DIN W48×H24mm Small size digital multi panel meter

▣Features

- ●Various output options(Default : Indicator)
  RS485 communication output, current(DC4−20mA),
  NPN/PNP open collector output, relay contact output
- ●Max. measuring inputs
  : DC50V, AC250V, DC500mA, AC5A
- ●Display range : −1999 to 9999
- ●High/Low scale
- ●AC frequency measurement : Range 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
- ●Power supply : 12−24VDC/VAC, 100−240VAC

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

CE

▣Ordering information

MT 4 N − DV − E 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

※Output(0 to 4) : Option

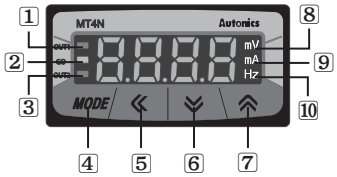
Power supply	E	12−24VDC/AC
	4	100−240AC

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

Size	N	DIN W48×H24mm
Digit	4	9999(4 Digit)
Item	MT	Multi Meter

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

▣Front panel identification



1 OUT1 : Preset output of OUT1
2 GO : Preset Go output of OUT1/OUT2
3 OUT2 : Preset output of OUT2
4 MODE key : Mode key
5 ≪ : Shift key
6 ≫ : Down key
7 ≪ : Up key
8 mV, V unit
9 mA, A unit
10 Hz unit

※There is no 1, 2, 3 on a display panel of MT4N−□□−□N.
※MT4N−□□−□3, □4 model has output display part of OUT1 only.

▣Specifications

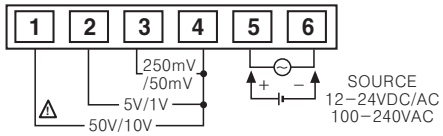
Series	MT4N-DV-E□ MT4N-DA-E□	MT4N-AV-E□ MT4N-AA-E□	MT4N-DV-4□ MT4N-DA-4□	MT4N-AV-4□ MT4N-AA-4□
Measurement input	DC voltage, ampere	AC voltage, ampere, Frequency	DC voltage, ampere	AC voltage, ampere, Frequency
Power supply	12-24VDC/AC(90 to 110% of rated voltage)		100-240AC(90 to 110% of rated voltage)	
Power consumption	DC : 3W, AC : 5VA		5VA	
Display method	7Segment LCD display, Character height : 9mm			
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. display range	-1999 to 9999(4 Digit)			
Preset output	• Relay output ☞ Contact capacity : 125VAC 0.3A, 30VDC 1A/Contact composition : N.O(1a) • NPN/PNP Open Collector output ☞ 12-24VDC ±2V 50mA Max.(Load resistance)			
Sub output (Transmission output)	• RS485 communication output ☞ Baud rate : 1200/2400/4800/9600, Communication method : 2 wires half duplex, Tuning method : Sub-synchronization, Protocol : Modbus RTU • Transmission(DC4-20mA) output ☞ Resolution : 12,000 division(Load resistance max. 600Ω)			
AC measuring function	(★1)	Selectable RMS or AVG		
Frequency measuring function	(★1)	Measurement range : 0.100 to 9999Hz(Differ according to decimal point position)		
Hold function	(★2)	Includes(Outer hold function)		
Insulation resistance	Min. 20MΩ(at 500VDC megger)			
Dielectric strength	1000VAC 50/60Hz for 1 minute (Between external terminal and case)		2000VAC 50/60Hz for 1 minute (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 to 55Hz in each of X, Y, Z directions for 2hour			
Vibration 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			
Shock Malfunction	300m/s² (30G) in X, Y, Z directions for 3 times			
Ambient temperature	-10 to 50℃(at non-dew status)			
Storage temperature	-20 to 60℃(at non-dew status)			
Ambient humidity	35 to 85%RH			
Insulation type	(★3) ▣			
Approval	CE		———	
Unit weight	Approx. 65g			

※(★1) AC measuring function, and frequency measuring function are only for AC measuring input type.
※(★2) The indicator has no hold function.
※(★3) "▣" Mark indicated that equipment protected throughout by double insulation or reinforced insulation.

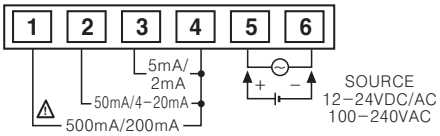
▣Connections

◎Measuring input terminal connection

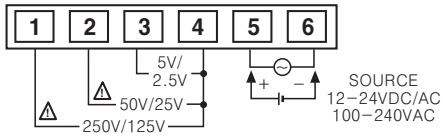
●MT4N-DV-E□



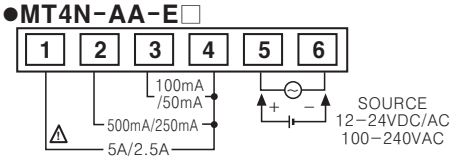
●MT4N-DA-E□



●MT4N-AV-E□

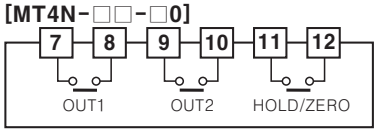


●MT4N-AA-E□

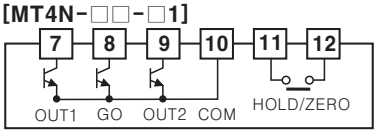


〈Option〉

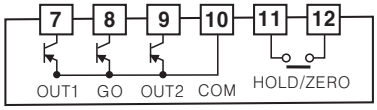
●Relay output [MT4N-□□-□0]



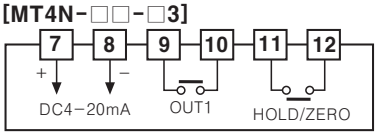
●NPN open collector output [MT4N-□□-□1]



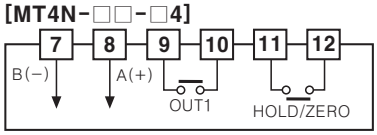
●PNP open collector output [MT4N-□□-□2]



●Relay+Current(DC4-20mA) output [MT4N-□□-□3]

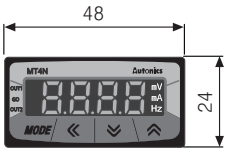


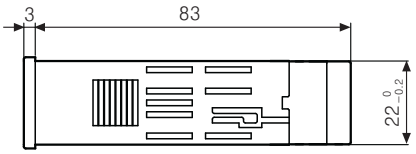
●Relay+RS485 communication output [MT4N-□□-□4]



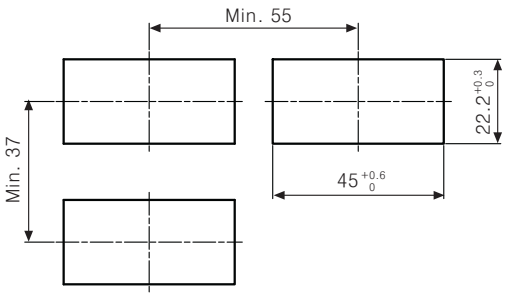
▣Dimensions

●MT4N-□□-EN





●Panel cut-out



※Process the unit after consider the above recommened cut-out fully.

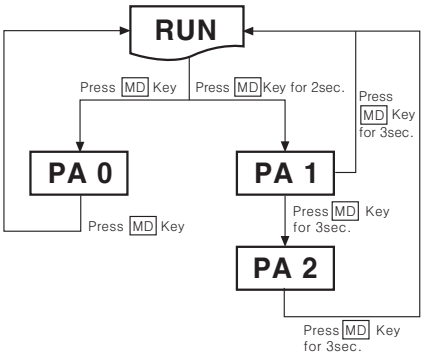
●MT4N-□□-E0

●MT4N-□□-E1, E2

●MT4N-□□-E3, E4

(Unit:mm)

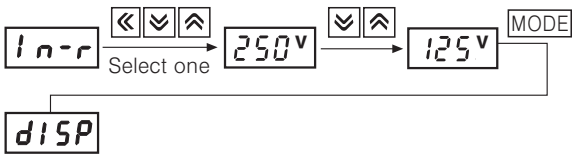
▣Parameter setting



※Press MODE key in **RUN** status, it will advance to **PA-0** group.
※Press MODE key in **RUN** status over 2sec., **PA-1** is displayed.
※Press MODE key in **RUN** status over 5sec., **PA-2** is displayed after **PA-1** and it stops at **PA-2** as press MODE key continuously.
※When release MODE key at displaying **PA-1** or **PA-2**, then it will advance to each parameter.
※Press MODE key over 3sec. at any position of **PA-1** or **PA-2**, it returns to **RUN** mode automatically.
※If any key is untouched for 60sec. in each parameter, it returns to **RUN** mode automatically.
※Press MODE key within 2sec. after return to **RUN**, it advance to previous parameter again. (See the below procedure of each parameter to set.)
※It cannot advance to **PA-0** when preset output operation mode of **PA-2** is **oFF**.

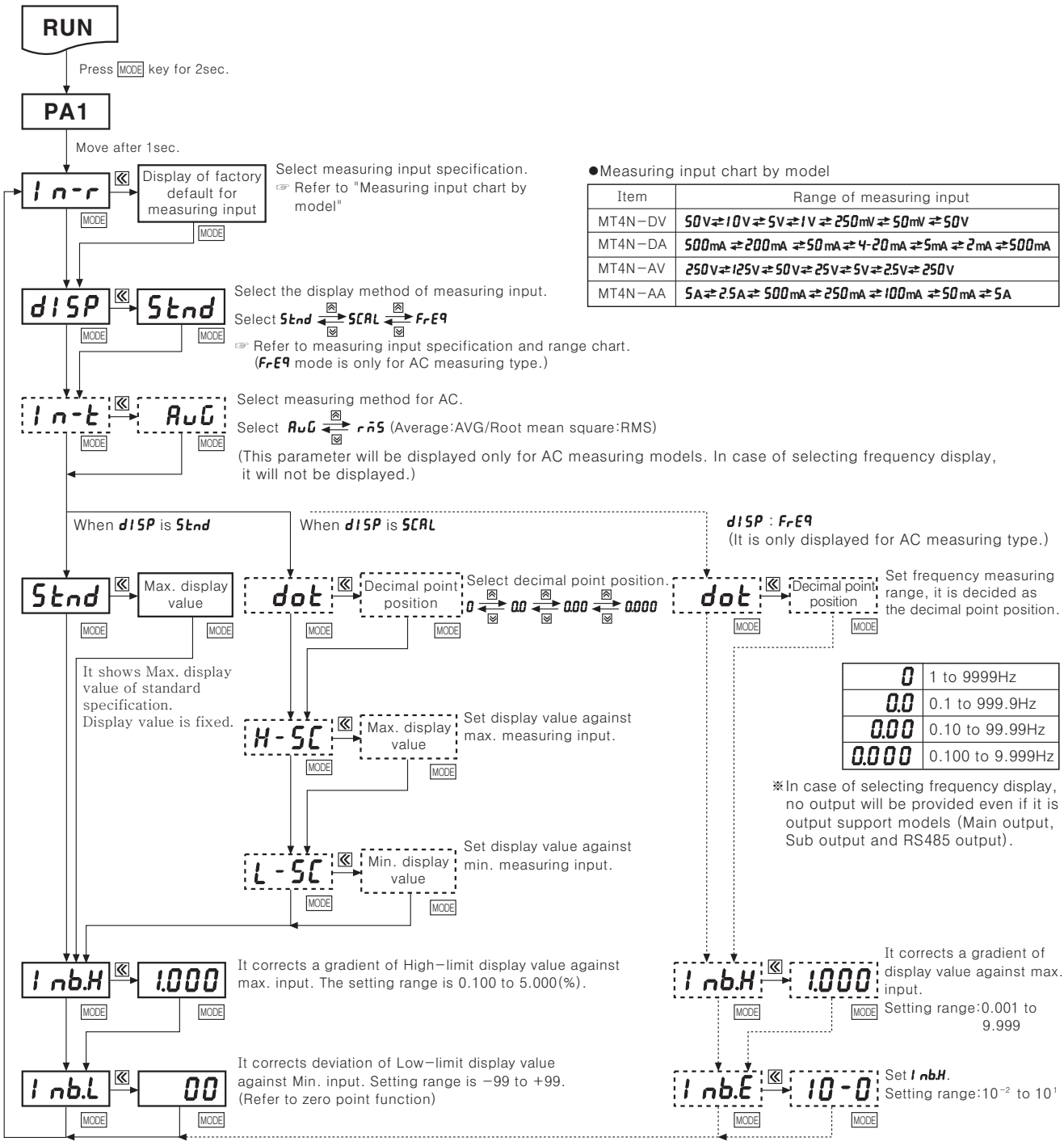
▣Change the parameter setting value

1. Advance to the parameter to be changed when press MODE key continuously in RUN mode and release MODE key at the parameter. (Refer to "▣ Parameter setting".)
2. When press MODE key in each parameter, the initial mode of the parameter is displayed. (Refer to the description of each parameter.)
3. When press one of ≪, ∨, ∧ keys in display mode, saved setting value is displayed.
   Ex)

   Saved setting value flashes every 0.5sec.
4. Change the setting value by ∧ or ∨ key.
   Ex) Change AC type measuring input from 250V to 125V.
   

5. When press MODE key to complete the change and it is advanced to the next mode after flash 2 times.
6. When press MODE key for 3sec. after change, it returns to RUN mode.

▣Parameter group 1



●Measuring input chart by model

Item	Range of measuring input
MT4N-DV	50V⇄10V⇄5V⇄1V⇄250mV⇄50mV⇄50V
MT4N-DA	500mA⇄200mA⇄50mA⇄4-20mA⇄5mA⇄2mA⇄500mA
MT4N-AV	250V⇄125V⇄50V⇄25V⇄5V⇄2.5V⇄250V
MT4N-AA	5A⇄2.5A⇄500mA⇄250mA⇄100mA⇄50mA⇄5A

0	1 to 9999Hz
0.0	0.1 to 999.9Hz
0.00	0.10 to 99.99Hz
0.000	0.100 to 9.999Hz

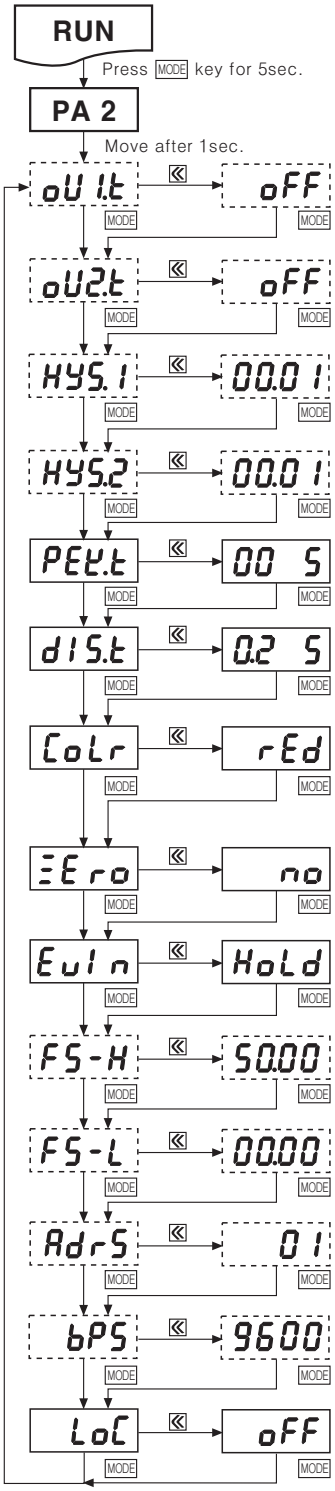
※In case of selecting frequency display, no output will be provided even if it is output support models (Main output, Sub output and RS485 output).

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

◎Factory defaults

Mode	MT4N-DV	MT4N-DA	MT4N-AV	MT4N-AA	Mode	MT4N-DV	MT4N-DA	MT4N-AV	MT4N-AA
In-r	50	500	250	5	InbH	1.000	1.000	1.000	1.000
disP	Stnd	Stnd	Stnd	Stnd	InbL	00	00	00	00
In-t	——	——	AvG	AvG	dot	0.00	0.0	0.0	0.000
Stnd	50.00	500.0	250.0	5.000	InbE	——	——	10-0	10-0

▣Parameter group 2



Select Preset output mode of OUT1. (But, it is only displayed in OUT1 output included model.)
oFF ⇄ HI ⇄ Lo ⇄ HL ⇄ HL-G

Select Preset output mode of OUT2. (But, it is only displayed in OUT2 output included model.)
oFF ⇄ HI ⇄ Lo ⇄ HL ⇄ HL-G

Select Preset hysteresis of OUT1.
The range is within 10% of max. display range (Unit : digit) When resolution is over 10000, it is fixed as 9999.
※**ou1.t** mode is **oFF**, it is not displayed.

Select Preset hysteresis of OUT2.
The range is within 10% of max. display range (Unit : digit) When resolution is over 10000, it is fixed as 9999.
※**ou2.t** mode is **oFF**, it is not displayed.

Set a monitoring delay time for displayed peak value.
Setting range : 00 to 30sec.

Set a display cycle.
Setting range : 0.1 to 5.0sec.

Selectable color with 4 modes.
rEd ⇄ Grn ⇄ YEL ⇄ r-G ⇄ G-r
• red, green, yellow:Display with 1 color. • r-G, G-r:Color is changed when error is occurred.
Ex)r-G:Red is standard and green when error is occurred.
※Color is changed only when error in "▣ **Error display function**" is occurred excluding 'over'.

Select zero function with operation at front.
When [≪]+[≫] key are pressed for 3 sec. to set **YES**, it will be zero function and the deviation value is saved automatically at **Inbl** mode.

Select Hold input with 11, 12 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.
(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.
(When changing measuring input and prescale mode, it is changed automatically as minimum value of input range.)

Set the address of RS485 communication output.
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

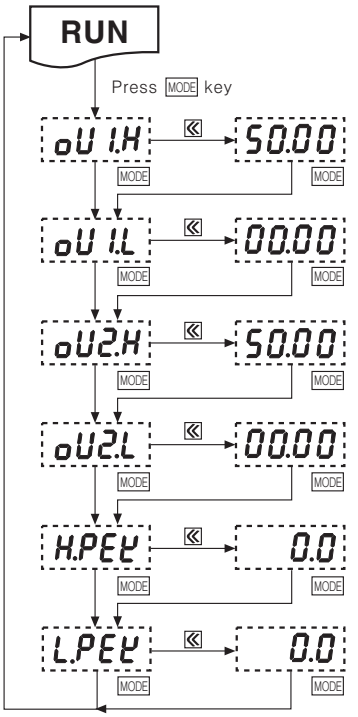
oFF	Disable to lock keys
LoC1	Lock Parameter 1
LoC2	Lock Parameter 1, 2
LoC3	Lock Parameter 0, 1 and 2

※The dotted mode is only displayed for output type.
※After setting each mode, press MODE key for 2sec. to return to **RUN** mode.
※If any key is untouched for 60sec. after advance to PARAMETER, it will return to **RUN** mode.
※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.

◎Factory defaults

Mode	MT4N-DV	MT4N-DA	MT4N-AV	MT4N-AA	Mode	MT4N-DV	MT4N-DA	MT4N-AV	MT4N-AA
ou1.t	oFF	oFF	oFF	oFF	ZEro	no	no	no	no
ou2.t	oFF	oFF	oFF	oFF	Evin	HoLd	HoLd	HoLd	HoLd
HYS.1	00.01	000.1	000.1	0.001	FS-H	50.00	500.0	250.0	5.000
HYS.2	00.01	000.1	000.1	0.001	FS-L	00.00	000.0	0.0	0.000
PEAK.t	00 S	00 S	00 S	00 S	AdrS	01	01	01	01
dISP.t	0.2 S	0.2 S	0.2 S	0.2 S	bPS	9600	9600	9600	9600
ColR	rEd	rEd	rEd	rEd	LoC	oFF	oFF	oFF	oFF

▣Parameter group 0



Set High-limit preset value of OUT1. (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 Low-limit preset value of OUT1. (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 High-limit preset value of OUT2. (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 Low-limit preset value of OUT2. (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 **RUN** status.
It will be reset by pressing any ≪, ≪, ≫ key.

It shows Low-limit monitoring value while it is **RUN** status.
It will be reset by pressing any ≪, ≪, ≫ 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	MT4N-DV	MT4N-DA	MT4N-AV	MT4N-AA	Mode	MT4N-DV	MT4N-DA	MT4N-AV	MT4N-AA
oU 1.H	50.00	500.0	250.0	5.000	oU2.L	00.00	000.0	000.0	0.000
oU 1.L	00.00	000.0	000.0	0.000	H.PEU	0.00	0.0	0.0	0.000
oU2.H	50.00	500.0	250.0	5.000	L.PEU	0.00	0.0	0.0	0.000

▣Specification of measuring input and range

	Measuring input and range	Input impedance	Standard [Stnd]	Prescale [SCAL]
			Display range [Fixed]	Display range [Variable]
DC Volt	0-50V [50V]	434.35kΩ	0.00 to 50.00(Fixed)	-1999 to 9999(Variable) -199.9 to 999.9(Variable) -19.99 to 99.99(Variable) -1.999 to 9.999(Variable) (Display position will be changed depending on decimal point position.)
	0-10V [10V]	434.35kΩ	0.00 to 10.00(Fixed)	
	0-5V [5V]	43.35kΩ	0.000 to 5.000(Fixed)	
	0-1V [1V]	43.35kΩ	0.000 to 1.000(Fixed)	
	0-250mV [250mV]	2.15kΩ	0.0 to 250.0(Fixed)	
	0-50mV [50mV]	2.15kΩ	0.00 to 50.00(Fixed)	
DC Ampere	0-500mA [500mA]	0.1Ω	0.0 to 500.0(Fixed)	
	0-200mA [200mA]	0.1Ω	0.0 to 200.0(Fixed)	
	0-50mA [50mA]	1.1Ω	0.00 to 50.00(Fixed)	
	4-20mA [4-20mA]	1.1Ω	4.00 to 20.00(Fixed)	
	0-5mA [5mA]	101.1Ω	0.000 to 5.000(Fixed)	
	0-2mA [2mA]	101.1Ω	0.000 to 2.000(Fixed)	
AC Volt	0-250V [250V]	1.109MΩ	0.0 to 250.0(Fixed)	※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%.
	0-125V [125V]	1.109MΩ	0.0 to 125.0(Fixed)	
	0-50V [50V]	200kΩ	0.00 to 50.00(Fixed)	
	0-25V [25V]	222kΩ	0.00 to 25.00(Fixed)	
	0-5V [5V]	22kΩ	0.000 to 5.000(Fixed)	
	0-2.5V [2.5V]	22kΩ	0.000 to 2.500(Fixed)	
AC Ampere	0-5A [5A]	0.01Ω	0.000 to 5.000(Fixed)	
	0-2.5A [2.5A]	0.01Ω	0.000 to 2.500(Fixed)	
	0-500mA [500mA]	0.1Ω	0.0 to 500.0(Fixed)	
	0-250mA [250mA]	0.1Ω	0.0 to 250.0(Fixed)	
	0-100mA [100mA]	0.5Ω	0.0 to 100.0(Fixed)	
	0-50mA [50mA]	0.5Ω	0.00 to 50.00(Fixed)	

▣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 sets preset display value as zero when min. input is entered into the measuring terminal, zero error can be adjusted with 3 ways as below.

When zero adjustment is finished normally by front key and hold terminal, zero will be displayed and the adjusted value is saved in automatically.

Operation	Input correction value	Front panel key	External input signal
Description	PA I :Direct input correction value method at I nb.L mode.	≪, ≫keys are pressed for 3sec. at measuring mode.	Short-circuit External hold terminal no.11, 12 over min. 50m. ※It is enable to use in option mode.

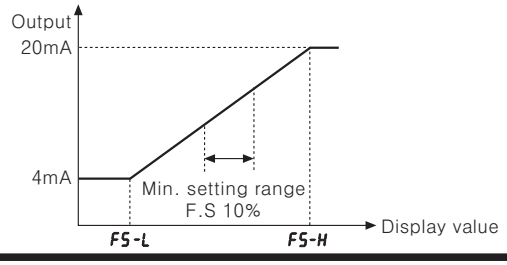
※Refer to "◎**Error correction function**", "◎**Error display function**" and "▣**Parameter 2**" for function and error.

◎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 current 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 12,000 division 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)

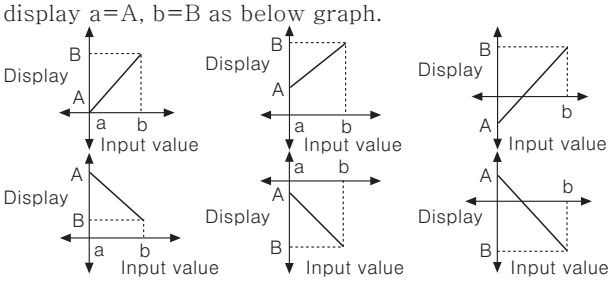
※An error is cancelled automatically when it is in the measuring and display range.

※"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)

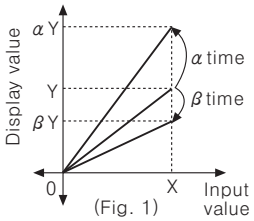
This function is to display setting(-1999 to 9999) of particular High/Low-limit value in order to display High/Low-limit value of measuring input. If measuring inputs are a or b and particular values are A or B, it will display a=A, b=B as below graph.



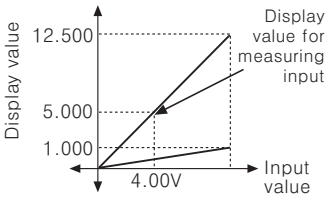
◎Gradient correction function(PA1 : I nb.H mode)

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) When 4.00VDC, display 5.000 for measuring input 0 to 10.00V



(Fig. 1)



(Setting the gradient correction value)

①Set the decimal position as '0.000' for prescale value.

②In order to display 5.000 when measuring input is 4.00VDC, 12.500 will be displayed when max. input value is 10.00V, but it cannot set the max. setting value.

③Set gradient correction setting value[I nb.H] ×High scale value[H-SC]=12.500 as follows.

④It displays 5.000 when measuring input is 4.00V after set is finished.

Setting	H-SC	L-SC	I nb.H	Other
①	Disable	0.000	1.000	———
②	6.250	0.000	2.000	It will be the same display value.
③	3.125	0.000	4.000	
④	2.500	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 : dIS.t mode)

In 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 dIS.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

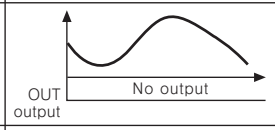
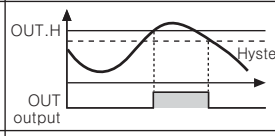
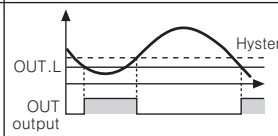
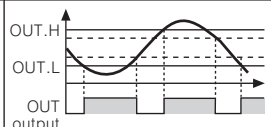
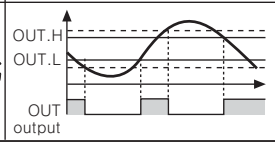
(PA 0: H.PEU / L.PEU mode, PA 2: PEU.t mode)

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 : oU1t / oU2t mode)

Mode	Output operation	Operation
oFF		No output
HI		Period ON : Display value ≥ OUT.H Period OFF : Display value ≤ OUT.H−Hys
Lo		Period ON : Display value ≤ OUT.L Period OFF : Display value ≥ OUT.L+Hys
HL		Period ON : Display value ≤ OUT.L or Display value ≥ OUT.H Period OFF : Display value ≥ OUT.L+Hys or Display value ≤ OUT.H+Hys
HL-G		Period ON : OUT.L ≤ Display value ≤ OUT.H+Hys Period OFF : Display value ≤ OUT.L+Hys or Display value ≥ OUT.H+Hys

※Set output mode separately for each OUT1/OUT2.

※OUT1/OUT2 are operated individually depending on output operation mode.

※Setting value mode of parameter group 0 is displayed by output operation mode selection.

※GO is outputted within the period both OUT1/OUT2 are off. (NPN/PNP Open collector output type.)

▣Communication output

(Refer to L−33 to L−34.)