

Industrial Edge Gateway

USR-M300

IEC104 Protocol conversion



Be Honest & Do Best

Your Trustworthy Smart Industrial IoT Partner

Directory

目录

1. product introduction	•
2. IEC104 protocol	,
3. Environmental preparation	,
4. ConfigurationM300	,
4.1. Connection	,
4.2. ConfigureIEC104protocol conversion	•
5. Analog Slave Software Configuration	,
5.1. Create links	,
5.2. Open the collection point	
6. view results	
7. Update history	



1. product introduction

The M300 is a high-performance, scalable, comprehensive edge gateway. The product integrates edge data acquisition, calculation, active reporting, data reading and writing, linkage control, IO acquisition and control functions, etc. The acquisition protocol includes standard Modbus protocol and a variety of common PLC protocols, as well as industry-specific protocols. Active reporting adopts group reporting mode, and Json reporting template is customized to quickly realize the docking of server data formats. At the same time, the product also has routing and VPN and graphical program ming functions, graphical module design edge computing functions, to meet customer's own design needs. The product supports TCP/MQTT(S) protocol communication, supports multi-channel connection; supports Modbus RTU/TCP and OPC UA protocol conversion and other functions, and supports fast access to common platforms such as PUSR, Alibaba Cloud, AWS and Huawei Cloud.

The product adopts Linux core, the main frequency is up to1.2GHz; the network adopts WAN/LANplus4Gcellular design, the uplink transmission is more reliable, and the LAN port can be connected to external cameras and other devices, and the function application can be realized by combining its own routing function; the hardware integrates2-wayDI,2-wayDO,2-wayAland2-wayRS485, which not only can realize the industrial field control and acquisition requirements, but also can realize linkage control according to various acquisition point data or status. It can be widely used in intelligent breeding, intelligent factories and other industrial intelligent solutions.

The product adopts expandable design in structure, which can be combined and applied by expanding modules with different functions, so as to better meet the requirements of IO quantity and communication interface in different scenarios. Convenient and cost effective.

2. IEC104 protocol

IEC104 protocol, formally known as IEC60870-5-104, is a standard developed by the International Electro technical Commission (IEC) to support network communication between power system automation equipment. The protocol uses TCP/IP as the underlying communication protocol for monitoring and controlling all types of equipment in power systems, including but not limited to substations, generators, switches, etc.

3. Environmental preparation

USR-M300 *1 net cable*1 12V/1 A power adapter *1

4. ConfigurationM300

4.1. Connection

Connect the LAN port of the M300 to the computer and enter the built-in page of the M300 through the LAN port IP (192.168.1.1) in the browser of the computer. Enter your account password (default password is admin). Then click Login.



	Welcome to Login
	Account
CONNECTING VALUE	Please enter account name
CONNECTING VALUE	Password
VALUABLE CONNECTION	Please enter password
	Login

4.2. ConfigureIEC104protocol conversion

(1) Under the interface of Edge Computing-Protocol Conversion-IEC104, configure the basic configurations of Local Port Number, COT Size, K,W,TO, T1, T2, T3 and Maximum Number of Connections, and click Apply.

·Server address: IP address of the machine

·Local port: custom.

COT Size: An important field used to identify the reason for the data transfer. Default is 2.

K: The maximum number of retransmissions before the host receives an acknowledgement during data transmission.

W: The maximum number of unacknowledged data frames a host can send before waiting for an acknowledgement.

T0: The longest time the host waits for an acknowledgement after sending a message.

T1: The longest time the slave sends an acknowledgement after receiving a message.

T2: The longest time the host sends a life-detection request without receiving any data or acknowledgement. Note: T2 < T1

T3: The longest time the host waits for a response after sending a life-detection request.



USR-M300 IEC104protocol conversion

🛧 USR IoT	0verview	💽 Network	C Edge Computing	System Management							© 81	88492 🧔
Wizard	> Proto	col										
Edge Mode	Protoc	ol										
Extension IO		Andhus RTU	IEC104	1								
IO Module	~	Addbus TCP										
Data Point		OPC UA	Basic settin	ngs 4								
Protocol		Json	Connection C	Config								
Edge Gatewa	~	BACnet	Server Add	192.108.1.1	* Local Port: 2404		· COT size:	10	~	· K	12	
		IEC104		*T3: 20 *M	avimum connection: 10			13		12	10	
/		IEC61150		10. LV								
2		S(651	apply									
			Node mappi	ing table							Add De	elete
	/			ID Position Name	Source(slave	e) Data Type	Rea	ad Write Status	Mapping Address		ASDU Oper	ration
	2					No data	yet					
	5								Total 0 10/	page v	t Next Go	o to 1

(2) To add point mapping, click Add in Point Mapping Table, fill in ASDU of slave, select Type ID, fill in Mapping Initial Address, select Add Point in Point, select slave to add point, select point to add, click OK after configuration. Then restart. (This test converts the DO point of the M300 it self).

X USK IOT	Review 🛞 Network 🐘 Edge Computing 🛞 System Management 👘 Revez 📦 #
Wizard	Protocol
Edge Mode	Protocol
Wizard Edge Mode Extension IO IO Module ~ Data Point Protocol Edge Gateway ~	Protocol Module RTU Module TOP OPC UA Joon BAChet ECCR850 SLSS1 SLSS1 Contractions Contrac
V1.1.88	





5. Analog Slave Software Configuration

5.1. Create links

In this test, IEC104 Client Simulator software is used to simulate the master station to collect data converted from M300 protocol. Click "New Connection", fill in the corresponding configuration, and click OK after configuration. •Server IP address: M300's local IP address

Server port: Local port of M300.

COT Size: An important field used to identify the reason for the data transfer. Default is 2.

K: The maximum number of retransmissions before the host receives an acknowledgement during data transmission.

W: The maximum number of unacknowledged data frames a host can send before waiting for an acknowledgement.

T0: The longest time the host waits for an acknowledgement after sending a message.

T1: The longest time the slave sends an acknowledgement after receiving a message.

T2: The longest time the host sends a life-detection request without receiving any data or acknowledgement. Note: T2T1<

T3: The longest time the host waits for a response after sending a life-detection request.

•Clock synchronization period: The time interval between the master sending a clock synchronization request to the slave.

Total call-up interval: The cycle time for the master to send a message requesting all data to the slave.



USR-M300 IEC104protocol conversion

	🚱 New Connection	- • ×	
	Protocol: IEC 60870-5-104	*	
N	Server IP: 192.168.1.1		
	Server Port: 2404		
	🗹 Advanced Settings 🔽 General I	nterrogation 💟 Counter Interroga	
	Advanced Settings		
	К:	12	
	W:	8	
	t0:	10	
	t1:	15	
	t2:	10	
	t3:	20	
	Originator Address:	0	
	Clock Sync Period (s):	0	
	General Interrogation Interval (s):	0	
	Counter Interrogation Interval (s):	0	

5.2. Open the collection point

Click on the established link, and then "open the connection", the corresponding point will be automatically

generated below the link.

File Edit Dipley Tools Control Commands Heip Wex Connection Open Condition To Discontention Traffic C.IC.N.1 C.IC.N.1 C.S.N.1 C.T.S.N.1 S.T.S.N.1 S.T.S.N.1 S.T.S	IEC104 Client Simulator							- 🗆 X
¹ 192.188.2.74.2404 > STATION 1 > Single-point information × ¹ 10.188.2.74.2404 > STATION 1 > Single-point information × ¹ 10.188.2.74.2404 > STATION 1 > Single-point information × ¹ 10.188.2.74.2404 > STATION 1 > Single-point information × ¹ 10.198.2.74.2404 > STATION 1 > Single-point information × ¹ 10.198.2.74.2404 > STATION 1 > Single-point information × ¹ 10.198.2.74.2404 > STATION 1 > Single-point information × ¹ 10.198.2.74.2404 > STATION 1 > Single-point information × ¹ 10.198.2.74.2404 > STATION 1 > Single-point information × ¹ 10.198.2.74.2404 > STATION 1 > Single-point information × ¹ 10.198.2.74.2404 > STATION 1 > Single-point information × ¹ 10.198.2.74.2404 > STATION 1 > Single-point information × ¹ 10.198.2.74.2404 > STATION 1 > Single-point information × ¹ 10.198.2.74.2404 > STATION 1 > Single-point information × ¹ 10.198.2.74.2404 > STATION 1 > Single-point information × ¹ 10.198.2.74.2404 > STATION 1 > Single-point information × ¹ 10.198.2.74.2404 > STATION 1 = Single-point information × ¹ 10.198.2.74.2404 > STATION 1 = Single-point information ×	File Edit Display Tools Control Com	mands Help) 🔏 nnection Edit Connecti	ion Communication Traffic	C_IC_NA_1 C_C			C_TS_TA_1 C_R	
	√ 🔗 192.168.2.74:2404	• 📚 192.168.2.7	4:2404 > STATION 1 > Single-point	information ×				
Single-point information IDA GroupName VariableName SIQ.SPI SIQ.SS SIQ.NT SIQ.IV COT 1	STATION 1	DA:1 45 46 47	48 49 50 51 58 5	i9 60 61 6i	2 63 64 110 111	112 113		
1 False F	Single-point information	IOA	GroupName VariableName	SIQ.SPI	SIQ.BL SIQ.SB	SIQ.NT	SIQ.IV	СОТ
2 False F		1		False	False False	False	False	INTERROGATED_
SINGLE-POINT INFORMATION WITH QUALITY DESCRIPTOR 常品质描述词約单点信息 SIQ := CP8{SPI,RES,BL,SB,NT,IV} SIQ := CP8{SPI,RES,BL,SB,NT,IV} SIQ := CP8{SPI,RES,BL,SB,NT,IV} SFI := BS1[1]<01>		2		False	False False	False	False	SPONTANEOUS (
SIQ := CP8{SPI,RES,BL,SB,NT,IV} SIQ := CP4{SPI,RES,BL,SB,NT,IV} SPI := BS1[1]<01> SPI := BS1[1]<01> <0> := OFF <0> := # <1> := 0N <1> := # RES RESERVE := BS3[24]<0> RES # ESSERVE := BS3[24]<0> 8L := BS1[5]<01> := # HT := BS1[6]<01> <0> := not blocked <1> := # # # <0> := not substituted <1> := # # # <0> := not substituted <1> := # # # <0> := not substituted <1> := # # # <0> := nt substituted <1> := # # # # # # <1> := substituted <1> := # # <td< th=""><th></th><th>SINGLE-POINT</th><th>INFORMATION WITH QUALITY DE</th><th>SCRIPTOR</th><th>带品质描述词的单,</th><th>流信息</th><th></th><th>•</th></td<>		SINGLE-POINT	INFORMATION WITH QUALITY DE	SCRIPTOR	带品质描述词的单,	流信息		•
<u> <lul><l< th=""><th></th><th>SIQ SPI <1> RES = RESERVE BL <0> <1> SB <0> <1> SB <0> <1> IV <0> <1> IV <0> <1> SB <0> <1> SB <0> <1> SB <0> <1> SB <0> <1> SB <0> <1> SB <0> <1> SB <0> <1> SB <0> <1> SB <0> <1> SB <0> <1> SB <0> <1> SB <0> <1> SB <0> <1> SB <0> <1> SB <0> <1> SB <0> <1> SB <0> <1> SB <0> <1> SB <0> <1> SB <0> <1> SB <0> <1> SB <0> <1> SB <0> <1> SB <0> <1> SB <0> <1> SB <0> <1> SB <0> <1> SB <0> <1> SB <0> <1> SB <0> <1> SB <0> <1> SB <0> <1> SB <0> <1> SB <0> <1> SB <0> <1> SB <0> <1> SB <0> <1> SB <0> <1> SB <0> <1> SB <0> <1> SB <0> <1> SB <0> <1> SB <0> <1> SB <0> <1> SB <0> <1> SB <0> <1> SB <0> <1> SB <0> <1> SB <0> <1> SB <0> <1> SB <0> <1> SB <0> <1> SB <0> <1> SB <0> SB <1> SB <1> SB <1 SB <1 SB <1 SB <1 SB <1 SB <1 SB <1 SB <1 SB <1 SB <1 SB <1 SB <1 SB <1 SB <1 SB <1 SB <1 SB <1 SB SB <1 SB SB SB SB SB SB SB SB SB SB SB SB SB</th><th><pre>:= CP8{SPI,RES,BL,SB,NT := BS1[1]<01> := OFF := ON := BS3[24]<0> := BS1[5]<01> := not blocked := BS1[6]<01> := not substituted := Substituted := SS1[7]<01> := topical := not topical := BS1[8]<01></pre></th><th>, IV}</th><th>SIQ SPI RES = RESERVE BL 40> 41> SB 40> 41> NT 40> 41> IV IV</th><th>:= CP8{SP1,RE := BS1[1]<0 := 开 := BS3[24]< := BS1[5]<0 := 未板闭锁 := 株成団锁 := 株取税 := 株取代 := 株取代 := 株取代 := 歩10]<0.1 := サ当前值 := BS1[8]<0</th><th>S,BL,SB,NT,IV} 1> 0> 1> 1> 1></th><th></th></l<></lul></u></u></u></u></u></u></u></u></u></u></u></u></u></u></u></u></u></u></u></u></u></u></u></u></u></u></u></u></u></u></u></u></u></u></u></u></u></u></u></u></u></u></u></u></u></u></u></u></u></u></u></u></u>		SIQ SPI <1> RES = RESERVE BL <0> <1> SB <0> <1> SB <0> <1> IV <0> <1> IV <0> <1> SB <0> <1> SB <0> <1> SB <0> <1> SB <0> <1> SB <0> <1> SB <0> <1> SB <0> <1> SB <0> <1> SB <0> <1> SB <0> <1> SB <0> <1> SB <0> <1> SB <0> <1> SB <0> <1> SB <0> <1> SB <0> <1> SB <0> <1> SB <0> <1> SB <0> <1> SB <0> <1> SB <0> <1> SB <0> <1> SB <0> <1> SB <0> <1> SB <0> <1> SB <0> <1> SB <0> <1> SB <0> <1> SB <0> <1> SB <0> <1> SB <0> <1> SB <0> <1> SB <0> <1> SB <0> <1> SB <0> <1> SB <0> <1> SB <0> <1> SB <0> <1> SB <0> <1> SB <0> <1> SB <0> <1> SB <0> <1> SB <0> <1> SB <0> <1> SB <0> <1> SB <0> <1> SB <0> <1> SB <0> <1> SB <0> <1> SB <0> <1> SB <0> <1> SB <0> <1> SB <0> <1> SB <0> SB <1> SB <1> SB <1 SB <1 SB <1 SB <1 SB <1 SB <1 SB <1 SB <1 SB <1 SB <1 SB <1 SB <1 SB <1 SB <1 SB <1 SB <1 SB <1 SB SB <1 SB SB SB SB SB SB SB SB SB SB SB SB SB	<pre>:= CP8{SPI,RES,BL,SB,NT := BS1[1]<01> := OFF := ON := BS3[24]<0> := BS1[5]<01> := not blocked := BS1[6]<01> := not substituted := Substituted := SS1[7]<01> := topical := not topical := BS1[8]<01></pre>	, IV}	SIQ SPI RES = RESERVE BL 40> 41> SB 40> 41> NT 40> 41> IV IV	:= CP8{SP1,RE := BS1[1]<0 := 开 := BS3[24]< := BS1[5]<0 := 未板闭锁 := 株成団锁 := 株取税 := 株取代 := 株取代 := 株取代 := 歩10]<0.1 := サ当前值 := BS1[8]<0	S,BL,SB,NT,IV} 1> 0> 1> 1> 1>	
		<1>	:= invalid		<1>	:= 无效		



6. view results

🛠 USR IoT	5	Overview	[·] Netwo	ork 😳 E	dge Computing	[·] System	n Management									nts 📦 \$7488 (?)
Wizard		> Dat	a Point													
Edge Mode		Data	Point													
Extension IO		Data	onne													
Extension to		Slav	e												Add	Imxport Export
IO Module	^	Version:	1741662023													
Function		L	cal IO			Slave Statu	s	offine								
Data Point		10	Slave		Chine	Slave Status										
Data Point						0:offline 1:abn	ormal 2:online 3:sto	p								
Protocol		pro	tocol: Local_IO			protocol: Slave	Status									
Edge Gateway	(×	_														
		List	of slave poin	ts												
															Please enterPoint Screen	
			ID	Node name	Data	Type Decima	al Number Address	Read Write Status	s Priority	Timeout(m:	s) Da	ata A	cquisition formula	Control formula	Node desc	Operation
			1	DO02	В	t	0 DO 02	Read/Write	Level 1	2000	1	1	1000			Edit Delete
			2	D001	В	t	0 DO 01	Read/Write	Level 1	2000	/ /	1			a	Edit Delete
	(A) 15C104	Climat Cimulate	3	DI02	Bi		0 DL02	Only Read	Level 1	2000	/ .	×			**	Edit Delete
	File Edi	t Display	Tools Cont	rol Commands	Help					/ /		- 0 ^				Edit Delete
	ø		U	U	<i>d</i> i		1	<u>ن</u>	6 G	<u>ن</u> ان	⑥	<u>6</u>				Edit Delete
	New Conne	ection Open 68.2.74:2404	Connection C	lose Connectio	Edit Connect 192 168 2	tion Communit	cation Traffic	C_IC_NA_1 C_CI	INA_1 C PO_NA_1	C_CS_N1 C_TS_NA	A_1 C_TS_TA_1 C	C_RP_NA_1_F_SC_NA	_1		2.2	Edit Delete
	V 🛢 ST	ATION 1		COA:1	45 46 47	48 49 5	0 51 58 5	60 61	63 64 10	111 112 113		2		Total 6 1	5/page ~ Lant 1	Next Go to 1
	3	Single-point	information	M_SP_NA_1	IOA	GroupName	VariableName	SIQ 9 1	SIQ.BL SIC	.SB SIQ.NT	SIQ.IV	COT				
					1			True	Forse Fal	se False	False	SPONTANEOUS	(3			
					2			True	False Fal	se False	False	SPONTANEOUS	(3			
V1 1 8																
¥1.1.0																

7. Update history

Versions	Update content	Turnover time
V1.0.0	First edition	2025-03-11

