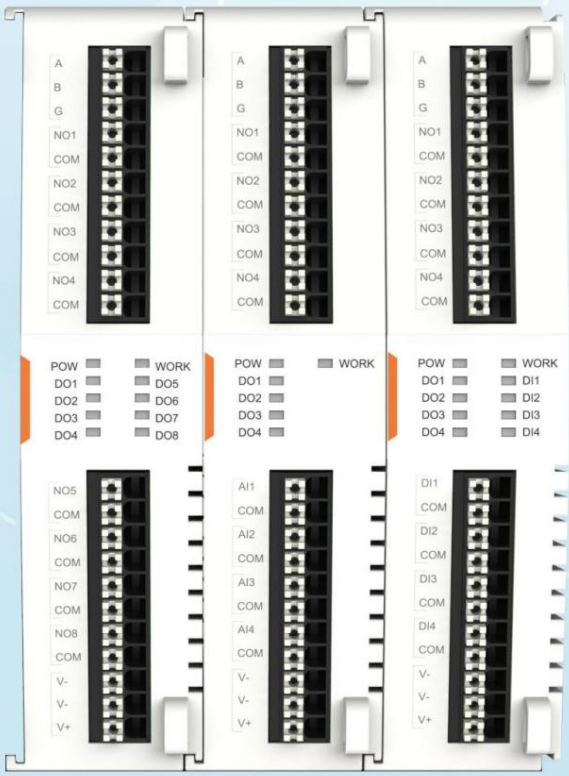
Building block IO controller

USR-IOXXXX series

manual



Find someone online

Trusted Smart Industrial IoT Partner

Table of contents

1. Product Overview

1.1. Product introduction

USR-IOXXXX series IO controller is a new generation of IO acquisition and control module launched by someone. It adopts expanded structural design, flexible matching, standard RS485 interface, and standard Quasi-Modbus RTU protocol enables quick application matching. The product is small in size and can be installed in a three-dimensional manner with guide rails and hanging ears, saving space. Simple and practical, with rich indicator lights, you can judge at a glance device status.

The USR-IOXXXX series IO controllers have a variety of models to choose from. They can be flexibly matched according to different on-site needs. With just a gentle push, the level of IO modules can be realized. Connected, simple to operate and easy to use.

At the same time, it can be combined with other people's M100, M300 and IO network hosts, perfectly interpreting the flexible application method of "building block" network IO.

1.2. Product selection

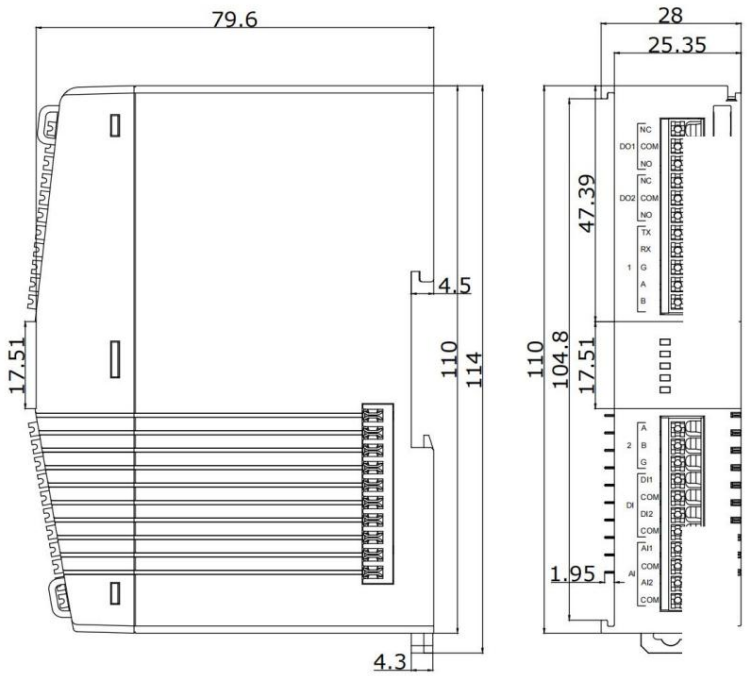
Product model USR-IO4040		USR-IO0440	USR-IO0080	USR-IO8000
DI quantity	4	0	0	8
AI quantity	0	4	0	0
DO quantity	4	4	8	0
AO quantity	0	0	0	0
AI form	/	current	/	/
AI specifications	/	4~20mA	/	/
DI specifications	9~36V	/	/	9~36V
DO form	relay	relay	relay	/
DO specifications	3A	3A	3A	/
Communication Interface	RS485	RS485	RS485	RS485
expand	support	support	support	support

1.3. Product parameters

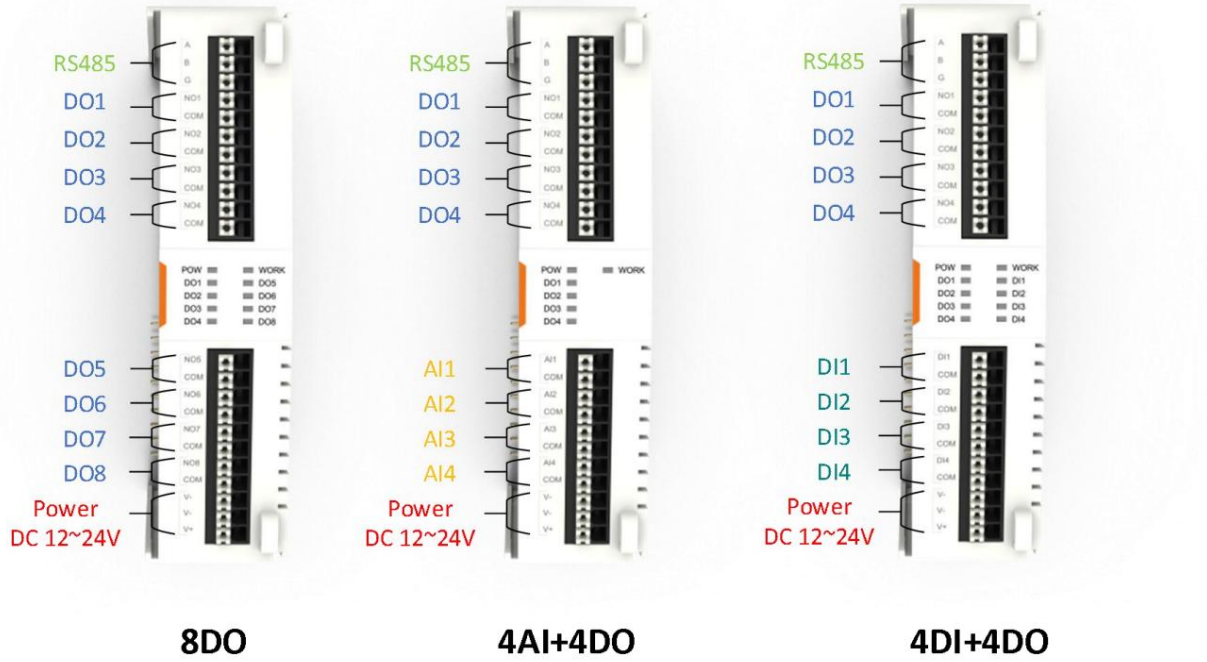
parameter		describe
interface	RS485	Default parameters: 9600, NONE, 8, 1
		Baud rate: 4800, 9600, 115200, 230400
		Check digit: NONE, EVEN, ODD
		Data bits: 8
		Stop bits: 1, 2
Dimensions	Dimensions (mm)	79.6 x 28 x 110 (mm)
weight	Unit: g	ý150g
Installation method		Both mounting ears and guide rails are supported
indicator light	POW	Power indicator light, always on when power is supplied
	WORK	Work indicator light flashes during normal operation, with a flashing frequency of 1s on and off for 1s
	The DO status indicator light turns on when the relay is closed, and turns off when the relay is off.	

	DI status indicator	Valid input lights up, invalid input turns off
power supply	Terminal power supply	DCÿ12~24V
temperature range	normal operating temperature	-25ÿ ~ +75ÿ
	storage temperature	-40ÿ ~ +105ÿ
Humidity range	Working humidity	5%~95% (no condensation)
IO interface	FROM	Digital input, 9-36V is high (status is set to 1), 0-2V is low (status is set to 0), optocoupler isolation
	AI	Current detection, 4~20mA
	DO	Relay output, contact load: 3A 250VAC/ 3A 30VDC, durability: 100,000 times
slave address		1-255, default value is 1

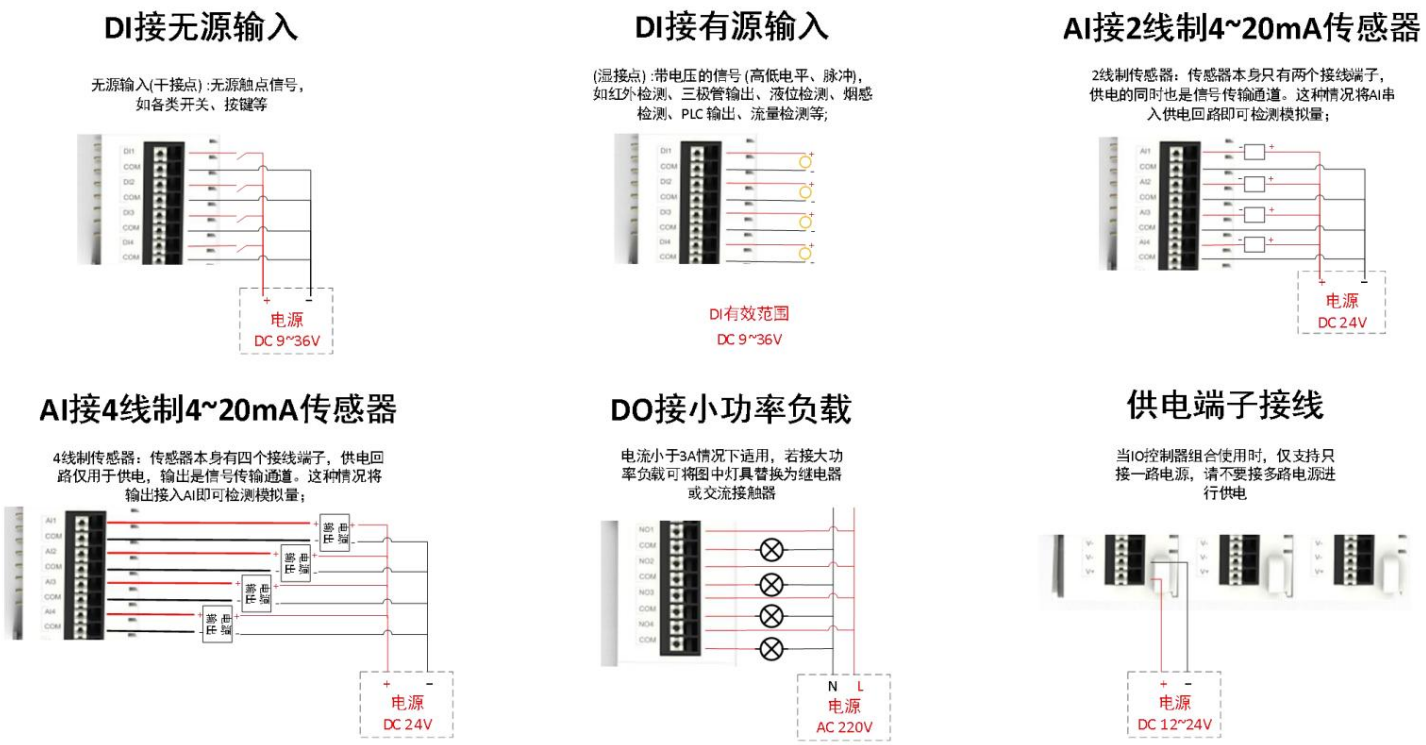
1.4. Product dimensions



1.5. Hardware interface



1.6. Wiring diagram



2. Communication protocol and data format

The USR-IOXXXX series IO controller supports the standard Modbus RTU protocol. This chapter will provide a detailed description of the protocol and register address.

2.1. Modbus command code

Script code	illustrate	operate	Number of operations
01 H	Read coil status	Bit operations single or multiple	
02 H	Read discrete input status (only 0 and 1 can be read)	Bit operations single or multiple	
03 H	Read holding register	Word operations single or multiple	
04 H	Read input register	Word operations single or multiple	
05 H	Write a single coil	Bit operations	single
06 H	Write to a single holding register	Word operations	single
0F H	Write multiple coils	Bit operations	Multiple
10 H	Write multiple holding registers	Word operations	Multiple

2.2. Serial port parameters

Serial port parameters	scope	default value
baud rate	4800ÿ9600ÿ115200ÿ230400	9600
data bits	8	8
Stop bit	1,2	1
Check Digit	NoneÿEvenÿOdd	None

2.2.1. Serial port parameter register

Serial port parameters	Register type	Register address (10 hex)	function code	Bit	illustrate
baud rate	4x	0032~0033	03ÿ10	32 bit	Baud rate 4 bytes
data bits	4x	0034	03ÿ06ÿ10	16 bit	8

Stop bit	4x	0035	03ÿ06ÿ10	16 bit	1,2
Check Digit	4x	0036	03ÿ06ÿ10	16 bit	0ÿNONE 1ÿODD 2ÿEVEN

2.2.2. Serial port parameter reading and configuration example:

Serial port parameter operation	Order	reply
Read baud rate	01 03 00 20 00 02 C5 C1	01 03 04 00 00 25 80 E1 03
Write baud rate 115200	01 10 00 20 00 02 04 00 01 C2 00 F1 17	01 10 00 20 00 02 40 02

Note: After the serial port parameter modification is completed, it needs to be saved and restarted to take effect.

2.3. System parameters

System parameters	Register type	Register address (10 hex)	function code	Bit	illustrate
slave address	4x	0017	03ÿ06	16 bit	Default value 1
Restart	4x	0016	06	16 bit	Restart: 0xFF00
SN	4x	0112~0121	03	10 words	SN is 20 digits
DI filter time (MS)	4x	0048~0055	03ÿ10	16 bit	Range: 10~65535

2.3.1. System parameter reading command example:

System parameter operation	Order	reply
Restart	01 06 00 10 FF 00 C9 FF	01 06 00 10 FF 00 C9 FF
Read slave address	01 03 00 11 00 01 D4 0F	01 03 02 00 01 79 84
Read SN	01 03 00 70 00 0A C4 16	01 03 14 30 32 31 30 32 32 32 32 30 38

		30 39 30 30 30 31 32 32 32 32 13 9C

Note: The SN register value needs to be converted from hexadecimal to ASCII code.

2.4. IO register

IO interface	Register type	Register address (hexadecimal)	function code	Bit	illustrate
FROM	1x	0000 ~ 0007	02	1 person	
AI	3x	0000 ~ 000F	04	32 bit	
DO	0x	0000 ~ 0007	01ÿ05ÿ0F	1 person	ONÿ0xFFOO OFFÿ0x0000

Note: AI is a 32-bit floating point number.

Collection and control examples:

IO operations	Order	reply
DO control	01 05 00 00 FF 00 8C 3A	01 05 00 00 FF 00 8C 3A
DI acquisition	01 02 00 00 00 01 B9 CA	01 02 01 00 A1 88
AI collection	01 04 00 00 00 02 71 CB	01 04 04 00 00 00 00 FB 84

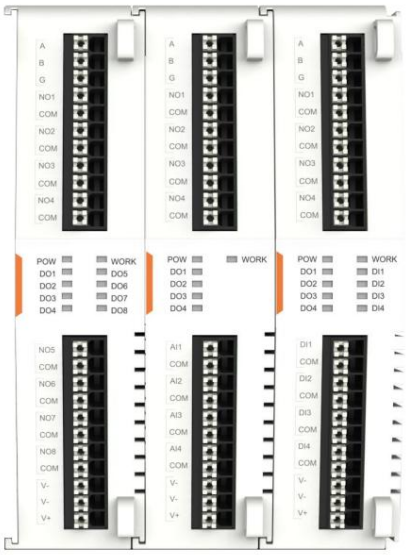
3. IO combination

Currently, the USR-IOXXXX series supports combination expansion functions, matching different types of IO modules for combined use according to different needs.

The expansion method is a push-pull sliding method. The product comes with expansion guide rails and expansion interface pieces. You only need to push the two products gently to achieve combination.

3.1. Expansion machine combination

Schematic diagram of expanded combination:



When the expansion machine is used in combination, the leftmost IO module serves as the first slave machine. It only needs to supply power to the first slave machine to realize the work of all IO modules. At the same time, it can be powered by the first slave machine.

RS485 serial port accesses all IO modules, reducing wiring.

The slave address allocation principle follows the allocation principle from left to right. You only need to set the slave address of the first IO module on the left. The slaves on the right follow the slaves on the left in turn.

+1. For example, the slave address of the first IO module on the left is 10, then the slave address of the second IO module is 11, the slave address of the third IO module is 12, and so on.

Note: Judgment of the left side: The line of sight is facing the front of the IO module, and the left-hand side is the first slave module.

3.2. Combined with host expansion

The IO module can be used as an expansion slave with USR-M100 and USR-M300 and IO networking host. The expansion display intention is as follows:

After the IO module is connected to the host, the slave address and register address are uniformly allocated by the host, and power supply and communication are provided by the host. There is no need to provide separate power supply and connect communication lines.

After connecting to M100 or M300, all IO interfaces of the IO module can be debugged and supervised through the host's built-in web page.

4. Restore factory settings

The IO module can restore factory settings through hardware. When powered on, press the Reload button, keep the Reload button pressed and release it after 3-15s to restore the hardware.

Restore factory settings.

可信赖的智慧工业物联网伙伴

Tmall flagship store: https://youren.tmall.com

JD flagship store: https://youren.jd.com

Official website: www.usr.cn

Technical support ticket: im.usr.cn

Strategic cooperation contact: ceo@usr.cn

Software cooperation contact: console@usr.cn

Phone: 4000 255 652

Address: IoT on the 12th and 13th floors of CEIBS Alumni Industrial Building, No. 3 Maolingshan Road, Lixia District, Jinan City, Shandong Province

Follow someone's WeChat official account and log in to the mall to place an order quickly