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
  : DC500V, AC500V, DC5A, AC5A
- ●Max. display range : −1999 to 9999
- ●High/Low scale function
- ●**AC frequency measurement function : 0.1 to 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

Output

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 to 6) : Option

Y type

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 to 9) : Option

W type

Power supply

1	12−24VDC
4	100−240VAC

Input

DV	DC voltage
DA	DC ampere
AV	AC voltage
AA	AC ampere

Size

Y	DIN W72×H36mm
W	DIN W96×H48mm

Digit

4	9999(4 Digit)

Item

MT	Multi Meter

※To measure the current over DC 5A, please select DV type because the shunt should be used.
※In case of selecting frequency display, no output will be provided even if it is output support models.
(Main output, Sub output and RS485 output)

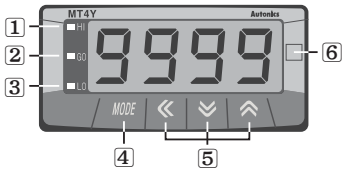
▣Specifications

Series		MT4Y-DV-4□ MT4Y-DA-4□	MT4Y-AV-4□ MT4Y-AA-4□	MT4W-DV-4□ MT4W-DA-4□	MT4W-AV-4□ MT4W-AA-4□	MT4W-DV-1□ MT4W-DA-1□	MT4W-AV-1□ MT4W-AA-1□
Measurement input		DC voltage, ampere	AC voltage, ampere, Frequency	DC voltage, ampere	AC voltage, ampere, Frequency	DC voltage, ampere	AC voltage, ampere, Frequency
Power supply		100-240VAC 50/60Hz (90 to 110% of rated voltage)				12-24VDC (90 to 110% of rated voltage)	
Power consumption		5VA				5W	
Display method		7Segment LED display(Red) (Character height:14.2mm)					
Display accuracy		• 23℃±5℃ ☞ DC type : F.S.±0.1% rdg±2digit / AC type : F.S.±0.3% rdg±3digit DC/AC type : F.S +0.3% rdg +3digit max. only for 5A terminal. • -10℃ to 50℃ ☞ DC/AC type : F.S.±0.5% rdg±3digit					
Max. allowable input		110% for input spec.					
A/D conversion method		Practical oversampling using successive approximation ADC					
Sampling cycle		DC type : 50ms, AC type : 16.6ms(Resolution 1/12000)					
Max. indication range		-1999 to 9999(4 Digit)					
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 (Trans-mission output)	RS485 commu-nication output	• Baud rate : 1,200/2,400/4,800/9,600bps • Protocol : RTU type			• Communication type : 2 wires half duplex • Tuning method : Sub-synchronization		
	Serial output	NPN open collector output, 12-24VDC Max. 50mA (Resistive load)					
	BCD output						
	DC4-20mA output	Resolution : 12,000 division(Load resistance max. 600Ω), Response time : Max. 450ms					
AC measuring function		(★1) Selectable RMS or AVG					
Frequency measuring function		(★1)(★2) Measurement range : 0.100 to 9999Hz(Differ according to decimal point position)					
Hold function		(★3) Including(Outer hold function)					
Insulation resistance		Min. 100MΩ (at 500VDC megger) between external terminal and case					
Dielectric stength		2,000VAC for 1minute between external terminal and case					
Noise stength		±2kV the square wave noise(pulse width : 1㎲) by the noise simulator					
Vibration	Mechanical	0.75mm amplitude at frequency of 10 to 55Hz in each of X, Y, Z directions for 2hours					
	Malfunction	0.5mm amplitude at frequency of 10 to 55Hz in each of X, Y, Z directions for 10minutes					
Shock	Mechanical	100m/s² (10G) in X, Y, Z directions for 3 times					
	Malfunction	300m/s² (30G) in X, Y, Z directions for 3 times					
Relay life cycle	Malfunction	Min. 20,000,000 times					
	Mechanical	Min. 100,000 times(250VAC 3A Load current)					
Ambient temperature		-10 to 50℃ (at non-freezing status)					
Storage temperature		-20 to 60℃ (at non-freezing status)					
Ambient humidity		35 to 85%RH					
Insulation type		(★4) ▣					
Approval		CE cULus				CE	
Unit weight		Approx. 134g		Approx. 211g			

※(★1) AC measuring function, and frequency measuring function are only for AC measuring input type.
※(★2) Frequency measuring accuracy : 1kHz Max. ±0.1% F.S, 1kHz to 10kHz Max. ±0.3% F.S
※(★3) MT4Y-□□-4N model has no hold function.
※(★4) "▣" Mark indicated that equipment protected throughout by double insulation or reinforced insulation.

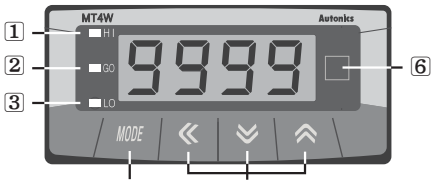
▣Front panel identification

●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



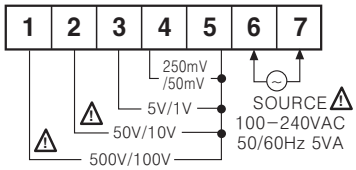
4 MODE key : Enter to parameter group, memorize the setting value, Move the parameter mode
5 ≪ key : Move the digit, enter to parameter group
≫, ⩓ key : Change the setting value.
6 Unit sticker

※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.

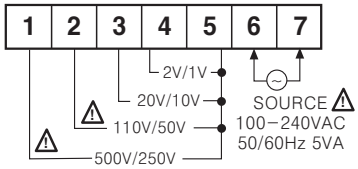
▣Connections

◎Measuring input connection of MT4Y Series

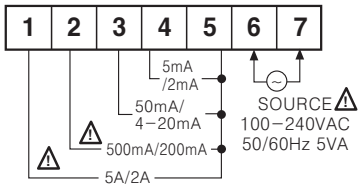
●MT4Y-DV-4□



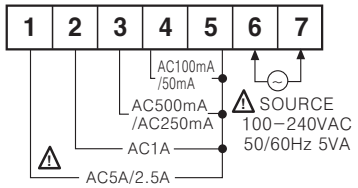
●MT4Y-AV-4□



●MT4Y-DA-4□

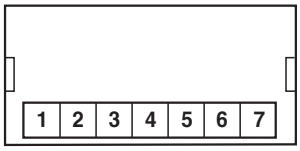


●MT4Y-AA-4□



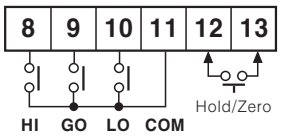
◎Output terminal of connection of MT4Y Series

●MT4Y-□□-4N (Indicator)



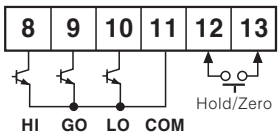
●MT4Y-□□-40

(Triple relay contact output)



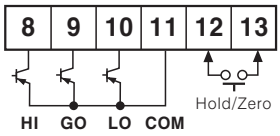
●MT4Y-□□-41

(Triple NPN O.C output)



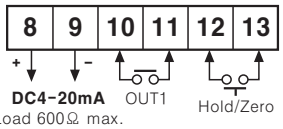
●MT4Y-□□-42

(Triple PNP O.C output)



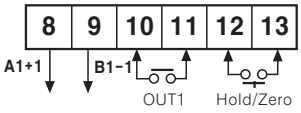
●MT4Y-□□-43

(Relay output+Transmission output)



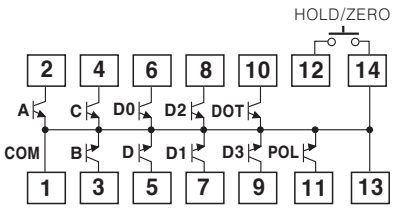
●MT4Y-□□-44

(Relay+RS485 communication output)

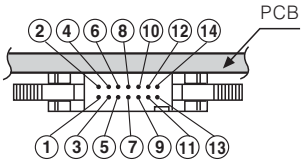


●MT4Y-□□-45

(BCD Dynamic output)

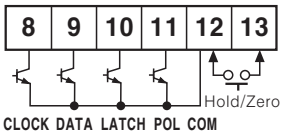


(Note) There is no signal output terminal about − sign.



※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]

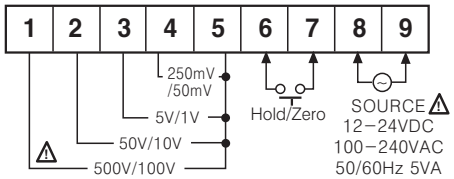
●MT4Y-□□-46(Low speed serial output)



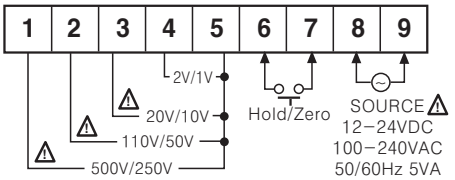
※POL : When a display value is "−", the signal of "−" will be outputted.

◎Measuring input connection of MT4W Series

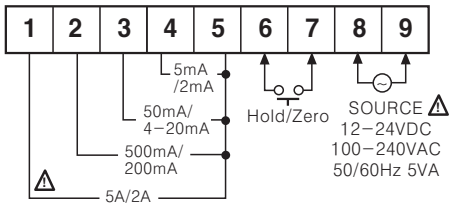
●MT4W-DV-4□



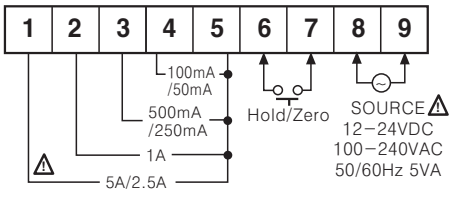
●MT4W-AV-4□



●MT4W-DA-4□



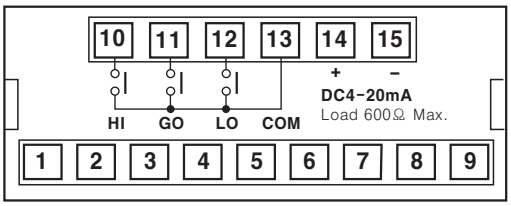
●MT4W-AA-4□



◎Output terminal connection of MT4W Series

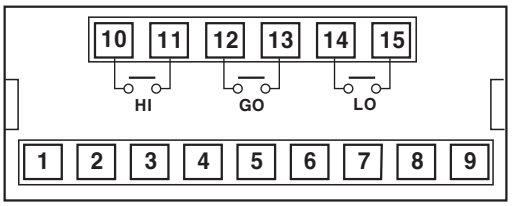
●MT4W-□□-40 (Triple relay contact output +Transmission output)

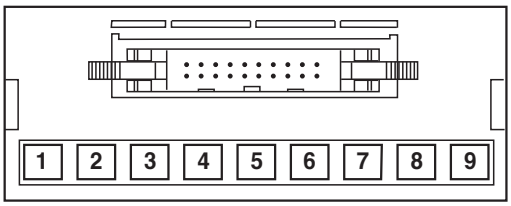
MAIN OUT
CONTACT OUT
:250VAC 3A 1a RESISTIVE LOAD

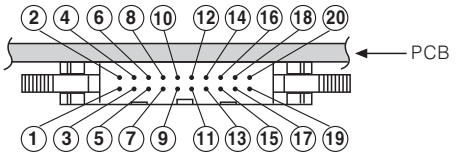


●MT4W-□□-41 (Triple relay contact output)

MAIN OUT
CONTACT OUT
:250VAC 3A 1a RESISTIVE LOAD



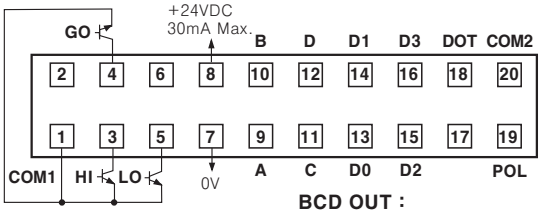




※Hirose connector pin header model of the unit : HIF3BA-20PA-2.54DS
※Contact Hirose Electric to purchase socket and wires of Hirose connector.
[Socket : HIF3BA-20D-2.54R]

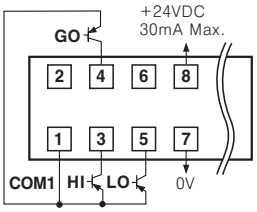
●MT4W-□□-42 / MT4W-□□-43 (Triple NPN/PNP open collector output+BCD output)

MAIN OUT :
NPN OPEN COLLECTOR
12-24VDC Max. 50mA



BCD OUT :
NPN OPEN COLLECTOR
12-24VDC Max. 50mA

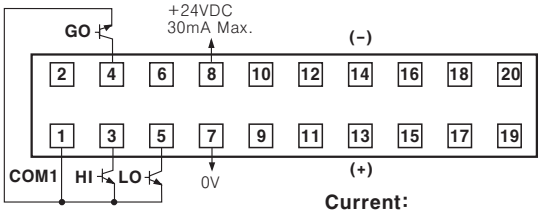
MAIN OUT :
PNP OPEN COLLECTOR
12-24VDC Max. 50mA



※POL : When a display value is "−", the signal of "−" will be outputted.

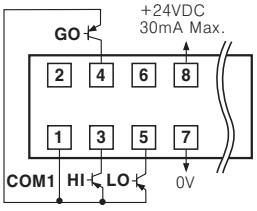
●MT4W-□□-44/ MT4W-□□-45 (Triple NPN/PNP open collector output+Transmission output)

MAIN OUT :
NPN OPEN COLLECTOR
12-24VDC Max. 50mA



Current:
DC4-20mA LOAD 600Ω Max.

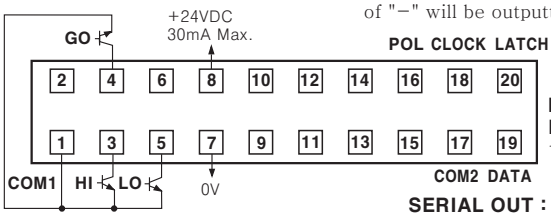
MAIN OUT :
PNP OPEN COLLECTOR
12-24VDC Max. 50mA



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

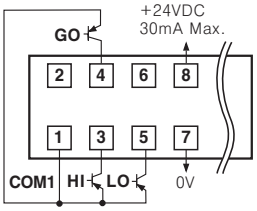
※POL : When a display value is "−", the signal of "−" will be outputted.

MAIN OUT :
NPN OPEN COLLECTOR
12-24VDC Max. 50mA



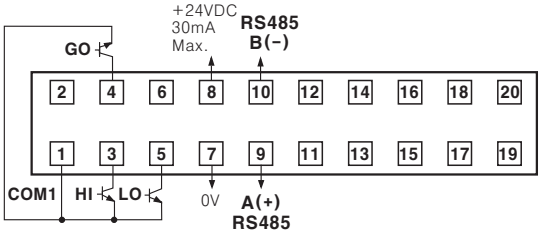
SERIAL OUT :
NPN OPEN COLLECTOR
12-24VDC Max. 50mA

MAIN OUT :
PNP OPEN COLLECTOR
12-24VDC Max. 50mA

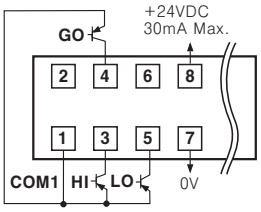


●MT4W-□□-48/ MT4W-□□-49 (Triple NPN/PNP open collector output+RS485 output)

MAIN OUT :
NPN OPEN COLLECTOR
12-24VDC Max. 50mA



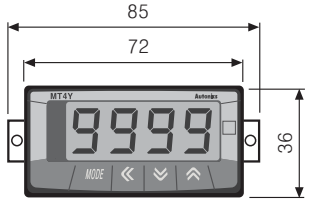
MAIN OUT :
PNP OPEN COLLECTOR
12-24VDC Max. 50mA

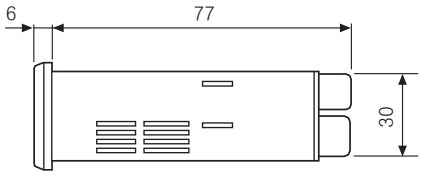


▣Dimensions

(Unit:mm)

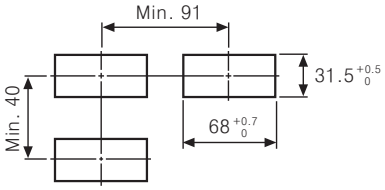
●MT4Y−□□−4N, 45, 46





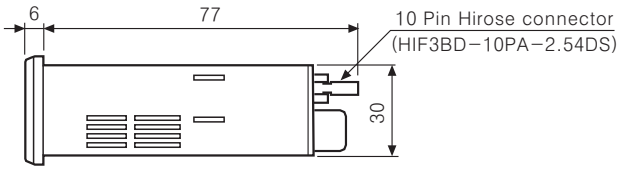
〈MT4Y−□□−4N, 40~44, 46〉

●Panel cut−out



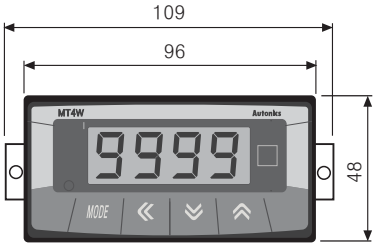
●MT4Y−□□−43, 44

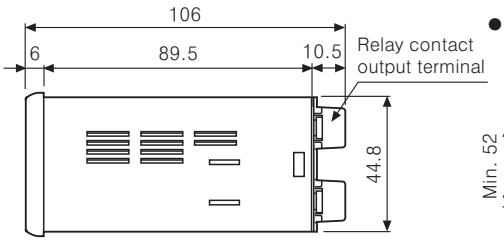
●MT4Y−□□−40, 41, 42



〈MT4Y−□□−45〉

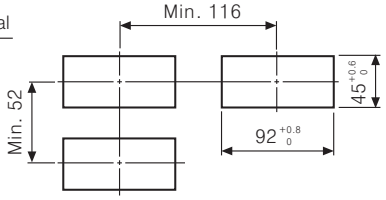
●MT4W−□□−4N (Indicator)





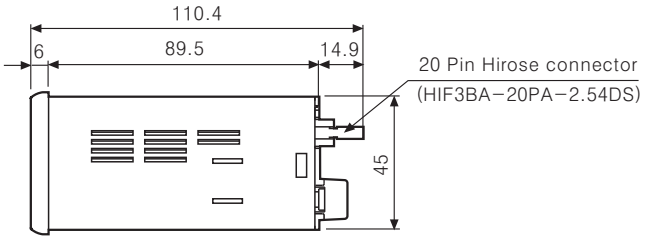
※There is no Relay contact output terminal block in indication type.

●Panel cut−out



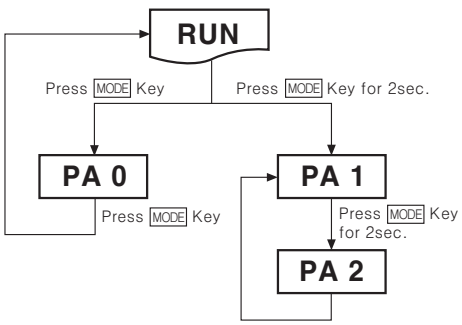
〈 MT4W−□□−4N, MT4W−□□−40, 41 〉

●MT4W−□□−40 to 49



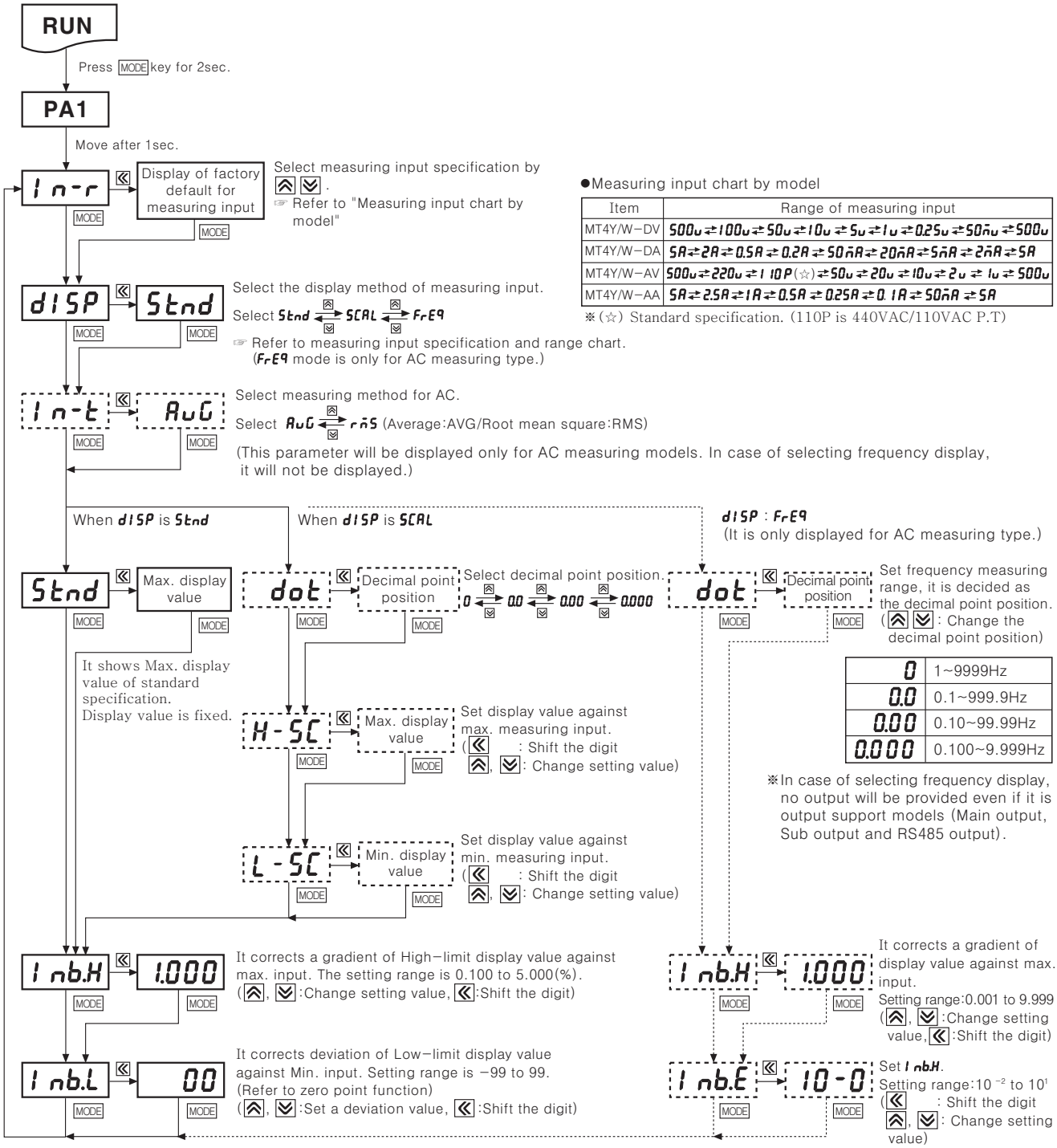
〈 MT4W−□□−42 to 49 〉

▣Parameter setting



※If MODE 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 MODE key is pressed for 2 sec., **PA-1** is displayed.
※If MODE key is pressed for 4 sec., **PA-2** is displayed after **PA-1**.
※When releasing MODE key at displaying **PA-1** or **PA-2**, then it will enter into Parameter.
※If MODE key is touched for 3 sec. after advance to parameter, it will return to **RUN** mode.

▣Parameter group 1



※After setting each mode, press MODE key for 2 sec. to return to RUN.
※If any key is untouched for 60sec. after advance to Parameter, it will return to RUN.

●Measuring input chart by model

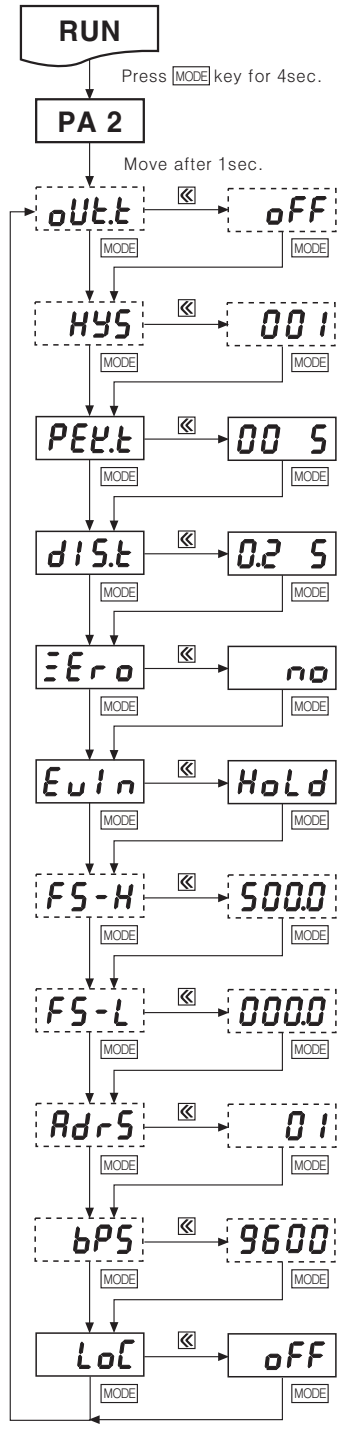
Item	Range of measuring input
MT4Y/W-DV	500u ⇄ 100u ⇄ 50u ⇄ 10u ⇄ 5u ⇄ 1u ⇄ 0.25u ⇄ 50mu ⇄ 500u
MT4Y/W-DA	5A ⇄ 2A ⇄ 0.5A ⇄ 0.2A ⇄ 50mA ⇄ 20mA ⇄ 5mA ⇄ 2mA ⇄ 5A
MT4Y/W-AV	500u ⇄ 220u ⇄ 110P(☆) ⇄ 50u ⇄ 20u ⇄ 10u ⇄ 2u ⇄ 1u ⇄ 500u
MT4Y/W-AA	5A ⇄ 2.5A ⇄ 1A ⇄ 0.5A ⇄ 0.25A ⇄ 0.1A ⇄ 50mA ⇄ 5A

※(☆) Standard specification. (110P is 440VAC/110VAC P.T)

◎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	In.H	1.000	1.000	1.000	1.000
dISP	Stnd	Stnd	Stnd	Stnd	In.L	00	00	00	00
In-t	——	——	AvG	AvG	dot	0.0	0.000	0.0	0.000
Stnd	500.0	5.000	500.0	5.000	In.E	——	——	10-0	10-0

▣Parameter group 2



Select output operation mode of preset output. (It displays when it is preset output type only.)

oFF ⇄ L.St ⇄ H.St ⇄ LH.St ⇄ HH.St ⇄ LL.St ⇄ Ld.St

In MT4Y−□□−43,44, "**oFF**, **L.St**" are only displayed.

Set a hysteresis of preset. (◁◁:Shift the digit, △ ▽ : Change setting value)
The range is within 10% of max. display range (Unit : digit) If resolution is higher than 10,000, it is fixed to 9999.
※**out.t** mode is **oFF**, it is not displayed.

Set a monitoring delay time for displayed peak value.
(◁◁:Shift the digit, △ ▽ : Change setting value)
Setting range : 00 to 30sec.

Set a display cycle. (◁◁:Shift the digit, △ ▽ : Change setting value)
Setting range : 0.1 to 5.0sec.

Select zero function with operation at front. (Set with △, ▽ key)
When ◁◁ + △ key are pressed for 3 sec. to set **YES**, it will be zero function and the deviation value is saved automatically at **I nb.L** mode.

Select input with 6, 7(MT4W)[12, 13(MT4Y)] terminal or zero function for external signal.
(Set with △, ▽ key)
HoLd : Holding display value, **ZEro** : Zero function using Hold/Zero terminal

Set the high limit value, output point of current output 20mA.
(◁◁:Shift the digit, △ ▽ : Change setting value)
(When changing measuring input and prescale mode, it is changed automatically as maximum value of input range.)

Set the low limit value, output point of current output 4mA.
(◁◁:Shift the digit, △ ▽ : Change setting value)
(When changing measuring input and prescale mode, it is changed automatically as minimum value of input range.)

Set the address of RS485 communication output.
(◁◁:Shift the digit, △ ▽ : Change setting value)
Setting range : **01** to **99**

Select Baud rate of RS485 communication output.
Setting range : 9600 ⇄ 4800 ⇄ 2400 ⇄ 1200

Set key lock function and select from 4 types.
oFF ⇄ LoC1 ⇄ LoC2 ⇄ LoC3

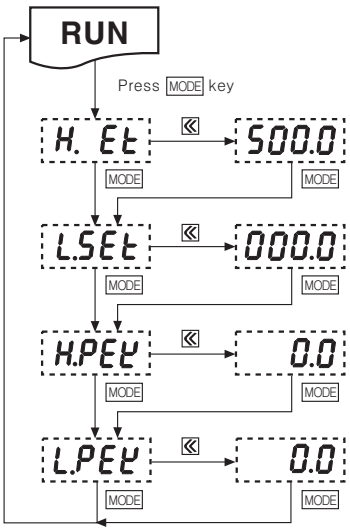
oFF	Disable to lock keys
LoC1	Lock Parameter 1
LoC2	Lock Parameter 1, 2
LoC3	Lock Parameter 0, 1 and 2

※The dotted mode is only displayed for output type.
※After setting each mode, press MODE 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.

◎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	5.000	500.0	5.000
HYS	001	001	001	001	FS-L	000.0	0.000	000.0	0.000
PEU.t	00 S	00 S	00 S	00 S	AdrS	01	01	01	01
dIS.t	0.2 S	0.2 S	0.2 S	0.2 S	bPS	9600	9600	9600	9600
ZEro	no	no	no	no	LoC	oFF	oFF	oFF	oFF
EuIn	HoLd	HoLd	HoLd	HoLd					

▣Parameter group 0



Set preset High-limit value. (Set with ≪, ≫, ≫ key)
※It is displayed when set the preset only.
When set **oFF** in **oUt.t** mode if **PA-2**, the parameter is not displayed.

Set preset Low-limit value. (Set with ≪, ≫, ≫ key)
※It is displayed when set the preset only.
When set **oFF** in **oUt.t** mode if **PA-2**, the parameter is not displayed.

It shows High-limit monitoring value while it is in **RUN** mode.
It will be reset by pressing ≪ key.

It shows Low-limit monitoring value while it is in **RUN** mode.
It will be reset by pressing ≪ key.
※If "**00**" is set in **PEU.t** mode of **PA-2**, **H.PEU** and **L.PEU** modes will not be displayed.

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

◎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
H.SEL	500.0	5.000	500.0	5.000	H.PEU	0.0	0.000	0.0	0.000
L.SEL	000.0	0.000	000.0	0.000	L.PEU	0.0	0.000	0.0	0.000

▣Measuring input and range

Type	Measuring input and range		Input impedance	Standard specification [Stnd]	Prescale specification [SCAL]
				Display range[Fixed]	Display range[Variable]
DC Volt	0-500V	[500u]	4.33MΩ	0.0 to 500.0	-1999 to 9999 -199.9 to 999.9 -19.99 to 99.99 -1.999 to 9.999 (The display range is changed according to the decimal point position.) ※Please connect proper terminal its max. input voltage is within 30 to 100% of input terminal. 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	[100u]	4.33MΩ	0.0 to 100.0	
	0-50V	[50u]	433.15kΩ	0.00 to 50.00	
	0-10V	[10u]	433.15kΩ	0.00 to 10.00	
	0-5V	[5u]	43.15kΩ	0.000 to 5.000	
	0-1V	[1u]	43.15kΩ	0.000 to 1.000	
	0-250mV	[0.25u]	2.15kΩ	0.0 to 250.0	
	0-50mV	[50mu]	2.15kΩ	0.00 to 50.00	
DC Ampere	0-5A	[5A]	0.01Ω	0.000 to 5.000	
	0-2A	[2A]	0.01Ω	0.000 to 2.000	
	0-500mA	[0.5A]	0.1Ω	0.0 to 500.0	
	0-200mA	[0.2A]	0.1Ω	0.0 to 200.0	
	0-50mA	[50mA]	1.0Ω	0.00 to 50.00	
	4-20mA	[20mA]	1.0Ω	4.00 to 20.00	
	0-5mA	[5mA]	10.0Ω	0.000 to 5.000	
	0-2mA	[2mA]	10.0Ω	0.000 to 2.000	
AC Volt	0-500V	[500u]	4.98MΩ	0.0 to 500.0	
	0-250V	[250u]	4.98MΩ	0.0 to 250.0	
	0-110V	[110P]	1.08MΩ	0.0 to 440.0	
	0-50V	[50u]	1.08MΩ	0.00 to 50.00	
	0-20V	[20u]	200kΩ	0.00 to 20.00	
	0-10V	[10u]	200kΩ	0.00 to 10.00	
	0-2V	[2u]	20kΩ	0.000 to 2.000	
	0-1V	[1u]	20kΩ	0.000 to 1.000	
AC Ampere	0-5A	[5A]	0.01Ω	0.000 to 5.000	
	0-2.5A	[2.5A]	0.01Ω	0.000 to 2.500	
	0-1A	[1A]	0.05Ω	0.000 to 1.000	
	0-500mA	[0.5A]	0.1Ω	0.0 to 500.0	
	0-250mA	[0.25A]	0.1Ω	0.0 to 250.0	
	0-100mA	[0.1A]	0.5Ω	0.0 to 100.0	
	0-50mA	[50mA]	0.5Ω	0.00 to 50.00	

▣Functions

◎AC frequency measurement function (PA1 : dISP mode)

It measures input signal frequency when it is an AC input using fixed decimal point[PA1:dot mode] and measuring range can be changed by setting and measuring range of decimal point position is as below. It is available to adjust upper gradient with[PA1:I nb.H mode] and [PA1:I nb.E mode]. In order to measure frequency normally, input signal, over 30% F.S of measuring range should be supplied. Please select the proper point of measuring terminal.

①Measuring range

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

※0.100 to 5000Hz
: Display accuracy error within ±0.3%F.S.±2Digit
※5000 to 9999Hz
: Display accuracy error within ±1%F.S.±3Digit

② I nb.H : 0.100 to 9.999
[Gradient adjustment of high value]

③ I nb.E : 10^{-2}, 10^{-1}, 10^{-0}, 10^{1}[Index adjustment of I nb.H]

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

It adjusts the display value of the optional configured input value as zero by force, zero point error can be adjusted with 3 ways as below.

When zero point adjustment with front key and Hold terminal is finished normally, zero point of measuring terminal is displayed and the adjusted value is saved in I nb.L automatically.

Operation	Input correction value	Front panel key	External input signal
Description	PA 1 :Direct input correction value method at I nb.L mode.	Press both ≪, ≫ keys for 3 sec. at the measuring mode.	Short-circuit external Hold terminal no.11, 12 [no. 6, 7(MT4W)] over min. 50m. ※It is enable to use in option mode.

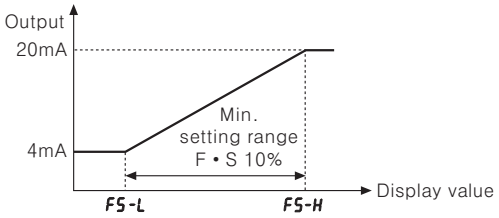
※Refer to "◎**Error correction function**", "◎**Error display function**" and "▣**Parameter 2**" for function and error.

◎Current output(DC4-20mA) scale function (PA2 : FS-H / FS-L mode)

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

※The min. setting interval between FS-H and FS-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 FS-L, 4mA is outputted and 20mA for it is over the setting value of FS-H mode.



◎Initialization function

It initializes as the factory default status. If press ≪, ≫, ≪ keys together for 2sec. in **RUN** mode, I nL.t mode and the setting value(no) is displayed every 0.5 sec. and it will be initialized as the factory default when press MODE key after change no → YES.

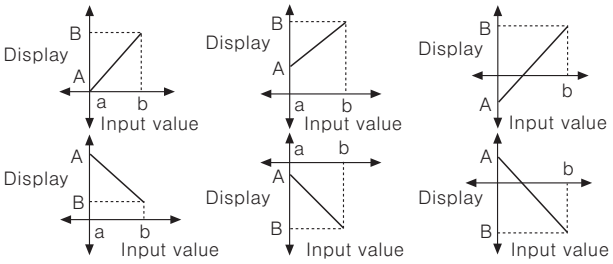
◎Error display function

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	Lights when display input is exceeded the max. display range(9999) or H-SC setting value
d-LL	Lights when display input is exceeded the min. display range (-1999) or L-SC setting value
F-HH	Flashes when measuring frequency is exceeded the max. measuring rvalue (9999)
oUEr	Flashes when it exceeds zero adjustment 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 "oUEr" 2 times when it exceeds the zero range, it returns to RUN mode.

◎Prescale function(PA 1 : H-SC/L-SC mode)

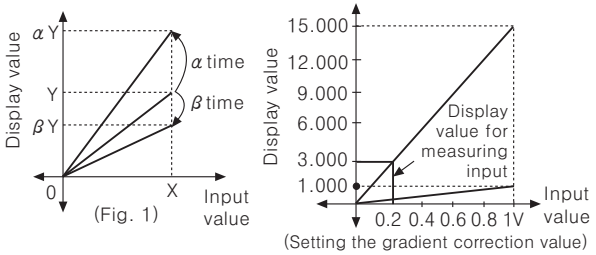
This function is to display setting(-1999 to 9999) of particular High/Low-limit value in order to display High/Low-limit value of measuring input. If measuring inputs are a or b and particular values are A or B, it will display a=A, b=B as below graph.



◎Gradient correction function(PA1:I nb.H mode)

This function is to correct a gradient of prescale value and display value. (Fig.1)Display value Y can be used as α, β times against X input value by correction function[I nb.H]. And also can be used as correction function of max. display value(H-SC). Adjustment range is 0.100 to 5.000 and multiply current gradient.

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



①Select 0-1VDC for measuring input in Parameter1.

②Standard specification in input : 0-1VDC and 1.000 therefore it has to be 15.000(H-SC) for 1VDC(input) in order to display 3.000 for DC200mV(input).
But it is disable due to setting range is 9.999

③In this case, please check below chart.
Please set as I nb.H×H-SC =15.000

Setting	H-SC	L-SC	I nb.H	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	

◎Error correction function(PA 1: I nb.H / I nb.L mode)

It corrects display value error of measured input.
I nb.L : ±99 (Adjust deviation of low value)
I nb.H : 5.000 to 0.100 [Correct gradient(%) of high value]
Display value=(Measured value × I nb.H) + I nb.L
Ex) Low value correction
When there is an application where there is a residual voltage of 1.2V, but a 0V display is desired, then it is possible by adjusting the INB.L parameter setting to 12(offset correcting value or equal to 1.2V without decimal) that the desired display value of 0 can be achieved.
Ex) High value correction
When there is an application where the high actual value of display is 501 and exceeds the 500V display range, then it is possible by adjusting the I nb.H parameter setting to 0.998(calculated by desired value of 500/actual value of 501), that the desired value can be achieved.
※The offset correction range of I nb.L is within −99 to 99 for D^{-0}, D^{-1} digit regardless of decimal point.

◎Display cycle delay function(PA 2:d I S.t mode)

n some applications the measured input may fluctuate which in turn causes the display to fluctuate. By adjusting the display cycle delay function time in the d I S.t mode in parameter 2, the operator can adjust the display time within a range of 0.1 sec to 5 sec. For example, if the operator sets the display cycle time to 4.0 sec., the display value displayed will be the average input value over 4 sec. and also will show any changes if any every 4 sec.

◎Monitoring peak display value function (PA 0: H.PEU / L.PEU mode, PA 2: PEU.t mode)

It monitors Max./Min. value of display value based on current display value and then display the data in H.PEU mode and L.PEU mode of parameter 0. Set delay time(0 to 30 sec.) in PEU.t mode of parameter 2 in order to avoid caused by initial overcurrent or overvoltage, when monitoring the peak value. Delay time is 0 to 30 sec. and it starts to monitor the peak value after set time.
When ≪, ≫, ≪ keys are pressed at H.PEU and L.PEU mode of parameter 0, it will be initialized.
※Monitoring function is not indicated when setting the PEU.t of parameter 2 as "0".

◎Preset output Mode[PA 2 : oUt.t mode]

Mode	Output operation	Operation
	HSEt / LSEt	H:Hysteresis
oFF		No output
LSt	GO / LO	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.
HSt	HI / GO	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.
LHSt	HI / GO / LO	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.
HHSt	HI / GO / LO	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.
LLSt	HI / GO / LO	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. If it is bigger than low setting value and High setting value, GO output will be ON.
Ld.St	GO / LO	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 wil be ON.

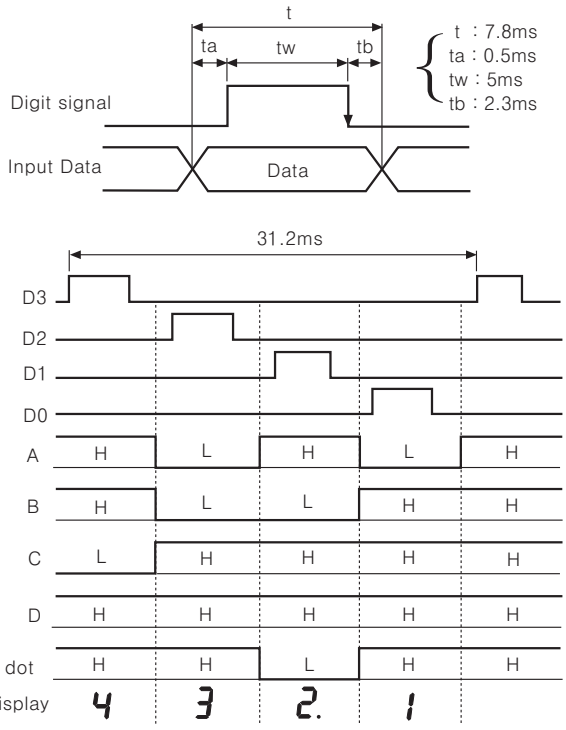
※"H" means hysteresis and able to set 1 to 99 at "HYS" mode in para−meter 2 among above comparison output chart.
※In MT4Y−□□−43, 44, LSt modes are only available to use.

◎Sub output(Transmission function)

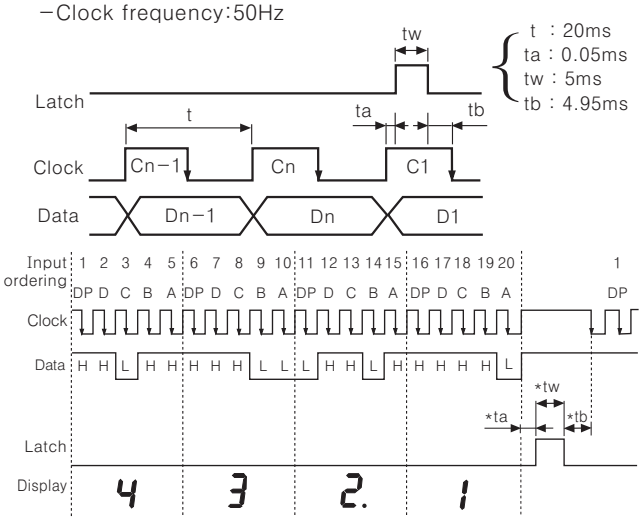
●RS485 communication output
It is able to set address(01 to 99)
It is able to transmit by selecting modulation speed (Transmitted number of signal per 1sec.) of serial trans −mission. (Selectable 1200, 2400, 4800, 9600bps)
●Low−speed serial output
It outputs current display value as Low−frequency(50Hz) 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.

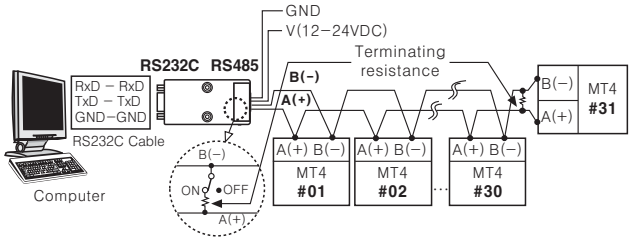
▣Communication output

The protocol is changed as Modbus type.

◎Interface

Standard	EIA RS485
Number of connections	Max. 31 units.(It is available to set address 01 to 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

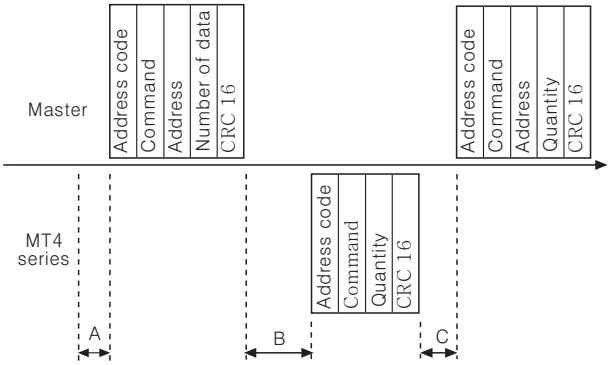


※It is recommended to use communication converter, RS232C to RS485(SCM-38I, sold separately), USB to RS485 converter(SCM-US48I, sold separately).

※Please use a proper twist pair 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 applying power

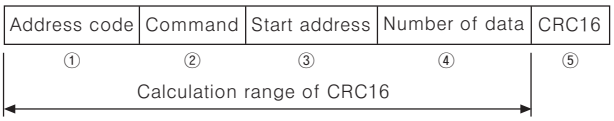
B →
- 9600bps : Within 10.4ms
- 4800bps : Within 20.8ms
- 2400bps : Within 41.6ms
- 1200bps : Within 83.3ms

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



①Address code : This code is the master system can discern MT4 series and able to set within range 01H-63H.

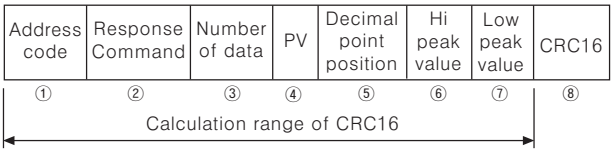
②Command : Read command for input register.

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



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		NULL
			High	Low	High	Low	High	Low	High	Low	Low	High	1byte
01	04	08	08	9B	00	01	08	9C	00	00	CRC16		00

※It is responded with 1 byte sized NULL(00H) at the end of response frame (next BCC 16).

●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	Com−mand	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	Com−mand	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 **bps** mode of **PA 2**. The factory default is **9600**bps.

◎Setting of communication address (Setting range: 01 to 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	0x40
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	0xCC	0x0C	0x0D	0xCD	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	0x1D	0x1C	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	0xEC	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

1. 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)
2. First make communication Parameter of MT4 series and master system one.
3. It is not allow to set overlapping communication number at the same communication line. (Error will occur)
4. Please use twist pair wire for RS485 communi−cation.
5. The total length of communication is 800m and max. 31 units can be connected.
6. When connecting communication cable between MT4 series and master systems, the vertical resistance(100 to 120Ω) must be installed at between both communication lines.
7. The setting item of communication parameter is as below.
   ①Start bit : 1bit(Fixed)
   ②Stop bit : 1bit(Fixed)
   ③Parity bit : None(Fixed)
   ④Data bit : 8bit(Fixed)
   ⑤Baud rate : 9600, 4800, 2400(Setting)
   ⑥Address : 01 to 99(Setting)