



PROTOCOLO MODBUS

MAPA MODBUS
GUÍA DE USUARIO ULTRA TT

EQUIPOS Y SISTEMAS PARA MEDIR Y TRATAR AGUA S.A. DE C.V.



Índice

Capítulo	Número de página
1. The serial transmission modes	3
2. Register and message format	4
2.1 COIL	4
2.2 FLOAT	4
2.3 INT	4
2.4 LONG	4
3. Message format definition	5
3.1 CMD=0x03 (read 1 or more registers)	5
3.2 CMD=0x05 (write COILVariable)	6
3.3 CMD=0x06 (write a single register)	7
3.3 CMD=0x10 (write many registers)	8
3.4 Exception response	9
4. Data error check field algorithm	10
4.1 LRC check	10
4.2 CRC16 check	11
5. Flow meter Variable(slave address) definition	13
6. Appendix 1: Constant table: Error code	14
7. Appendix 2: Constant table: flow unit	15
8 Appendix 3: Alarm definition	18

1 Date type

Date type	Date size (Bit)	Register number
Bool	1	1
Int	16	1
Float	32	2

2 Date-Register map table

Register	Date type	Function Code	Information analysis	Read-Write
0x0200	Int	0x03	Positive flow volume high-16bit	Only read
0x0201	Int	0x03	Positive flow volume low-16bit	Only read
0x0202	Int	0x03	Positive flow volume unit and fractional part	Only read
0x0203	Int	0x03	Backward flow volume high-16bit	Only read
0x0204	Int	0x03	Backward flow volume low-16bit	Only read
0x0205	Int	0x03	Backward flow volume unit and fractional part	Only read
0x0400	Int	0x03	Flow rate high-16bit	Only read
0x0401	Int	0x03	Flow rate low-16bit	Only read
0x0402	Int	0x03	Flow rate unit and fractional part	Only read
0x0403	Int	0x03	Water temperature high-16bit	Only read
0x0404	Int	0x03	Water temperature low-16bit	Only read
0x0405	Int	0x03	Water temperature unit and fractional part	Only read
0x0406	Int	0x03	Operating time high-16bit	Only read
0x0407	Int	0x03	Operating time low-16bit	Only read
0x0408	Int	0x03	Operating time unit and fractional part	Only read
0x0409	Int	0x03	Warning time high-16bit	Only read
0x040A	Int	0x03	Warning time low-16bit	Only read
0x040B	Int	0x03	Warning time unit and fractional part	Only read
0x040C	Int	0x03	Device status	Only read
0x0600	Int	0x03	Software versions (e.g.0x03A1 = Ver3.A1)	Only read
0x0601	Int	0x03	Hardware versions (e.g.0x020B = Ver2.0B)	Only read
0x0602	Int	0x03	Secondary address high-16bit	Only read
0x0603	Int	0x03	Secondary address low-16bit	Only read
0x0604	Int	0x03/0x10/0x06	Address	Read and write
0x0605	Int	0x03/0x10/0x06	Communication parameters	Read and write
0xFEFF	Char (12)	0x10	Setting the date and time(Y.M.D.H.m.s) e.g.02-10-2009 14:15:16 01 10 fe ff 00 01 0C 30 32 31 30 30 39 31 34 31 35 31 36 35 49	Only write

Unit definition

Unit	Code
L	0x29
m ³	0x2C
L/h	0x32
m ³ /h	0x35
°C	0x40
K	0x41
h	0x50
d	0x51

3 Request master and response slave

3.1 Read positive flow volume

Request master:

0x01	0x03	0x02	0x00	0x00	0x03	0x04	0x73
------	------	------	------	------	------	------	------

Address: 0x01

Function Code: 0x03

Register: 0x0200, #Points: 0x0003

CRC16: 0x04 0x73

Response slave:

0x01	0x03	0x06	0x07	0x5B	0xCD	0x15	0x2C	0x01	0xB7	0x67
------	------	------	------	------	------	------	------	------	------	------

Date length: 0x06

Date: 0x07 0x5B 0xCD 0x15, mean 0X75BCD15 = 123456789

Date: 0x2C 0x01, mean m³-Unit, One fractional part.

Positive flow volume is 12345678.9m³

3.2 Read backward flow volume

Request master:

0x01	0x03	0x02	0x03	0x00	0x03	0xF4	0x73
------	------	------	------	------	------	------	------

Address: 0x01

Function Code: 0x03

Register: 0x0200, #Points: 0x0003

CRC16: 0x04 0x73

Response slave:

0x01	0x03	0x06	0x07	0x5B	0xCD	0x15	0x2C	0x01	0xB7	0x67
------	------	------	------	------	------	------	------	------	------	------

Date length: 0x06

Date: 0x07 0x5B 0xCD 0x15, mean 0X75BCD15 = 123456789

Date: 0x2C 0x01, mean m³-Unit, One fractional part

Backward flow volume is 12345678.9m³

3.3 Read flow rate

Request master:

0x01	0x03	0x04	0x00	0x00	0x03	0x04	0xFB
------	------	------	------	------	------	------	------

Address: 0x01

Function Code: 0x03

Register: 0x0400, #Points: 0x0003

CRC16: 0x04 0xFB

Response slave:

0x01	0x03	0x06	0x07	0x5B	0xCD	0x15	0x35	0x03	0x3D	0x36
------	------	------	------	------	------	------	------	------	------	------

Date length: 0x06

Date: 0x07 0x5B 0xCD 0x15, mean 0X75BCD15 = 123456789

Date: 0x35 0x03, mean m³/h-Unit, three fractional part

Flow rate is 12345.6789m³/h

3.4 Read water temperature

Request master:

0x01	0x03	0x04	0x03	0x00	0x03	0xF4	0xFB
------	------	------	------	------	------	------	------

Address: 0x01

Function Code: 0x03

Register: 0x0403, #Points: 0x0003

CRC16: 0x04 0xFB

Response slave:

0x01	0x03	0x06	0x07	0x5B	0xCD	0x15	0x40	0x02	0xDA	0x66
------	------	------	------	------	------	------	------	------	------	------

Date length: 0x06

Date: 0x07 0x5B 0xCD 0x15, mean 0X75BCD15 = 123456789

Date: 0x40 0x02, mean °C-Unit, two fractional part

Water temperature is 1234567.89 °C

3.4 Read water temperature

Request master:

0x01	0x03	0x04	0x03	0x00	0x03	0xF4	0xFB
------	------	------	------	------	------	------	------

Address: 0x01

Function Code: 0x03

Register: 0x0403, #Points: 0x0003

CRC16: 0x04 0xFB

Response slave:

0x01	0x03	0x06	0x07	0x5B	0xCD	0x15	0x40	0x02	0xDA	0x66
------	------	------	------	------	------	------	------	------	------	------

Date length: 0x06

Date: 0x07 0x5B 0xCD 0x15, mean 0X75BCD15 = 123456789

Date: 0x40 0x02, mean °C-Unit, two fractional part

Water temperature is 1234567.89 °C

3.5 Read operating time

Request master:

0x01	0x03	0x04	0x06	0x00	0x03	0xE4	0xFA
------	------	------	------	------	------	------	------

Address: 0x01

Function Code: 0x03

Register: 0x0406, #Points: 0x0003

CRC16: 0xE4 0xFA

Response slave:

0x01	0x03	0x06	0x07	0x5B	0xCD	0x15	0x40	0x02	0xDA	0x66
------	------	------	------	------	------	------	------	------	------	------

Date length: 0x06

Date: 0x07 0x5B 0xCD 0x15, mean 0x75BCD15 = 123456789

Date: 0x50 0x00, mean h-Unit, none fractional part

Operating time is 123456789h

3.6 Read warning time

Request master:

0x01	0x03	0x04	0x09	0x00	0x03	0xD4	0xF9
------	------	------	------	------	------	------	------

Address: 0x01

Function Code: 0x03

Register: 0x0409, #Points: 0x0003

CRC16: 0xD4 0xF9

Response slave:

0x01	0x03	0x06	0x07	0x5B	0xCD	0x15	0x40	0x02	0xDA	0x66
------	------	------	------	------	------	------	------	------	------	------

Date length: 0x06

Date: 0x07 0x5B 0xCD 0x15, mean 0X75BCD15 = 123456789

Date: 0x50 0x00, mean h-Unit, none fractional part

Warning time is 123456789h

3.7 Read device status

Request master:

0x01	0x03	0x04	0x0C	0x00	0x01	0xA5	0x38
------	------	------	------	------	------	------	------

Address: 0x01

Function Code: 0x03

Register: 0x040C, #Points: 0x0001

CRC16: 0xA5 0x38

Response slave:

0x01	0x03	0x06	0x07	0x5B	0xCD	0x15	0x40	0x02	0xDA	0x66
------	------	------	------	------	------	------	------	------	------	------

Date length: 0x02

Date length: 0x00 0x04, mean 0x0004

Device status is 0x0004 (acc. to table 3.7.1)

Table 3.7.1 Device status

	BIT15-BIT8	BIT7	BIT6	BIT5	BIT4	BIT3	BIT2	BIT1	BIT0
0	Reserved	Factory flag is not set	Reset seals	Not sensor error	Reserved	Reserved	Not power low	Reserved	Reserved
1		Factory flag is set	Set seals	Sensor error			Power low		

3.8 Read software versions

Request master:

0x01	0x03	0x06	0x00	0x00	0x01	0x84	0x82
------	------	------	------	------	------	------	------

Address: 0x01

Function Code: 0x03

Register: 0x0600, #Points: 0x0001

CRC16: 0x84 0x82

Response slave:

0x01	0x03	0x02	0x12	0x34	0xB5	0x33
------	------	------	------	------	------	------

Date length: 0x02

Date: 0x12 0x34, mean 0x1234 = 12.34

Software versions is 12.34

3.9 Read Hardware versions

Request master:

0x01	0x03	0x06	0x01	0x00	0x01	0xD5	0x42
------	------	------	------	------	------	------	------

Address: 0x01

Function Code: 0x03

Register: 0x0601, #Points: 0x0001

CRC16: 0xD5 0x42

Response slave:

0x01	0x03	0x02	0x12	0x34	0xB5	0x33
------	------	------	------	------	------	------

Date length: 0x06

Date: 0x07 0x5B 0xCD 0x15, mean 0x75BCD15 = 123456789

Date: 0x50 0x00, mean h-Unit, none fractional part

Operating time is 123456789h

3.10 Read secondary address

Request master:

0x01	0x03	0x06	0x02	0x00	0x02	0x65	0x43
------	------	------	------	------	------	------	------

Address: 0x01

Function Code: 0x03

Register: 0x0602, #Points: 0x0002

CRC16: 0xD5 0x42

Response slave:

0x01	0x03	0x04	0x00	0xBC	0x61	0x4E	0xB5	0x33
------	------	------	------	------	------	------	------	------

Date length: 0x04

Date: 0x00 0xBC 0x61 0x4E, mean 0x00BC614E = 12345678

Secondary address is 12345678

3.11 Read address

Request master:

0x01	0x03	0x06	0x04	0x00	0x01	0xC5	0x43
------	------	------	------	------	------	------	------

Address: 0x01

Function Code: 0x03

Register: 0x0604, #Points: 0x0001

CRC16: 0xC5 0x43

Response slave:

0x01	0x03	0x02	0x00	0x01	0x79	0x84
------	------	------	------	------	------	------

Date length: 0x02

Date: 0x00 0x01, mean 0x0001

Address is 01

3.12 Read communication parameters

Request master:

0x01	0x03	0x06	0x05	0x00	0x01	0x94	0x83
------	------	------	------	------	------	------	------

Address: 0x01

Function Code: 0x03

Register: 0x0605, #Points: 0x0001

CRC16: 0x94 0x83

Response slave:

0x01	0x03	0x02	0x00	0x24	0xB8	0x5F
------	------	------	------	------	------	------

Date length: 0x02

Date: 0x00 0x24, mean 0x0024

Communication parameters is 0x0024 (acc. to table 3.12.1)

Table 3.12.1 Communication parameters

BIT15-BIT8	BIT7	BIT6	BIT5	BIT4	BIT3	BIT2	BIT1	BIT0
Reserved	00b: EN13757 protocol 01b: Modbus protocol 10b: CJ188 protocol 11b		00b: even parity 01b: none parity 10b: even parity 11b: odd parity		0b: one stop 1b: two stop			000b: 2400bps 001b: 300bps 010b: 600bps 011b: 1200bps 100b: 2400bps 101b: 4800bps 110b: 9600bps 111b: 2400bps

3.13 Setting address

3.13.1 Function Code 16

Request master:

0x01	0x10	0x06	0x04	0x00	0x01	0x02	0x00	0x02	0x40	0x15
------	------	------	------	------	------	------	------	------	------	------

Address: 0x01

Function Code: 0x10

Register: 0x0604, #Points: 0x0001

Bytes number: 0x02

Setting address: 0x0002

CRC16: 0x40 0x15

Response slave:

0x01	0x10	0x06	0x04	0x00	0x01	0x40	0x80
------	------	------	------	------	------	------	------

Address of before setting: 0x01

Function Code: 0x10

Register: 0x0604

Date length: 0x0001

CRC16: 0x40 0x80

3.13.2 Function Code 6

Request master:

0x02	0x06	0x06	0x04	0x00	0x03	0x88	0xB1
------	------	------	------	------	------	------	------

Address: 0x02

Function Code: 0x06

Register: 0x0604

Setting address: 0x0003

CRC16: 0x88 0xB1

Response slave:

0x02	0x06	0x06	0x04	0x00	0x03	0x88	0xB1
------	------	------	------	------	------	------	------

Address of before setting: 0x02

Function Code: 0x06

Register: 0x0604

Setting address: 0x0003

CRC16: 0x88 0xB1

3.14 Setting communication parameters

3.14.1 Function Code 16

Request master:

0x03	0x10	0x06	0x05	0x00	0x01	0x02	0x00	0x25	0x18	0xBE
------	------	------	------	------	------	------	------	------	------	------

Address: 0x03

Function Code: 0x10

Register: 0x0605, #Points: 0x0001

Bytes number: 0x02

Setting communication parameters: 0x0025(acc. to table 3.14.1.1)

CRC16: 0x40 0x15

Response slave:

0x03	0x10	0x06	0x05	0x00	0x01	0x10	0xA2
------	------	------	------	------	------	------	------

Address: 0x03 Function

Code: 0x10

Register: 0x0605

Date length: 0x0001

CRC16 : 0x10 0xA2

3.14.2 Function Code6

Request master:

0x03	0x06	0x06	0x05	0x00	0x16	0x19	0x6F
------	------	------	------	------	------	------	------

Address: 0x03 Function

Code: 0x06

Register: 0x0605

Setting communication parameters: 0x0016(acc. to table 3.14.1.1)

CRC16: 0x19 0x6F

Response slave:

0x03	0x06	0x06	0x05	0x00	0x16	0x19	0x6F
------	------	------	------	------	------	------	------

Address: 0x03 Function

Code: 0x06

Register: 0x0605

Setting communication parameters: 0x0016(acc. to table 3.14.1.1)

CRC16: 0x19 0x6F

Table 3.14.1.1 Communication parameters

BIT15-BIT8	BIT7	BIT6	BIT5	BIT4	BIT3	BIT2	BIT1	BIT0
Reserved			00: even parity 01: none parity 10: even parity 11: odd parity	0b: one stop 1b: two stop	000: 2400bps 001: 300bps 010: 600bps 011: 1200bps 100: 2400bps 101: 4800bps 110: 9600bps 111: 2400bps			

3.15 Setting the date and time

Request master:

0x01	0x10	0xFE	0xFF	0x00	0x01	0x0C	0x31	0x32	0x30	0x35	0x31	0x35	0x31	0x36
0x33	0x31	0x31	0x36	0xAF	0x96									

Address: 0x01

Function Code: 0x10

Register: 0xFEFF, #Points: 0x0001

Bytes number: 0x0C

Setting the date and time: 0x31 0x32 (12 month), 0x30 0x35 (05day), 0x31 0x35 (15year),
0x31 0x36 (16hour), 0x33 0x31 (31 minute), 0x31 0x36 (16 second)

CRC16: 0xAF 0x96

Response slave:

0x01	0x10	0xFE	0xFF	0x00	0x01	0x00	0x11
------	------	------	------	------	------	------	------

Address: 0x01

Function Code: 0x10

Register: 0xFEFF

Date length: 0x0001

CRC16: 0x00 0x11

3.16 Response error code analysis

Request master:

0x01	0x80	0x01	0x80	0x00
------	------	------	------	------

Address: 0x01

Error code: 0x8001

CRC16: 0x80 0x00

Error code

Error code	Analysis
0x8001	Setting date error
0x8002	Address error
0x8003	The sum of address and #Points is error (too long or zero)
0x8030	Address it too long than 0XF7 (247)