

MODBUS

Communication Protocol Manual

Coolmay PLC Modbus Communication Protocol Manual

1.Introduction

Modbus Communication protocol has been widely used in various fields,as standard industrial communication protocol. Coolmay PLC RS485 communication interface supports this kind communication protocol so that PLC can communicate with device with MODBUS communication protocol conveniently, such as converter, temperature module, humidity module, configuration network, and various sensors etc.

The Modbus communication protocol is divided into two series communication modes, ASCII and RTU. When configuring each PLC, User choose communication mode and RS485 serial port communication parameters (Baud rate, parity check etc), all devices on the Modbus bus should have same communication mode and series communication parameters. Using Modbus communication,the relevant special components of each PLC must be set in the ladder diagram.

Coolmay PLC is with default programming port(RS232/RS422), besides, two communication port (RS232/RS485)is optional installed to meet users' external connection to three types equipment.

★ RS232/RS422 (PLC Programming port protocol) : Support Mitsubishi programming port protocol.

★ RS485 (A[485+] B[485-] Port) /RS232: Support Mitsubishi programming port protocol, Mitsubishi serial port protocol and MODBUS protocol (Modbus RTU/ASCII Protocol communication parameters is set in D8120,Station number is set in D8121,and could be used as master or slave.)

◆ Could be special customized as 2 way RS485, support Modbus Protocol Master.

Second RS485 COM Port(A1 B1) is used as MODBUS master communication function.

1,Set communication parameter in D8160 so that PLC ladder diagram runs under the condition of MODBUS master communication. When **M8161** is “ON”,RD3A and WR3A instructions are switched to communicate with the second RS485 communication port (A1,B1).

2, Use following register D8166(D8126), D8169(D8129), M8169(M8129), M8163(M8123), D8103(D8063), M8103(M8063), in same method with the first RS485 Com Port.

3, () is the first RS485 Com Port (A B port) MODBUS communication register.

※ The use of Mitsubishi series protocol, refer to RS instruction of “Mitsubishi FX Programming Manual”.

※ The use of MODBUS Protocol, refer to this manual or “Coolmay PLC Modbus Communication communication manual”.

D8120/D8160 Communication parameter selection register:

b1	b1	b1	b1	b1	b1	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
5	4	3	2	1	0										

b0	Date length 0:7 1:8
b2 b1	Parity 00:None 01:Odd 11:Even
b3	Stop 0:1 1:2
b7 b6 b5 b4	Baud rate 0100:600bps 0101:1200bps 0110:2400bps 0111:4800bps 1000:9600bps 1001:19200bps
b8	No related to Modbus, Set 0
b9	No related to Modbus, Set 0
b11	No related to Modbus, Set 0
b10	No related to Modbus, Set 0
b12	No related to Modbus, Set 0

b13	Modbus Communication Mode 0:RTU 1:ASCII
b14	Start Communication protocol 0:Use programming port protocol or RS instruction to communicate 1:Use Modbus protocol to communicate
b15	PLC Master Slave selection 0:Slave 1:Master

D8121/D8161 Slave station number register. Range: 1-247.

When PLC is as Modbus communication slave, there must be one station number, to set D8121/D8161 in ladder diagram.

D8126/D8166 Delay register before sending. range: 0-1000, unit:ms.

Give receiving equipment some preparation time, proper 5-20ms.

2, PLC as Master

When PLC is as master,only the following functions are supported:

03:Read holding register, get current binary value range of 1-32 in one or multiple holding registers.

06:Load the specific binary value into a holding register (write register), range is 1.

16: Preset multiple registers, Load the specific binary value into a series of constant holding registers (write multiple registers), range is 1-32.

Example of reading slave data instructions : RD3A K1 H0 D0

RD3A was originally analog module read instruction, the original instruction function can't be used. RD3A instruction correspond to function "03" of MODBUS and read the (4X type) register. In these instructions, K1 is station number of read slave device and range is 1-247, H0 is address number 0000(hexadecimal) of read data which is in the slave device,the value in D0 is numbers of register to be read and range is 1-32,the data being read is stored in order of D1,D2, D3...

Example of writing data to slave instruction: WR3A K1 H0 D0

WR3A was originally analog module write instruction, the original instruction function can't be used. WA3A instruction corresponds to function "16" of MODBUS and write data to each (4X type) register in slave device, if only write 1 register, WR3A correspond to function "06" and write 1 data to 1 register (4X type) in slave device. In these instructions, K1 represents station number of slave device being written and the range is 1-247, HO represents first address number (hexadecimal) of register to be written in slave device, DO represents numbers of register to be written and range is 1-32, the source data being written is stored in order D1, D2, D3...

D8129/D8169 (M8129/M8169) Overtime register. Range: 0-32767, Unit : 10ms.

When receiving is timeout and an error, **M8129/M8169=ON**.

M8123/M8163 one communication completed symbol

When complete one communication, **M8123/M8163=ON**, No matter whether it completed successfully or not.

When RD3A or WR3A instruction is not executed, it will not affect **M8129/M8169** and **M8123/M8163**, When instruction is executed, both **M8129** and **M8123** are off automatically by system if in communication process, **M8123/M8163** and **M8129/M8169** will output corresponding status if communication completed.

Multiple Programming

RD3A and WR3A can be programmed many times in ladder diagram, because communication is a long process, communication needs to be kept in execution and not to be used in pulse. When there are many instructions that needs to be communicated at same time, the system will take turns to time-sharing communication, using upper delay of M8123/M8163 could detect the current execution status of this communication instruction conveniently.

D8063/D8103 (M8063/D8103) Communication error message

The upper delay of M8063 could detect the communication fault message in this communication

instruction easily.

D8063's value represents the respective error message

6315: Slave number of Modbus is out of range , > 255 .

6316: Numbers of Modbus read and write registers are out of range, It is normally 1-32.

6317: Modbus receiving is timeout.

6318: Inconsistent station number to get response

6319: Illegal response

6320: LCR corresponded detects error

6321: Illegal address of saving data

6322: CRC corresponded detects error

6323: Data format corresponded is illegal

6324: The machine is not set as Modbus Master

6325: Address is out of range

6326: Modbus sending is timeout

3. PLC as slave

Once the PLC is set as MODBUS Slave, no matter whether the PLC is in "STOP" or "RUN",it could proceed Modbus communication.

Modbus function supported by Slave:

01:Read coils status to get current status (ON/OFF) of a group of logic coils,range is 1-512.

02:Read inputting status to get current status (ON/OFF)of a group of switch inputs,range is 1-512.

03:Read holding register to get current binary value in one or multiple holding registers,range is 1-32.

04:Get current binary value in one or multiple input register, range is 1-32.

05:Strong set single coil,set one logic coil "ON/OFF" state (write 1 bit),range is 1.

06:Load specific binary value into one holding register (write register),range is 1.

15:Strong set multi-coils, set a series of constant logic coils "ON/OFF" state (write multiple bits),range is 1-512.

16:Preset multiple register,load specific binary value into a series of constant holding registers (write

multiple registers),range is 1-32.

The address number corresponding to PLC Register in MODBUS communication:

Hexadecimal Address Number	Register
0000-01FF	D0-D511
1F40-203F	D8000-D8255
A140-A23F	T0-T255
A340-A407	C0-C199
A408-A477	C200-C255, 32bit takes 1 addresses

The address number corresponding to PLC bit components in MODBUS communication:

Hexadecimal Address Number	Bit Components
0000-05FF	M0-M1535
1E00-1EFF	M8000-M8255
2000-23E7	S0-S999
3000-30FF	T0-T255
3200-32FF	C0-C255
3300-33B7	Y0-Y267
3400-34B7	X0-X267

Note: When PLC communicate with Kingview as slave, the hexadecimal address number corresponding to register and bit components must be shifted by one. For example, D0 corresponds to 40000,It should be 40001 corresponded to Kingview inside; Y0 corresponds to 13056, it should be 13057 corresponded to Kingview inside; M0 corresponds to 00000, it should be 00001 corresponded to Kingview inside. If the register corresponds to floating points,the one corresponding to kingview should be shifted by two. For example, D0corresponds to 40000,It should be 40002 corresponded to Kingview inside.