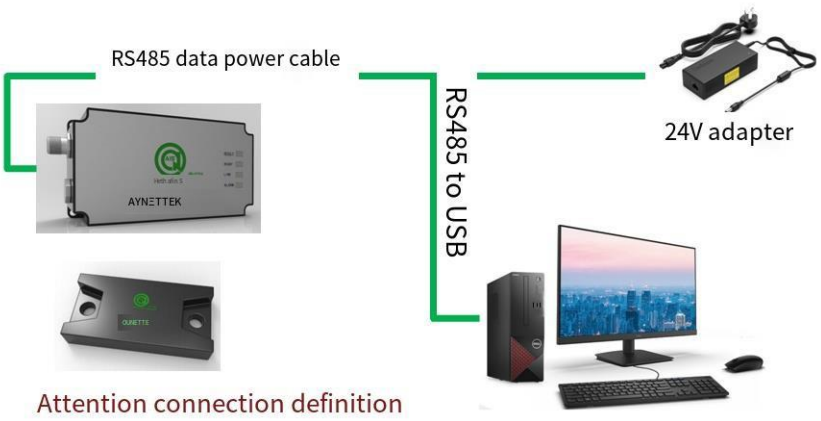
Please refer to the technical specification of the corresponding model.

4. Setup of DEMO test environment

DEMO hardware environment construction

Table 6 Hardware required for RS485 model DEMO environment construction6

Reader	**RS485 model**
Power supply	24V adapter or DC power supply (with terminal)
Data Line	RS485 to USB cable (with terminals)
Power Line	RS485 data power cord (provided by our company)
Reader antenna (optional)	Split model optional
Tags	Selection labels
Network Cable	Standard network cable
Computer	Window system computer

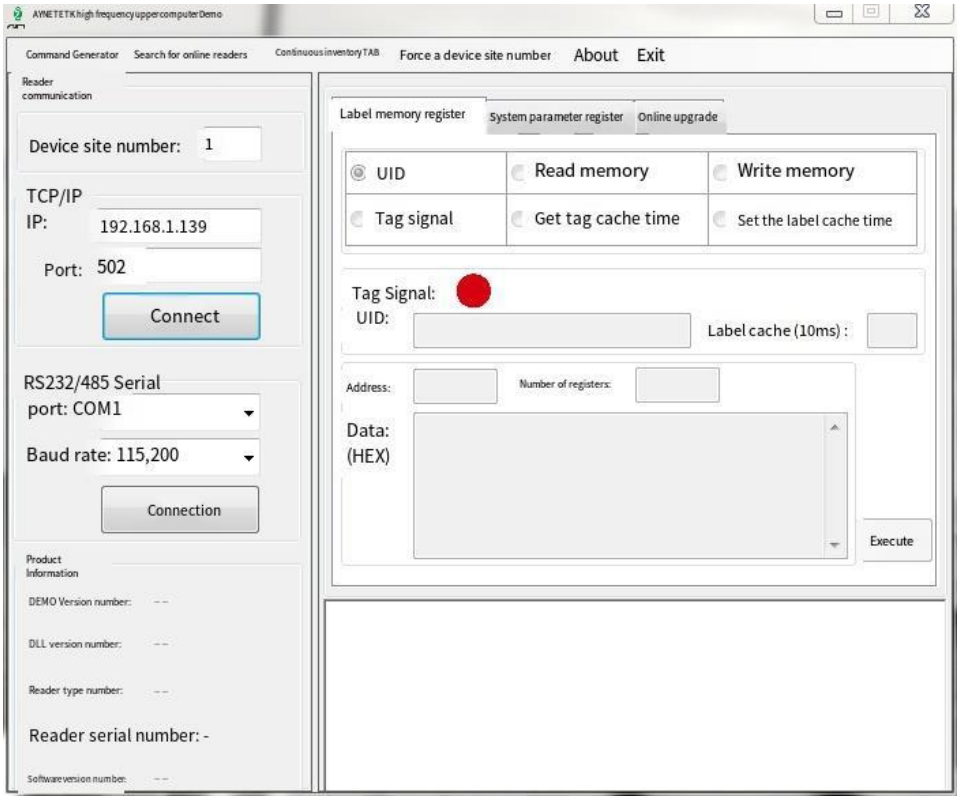


RS485 model wiring definition

DEMO software environment construction

Select the DEMO running program in the development package provided by our company, and double-click it to run.

POE model select TCP/IP connection, the default IP port is as shown below. RS485 models choose serial port connection, the default baud rate is 115200.



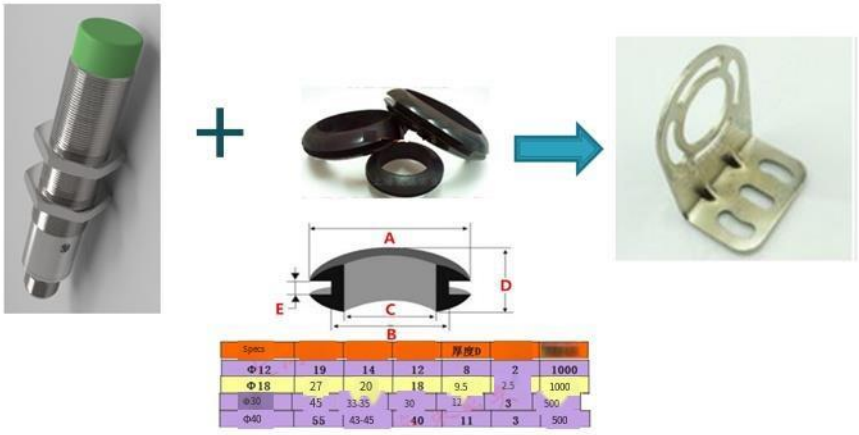
For detailed use of the DEMO software, please refer to the High-frequency Reader DEMO Use Reference Manual in the software development kit.

5. Installation Notes

Bracket design

!!!!!!!!!! Legibility radome for non-metal material, no impact!!!!!!!!!!

High-frequency readers are sensitive to low-frequency interference signals, and the equipment housing needs to be well grounded to shield external interference. However, due to the existence of various motors and it is difficult to ground the production line equipment, the metal shell of the reader is directly connected to the equipment, but the interference signal on the equipment will be conducted. Therefore, when designing the support, the metal shell of the reader (including the antenna) needs to be insulated from the mechanical equipment with insulating material. The insulation material is PC, bakken, etc. At the same time, we are equipped with responsive installation components to facilitate the insulation design of the support.



Specs						
Φ12	19	14	12	8	2	1000
Φ18	27	20	18	9.5	2.5	1000
Φ30	45	33-35	30	12	3	500
Φ40	55	43-45	40	11	3	500

The cylindrical reader or antenna should be used with an apron

Reader installation spacing

High-frequency readers use magnetic fields around their antennas to read and write tags. If two devices are installed in close proximity, the magnetic fields radiated by their antennas can interfere with each other's reading of the tag. The installation distance of all readers or antennas follows the distance in the table below. If it is unavoidable in the field, the readers need to conduct time-sharing polling work.

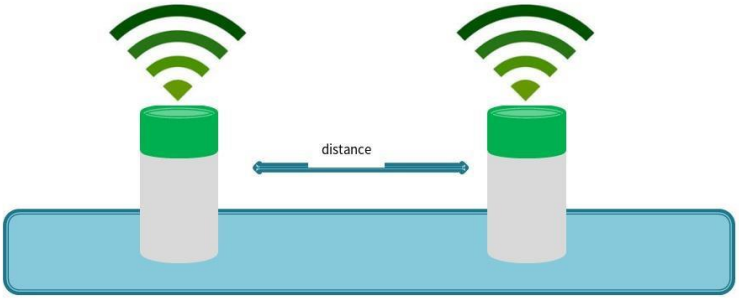


Table 15 Reader installation spacing Table7

Reader model No	Install safe distance (cm)
AIS-HR-Y302	25cm
AIS-HR-Y303 **AIS-HR-Y304C** **AIS-PHR-Y304** **AIS-PHR-Y305** **AIS-PHR-Y305N** **AIS-PHR-Y306**	40cm
AIS-HR-Y304 **AIS-PHR-Y307** **AIS-PHR-Y308**	100cm
AIS-HR-Y305 **AIS-HR-Y306** **AIS-PHR-Y309** **AIS-PHR-Y310**	150cm

Note: The split type depends on the size of the antenna it is connected to, refer to the reader spacing of the same size of the antenna. The antennas connected to the same split device are not affected by each other.

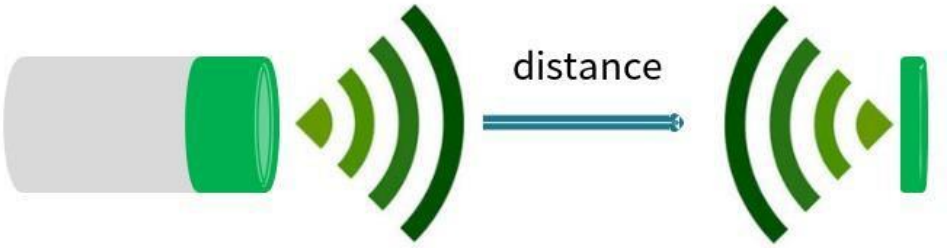
Reader data power cable placement

The high-frequency reader reads and writes the label through the magnetic field around the antenna. The production equipment will generate electromagnetic components. If the electromagnetic amount is large, it may affect the normal operation of the reader. Especially when the reader's power data cable is long and the device power cable is flat together. Therefore, it is recommended that:

- The power data line of the reader is routed in a separate slot.
- The feeder of the split antenna does not hover.

Read/Write distance selection

The high-frequency reader reads and writes to the tag through the magnetic field around the antenna, and the electromagnetic component around the reader will interfere with the normal operation of the reader. Therefore, it is recommended to use 60% of the maximum reading and writing distance of the reader as the installation distance. The reader antenna should be directly opposite the tag antenna.

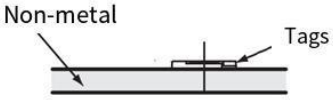


Installation of the tag

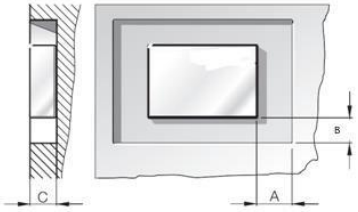
The high-frequency tag also communicates with the reader by a magnetic field. After the magnetic field meets the metal, it will generate the reverse eddy magnetic field because of the Lenz's law, which will cancel out with the magnetic field generated by the reader, so that

the magnetic field energy of the reader obtained by the tag decreases sharply, resulting in the tag cannot be read. In this way, it is necessary to increase the magnetic conductive material at the bottom of the label to reduce the impact of metal, or reserve an avoidance area during installation.

Anti-metal tabs can be mounted directly onto metal surfaces

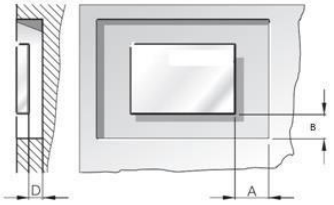


(Example: resin, plastic, wood, etc.) Non-metal resistant labels can not be directly installed on the metal surface, if the installation needs to be padded 1 cm high



Metal resistant tags embedded in metal mounting,

A and B leave 1 cm space for avoidance



Non-resistant metal tabs embedded in metal mounting, A, B

B leave 1 cm and D leave 0.5 cm shelter

Estimate the maximum speed at which the tag moves

Move the maximum speed allowed for reading. If reading on the move, it is necessary to actually measure the readable range at the current read distance, and estimate the time required for two reads based on the number of bytes read. Speed = readable range/time required.

FCC warning statements:

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Caution: Any changes or modifications to this device not explicitly approved by manufacturer could void your authority to operate this 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.

The device has been evaluated to meet general RF exposure requirement.