


# MT4Y/MT4W Series

DIN W72×H36mm, W96×48mm, digital multi panel meter

## ■ Features

- Various output options (Default : Indicator)  
RS485 Communication output, Low speed serial output, Current (4–20mA), BCD output, NPN/PNP open collector output, Relay output
- Max. measuring input specification :  
500VDC, 500VAC, DC5A, AC5A
- Max. display range : -1999 ~ 9999
- High/Low scale function
- **AC frequency measurement function : 0.1~9999Hz**
- Various functions : Monitoring function for max. and min. display value function, Display cycle delay function, **Zero function**, High display correction function, **Current output scale function**
- Wide range of power supply : 12–24VDC, 100–240VAC

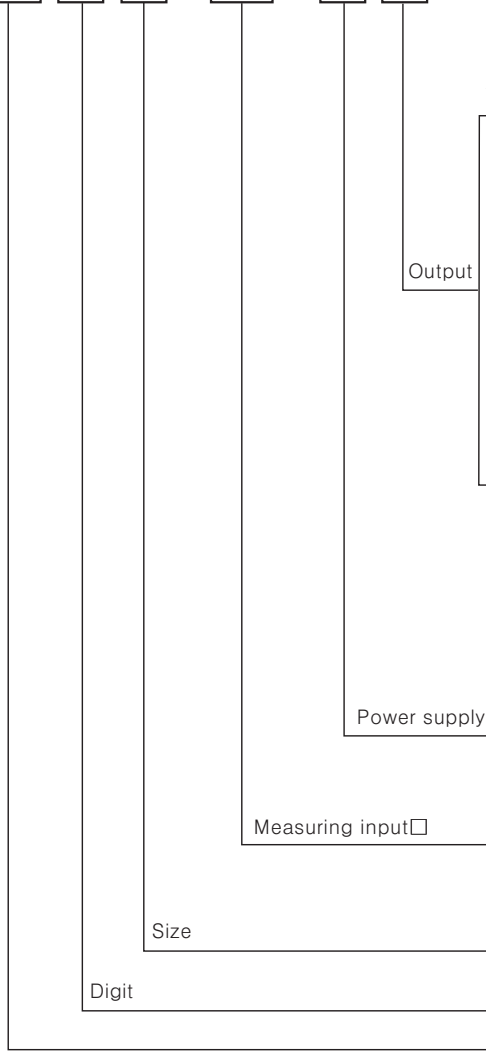


 Please read "Caution for your safety" in operation manual before using.



## ■ Ordering information

MT 4 W - DV - 4 N




|                        |   |
|------------------------|---|
| N                      | Indicator (No output function)                          |
| 0                      | Relay contact output                                    |
| 1                      | NPN open collector output                               |
| 2                      | PNP open collector output                               |
| 3                      | Relay contact output+Transmission output(DC4–20mA)      |
| 4                      | Relay contact output+RS485 communication output         |
| 5                      | BCD Dynamic output                                      |
| 6                      | Low speed serial output                                 |
| *Output (0~6) : Option |   |
| N                      | Indication type (No output function)                    |
| 0                      | Relay contact output+Transmission output(DC4–20mA)      |
| 1                      | Relay contact output                                    |
| 2                      | NPN open collector output+BCD Dynamic output            |
| 3                      | PNP open collector output+BCD Dynamic output            |
| 4                      | NPN open collector output+Transmission output(DC4–20mA) |
| 5                      | PNP open collector output+Transmission output(DC4–20mA) |
| 6                      | NPN open collector output+Low speed serial output       |
| 7                      | PNP open collector output+Low speed serial output       |
| 8                      | NPN open collector output+RS485 output                  |
| 9                      | PNP open collector output+RS485 output                  |
| *Output (0~9) : Option |   |
| 1                      | 12–24VDC  |
| 4                      | 100–240VAC  |
| DV                     | DC Volt   |
| DA                     | DC Ampere   |
| AV                     | AC Volt   |
| AA                     | AC Ampere   |
| Y                      | DIN W72×H36mm   |
| W                      | DIN W96×H48mm   |
| 4                      | 4digit  |
| MT                     | Multi Meter   |

\*To measure the current over 5ADC, please select DV type because the shunt should be used.

# Multi Panel Meter

## Specifications

| Series                           | MT4Y-DV-4□<br>MT4Y-DA-4□  | MT4Y-AV-4□<br>MT4Y-AA-4□  | MT4W-DV-4□<br>MT4W-DA-4□ | MT4W-AV-4□<br>MT4W-AA-4□  | MT4W-DV-1□<br>MT4W-DA-1□                 | MT4W-AV-1□<br>MT4W-AA-1□ |  |
|----------------------------------|---|---|--------------------------|---|--|--------------------------|--|
| Measurement function             | VDC, ADC  | VAC, AAC, Frequency   | VDC, ADC                 | VAC, AAC, Frequency   | VDC, ADC                                 | VAC, AAC, Frequency      |  |
| Power supply                     | 100-240VAC 50/60Hz<br>(90 ~ 110% of rated voltage)  |   |                          |   | 12-24VDC<br>(90 ~ 110% of rated voltage) |                          |  |
| Power consumption                | 5VA   |   |                          |   | 5W                                       |                          |  |
| Display method                   | 7Segment LED Display (Red) (Character height:14.2mm)                                      |   |                          |   |  |                          |  |
| Display accuracy                 | 23°C ±5°C<br>35~85%RH   | DC Type ⚡ Voltage/Current : ±0.1% F.S ±2Digit<br>AC Type ⚡ Voltage/Current : ±0.3% F.S ±3Digit, Frequency : ±0.1% F.S ±2Digit |                          |   |  |                          |  |
|                                  | -10°C~50°C  | When ±0.3% F.S ±3Digit only for 5A terminal of MT4Y-DA, AA Type   |                          | When ±1.0% F.S ±3Digit only for 5A terminal of MT4W-DA, AA Type                     |  |                          |  |
| A/D conversion method            | Practical Over sampling using successive approximation ADC                                |   |                          |   |  |                          |  |
| Sampling cycle                   | DC type:50ms, AC type:16.6ms (Resolution 1/12000)   |   |                          |   |  |                          |  |
| Max. indication range            | -1999 ~ 9999 (4Digit)   |   |                          |   |  |                          |  |
| Max. input                       | 110% for input specification  |   |                          |   |  |                          |  |
| Main output                      | Relay output  | • Contact capacity : 250VAC 3A, 30VDC 3A • Contact composition: N.O(1a)   |                          |   |  |                          |  |
|                                  | NPN open collector output   | 12-24VDC ±2V 50mA Max. (Resistive load)   |                          |   |  |                          |  |
|                                  | PNP open collector output   |   |                          |   |  |                          |  |
| Sub output (Transmission output) | RS485 communication output  | • Baud rate : 1200/2400/4800/9600bps<br>• Protocol : RTU type   |                          | • Communication type : 2 wires half duplex<br>• Tuning method : Sub-synchronization |  |                          |  |
|                                  | Serial output   | NPN open collector output, 12-24VDC Max. 50mA (Resistive load)  |                          |   |  |                          |  |
|                                  | BCD output  |   |                          |   |  |                          |  |
|                                  | DC4-20mA output   | Resolution : 12000 division (Load resistance max. 600Ω)   |                          |   |  |                          |  |
| AC measuring function            | Selectable RMS or AVG   |   |                          |   |  |                          |  |
| Hold function                    | Including (Outer hold function)   |   |                          |   |  |                          |  |
| Insulation resistance            | Min. 100MΩ (at 500VDC mega) between external terminal and case                            |   |                          |   |  |                          |  |
| Dielectric strength              | 2000VAC for 1minute between external terminal and case                                    |   |                          |   |  |                          |  |
| Noise strength                   | ±2kV the square wave noise (pulse width:1μs) by the noise simulator                       |   |                          |   |  |                          |  |
| Vibration                        | Mechanical  | 0.75mm amplitude at frequency of 10 ~ 55Hz in each of X, Y, Z directions for 2hours   |                          |   |  |                          |  |
|                                  | Malfuction  | 0.5mm amplitude at frequency of 10 ~ 55Hz in each of X, Y, Z directions for 10minutes   |                          |   |  |                          |  |
| Shock                            | Mechanical  | 100m/s <sup>2</sup> (10G) in X, Y, Z directions for 3 times   |                          |   |  |                          |  |
|                                  | Malfuction  | 300m/s <sup>2</sup> (30G) in X, Y, Z directions for 3 times   |                          |   |  |                          |  |
| Relay life cycle                 | Malfuction  | Min. 20,000,000 times   |                          |   |  |                          |  |
|                                  | Mechanical  | Min. 100,000 times (250VAC 3A Load current)   |                          |   |  |                          |  |
| Ambient temperature              | -10 ~ +50°C (at non-freezing status)  |   |                          |   |  |                          |  |
| Storage temperature              | -20 ~ +60°C (at non-freezing status)  |   |                          |   |  |                          |  |
| Ambient humidity                 | 35 ~ 85%RH  |   |                          |   |  |                          |  |
| Approval                         | CE  US |   |                          |   |  |                          |  |
| Unit weight                      | Approx. 134g  |   |                          |   | Approx. 211g                             |                          |  |

(A) Counter

(B) Timer

(C) Temp. controller

(D) Power controller

(E) Panel meter

(F) Tacho/Speed/Pulse meter

(G) Display unit

(H) Sensor controller

(I) Switching power supply

(J) Proximity sensor

(K) Photo electric sensor

(L) Pressure sensor

(M) Rotary encoder

(N) Stepping motor &amp; Driver &amp; Controller

(O) Graphic panel

(P) Field network device

(Q) Production stoppage models &amp; replacement

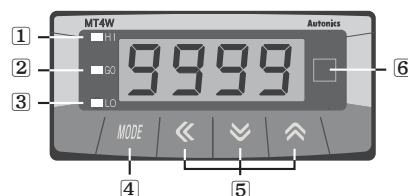
## Front panel identification

### ●MT4Y Series



- 1 HI : High output indication of preset
- 2 GO : GO output indication of preset
- 3 LO : Low output indication of preset

### ●MT4W Series



- 4 [MD] key : Enter to parameter group, Memorize the setting value, Move the parameter mode
- 5 [←] key : Move the digit, Enter to parameter group
- [↓], [↑] key : Change the setting value.
- 6 Unit sticker

\*There is no 1, 2, 3 on a display panel of MT4Y-□□-4N, 45, 46 and MT4W-□□-4N.

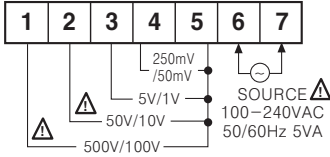
\*In MT4Y-□□-43, 44, OUT is used for Go output display and there is no 1, 3 in display panel.

# MT4Y/MT4W Series

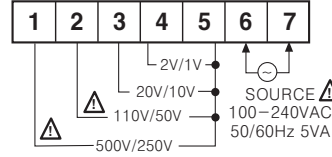
## Connections

### Measuring input connection of MT4Y series

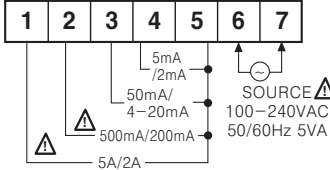
#### MT4Y-DV-4



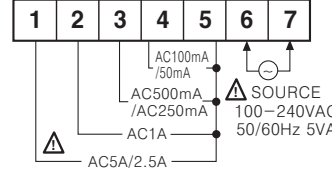
#### MT4Y-AV-4



#### MT4Y-DA-4

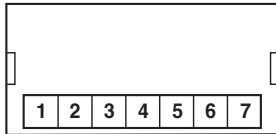


#### MT4Y-AA-4



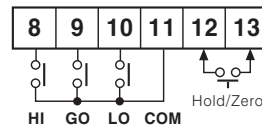
### Output terminal of connection of MT4Y Series

#### MT4Y-□□-4N (Indicator)



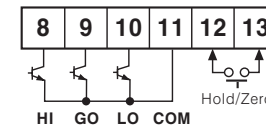
#### MT4Y-□□-40

(Triple relay contact output)



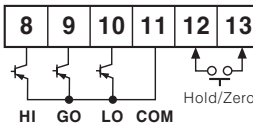
#### MT4Y-□□-41

(Triple NPN O.C output)



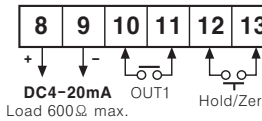
#### MT4Y-□□-42

(Triple PNP O.C output)



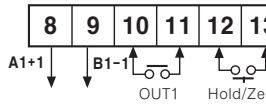
#### MT4Y-□□-43

(Relay output+Current output)



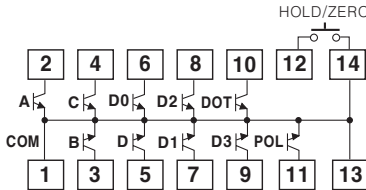
#### MT4Y-□□-44

(Relay+RS485 communication output)

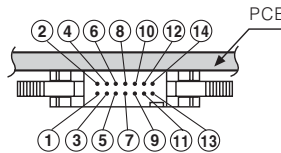


#### MT4Y-□□-45

(BCD Dynamic output)

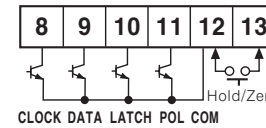


(Note) There is no signal output terminal about - sign.



\* Hirose connector pin header model of the unit : HIF3BA-14PA-2.54DS  
\* Contact Hirose Electric to purchase socket and wires of Hirose connector.  
[Socket : HIF3BA-14D-2.54R]

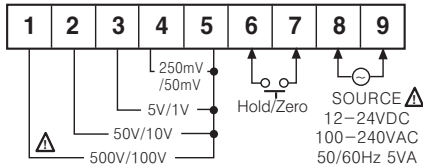
#### MT4Y-□□-46 (Low speed serial output)



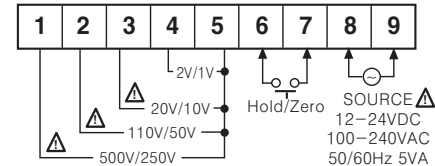
\* POL : When a display value is "-", the signal of "-" will be outputted.

### Measuring input connection of MT4W Series

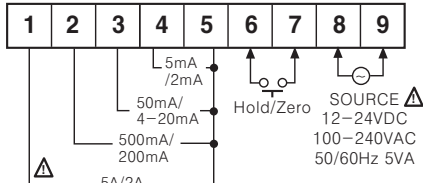
#### MT4W-DV-4



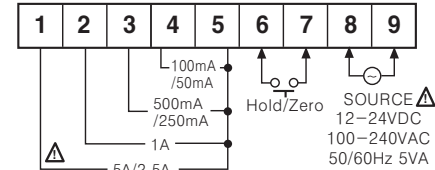
#### MT4W-AV-4



#### MT4W-DA-4



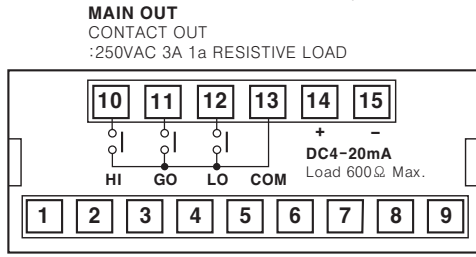
#### MT4W-AA-4



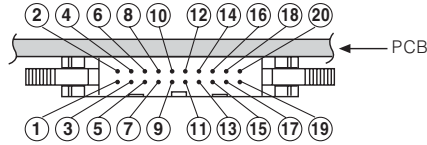
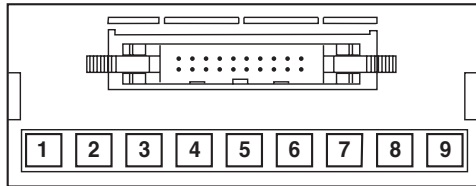
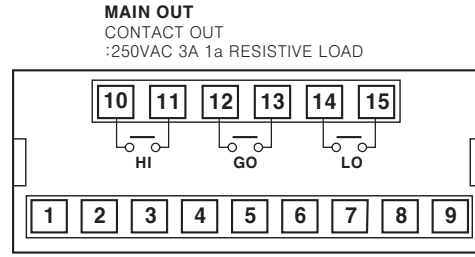
# Multi Panel Meter

## Output terminal connection of MT4W Series

●MT4W-□□-40 (Triple relay contact output +Current output)

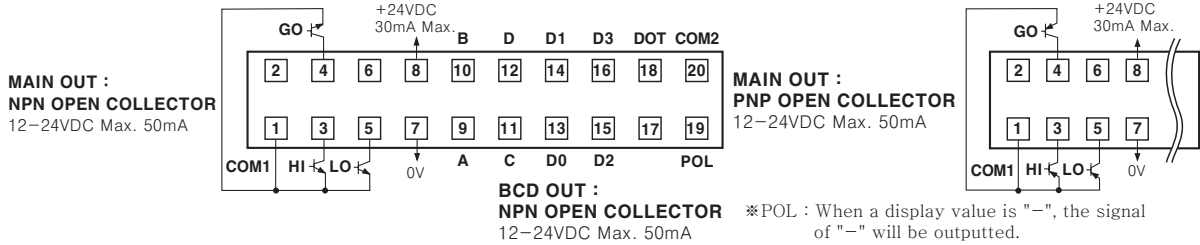


●MT4W-□□-41 (Triple relay contact output)

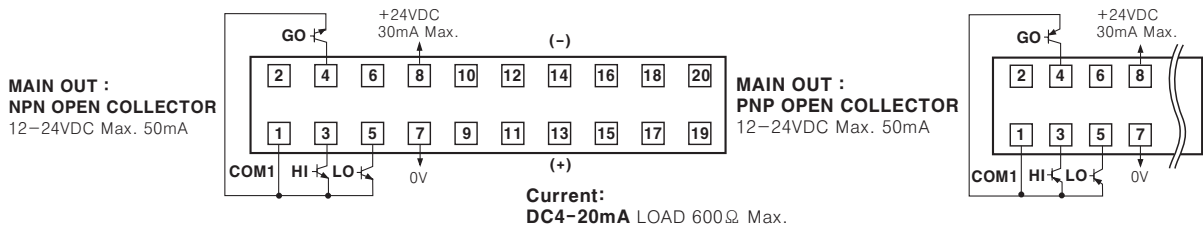


\*Hirose connector pin header model of the unit : HIF3BA-20PA-2.54DS  
\*Contact Hirose Electric to purchase socket and wires of Hirose connector.  
[Socket : HIF3BA-20D-2.54R]

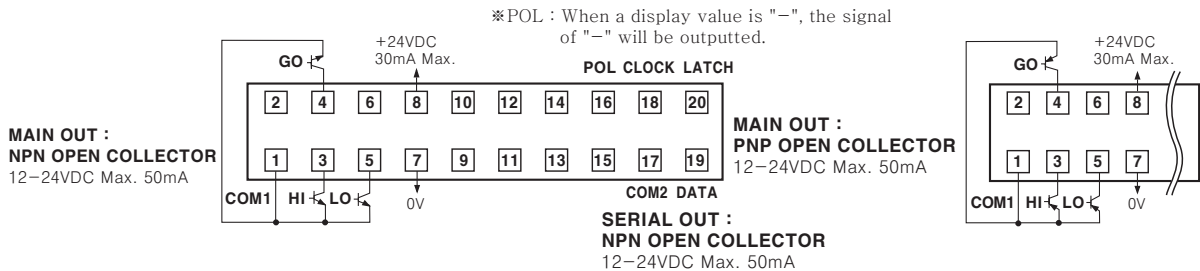
●MT4W-□□-42 / MT4W-□□-43 (Triple NPN/PNP open collector output+BCD output)



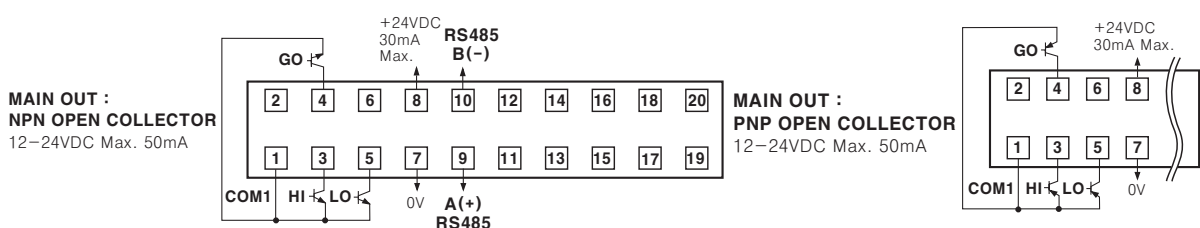
●MT4W-□□-44/ MT4W-□□-45 (Triple NPN/PNP open collector output+Current output)



●MT4W-□□-46/ MT4W-□□-47 (Triple NPN/PNP open collector output+Low speed serial output)



●MT4W-□□-48/ MT4W-□□-49 (Triple NPN/PNP open collector output+RS485 output)



(A)  
Counter

(B)  
Timer

(C)  
Temp.  
controller

(D)  
Power  
controller

(E)  
Panel  
meter

(F)  
Tacho/  
Speed/  
Pulse  
meter

(G)  
Display  
unit

(H)  
Sensor  
controller

(I)  
Switching  
power  
supply

(J)  
Proximity  
sensor

(K)  
Photo  
electric  
sensor

(L)  
Pressure  
sensor

(M)  
Rotary  
encoder

(N)  
Stepping  
motor &  
Driver &  
Controller

(O)  
Graphic  
panel

(P)  
Field  
network  
device

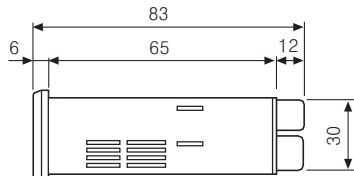
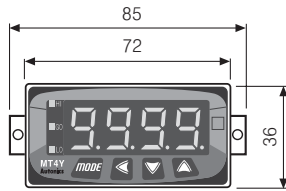
(Q)  
Production  
stoppage  
models &  
replacement

# MT4Y/MT4W Series

## Dimensions

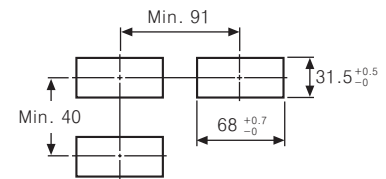
(Unit:mm)

- MT4Y-□□-4N, 45, 46

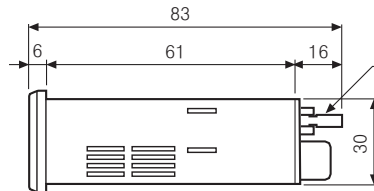


<MT4Y-□□-4N, 40~44, 46>

- Panel cut-out



- MT4Y-□□-43, 44

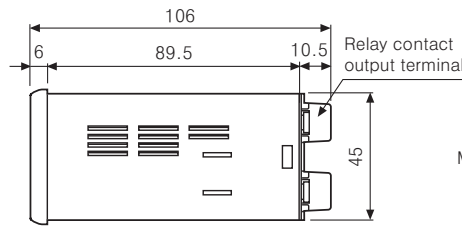
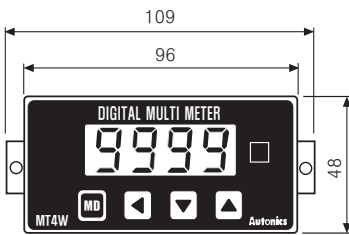


<MT4Y-□□-45>

- MT4Y-□□-40, 41, 42



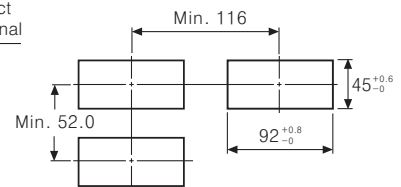
- MT4W-□□-4N (Indicator)



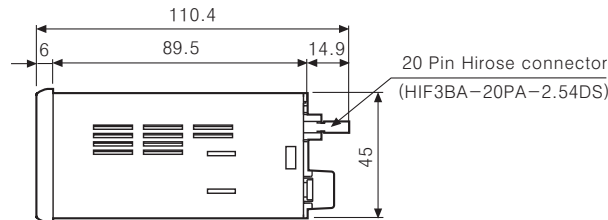
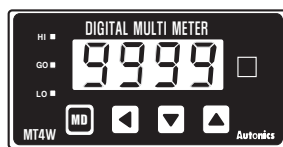
※There is no Relay contact output terminal block in indication type.

< MT4W-□□-4N, MT4W-□□-40, 41 >

- Panel cut-out

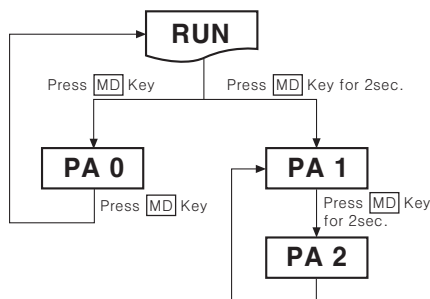


- MT4W-□□-40~49



< MT4W-□□-42~49 >

## Parameter setting



※If [MD] key is pressed, it will advance to **PA-0** group.

It can be entered only when setting monitoring time of **Pek.t** mode in **PA-2** group or **Out.t** mode is not **OFF**.

※If [MD] key is pressed for 2 sec, **PA-1** is displayed.

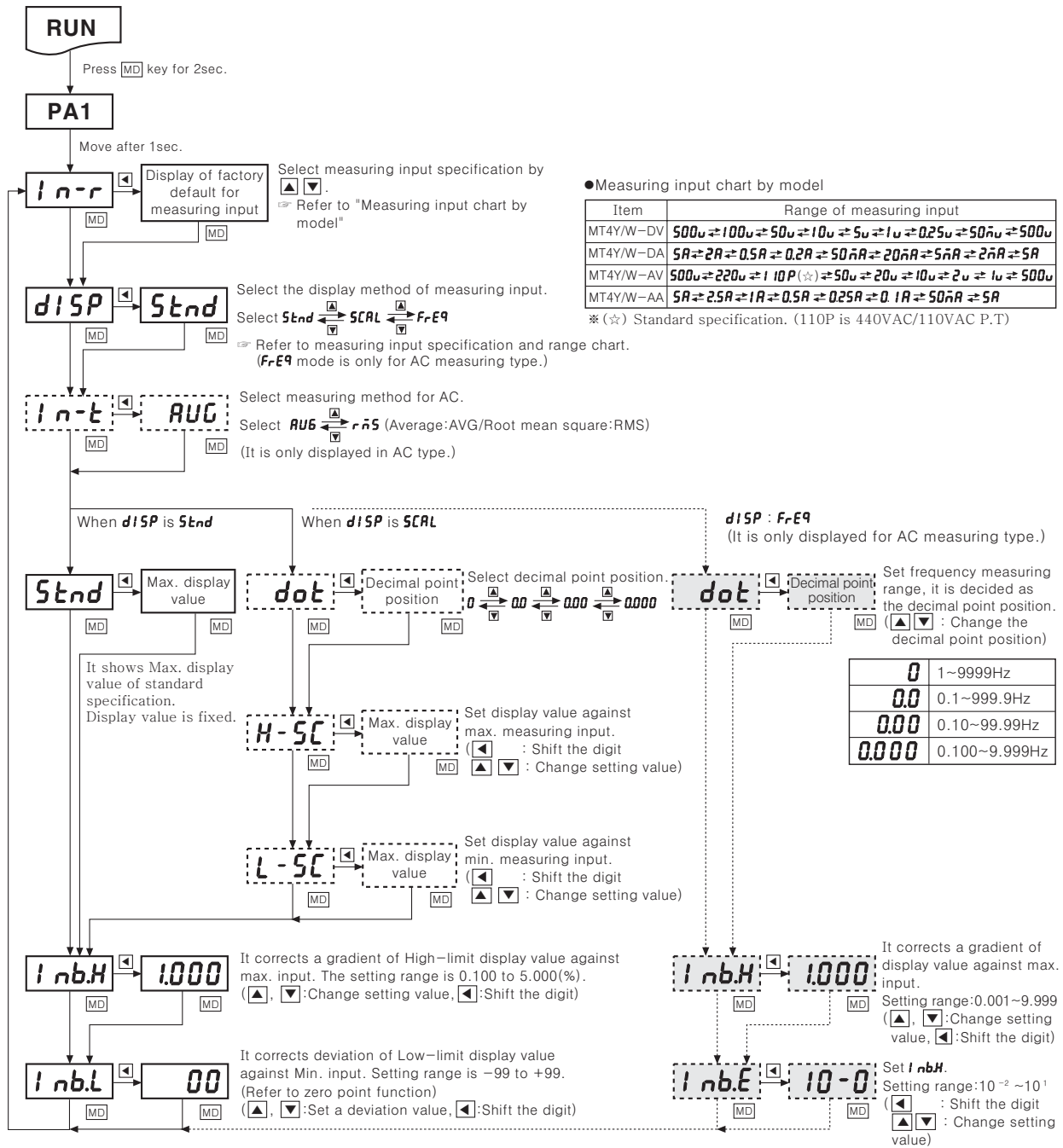
※If [MD] key is pressed for 2 sec, **PA-2** is displayed after **PA-1**.

※When releasing [MD] key at displaying **PA-1** or **PA-2**, then it will enter into Parameter.

※If [MD] key is touched for 3 sec after advance to parameter, it will return to **RUN** mode.

# Multi Panel Meter

## Parameter group 1



- (A) Counter
- (B) Timer
- (C) Temp. controller
- (D) Power controller
- (E) Panel meter
- (F) Tacho/ Speed/ Pulse meter
- (G) Display unit
- (H) Sensor controller
- (I) Switching power supply
- (J) Proximity sensor
- (K) Photo electric sensor
- (L) Pressure sensor
- (M) Rotary encoder
- (N) Stepping motor & Driver & Controller
- (O) Graphic panel
- (P) Field network device
- (Q) Production stoppage models & replacement

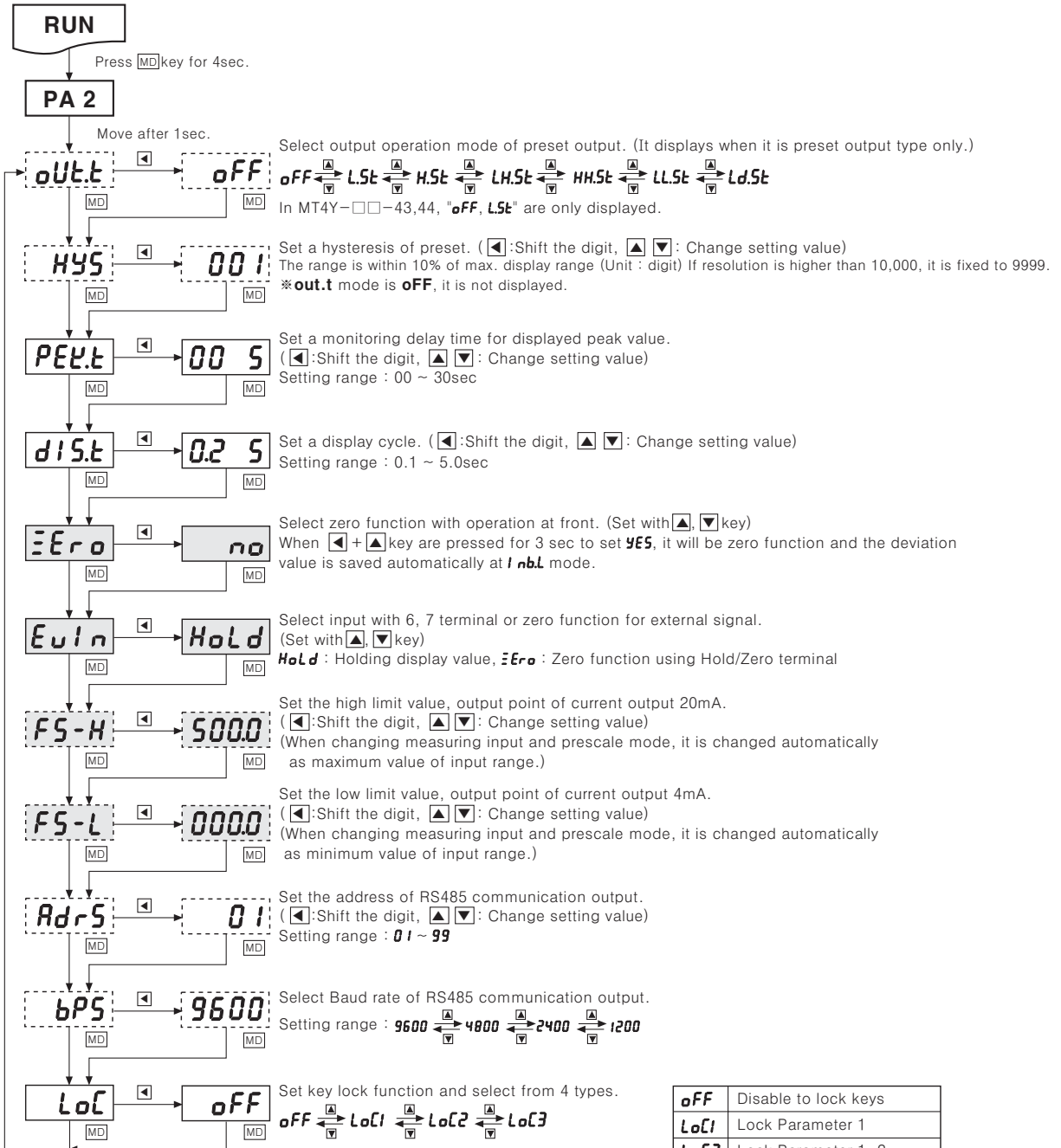
- \* A blacked (■) display mode is added one.
- \* After setting each mode, press MD Key for 2 sec. to return to RUN.
- \* If any key is untouched for 60sec. after advance to Parameter, it will return to RUN.

## Factory defaults

| Mode | MT4Y/W-DV | MT4Y/W-DA | MT4Y/W-AV | MT4Y/W-AA | Mode  | MT4Y/W-DV | MT4Y/W-DA | MT4Y/W-AV | MT4Y/W-AA |
|------|-----------|-----------|-----------|-----------|-------|-----------|-----------|-----------|-----------|
| In-r | 500u      | 5A        | 500u      | 5A        | Inb.H | 1.000     | 1.000     | 1.000     | 1.000     |
| DISP | Stnd      | Stnd      | Stnd      | Stnd      | Inb.L | 00        | 00        | 00        | 00        |
| In-t | —         | —         | AUG       | AUG       | dot   | —         | —         | 00        | 00        |
| Stnd | 500.0     | 5.000     | 500.0     | 5.000     | Inb.E | —         | —         | 10-0      | 10-0      |

# MT4Y/MT4W Series

## Parameter group 2



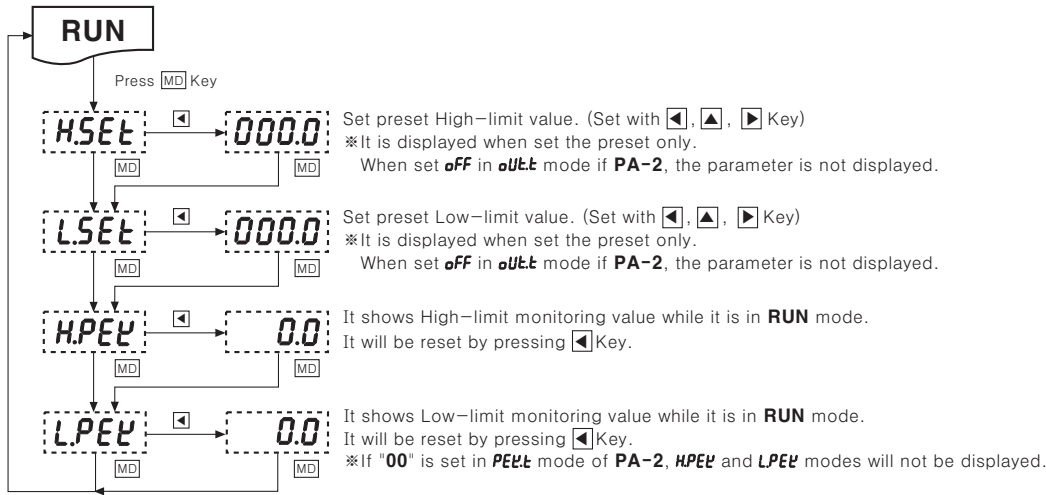
- \*A blacked (□) display mode is added one.
- \*The dotted mode is only displayed for output type.
- \*After setting each mode, press MD Key for 2 sec. to return to RUN mode.
- \*If any key is untouched for 60sec. after advance to PARAMETER, it will return to RUN mode.

|      |                           |
|------|---------------------------|
| oFF  | Disable to lock keys      |
| LoC1 | Lock Parameter 1          |
| LoC2 | Lock Parameter 1, 2       |
| LoC3 | Lock Parameter 0, 1 and 2 |

## Factory defaults

| Mode  | MT4Y/W-DV | MT4Y/W-DA | MT4Y/W-AV | MT4Y/W-AA | Mode  | MT4Y/W-DV | MT4Y/W-DA | MT4Y/W-AV | MT4Y/W-AA |
|-------|-----------|-----------|-----------|-----------|-------|-----------|-----------|-----------|-----------|
| out.t | oFF       | oFF       | oFF       | oFF       | FS-H  | 500.0     | 500.0     | 500.0     | 500.0     |
| HYS   | 001       | 001       | 001       | 001       | FS-L  | 000.0     | 000.0     | 000.0     | 000.0     |
| PEK.t | 005       | 005       | 005       | 005       | Adr.S | 01        | 01        | 01        | 01        |
| dist  | 0.25      | 0.25      | 0.25      | 0.25      | bPS   | 9600      | 9600      | 9600      | 9600      |
| zero  | no        | no        | no        | no        | LoC   | oFF       | oFF       | oFF       | oFF       |
| Euln  | HoLd      | HoLd      | HoLd      | HoLd      |       |           |           |           |           |

## Parameter group 0



\*If any key is untouched for 60sec after advance to Parameter, it will return to **RUN** mode.

## Factory default

| Mode        | MT4Y/W-DV    | MT4Y/W-DA    | MT4Y/W-AV    | MT4Y/W-AA    | Mode        | MT4Y/W-DV  | MT4Y/W-DA    | MT4Y/W-AV  | MT4Y/W-AA    |
|-------------|--------------|--------------|--------------|--------------|-------------|------------|--------------|------------|--------------|
| <b>HSEL</b> | <b>000.0</b> | <b>000.0</b> | <b>000.0</b> | <b>000.0</b> | <b>HPEL</b> | <b>0.0</b> | <b>0.000</b> | <b>0.0</b> | <b>0.000</b> |
| <b>LSEL</b> | <b>000.0</b> | <b>000.0</b> | <b>000.0</b> | <b>000.0</b> | <b>LPEL</b> | <b>0.0</b> | <b>0.000</b> | <b>0.0</b> | <b>0.000</b> |

## Measuring input and range

\*A blacked (■) items are added input specifications.

| Type          | Measuring input and range | Input impedance | Standard specification [ <b>Stnd</b> ] | Prescale specification [ <b>SCAL</b> ]   |
|---------------|---------------------------|-----------------|--|--|
|               |                           |                 | Display range [Fixed]                  | Display range [Variable]   |
| DC Volt       | 0~500V [500V]             | 4.33MΩ          | 0.0~500.0                              | (The display range is changed according to the decimal point position.)<br><br>*Please connect proper terminal its max. input voltage is within 30~ 100% of input terminal.<br>When it is higher than input voltage, it may cause a breakdown of terminal and over display range and the accuracy is decreased when it is connected to the terminal under 30%. |
|               | 0~100V [100V]             | 4.33MΩ          | 0.0~100.0                              |  |
|               | 0~50V [50V]               | 433.15kΩ        | 0.00~50.00                             |  |
|               | 0~10V [10V]               | 433.15kΩ        | 0.00~10.00                             |  |
|               | 0~5V [5V]                 | 43.15kΩ         | 0.000~5.000                            |  |
|               | 0~1V [1V]                 | 43.15kΩ         | 0.000~1.000                            |  |
|               | 0~250mV [0.25V]           | 2.15kΩ          | 0.0~250.0                              |  |
| DC Ampere     | 0~50mV [50mV]             | 2.15kΩ          | 0.00~50.00                             |  |
|               | 0~5A [5A]                 | 0.01Ω           | 0.000~5.000                            |  |
|               | 0~2A [2A]                 | 0.01Ω           | 0.000~2.000                            |  |
|               | 0~500mA [0.5A]            | 0.1Ω            | 0.0~500.0                              |  |
|               | 0~200mA [0.2A]            | 0.1Ω            | 0.0~200.0                              |  |
|               | 0~50mA [50mA]             | 1.0Ω            | 0.00~50.00                             |  |
|               | 4~20mA [20mA]             | 1.0Ω            | 4.00~20.00                             |  |
|               | 0~5mA [5mA]               | 10.0Ω           | 0.000~5.000                            |  |
|               | 0~2mA [2mA]               | 10.0Ω           | 0.000~2.000                            |  |
|               | AC Volt                   | 0~500V [500V]   | 4.98MΩ                                 | 0.0~500.0  |
| 0~250V [250V] |                           | 4.98MΩ          | 0.0~250.0                              |  |
| 0~110V [110V] |                           | 1.08MΩ          | 0.0~440.0                              |  |
| 0~50V [50V]   |                           | 1.08MΩ          | 0.00~50.00                             |  |
| 0~20V [20V]   |                           | 200kΩ           | 0.00~20.00                             |  |
| 0~10V [10V]   |                           | 200kΩ           | 0.00~10.00                             |  |
| 0~2V [2V]     |                           | 20kΩ            | 0.000~2.000                            |  |
| 0~1V [1V]     |                           | 20kΩ            | 0.000~1.000                            |  |
| AC Ampere     | 0~5A [5A]                 | 0.01Ω           | 0.000~5.000                            |  |
|               | 0~2.5A [2.5A]             | 0.01Ω           | 0.000~2.500                            |  |
|               | 0~1A [1A]                 | 0.05Ω           | 0.000~1.000                            |  |
|               | 0~500mA [0.5A]            | 0.1Ω            | 0.0~500.0                              |  |
|               | 0~250mA [0.25A]           | 0.1Ω            | 0.0~250.0                              |  |
|               | 0~100mA [0.1A]            | 0.5Ω            | 0.0~100.0                              |  |
|               | 0~50mA [50mA]             | 0.5Ω            | 0.00~50.00                             |  |

(A) Counter

(B) Timer

(C) Temp. controller

(D) Power controller

(E) Panel meter

(F) Tacho/ Speed/ Pulse meter

(G) Display unit

(H) Sensor controller

(I) Switching power supply

(J) Proximity sensor

(K) Photo electric sensor

(L) Pressure sensor

(M) Rotary encoder

(N) Stepping motor & Driver & Controller

(O) Graphic panel

(P) Field network device

(Q) Production stoppage models & replacement



# MT4Y/MT4W Series

## ■ Functions

### ○ Measuring AC frequency function (PA1 : d15P mode)

It measures the frequency of input signal when it is AC input. The measuring range is 0.1~9999Hz, it is changed according to the decimal point position.

Please refer to the below table.

| Decimal point position | 0.000         | 0.00         | 0.0         | 0        |
|------------------------|---------------|--------------|-------------|----------|
| Measurement range      | 0.100~9.999Hz | 0.10~99.99Hz | 0.1~999.9Hz | 1~9999Hz |

It is also available to adjust the high limit of gradient at *lnbH* and *lnbE* mode of PA 1.

To measure correctly, the input signal is over F.S 10% of measuring range should be supplied.

### ○ Zero adjustment function (Deviation correction function of low limit display value)

It sets the display value as a zero when min. input is supplied at measuring input terminal. It can be corrected an error of zero with 3 types as below.

The deviation value is corrected normally with external Hold/Zero terminal can be saved automatically *lnbL* mode of PA 1 group.

| Type        | Input the deviation value                             | Front key   | Input the external signal  |
|-------------|---|---|--|
| Description | Input the deviation value in <i>lnbL</i> mode of PA 1 | Input the minimum value at the measuring input terminal, press $\left[ \blacktriangleleft \right]$ , $\left[ \blacktriangleright \right]$ key together for 3 sec. | Short-circuit external No.6, 7 Hold/Zero terminal over min.50ms. |

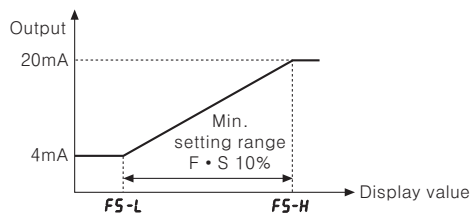
※ Please refer to Low display correction of error correction function for inputting the correction value.

### ○ Current output (DC4~20mA) scale function (PA2 : F5-H / F5-L mode)

It outputs DC4~20mA within the setting range of *F5-H* and *F5-L* mode to transmit the of display value to the other. When it is over the setting value of *F5-H* of PA 2, 20mA is outputted and 4mA for it is under the setting value of *F5-L* mode. (The resolution is divided as 12000 and it depends on full scale range.)

※ The min. setting interval between *F5-H* and *F5-L* is 10% F · S, it is fixed as 10% of the setting value when it is small.

※ In case, the display value is under *F5-L*, 4mA is outputted and 20mA for it is over the setting value of *F5-H* mode.



### ○ Initialization function

It initializes as the factory default status. If  $\left[ \blacktriangleleft \right]$ ,  $\left[ \blacktriangledown \right]$ ,  $\left[ \blacktriangleright \right]$  keys are pressed together for 2 sec in RUN mode, *lnbL* mode and the setting value (no) is displayed every 0.5 sec and it will be initialized as the factory default when press  $\left[ \text{MD} \right]$  key after change no → YES.

### ○ Error display function

| Display | Description   |
|---------|---|
| HHHH    | Flashing when measuring input is exceeded the max. allowable input(110%)            |
| LLLL    | Flashing when measuring input is exceeded the minx. allowable input(-10%)           |
| d-HH    | Flashing when display input is exceeded H-SC setting value                          |
| d-LL    | Flashing when display input is exceeded L-SC setting value                          |
| F-HH    | Flashing when input frequency is exceeded the max. display value of measuring range |
| oUr     | Flashing when it exceeds zero range(±99).   |

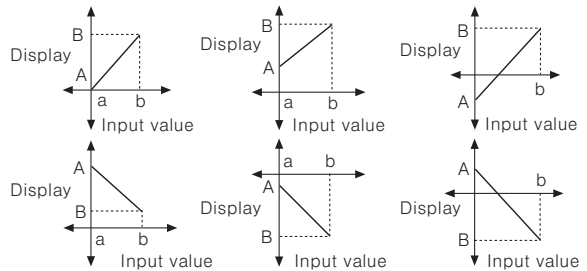
※ An error is cancelled automatically when it is in the measuring and display range.

※ "LLLL" is displayed when the measuring input is 4~20mA.

※ After flashing "oUr" 2 times when it exceeds the zero range, it returns to RUN mode.

### ○ Prescale function (PA 1 : H-5C/L-5C mode)

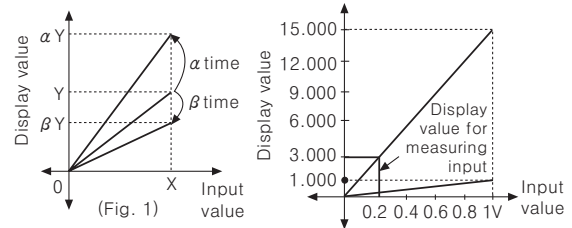
This function is to display setting (-1999 to 9999) of particular High/Low-limit value in order to display High/Low-limit value of measuring input. If measuring inputs are a or b and particular values are A or B, it will display a=A, b=B as below graph.



### ○ Gradient correction function (PA1:lnbH mode)

This function is to correct a gradient of prescale value and display value. (Fig.1) Display value Y can be used as  $\alpha$ ,  $\beta$  times against X input value by correction function [*lnbH*]. And also can be used as correction function of max. display value (H-5C). Adjustment range is 0.100 to 5.000 and multiply current gradient.

Ex) Input:DC200mV, Display:3.000 for MT4W-DV



(Setting the gradient correction value)

- ① Select 0~1VDC for measuring input in Parameter1.
- ② Standard specification in input : 0~1VDC and 1.000 therefore it has to be 15.000 (H-5C) for 1VDC (input) in order to display 3.000 for DC200mV (input). But it is disable due to setting range is 9.999
- ③ In this case, please check below chart.

Please set as  $lnbH \times H-5C = 15.000$

| Setting | H-5C    | L-5C  | lnbH  | Other                              |
|---------|---------|-------|-------|------------------------------------|
| ①       | Disable | 0.000 | 1.000 | —                                  |
| ②       | 7.500   | 0.000 | 2.000 | It will be the same display value. |
| ③       | 5.000   | 0.000 | 3.000 |                                    |
| ④       | 3.750   | 0.000 | 4.000 |                                    |
| ⑤       | 3.000   | 0.000 | 5.000 |                                    |

## ◎Correction function(PA 1: *l nbH* / *l nbL* mode)

This function is for correcting display value error of measuring input.

*l nbH*: 5.000 ~ 0.100 [Correct gradient(%) of High value]

*l nbL*: -99 ~ +99 [Adjust deviation of Low value]

Ex) When measuring input range is 0~500VDC and a display value is 0.0~500.0.

### ●Correction of high display value

When the measuring input is 500V, the deviation correction value is  $5000 \div 5005 = 0.999$  for high display value "500.5" and it is available to correct the gradient of high display value when set 0.999 at *l nbH*. The reset part of the decimal point is not calculated.

### ●Correction of low display value

When the measuring input is 0V, the deviation of low display value can be cleared if "-12" is set at *l nbL* when low display value is "001.2".

The reset part of the decimal point is not calculated.

## ◎Display cycle delay function(PA 2:*d15t* mode)

It is difficult to read as display value follows the measuring input value. Display when the measuring input value is fluctuating. In this case, it is able to make display value stable by delaying display cycle. Display cycle displaying time can be changed in *d15t* mode of Parameter 2 (Setting range:0.1~5.0sec). If **5.0** is selected, the display value is displayed every 5sec. averaging input value for 5sec.

## ◎Monitoring function for peak value of display (PA 0: *HPEt*/*LPEt* mode)

It is to observe Max./Min. value of display value by current display value and then display the data in *HPEt* mode and *LPEt* mode of parameter 0.

Set delay time(0~30sec.) in *PEt* mode of parameter 2 in order to prevent malfunction caused by initial over current or over voltage, when it monitor the peak value. Delay time is 0~30sec. and it will monitor the peak value after setting time. If **◀** key is pressed at *HPEt* and *LPEt* mode of parameter 0, monitoring data will be initialized.

## ◎Preset output Mode[PA 2 : *oUt* mode]

| Mode        | Output operation | Operation  |
|-------------|------------------|--|
|             |                  | H: Hysteresis  |
| <b>oFF</b>  |                  | No output  |
| <b>LSt</b>  |                  | If it is equal or smaller than low setting value, LO output will be ON. If it is bigger than low setting value, GO output will be ON.  |
| <b>HSt</b>  |                  | If it is equal or bigger than high setting value, HI output will be ON. If it is equal or smaller than high setting value, GO output will be ON.   |
| <b>LHSt</b> |                  | If it is equal or smaller than low setting value and equal or bigger than high setting value, the output will be ON. If it is bigger than Low setting value and smaller than high setting value, GO output will be ON. |
| <b>HHSt</b> |                  | If it is equal or bigger than low set and equal or bigger than high set value, output will be ON. If it is smaller than low setting value and high setting value, GO output will be ON.                                |
| <b>LLSt</b> |                  | If it is equal or smaller than low setting value, LO output will be ON. If it is equal or smaller than high setting value, HI output will be ON.   |
| <b>LdSt</b> |                  | This operation is the same as L.St. But it doesn't operate at initial low set value, it will operate at next low set value, if this is higher than low set value, Go output will be ON.                                |

\*"H" means hysteresis and able to set 1 to 99 at "HYS" mode in parameter 2 among above comparison output chart.

\*In MT4Y-□□-43, 44, **LSt**, **HSt**, **LdSt** modes are only available to use.

## ◎Sub output(Transmission function)

### ●RS485 communication output

It is able to set address(01~99)

It is able to transmit by selecting modulation speed (Transmitted number of signal per 1sec.) of serial transmission. (Selectable 1200, 2400, 4800, 9600bps)

### ●Low-speed serial output

It outputs current display value as Low-frequency (50Hz) type.

### ●Current output (DC4~20mA)

It outputs DC4~20mA against High/Low-limit scale. (Resolution:12000 division)

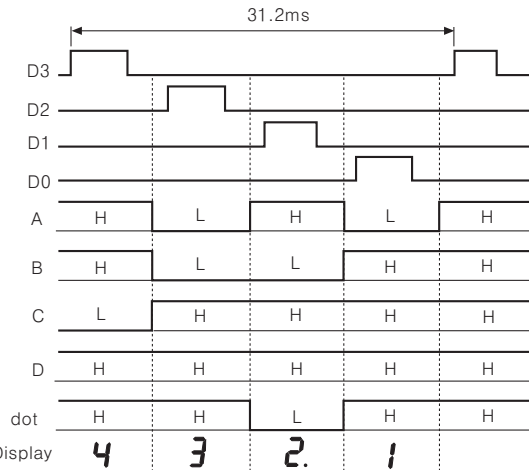
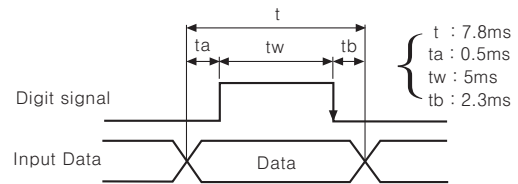
### ●BCD output

It outputs display value as BCD Code.

**\*Only one sub-output is selectable. (More than one sub-output is not allowed.)**

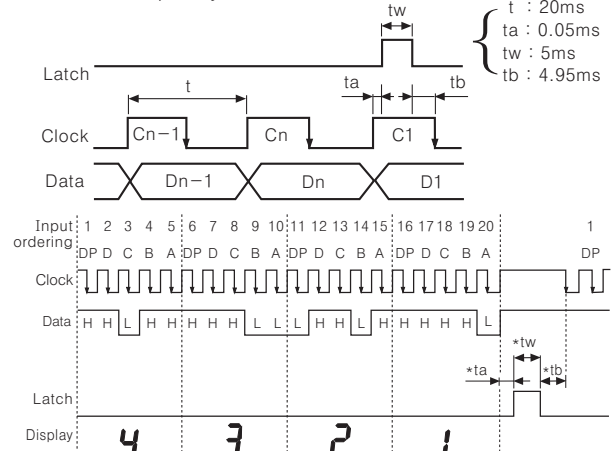
## ◎Time chart of BCD output and Low speed serial output

### ●BCD output(Negative logic)



### ●Low speed serial output(Negative logic)

-Clock frequency:50Hz



\*When clock pulse changed from High to Low, Data will be read.

(A) Counter

(B) Timer

(C) Temp. controller

(D) Power controller

(E) Panel meter

(F) Tacho/Speed/Pulse meter

(G) Display unit

(H) Sensor controller

(I) Switching power supply

(J) Proximity sensor

(K) Photo electric sensor

(L) Pressure sensor

(M) Rotary encoder

(N) Stepping motor & Driver & Controller

(O) Graphic panel

(P) Field network device

(Q) Production stoppage models & replacement

# MT4 Series

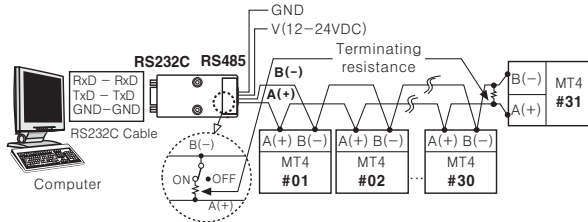
## Communication output

The protocol is changed as MODBUS type.

### Interface

|                        |  |
|------------------------|--|
| Standard               | EIA RS485  |
| Number of connections  | Max. 31 units. (It is available to set address 01~99.) |
| Communication method   | 2 wire half duplex                                     |
| Synchronous method     | Asynchronous type                                      |
| Communication distance | Within max. 800m                                       |
| Communication speed    | 1200, 2400, 4800, 9600bps                              |
| Start bit              | 1bit(Fixed)  |
| Stop bit               | 1bit(Fixed)  |
| Parity bit             | none   |
| Data bit               | 8bit(Fixed)  |
| Protocol               | MODBUS RTU   |

### Application of system organization

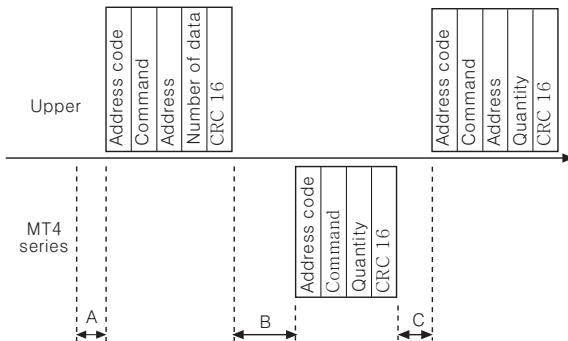


\*Autonics SCM-38I is recommended to use for RS232C to RS485 converter.

\*Please use proper twist pair line for RS485 communication cable.

### 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 high order system, it starts to communicate.
3. Initial communication will be started by the high order system. When a command comes out from the high order system, MT4 series will respond.



\*A → Min. 0.5sec. after applying 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 high order 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 |                  |                |    |                        |               |                |       |

①Unit number : 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 command | Command | Start address |     | Number of data |     | CRC16 |      |
|-----------------|---------|---------------|-----|----------------|-----|-------|------|
|                 |         | High          | Low | High           | Low | Low   | High |
| 01              | 04      | 00            | 00  | 00             | 04  | F1    | C9   |

#### Response

| Address command | 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 |

# Multi Panel Meter

## ●Error processing(Slave → Master)

### 1. Non-supportable command

| Unit number | 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

| Unit number | 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

| Unit number | 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 | Com-mand | Transmission  | Remark  |
|---------------|----------|---|---|
| 30001 (0000)  | 04       | Process value<br>• Standard:<br>Transmit up to -5%~110% of display range<br>• Scale:<br>Able to transmit from -1999 to 9999% of display range | Data transmittance for measuring error<br>• Standard :<br>Transmit "9999" if "HHHH" is displayed. Transmit "-1999" if "LLLL" is displayed.<br>• Scale :<br>Transmit the setting value of <b>H-SC</b> and <b>L-SC</b> .<br>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.<br>• Standard: 0.00 0 → 0003H, 0.00 → 0002H, 0.0 → 0001H, 0 → 0000H,<br>• 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 | Com-mand | Transmission   | Remark  |
|---------------|----------|--|---|
| 00001 (0000)  | 01       | Output status<br>• 01h:Lo output<br>• 02h:Go output<br>• 04h:Hi output<br>• 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 **bps** mode of **PA 2**. The factory default is **9600**bps.

## ◎Setting of communication address (Setting range: 01~99)

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

It is enable 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 | 0x86 | 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 | 0x0C | 0x0D | 0xC0 | 0x0F | 0xCF | 0xCE | 0x0E | 0x0A | 0xCA | 0xCB | 0x0B | 0xC9 | 0x09 | 0x08 | 0xC8 |
| 2 | 0xD8 | 0x18 | 0x19 | 0xD9 | 0x1B | 0xDB | 0xDA | 0x1A | 0x1E | 0xDE | 0xDF | 0x1F | 0xDD | 0xD1 | 0xD0 | 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 | 0x34 | 0xF4 |
| 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 | 0x64 | 0xA4 |
| 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 upper 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 upper 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 : 1bit(Fixed)
  - Stop bit : 1bit(Fixed)
  - Parity bit : None(Fixed)
  - Data bit : 8bit(Fixed)
  - Baud rate : 9600, 4800, 2400(Setting)
  - Address : 01~99(Setting)

(A) Counter

(B) Timer

(C) Temp. controller

(D) Power controller

(E) Panel meter

(F) Tacho/Speed/Pulse meter

(G) Display unit

(H) Sensor controller

(I) Switching power supply

(J) Proximity sensor

(K) Photo electric sensor

(L) Pressure sensor

(M) Rotary encoder

(N) Stepping motor & Driver & Controller

(O) Graphic panel

(P) Field network device

(Q) Production stoppage models & replacement