Modbus-RTU communication protocol

Serial port: 8 data bits, 1 stop bit, no parity effect

Baud rate: 96,000,19200

RTU mode

When the controller is set to communicate in RTU (Remote Terminal Unit) mode over the Modbus network, each 8Bit byte in the message contains two 4Bit hexadecimal characters.The main advantage of this method is that it can transmit more data than ASCII method at the same baud rate.

System of code

□8-bit binary, hexadecimal 0...9, A...F

□Each 8-bit field in the message is a two-hexadecimal character

The bits of each byte

□1 starting bit

□8 data bits, the smallest significant bit sent first

□1 parity bit, none if no parity check

□1 stop Bit (with check), 2 bits (without check)

Error detection domain

□CRC(Cyclic Verbose Detection)

RTU frame

With RTU mode, the message is sent with a pause interval of at least 3.5 characters.This is easiest to achieve with a variety of character times at the network baud rate (as shown in T1-T2-T3-T4 below).The first domain transmitted is the device address.The transmission character that can be used is hexadecimal 0...9,A...F.Network devices constantly detect the network bus, including during pause intervals.When the first domain (address domain) receives a message, each device decodes it to determine whether it is sent to its own.After the last transmission character, a pause of at least 3.5 characters marks the end of the message.A new message can start after this pause.

The entire message frame must be transmitted as one continuous stream.If there is a pause time of more than 1.5 characters before the frame completes, the receiving device will refresh the incomplete message and assume that the next byte is the address field of a new message.Similarly, if a new message starts with the previous message in less than 3.5 characters, the receiving device will consider it a continuation of the previous message.This will result in an error because the value in the CRC field at the end cannot be correct.A typical message frame looks like this:

Position of origin	Device address	Function code	data	CRC verification	End of character
T1-T2-T3-T4	8Bit	8Bit	N 8Bit	16Bit	T1-T2-T3-T4

RTU message frame

Modbus communication protocol is a master-slave protocol. Only one device can transmit on the line at any one time. The master manages the information exchange and only it can initiate it. It polls the slave stations successively, otherwise none of the slave stations can send messages. There is no direct communication between slave stations.

I. Overview of MODBUS-RTU protocol registers

Group 2 Parameter (Read/write) (Read/write) The 03 function code is used for read, and the 10 (hexadecimal) function code is used for write				
Symbo	**Name**	**Content**	**Date format**	**PLC register address (decimal)**
FC	FI	The coefficient of	floa	13
F-r	F-r	measrangevalue	float	15
in-b	in-b	(zero;	float	37
mv	mv	Sensor sensitivity	float	39
in-d	in-d	Displays the decimal	float	7
		position	float	41
SZro	SZro	Power-on automatic reset selection	floa	9
			ry	11
Zror	Zror	Zero set range	floa	43
FLtr	tr	Digital filtering	floa	45
unit	unit	unit	floa	47
Std	Std	Degree of stability	floa	49
tr-d	tr-d	Zero tracking range of	floa	51
		The alarm set value is	floa	53
oA1 out2	oA1 OUT2	selected by password controls control	floa	55 15
		value of the output		
Au	Au	Compare the target value of the control output	floa	17
oA	oA	password	floa	19
ALo1	ALo1	The first comparison controls how the output is compared	floa	21
ALo2	ALo2	The second comparison controls how the output is compared	floa	23
HYA1	HYA1	The first compares the sensitivity of the control output	floa	25
HYA2	HYA2	The second compares the sensitivity of the control output	floa	27
AHH	AHH	Peak value judgment threshold	floa	29
ALL	ALL	Threshold for determining the valley value	floa	31

Parameter 1 (Read/write) The 03 function code is used for read and the 10 (hexadecimal) function code is used for write

Symbo	**Name**	**Content**	**Date format**

Add	Add	Instrument communication address	floa	57
bAud	bAud	Communication rate selection	floa	59
Jocs	Jocs	Retain	floa	61
ctd	ctd	Retain	floa	63

Example 1.Read GROSS Gross, such as 1000 (4-byte floating point)

Host Request(hexadecimal)						
address	Function code	Start high	Start low	Number of registers in the high bit	Number of registers in the low bit	CRC verification
01	03	00	02	00	02	65CB

Slave answering(hexadecimal)							
address	Function code	Number of bytes	Total value 1000 (4-byte floating point)				CRC verification
			Middle mantissa	Low mantissa	Number step code	High mantissa	
01	03	04	00	00	44	7A	48D0

Example 2.Read all parameter values

Host Request(hexadecimal)						
address	Function code	Start high	Start low	Number of registers in the high bit	Number of registers in the low bit	CRC verification
01	03	00	00	00	40	443A

Slave answering(hexadecimal)							
address	Function code	Number of bytes	全部参数数值				CRC verification
			The measured value	Total value 4	Net worth	n the value	
01	03	80	4byte Floating Point value	4byte Floating Point value	4byte Floating Point value	4byte Floating Point value	XXXX

Example 3. Write out1. Compare theratio of the control outputto1.Write 1000 (32-bit floatingpoint).

Host Request(hexadecimal)								
address	Function	Start	Start	Number	Number	Number	Write 1000 (4-byte	CRC

	code	high address	low address	of registers in the high bit	of registers in the low bit	of bytes	floating point				verification
							In the mantissa	Low mantissa	Number of operators exponent	High mantissa	
01	10	00	0C	00	02	04	00	00	44	7A	4119

Slave answering(hexadecimal)						
address	Function code	Start high address	Start low address	Number of registers in the high bit	Number of registers in the low bit	CRC verification
01	10	00	0C	00	02	81CB

Example 4. Read system status value (four bytes)

Host Request(hexadecimal)						
address	Function code	Start high address	Start low address	Number of registers in the high bit	Number of registers in the low bit	CRC verification
01	03	00	0A	00	02	E409

Slave answering(hexadecimal)							
address	Function code	Number of bytes	Firs byte	The second byte	The third byte	The fourth byte	CRC verification
01	03	04	XX	XX	XX	retain	XXXX

First byte							
seven	six	five	four	three	two	one	zero
				MOT	ZERO	OUT1	OUT2

When the status bit is 1, the indicator is on

The second byte							
seven	six	five	four	three	two	one	zero
retain	reta	reta	retain	retain	retain	X	X

	in	in					
GROSS value indicator is on						0	0
NET Net indicator light on						0	1
PEAK indicator is on						1	0
VALLEY indicator light is on						1	1
The third byte							
seven	six	five	four	three	two	one	zero
retain	retain	retain	retain	retain	retain	X	X
KN thousand cattle indicator light						0	0
G gram indicator light on						0	1
Kg The indicator is on						1	0
T ton indicator light on						1	1