

MT4N/MT4Y/MT4W Common Features

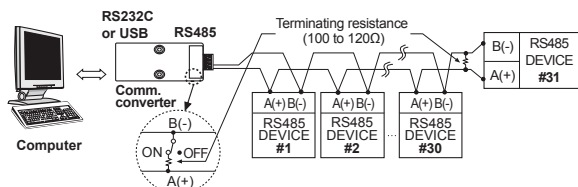
■ Communication Output

The protocol is changed as Modbus type.

◎ Interface

Comm. protocol	Modbus RTU
Connection type	RS485
Application standard	Compliance with EIA RS485
Max. connection	31 units (address: 01 to 99)
Synchronous method	Asynchronous
Comm. method	Two-wire half duplex
Comm. distance	Max. 800m
Comm. speed	1200, 2400, 4800, 9600 bps
Start bit	1-bit (fixed)
Data bit	8-bit (fixed)
Parity bit	None, Even, Odd
Stop bit	1-bit, 2-bit (fixed)

◎ Application of system organization

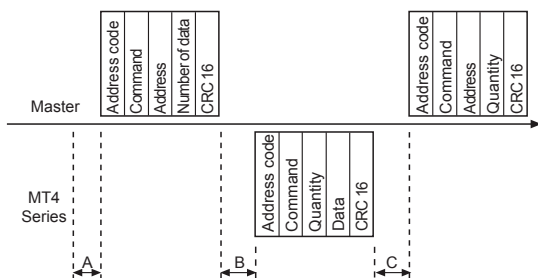


※ It is recommended to use Autonics communication converter; SCM-US48I (USB to RS485 converter, sold separately), SCM-38I (RS232C to RS485 converter, sold separately).

Please use twisted pair wire for RS485 communication.

◎ Communication control ordering

1. The communication ordering of MT4 Series is Modbus RTU. (PI-MBUS-300-REV.J)
2. After 0.5sec. being supplied the power into the master system, it starts to communicate.
3. Initial communication will be started by the master system. When a command comes out from the master system, MT4 Series will respond.



※A → Min. 0.5sec. after supplying power

- B →
- 9600bps: Within 10.4ms
 - 4800bps: Within 20.8ms
 - 2400bps: Within 41.6ms
 - 1200bps: Within 83.3ms

- C →
- 9600bps: Within 4.2ms
 - 4800bps: Within 8.4ms
 - 2400bps: Within 16.7ms
 - 1200bps: Within 33.4ms

◎ Communication command and block

The format of query and response

• Query

Address code	Command	Start address	Number of data	CRC16
①	②	③	④	⑤
← Calculation range of CRC16 →				

- ①Address code: This code is the master system can discern MT4 Series and able to set within range 01H-63H.
- ②Command: Read command for input register.
- ③Start address: The start address of input register to read (Start address), it is available to select 0000 to 0003 for start address.
- ④Number of data: The number of 16-bit data from start address (No. of points)
- ⑤CRC16: It is a Check Sum checking the whole frame and it is for more reliable transmit/receive to check the error between transmitter and receiver.

• Response

Address code	Response Command	Number of data	PV	Decimal point position	Hi peak value	Low peak value	CRC16
①	②	③	④	⑤	⑥	⑦	⑧
← Calculation range of CRC16 →							

- ①Address code: Distinguish MT4 Series and the number is available from 01H-63H.
- ②Response command: Response for a read command of input register. (Refer to Modbus mapping table)
- ③Amount of data: The number of 8-bit data on star code. (No. of points)
- ④PV: It is 16 Bit data, measuring and display value of MT4 Series. The decimal point data is not included in the transmitting PV.
- ⑤Decimal point position: It is the decimal point position is set in *dot* mode of Parameter 1.
- ⑥Hi peak value: The max. display value of PV
- ⑦Lo peak value: The min. display value of PV
- ⑧CRC16: It is a Check Sum checking the whole block.

◎ Application of communication command

In case, the display value of multi panel meter is 220.3V, the decimal point is 0.0, Hi Peak value is 220.4 and Lo Peak value is 0000.

• Query

Address code	Command	Start address		Number of data		CRC16	
		High	Low	High	Low	Low	High
01	04	00	00	00	04	F1	C9

• Response

Address code	Response command	Amount of data	Measured value		dot position		Hi Peak		Lo Peak		CRC16
			High	Low	High	Low	High	Low	High	Low	
01	04	08	08	9B	00	01	08	9C	00	00	CRC16

MT4N/MT4Y/MT4W Common Features

● Error processing (Slave → Master)

1. Non-supportable command

Address code	Response command	Exception code	CRC16	
01	81	01	81	90

※Set a received highest bit and send it to response command and exception code 01.

2. A start code of queried data is inconsistent with the transmittable code

Address code	Response command	Exception code	CRC16	
01	81	02	81	90

※Set a received highest bit and send it to response command and exception code 02.

3. The number of queried data is bigger than transmittable one

Address code	Response command	Exception code	CRC16	
01	81	03	—	—

※Set a received highest bit and send it to response command and exception code 03.

◎ Modbus Mapping Table

● Read Input Register

Start address	Command	Transmission	Remark
30001 (0000)	04	Process value • Standard: Transmit up to -5 to 110% of display range • Scale: Able to transmit from -1999 to 9999% of display range	Data transmittance for measuring error • Standard: Transmit "9999" if "HHHH" is displayed. Transmit "-1999" if "LLLL" is displayed. • Scale: Transmit the setting value of H-SC and L-SC. Transmit "9999" if "d-HH" is displayed. Transmit "-1999" if "d-LL" is displayed
30002 (0001)	04	Dot setting value	Transmit the position setting value of decimal point of PA-1 dot mode. • Standard: 0.00 0 → 0003H, 0.00 → 0002H, 0.0 → 0001H, 0 → 0000H, • Scale: 0.000 → 0103H, 0.00 → 0102H, 0.0 → 0101H, 0 → 0100H,
30003 (0002)	04	High Peak value	Transmit the max. display value of measuring display value
30004 (0003)	04	Low Peak value	Transmit the min. display value of measuring display value

● Read Coil Status

Start address	Command	Transmission	Remark
00001 (0000)	01	Output status • 01h:Lo output • 02h:Go output • 04h:Hi output • 05h:Lo/Hi output	Transmit "1" if the output is ON and "0" for OFF.

◎ Setting of communication speed

It is available to set the communication speed at *bP5* mode of **PA 2**. The factory default is 9600bps.

◎ Setting of communication address (Setting range: 01 to 99)

It is able to set the communication speed at *Ad5* mode of **PA 2**. The factory default is **01**.

It is able to set the communication address up to 99 but only 31 units can be connected to higher system.

◎ CRC16 Table

● High order byte table

0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F	
0	0x00	0xC1	0x81	0x40	0x01	0xC0	0x80	0x41	0x01	0xC0	0x80	0x41	0x00	0xC1	0x81	0x40
1	0x01	0xC0	0x80	0x41	0x00	0xC1	0x81	0x40	0x00	0xC1	0x81	0x40	0x01	0xC0	0x80	0x41
2	0x01	0xC0	0x80	0x41	0x00	0xC1	0x81	0x40	0x00	0xC1	0x81	0x40	0x01	0xC0	0x80	0x41
3	0x00	0xC1	0x81	0x40	0x01	0xC0	0x80	0x41	0x01	0xC0	0x80	0x41	0x00	0xC1	0x81	0x40
4	0x01	0xC0	0x80	0x41	0x00	0xC1	0x81	0x40	0x00	0xC1	0x81	0x40	0x01	0xC0	0x80	0x41
5	0x00	0xC1	0x81	0x40	0x01	0xC0	0x80	0x41	0x01	0xC0	0x80	0x41	0x00	0xC1	0x81	0x40
6	0x00	0xC1	0x81	0x40	0x01	0xC0	0x80	0x41	0x01	0xC0	0x80	0x41	0x00	0xC1	0x81	0x40
7	0x01	0xC0	0x80	0x41	0x00	0xC1	0x81	0x40	0x00	0xC1	0x81	0x40	0x01	0xC0	0x80	0x41
8	0x01	0xC0	0x80	0x41	0x00	0xC1	0x81	0x40	0x00	0xC1	0x81	0x40	0x01	0xC0	0x80	0x41
9	0x00	0xC1	0x81	0x40	0x01	0xC0	0x80	0x41	0x01	0xC0	0x80	0x41	0x00	0xC1	0x81	0x40
A	0x00	0xC1	0x81	0x40	0x01	0xC0	0x80	0x41	0x01	0xC0	0x80	0x41	0x00	0xC1	0x81	0x40
B	0x01	0xC0	0x80	0x41	0x00	0xC1	0x81	0x40	0x00	0xC1	0x81	0x40	0x01	0xC0	0x80	0x41
C	0x00	0xC1	0x81	0x40	0x01	0xC0	0x80	0x41	0x01	0xC0	0x80	0x41	0x00	0xC1	0x81	0x40
D	0x01	0xC0	0x80	0x41	0x00	0xC1	0x81	0x40	0x00	0xC1	0x81	0x40	0x01	0xC0	0x80	0x41
E	0x01	0xC0	0x80	0x41	0x00	0xC1	0x81	0x40	0x00	0xC1	0x81	0x40	0x01	0xC0	0x80	0x41
F	0x00	0xC1	0x81	0x40	0x01	0xC0	0x80	0x41	0x01	0xC0	0x80	0x41	0x00	0xC1	0x81	0x40

● Low order byte table

0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F	
0	0x00	0xC0	0xC1	0x01	0xC3	0x03	0x02	0xC2	0xC6	0x06	0x07	0xC7	0x05	0xC5	0xC4	0x04
1	0xC0	0xC0	0xD0	0x0F	0xCF	0xCE	0x0E	0x0A	0xCA	0xCB	0xC7	0x05	0xC5	0xC4	0x04	
2	0xD8	0x18	0x19	0xD9	0x1B	0xDB	0xDA	0x1A	0x1E	0xDE	0xDF	0x1F	0xDD	0x1D	0xDC	
3	0x14	0xD4	0xD5	0x15	0xD7	0x17	0x16	0xD6	0xD2	0x12	0x13	0xD3	0x11	0xD1	0xD0	0x10
4	0xF0	0x30	0x31	0xF1	0x33	0xF3	0xF2	0x32	0x36	0xF6	0xF7	0x37	0xF5	0x35	0xF4	0x34
5	0x3C	0xFC	0xFD	0x3D	0xFF	0x3F	0x3E	0xFE	0xFA	0x3A	0x3B	0xFB	0x39	0xF9	0xF8	0x38
6	0x28	0xE8	0xE9	0x29	0xEB	0x2B	0x2A	0xEA	0xEE	0x2E	0x2F	0xEF	0x2D	0xED	0xE0	0x2C
7	0xE4	0x24	0x25	0xE5	0x27	0xE7	0xE6	0x26	0x22	0xE2	0xE3	0x23	0xE1	0x21	0x20	0xE0
8	0xA0	0x60	0x61	0xA1	0x63	0xA3	0xA2	0x62	0x66	0xA6	0xA7	0x67	0xA5	0x65	0xA4	0x64
9	0x6C	0xAC	0xAD	0x6D	0xAF	0x6F	0x6E	0xAE	0xAA	0x6A	0x6B	0xAB	0x69	0xA9	0xA8	0x68
A	0x78	0xB8	0xB9	0x79	0xBB	0x7B	0x7A	0xBA	0xBE	0x7E	0x7F	0xBF	0x7D	0xBD	0xBC	0x7C
B	0xB4	0x74	0x75	0xB5	0x77	0xB7	0xB6	0x76	0x72	0xB2	0xB3	0x73	0xB1	0x71	0x70	0xB0
C	0x50	0x90	0x91	0x51	0x93	0x53	0x52	0x92	0x96	0x56	0x57	0x97	0x55	0x95	0x94	0x54
D	0x9C	0x5C	0x5D	0x9D	0x5F	0x9F	0x9E	0x5E	0x5A	0x9A	0x9B	0x5B	0x99	0x59	0x58	0x98
E	0x88	0x48	0x49	0x89	0x4B	0x8B	0x8A	0x4A	0x4E	0x8E	0x8F	0x4F	0x8D	0x4D	0x4C	0x8C
F	0x44	0x84	0x85	0x45	0x87	0x47	0x46	0x86	0x82	0x42	0x43	0x83	0x41	0x81	0x80	0x40

■ Caution For Using

- It is disable to modify Parameter (Baud rate, Address etc)related to communication of MT4 Series on line with upper systems such as PC, PLC etc. (Error will occur)
- First make communication Parameter of MT4 Series and master system one.
- It is not allow to set overlapping communication number at the same communication line. (Error will occur)
- Please use twist pair wire for RS485 communication.
- The total length of communication is 800m and max. 31 units can be connected.
- When connecting communication cable between MT4 Series and master systems, the vertical resistance (100 to 120Ω) must be installed at between both communication lines.
- The setting item of communication parameter is as below.
 - Start bit: 1-bit (Fixed)
 - Stop bit: 1-bit (Fixed)
 - Parity bit: None (Fixed)
 - Data bit: 8-bit (Fixed)
 - Baud rate: 9600, 4800, 2400, 1200 (Setting)
 - Address: 01 to 99 (Setting)

(A)	Photoelectric Sensors
(B)	Fiber Optic Sensors
(C)	Door/Area Sensors
(D)	Proximity Sensors
(E)	Pressure Sensors
(F)	Rotary Encoders
(G)	Connectors/ Connector Cables/ Sensor Distribution Boxes/ Sockets
(H)	Temperature Controllers
(I)	SSRs / Power Controllers
(J)	Counters
(K)	Timers
(L)	Panel Meters
(M)	Tacho / Speed / Pulse Meters
(N)	Display Units
(O)	Sensor Controllers
(P)	Switching Mode Power Supplies
(Q)	Stepper Motors & Drivers & Controllers
(R)	Graphic/ Logic Panels
(S)	Field Network Devices
(T)	Software