

The MODBUS protocol for series CE-A is completely compatible with MODBUS developed by Gould Modicon for use in Modicon PLC systems.

1.1 Format of data

1.1.1 Format of message

1.1.1.1 Function code 0x03 — To read the contents of registers from the slave equipment.

The Message from the master equipment:

Address of the slave equipment	0x01-0xFF	1 byte
Function code	0x03	1 byte
Address of the first register		2 bytes
Quantity of Registers		2 bytes
CRC code		2 bytes

The correct responded message from the slave equipment:

Address of the slave equipment	0x01-0xFF	1 byte
Function code	0x03	1 byte
Byte count	2 x N*	1 byte
Data section (contents of registers)		N* x 2 bytes
CRC code		2 bytes

*N = Quantity of Registers

1.1.1.2 Function code 0x10 — To set (write) data of registers of the slave equipment

The Message from the master equipment

Address of the slave equipment	0x01-0xFF	1 byte
Function code	0x10	1 byte
Address of the first register		2 bytes
Quantity of Registers		2 bytes
Byte count	2 x N*	1 byte
The data written to the registers		2 x N*
CRC code		2 bytes

*N = Quantity of Registers

The correct responded message from the slave equipment:

Address of the slave equipment	0x01-0xFF	1 byte
Function code	0x10	1 byte
Address of the first register		2 bytes
Quantity of Registers		2 bytes
CRC code		2 bytes

Note: 1. For all Address of register, Quantity of registers and Contents of register (Data), their high order byte is before their low order byte. But the low order byte of CRC code is before its high order byte.

2. The length of the register is 16 bits (2 bytes).

1.1.2 Format of commands and explanation of the registers

1.1.2.1 List of definitions of registers for electrical parameters data

Address of register (Hex)	Contents of register	Quantity of registers	Attribute of register	Range of data
0x0010	Voltage	1	Read only	0~12000
0x0011	Current	1	Read only	0~12000
0x0012	Power	1	Read only	0~12000
0x0013	Positive Energy	2	Read only	0 ~0x7FFFFFFF
0x0015	Negative Energy	2	Read only	0x80000000 ~0xFFFFFFFF

1.1.2.2 List of definitions of registers for transducer's name, address and baudrate:

Address of register (Hex)	Contents of register	Quantity of registers	Attribute of register	Range of data
0x0020	Address and baudrate	1	Read/write	Address (0-256) Baudrate (03-07)
0x0021	Transducer's name	2	Read only	Depend on part number (4 bytes)

1.1.2.3 The explanation of register "To clear the data of energy"

Address of register (Hex)	Contents of register	Quantity of registers	Attribute of register	Range of data
0x00A7	Clear the data of energy	1	Write	0x0000

1.1.2.4 Examples:

For all Address of register, Quantity of registers and Contents of register (Data), their high order byte is before their low order byte. But the low order byte of CRC code is before its high order byte.

A: Example for the command "To read the all data":

Address of slave equipment	Function code	Address of the first register		Quantity of registers		CRC-L	CRC-H
0x01	0x03	0x00	0x10	0x00	0x07	0x05	0xCD

Note: 1. 0x00 is the high order byte of the register, and 0x10 is the lower order byte of the register.

2. Please see above 5.1.2.1 list of definitions of register of electrical parameters data for the sequence of the output data.

B: Example for the command "To modify the address and baudrate":

(Change the address from 01 to 02; set new baudrate to 9600 bps <code 06>)

Address of slave equipment	Function code	Address of the first register		Quantity of registers		Data bytes count	Data written to register		CRC-L	CRC-H
0x01	0x10	0x00	0x20	0x00	0x01	0x02	0x02	0x06	0x20	0x52

Note: Codes for baudrate setting: 03-1200bps, 04-2400bps, 05-4800bps, 06-9600bps,

order byte ahead, the MSB is sign bit.)

1.2.3 Calculation of energy:

$$N = (n * \text{Rated current} * \text{Rated voltage}) / (1000 * 3600) \quad (\text{kWh})$$

There into: n——The data of active energy received by the master equipment. (4 bytes, high order byte ahead, the MSB is sign bit.)

1.2.4 Calculation of current and voltage:

$$u = (U / 10000) * \text{Rated voltage} \quad (\text{V})$$

There into: U—— The data of voltage received by the master equipment. (2 bytes, high order byte ahead, the MSB is sign bit.)

$$i = (I / 10000) * \text{Rated current} \quad (\text{A})$$

There into: I—— The data of current received by the master equipment. (2 bytes, high order byte ahead, the MSB is sign.)

Please contact us if you need some internal calibrating commands for zero point calibration