

FCC Statement

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.

RF Exposure Information

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator and your body.

AU3 IHR-3006-TCP

1Introduction

1.1Foreword

Purpose of this document

This system manual contains all the information needed to plan and configure the system. This document is intended for programming and testing/debugging personnel who debug systems and connect them to other units (automation systems, more programming equipment), as well as service and maintenance personnel who install extensions or perform fault/error analysis.

This document applies to all models of high-frequency IHR systems.

1.2version record

Modify content	date	edition
High frequency reader product manual	2022.05	V1.0
High frequency reader product manual	2023.03	V2.0

1.3Terms and abbreviations

The terms and abbreviations in this document are shown in Table1-1:

Terminology, abbreviations	solution
RFID	Radio frequency identification
TCP/IP	Transmission Control protocol/Network interconnection protocol
Modbus TCP	An open industrial communication protocol
PLC	Programmable logic controller

HMI	Man-machine interface
-----	-----------------------

Table1-1: Terms, abbreviations

2 System Overview

2.1 System Description

The IHR series reader is a high-frequency RFID tag reader based on radio frequency identification technology, with an operating frequency of 13.56MHz, which supports the reading and writing of RFID tags that comply with ISO15693 international standard protocols such as I-CODE 2 and I-CODE SLI.

The network port reader adopts Ethernet interface, supports PROFINET, MODBUS TCP communication protocol and custom TCP/IP communication protocol.

The reader has dynamic power control (DPC) to actively optimize RF performance, minimize the impact of the external environment on the reading distance, enhance its own anti-interference ability, and can adapt to more harsh environments. It has the characteristics of high sensitivity, stable performance and strong reliability.

The IHR series reader, is an induction recognition system specifically designed to control and optimize logistics in industrial production. The compact size of the reader makes it a must for applications where installation conditions are limited, especially for assembly lines, handling systems and workpiece delivery systems. The reader is suitable for both simple and demanding RFID applications and has the advantage of a compelling price/performance ratio.

2.2 Typical Applications of readers

Huamao Zongheng Control Technology (Suzhou) Co., LTD

IHR readers are primarily used for non-contact identification of containers, pallets and workpiece clamps in closed-loop production. The data carrier (RFID tag) will remain in the production chain and will not be equipped with the product. The reader has a compact transponder and reader housing size, ideal for tight Spaces.

Main application

- Mechanical Engineering, Automation Systems, conveyor systems
- Auxiliary assembly lines in the automotive industry, component suppliers
- Small assembly line

Application example

- Production line for transmitters, gearboxes, axles, etc.
- Assembly line for ABS systems, airbags, brake systems, doors, cockpit, etc.
- Assembly lines for Household appliances, consumer electronics and electronic communication equipment
- PC, low power motor, contactor, switch assembly line

advantage

- Because large amounts of data can be read and written in a short period of time, the production cycle time is reduced, helping to improve the production rate
- Rugged, high-protection components for use in harsh environments
- Easy system integration into standard TCP/IP and Modbus TCP networks
- Easy system integration into ASCII, Modbus RTU networks
- With built-in diagnostic capabilities, shorten commissioning times, reduce plant failures and reduce downtime
- Maintenance-free components also result in cost savings

2.3 Reader system integration topology

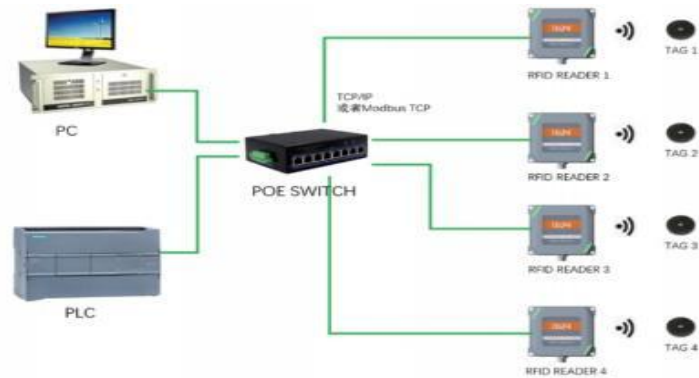


Figure2-2: Network port reader integration

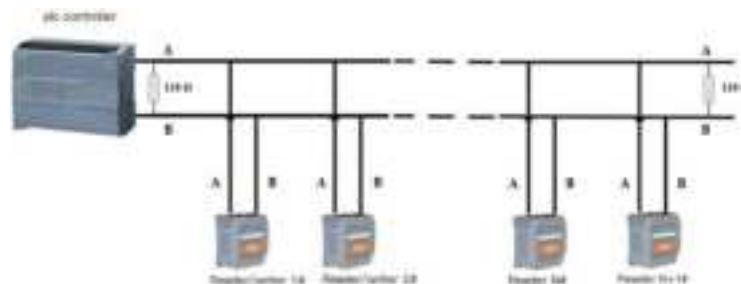


Figure2-2: RS485 Serial port reader MODBUS RTU integration diagram

2.4 Working mode of the reader

Description: The following is only a brief introduction to the working mode of the reader. For a detailed description, please refer to the reader protocol development document.

Working mode:

1: Command mode

In this mode, the communication is a request/response mechanism, and the controller controls the reader by actively sending commands.

2: Command + Automatic upload UID mode

In this mode, in addition to the normal response command, the gateway will automatically obtain the UID of the RFID tag through the reader and automatically transmit the data to the upper bit controller.

3: Command+automatically uploads the user area mode

In this mode, in addition to the normal response command, the gateway will automatically obtain the user area data through the reader according to the pre-set RFID tag address and length, and automatically transmit the data to the upperbit controller.

4: The command+automatically uploads labels in/stateless mode

In this mode, in addition to the normal response command, the reader will automatically read the "presence state" of the RFID tag,

And the status is automatically transmitted to the upper bit controller.

Look out**Reader Automatic Mode compatibility with Modbus protocol**

Because standard ModbusTCP and Modbus RTU use a "request first, answer later" mechanism, automatic mode provides additional "non-standard functionality" for reading and writing under the Modbus protocol.

3 Product installation and system planning**3.1 Reader and Label Installation guidelines**

Both readers and tags are inductive devices, and any metal in the area near these devices will affect them

If you want to maintain an effective and stable "signal field", the following points need to be considered during planning and installation:

- Minimum spacing between two readers or their antennas (10cm)

Huamao Zongheng Control Technology (Suzhou) Co., LTD
3.2 Overview of the reader and its housing materials

Materials for the various parts of the reader:

PC+ABS+Industrial glue

3.3 Electromagnetic Compatibility EMC Standards

EMC must adhere to the following basic principles:

1. Shielded by the shell

--Install the device in a cabinet to protect the device from external interference. The cabinet must be grounded.

--Uses metal plates to shield electromagnetic fields generated by inductors.

--Shield data wires using metal connector cabinets.

2. Large area ground connection

--Plan the network grounding concept.

--Connect all inert metal parts to the frame ground, ensuring large area low HF impedance contacts.

--Establishes a large area connection between the inert metal part and the central ground point.

--includes a shielding bus in the cabinet grounding system.

--Aluminum parts are not suitable for ground connections.

3. Planning cable installation

- Divide the cable routing into several cable groups and then install them separately.
- always distribute power cables, signal cables, and HF cables through separate ducts or separate cable bundles.
- The signal cable is as close to the cabinet surface as possible.
- Cable routing shall not pass through the antenna field.

4. Shielding of cables

- Shielded data cable, both ends of which are shielded.
- Shield the analog cable and connect the shield at one end (for example, at the driver end).
- Always apply a large area connection between the cable shield and the shield bus at the cabinet entrance, and use clamps to establish contacts.
- Uses braided shielding, not foil shielding.

5. Electrostatic discharge

If necessary, it is necessary to prevent static electricity on the surface of the product to avoid interference, and methods such as iso static brushes or effective metal grounding can be used to remove static electricity.

3.4 Effect of secondary field

The reader usually has a secondary field in the range from 0 mm to 30% of the restricted distance.

For example, when operating in dynamic mode, the label temporarily loses its presence during the transition from a secondary field to a primary field, and operations such as reading and writing may fail. Therefore, it is recommended to choose a limit distance greater than 30%.

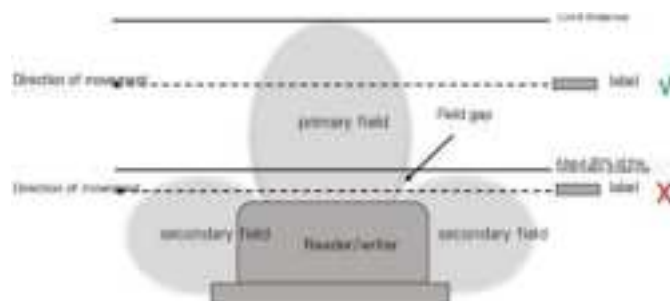


Figure3-1: One/secondary field of a reader

3.5 Effective field data of the reader

The working distance between the IHRreader and several commonly used Siemens labels is shown in Table3-1:

	D160 (mm)	D460 (mm)	D126 (mm)	D100 (mm)	D200 (mm)	D400 (mm)
AU3 IHR-3006-xxx	57/62	37/42	110/120	150/160	130/140	130/140


Table3-1: Reader and label working distance reference

xx/xxDescription: For example, 30/25 represents the static read/write distance 30mm and the dynamic read/write distance 25mm.

4 Reader/writer


4.1

Basic information

AU3 IHR-3006-XXX	Stats
	Ethernet physical interface; Built-in RF antenna; Tri-colorLEDstatus indicator, no card green, card blue, error flashing red;

4.2Reader interface definition

Ethernet version readerM12Interface definition:

stitch	ID	definition
	one	TX+
	2	TX-
	3	RX+
	4	NC
	5	24V DC
	6	RX-
	7	GND
	8	NC

4.3Technical specifications

❖Operating frequency: 13.56MHZ

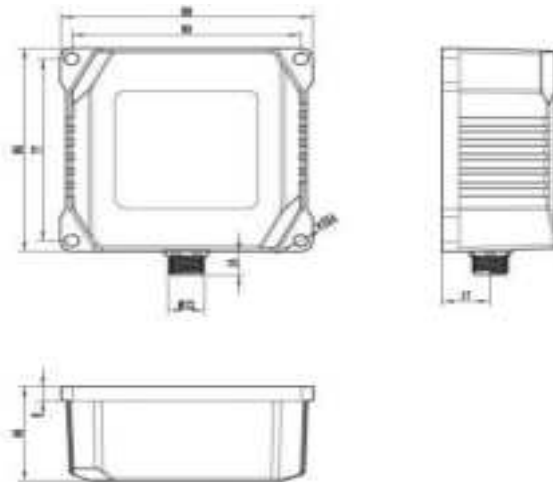
❖Protocol standard: ISO15693

❖Support label types: I-CODE2, I-CODE SLI, etc. comply with ISO15693 communication protocol tags

Huamao Zongheng Control Technology (Suzhou) Co., LTD

- ✧ Reading distance: 0-150mm (related to tag performance)
- ✧ Communication interface: Ethernet
- ✧ Working voltage: DC 12-36V
- ✧ Power consumption: Max. 0.9W
- ✧ Circuit protection: with polarity reverse protection
- ✧ Working temperature: -20℃--+70℃
- ✧ Storage temperature: -25℃--+85℃
- ✧ Protection Class: IP67
- ✧ Weight: 215g
- ✧ Drop test: 1.2m free fall
- ✧ ESD performance: air discharge $\pm 15\text{KV}$, contact discharge $\pm 8\text{KV}$
- ✧ Installation: M5 bolt *4

4.4 Dimensional drawing



- ✧ Family HF reader/writer with :



AU3 IHR-3001-232, AU3 IHR-3001-485, AU3 IHR-3001-IOL, AU3 IHR-3002-232, AU3 IHR-3002-485, AU3 IHR-3002-IOL, AU3 IHR-3004-PNT, AU3 IHR-3004-TCP, AU3 IHR-3004-CCL, AU3 IHR-3004-EIP, AU3 IHR-3004-ECT, AU3 IHR-3004-IOL, AU3 IHR-3004-COM, AU3 IHR-3006-PNT, AU3 IHR-3006-TCP, AU3 IHR-3006-CCL, AU3 IHR-3006-EIP, AU3 IHR-3006-ECT, AU3 IHR-3006-IOL, AU3 IHR-3006-COM, AU3 IHR-3007-PNT, AU3 IHR-3007-TCP, AU3 IHR-3007-CCL, AU3 IHR-3007-EIP, AU3 IHR-3007-ECT, AU3 IHR-3007-IOL, AU3 IHR-3007-COM, AU3 IHR-3011-PNT, AU3 IHR-3011-TCP, AU3 IHR-3011-CCL, AU3 IHR-3011-EIP, AU3 IHR-3011-ECT, AU3 IHR-3011-IOL, AU3 IHR-3011-COM, AU3-IHR-M3021 AU3-IHR-M3022 AU3-IA-2001 AU3-IA-2002 AU3-IA-2011 AU3-IA-2012